

End Semester Examination, Dec. 2018

B. Tech. – Third Semester

BASICS OF AUTOMOBILE ENGINEERING (AU-405)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer in brief:

- a) What is the function of universal joint?
- b) What are the salient features of limousine car?
- c) What is the function of distributor in battery ignition system?
- d) Define stroke length and top dead center?
- e) Calculate air resistance at 30Kmph if the air resistance at 10kmph is W.
- f) What is the purpose of a brake shoe adjuster?
- g) When does the necessity of bleeding the brakes arise?
- h) What is the advantage of low aspect ratio in automobile tyre?
- i) Why is tyre carcass is called as the basic skeleton of the tyre?
- j) What is the function of torsional spring in friction plate?

2×10

PART-A

- Q.2** a) Draw a schematic diagram showing the layout of the transmission system of a rear wheel driven car and explain the importance of each component? **10**
- b) Write the short notes on:
i) Propeller shaft
ii) Differential. **5×2**
- Q.3** a) With the help of neat sketch explain L and D MPFI systems? **10**
b) Explain the importance of IVTEC, VVTi, DTSSI technology in vehicles? **10**
- Q.4** a) Discuss the advantages of diaphragm spring clutch over helical coil spring clutch? **10**
b) Explain the construction and working of synchromesh gear box with the help of neat sketch? **10**

PART-B

- Q.5** Explain with sketches the following terms and their effects:
a) Castor
b) Camber
c) Toe in
d) Scrub radius **5×4**
- Q.6** a) With the help of a neat sketch, explain the working of a tandem master cylinder. **10**
b) What are the essential characteristics of a good braking fluid? Give complete details? **10**
- Q.7** a) Draw a neat labeled diagram of pressed steel disc wheel and explain the importance of each part? **10**
b) Write short notes on:
i) Wheel balancing.
ii) Tubeless tyres.
iii) Spoke wheel.
iv) Carcass. **2½×4**

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester
FUEL AND LUBRICANTS (AU-406A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

Q.1 Answer following:

- a) What are the various hydrocarbons present in crude oil?
- b) What is hydrogenation?
- c) What do you mean by cracking?
- d) What is viscosity index?
- e) Describe the factors affecting ignition delay period.
- f) What do you mean by abnormal combustion?
- g) Define alternate fuels. Enlist at least five alternate fuels.
- h) Explain alcohol as an alternate fuel.
- i) What is a lubricating emulsion?
- j) What is hydrodynamic lubrication?

2×10

PART-A

- Q.2 a) With the help of a neat sketch, explain the crude oil refining process. In the sketch show at what temperature different products are obtained? **10**
- b) What are different kinds of fuels used I.C. engine? Discuss merits and demerits of liquid fuel. **10**
- Q.3 a) Define and discuss viscosity and viscosity index. **10**
- b) With the help of neat sketch of Redwood viscometer, explain the procedure to find out viscosity of lubricant. **10**
- Q.4 a) Explain various stages of combustion in SI engine, elaborating the flame front propagation. **10**
- b) What is ignition delay period? Explain the effects of various engine variables on SI engine. **10**

PART-B

- Q.5 a) Define and discuss spark assisted diesel engines. **10**
- b) Discuss the advantages and disadvantages of using alcohol as an alternate fuel. **10**
- Q.6 a) Explain how lubricants are classified? **10**
- b) What are the specific requirements for automotive lubricants? **10**
- Q.7 Explain in detail:
a) Extreme pressure lubrication.

b) Hydrodynamic lubrication.

10×2

End Semester Examination, Dec. 2018

B. Tech. — Fifth Semester

AUTO ELECTRICALS AND ELECTRONICS (AU-503)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

Q.1 Answer the following questions:

- a) What is meant by earthed and insulated return system?
- b) Describe Nicel-Cadmium battery.
- c) Elaborate troubleshooting of an alternator.
- d) Describe contact less ignition system.
- e) What is plastic fiber optics? How are they different from printed circuits? **4×5**

PART-A

Q.2 a) Describe the working of a diode and transistor. **10**
b) Give a layout of a lighting and accessory system. **10**

Q.3 Write short notes on the following:

- a) Chemical action in lead acid battery cell when being discharged.
- b) Battery ratings.
- c) Battery capacities.
- d) Battery efficiency. **5×4**

Q.4 a) Explain the methods of eliminating voltage fluctuation in case of an automotive generator. **10**
b) Differentiate between the constant current and constant voltage system of regulation. **10**

PART-B

Q.5 Write different types of sensors used in an automobile. Explain the sensor for speed and throttle position. **20**

Q.6 a) With a neat sketch explain a spark plug. Also explain its different parts. **10**
b) Explain distributors with contract points. **10**

Q.7 a) Explain head light with a neat sketch. **10**
b) What is trafficator used in automobile? **10**

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

AUTOMOTIVE COMPONENTS DESIGN (AU-506)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) Write the expression for the effect of size factor under bending load.
- b) Explain stress concentration phenomena.
- c) What is surging in the spring?
- d) How classify the bearings?
- e) Write the Lewis equation.
- f) What types of stresses are induced in shaft?
- g) What are the commonly used materials for sliding contract bearing?
- h) What are the material used for cylinder?
- i) What are the desire properties of a good lubricant?
- j) What is piston skirt?

2x10

PART-A

Q.2 a) A bar of circular cross-section is subjected to alternating tensile force varying from a minimum of 200 kN to a maximum of 500 kN. It is to be manufactured of a material with a ultimate tensile strength of 900 MPa. And endurance limit of 700 MPa. Determine the diameter of the bar using safety factor of 3.5 related to ultimate tensile strength and 4 related to endurance limit and stress concentration factor of 1.65 for fatigue load. Use Goodman straight line as basis for design.
13

- b) Define fatigue and reliability factor.

7

Q.3 a) Design a helical compression spring for a maximum load of 1000 N for a deflection of 25mm using the value of spring index as 5. The maximum permissible shear stress for spring wire is 420MPa. and modulus of rigidity is 84 kN/mm².

Take Wahl's factor, $K = \frac{4C-1}{4C-4} + \frac{0.615}{C}$, where C = spring Index.

15

- b) How a hollow shaft has greater strength and stiffness than solid shaft of equal weight?

5

Q.4 The load on the journal bearing is 150kN due to turbine shaft of 300mm diameter running at 1800 r.p.m. Determine the following:

- a) Length of the bearing if the allowable bearing pressure is 1.6 N/mm².

- b) Amount of heat to be removed by the lubricant per minute if the bearing temperature is 60°C and viscosity of the oil at 60°C is 0.02 kg/m-S and he bearing clearance is 0.25mm.

20

PART-B

- Q.5 A helical cast steel gear with 30° helix angle has to transmit 35 KW at 1500 rpm. If the gear has 24 teeth, determine the necessary module pitch diameter and face width for 20° full depth teeth. The static stress for cast steel may be taken as 56 MPa. The width of the face may be taken as 3 times the normal pitch. What would be the end thrust on the gear? The tooth factor for 20° full depth in volute gear may be taken as $0.154 - \frac{0.912}{T_E}$, where T_E represent the equivalent number of teeth.

20

- Q.6 Design the piston head, piston ring, radial ribs and piston barrel for cast iron piston for a single acting four stroke engine for the following data: Cylinder bore = 100mm, Stroke = 125mm, Max gas pressure = 5 N/mm², Mechanical efficiency = 80% Fuel consumption = 0.15 kg per brake power per hour, HCV of fuel = 42x10³ KJ/Kg, speed = 2000 rpm. Any other data required for the design may be assumed.

20

- Q.7 a) How the fluctuation of energy in an I.C. engine is being controlled by a flywheel.

2

- b) Explain the turning moment diagram for a four stroke I.C. engine.

3

- c) Design the I-Section shank of the connecting rod of I.C. engine running at 1800 r.p.m. and developing a maximum pressure of 3.15 N/mm². The diameter of piston is 100mm, mass of the reciprocating part of cylinder 2.25 kg, length of connecting rod 380mm, stroke of piston 190 mm and compression ratio 6:1. Take a factor of safety of 6 for the design. The density of material of the rod may be taken as 8000 Kg/m³. The constant for numerator be taken as 320 N/mm² and the denominator constant 1/7500.

15

End Semester Examination, Dec. 2018

B. Tech. – Sixth / Seventh Semester
VEHICLE MAINTENANCE (AU-603)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Why is vehicle maintenance important?
- b) What is extended warranty? When it is provided?
- c) Compare fix spanner and ring spanner.
- d) Explain why wheel balancing is necessary?
- e) Explain the method of engine noise diagnosis.
- f) Explain the role of lambda sensor.
- g) How injector nozzle is serviced?
- h) Elaborate common clutch problems.
- i) How bleeding of brakes is performed?
- j) How tyres are retreaded?

2×10

PART-A

Q.2 a) Draw the layout of a workshop and explain its elements. **15**
b) Write method of customer satisfaction measurement. **5**

Q.3 a) Explain the operation of tyre changer. **10**
b) With a neat sketch explain high pressure car wash machine. **10**

Q.4 Explain engine disassembly procedure in detail. **20**

PART-B

Q.5 Describe various components of petrol injection system. List down various symptom and possible faults in petrol injection system. **20**

Q.6 a) Describe common service procedures to be carried out for manual transmission. **15**
b) What do you mean by clutch hand pedal? **5**

Q.7 Define the following terms with diagram:

- a) Caster
- b) Camber
- c) Kingpin inclination
- d) Toe-in and Toe-out
- e) Scrub Radius

4×5

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

AUTOMOTIVE POLLUTION AND ITS CONTROL (AU-610)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

- Q.1 a) How global warming causes torrential down powers?
b) List out various pollutants from an automobiles.
c) What is evaporative emission?
d) What are sulphides?
e) What are aldehydes?
f) What do you mean by EURO thousands of pollution?
g) What is the reason for greenhouse effect?
h) Draw layout of a chassis dynamometer.
i) What is FED test?
j) What is engine knocking?

2x10

PART-A

- Q.2 a) What is crank case emission? How the emission is hazardous to human health and environment? **15**
b) What is air pollution? **5**
- Q.3 What are nitric oxides? Elaborate the effect of various operating variables on NOX emission formation? **20**
- Q.4 Explain the following terms in context of emissions:
a) Poly nuclear aromatic hydrocarbon. **10**
b) Ice-tones. **10**

PART-B

- Q.5 What is noise pollution? What are the sources of noise pollution from an automobile? How noise can be reduced to permissible limit? **20**
- Q.6 a) Elaborate the role of catalytic convertor in controlling the pollutant emission. **10**
b) How fuel cells can be used in automobiles with a neat diagram? **10**
- Q.7 Explain the following with neat sketches/charts:
a) Chemiluminescent analyzers. **10**
b) Indian Emission Standards. **10**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

MOTOR VEHICLE AND ENVIRONMENT PROTECTION (AU-617)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

- Q.1 a) As per MV act 1988 define “goods carriage”.
b) Elaborate significance of MV Act.
c) What are driving schools?
d) Under what conditions a driving license can be suspended.
e) Explain why vehicle registrations are mandatory in India.
f) What is the procedure for vehicle insurance claim settlement?
g) What are special economic zone?
h) During normal combustion of fuel, what are the various gases obtained.
i) What is national permit?
j) Write the importance of motor vehicle insurance. **2x10**

PART-A

- Q.2 Explain motor vehicle Act 1988 in details, with description of chapter XIII on offences, penalties and procedure. **20**
- Q.3 a) What is the procedure for licensing of conductors of stage carriages? **10**
b) What is the importance of driving license? Elaborate the types of license used in India. **10**
- Q.4 a) What are the requirement of new registration for staying in other states? **10**
b) Explain “hire and purchase” with suitable example. **10**

PART-B

- Q.5 a) Differentiate between “tourist permit” and “national permit”. **10**
b) What is motor vehicle insurance? Explain in terms of procedures and claims. **10**
- Q.6 Explain the general power of central government to protect / improve environment and rules to regulate environment pollution in details. **20**
- Q.7 Explain the following terms:
a) Auto exhaust pollution. **10**
b) Transportation of hazardous chemicals. **10**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester
MEASURING TECHNIQUES (AU-626)

Time: 3 Hours

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all. **Q.1** is **Compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. All questions carry equal marks.

Q.1 Explain following terms in brief:

- a) Hysteresis and dead zone.
- b) Input characteristics of a transducer.
- c) Any two methods of torque measurement.
- d) Working of corrugated diaphragms used in pressure gauge.
- e) Hex-Nut screwdriver working.

4x5

PART-A

Q.2 Justify the following statements:

- a) A potentiometer is a Zeroth order device.
10
- b) A bare thermocouple is a first order device.
10

Q.3 How sensors are classified? Explain in detail about eddy current proximity sensors.
20

Q.4 An Engine is expected to develop 8 kW of mechanical output while running at an angular speed of 1200 rpm. A brake drum of 280 mm diameter is available. It is proposed to design a prony brake dynamometer using a spring balance as the force measuring instrument. The spring balance can measure a maximum force of 120N. Make calculations for proper torque arm for the dynamometer.

20

PART-B

Q.5 What are the important and desirable properties of the Manometry fluids? Explain in detail about at least five properties.
20

Q.6 What is temperature – resistance relation of resistance thermometers? Explain with the help of temperature – resistance graph.
20

Q.7 Explain the following:

- a) Torque wrench.
- b) Ratcheting screwdriver
- c) C-Clamp

End Semester Examination, Dec. 2018

B. Tech. – Sixth / Seventh Semester
MEASURING TECHNIQUES (AU-626)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Explain sensitivity and linearity.
- b) Explain output and inverse transducer.
- c) How shaft power is measured?
- d) Differentiate pressure with stress.
- e) What are the functions of growler?

4×5

PART-A

Q.2 What are the standard inputs for dynamic response study of a system? Define and sketch. **20**

Q.3 Give an overview of the inductive transducers, explaining their principle of operation like variation of number of turns, geometric configuration and permeability. Draw labeled sketch to show above effects. **20**

Q.4 Elucidate the construction and working of hydraulic load cells. Write their advantages and disadvantages. **20**

PART-B

Q.5 Give a detailed account of the construction and working of following:

- a) Bourdon tube.
- b) Diaphragms.

10×2

Q.6 a) Write a detail about various temperature scales. **10**

- b) Explain the principle and working of optical pyrometer. **10**

Q.7 Explain the working of following tools:

- a) Battery hydrometer.
- b) Piston ring expander.
- c) Ball-peen hammer.
- d) Micrometer.

5×4

End Semester Examination, Dec. 2018
B. Tech. — Eighth Semester
OFF-ROAD VEHICLES (AU-713)

Time: 3 hrs. Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1 Answer the following questions: **2×10**
- a) Define “Multiaxle vehicles”.
 - b) List out any five land clearing machines.
 - c) What are outriggers?
 - d) How tractors are used in farming?
 - e) How hydraulics of a tractor works?
 - f) What are the applications of a scraper?
 - g) What are bush cutters?
 - h) What are rippers?
 - i) Explain hydraulic mechanism of dump truck.
 - j) What is efficiency of an earth moving machine?

PART-A

- Q.2 With a neat sketch, explain the working principle of a ditcher. **20**
- Q.3
- a) Differentiate between a platform lift truck and forklift trucks. **10**
 - b) Differentiate between on-highway vehicles and off highway vehicles. **10**
- Q.4 In context of a tractor explain the following: **10×2**
- a) Power takes OFF.
 - b) Transmission system.

PART-B

- Q.5 What are the bull dozers? What are their applications? Explain the components and working with a neat sketch. **20**
- Q.6
- a) Differentiate between scrapers and graders. **10**
 - b) Differentiate between shovels and ditchers. **10**
- Q.7 What are revolving and stripper shovels? How capacity of a shovel can be evaluated? **20**

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) – Fifth Semester

DOWNSTREAM PROCESSING (BT-505A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer briefly:

- a) What is the effect change in upstream processes on downstream process?
- b) Compare the economics of downstream processing of chemicals and bioproducts.
- c) Name any two separation techniques based on size of the biomolecules.
- d) What are the important factors to be considered for selection of separation techniques applied for food products?
- e) Name any one flocculent and explain its application.
- f) What is a filter aid?
- g) Explain the principle of reverse osmosis.
- h) Why is ammonium sulphate salt chosen as a protein precipitant?
- i) What is the difference between polyacrylamide and agarose gel media for electrophoresis?
- j) How does drying increase shelf life?

2x10

PART-A

Q.2 a) Explain with the help of suitable example different steps in downstream processing.

10

- b) Describe the economic importance of downstream processing in bioprocessing.
5
- c) Discuss major difficulties in downstream processing.

5

Q.3 Explain any one separation technique based on the following physicochemical characteristics of bioproducts:

- | | |
|-------------------|-------------|
| i) Size | ii) Density |
| iii) Charge | |
| iv) Solubility | v) Affinity |
| vi) Boiling point | 20 |

Q.4 a) Compare mechanical, physical and chemical methods of cell disruption. Give suitable examples.

10

- b) Describe filtration by rotary vacuum filter using a suitable diagram.

10

PART-B

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) – Fifth Semester

ANIMAL BIOTECHNOLOGY (BT-506A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer Briefly:

a) What are the advantages and disadvantages of using serum in media?

3

b) How are viable cells separated from non-viable cells?

3

c) Distinguish between transformation and transfection.

4

d) Why do we perform karyotyping? Explain its role in animal cell culture.

4

e) Describe the role of stromal cells in tumorigenesis.

3

f) Enlist the applications of adult stem cells.

3

PART-A

Q.2 a) Explain the different routes of contamination in animal cell culture and how to you prevent its occurrence.

10

b) How do you prepare animal growth and maintenance media?

10

Q.3 a) Describe the various steps involved in creating immortal cell lines.

10

b) What is the application of keratinocytes culture? Briefly describe the methodology for generating keratinocyte cell lines.

10

Q.4 Explicate the process of generating test tube baby.

20

PART-B

Q.5 a) Discuss the advantages and disadvantages of gene therapy.

10

b) Can PCR help in identifying a genetic disorder? Explain through an example.

10

Q.6 a) Draw and explain the various antisense molecules used in antisense technology.

10

b) How does a tumor establish its vascular supply?

10

Q.7 a) What are the various sources of stem cells? Give examples.

10

b) Classify stem cells based on their potential to differentiate.

10

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester
FOOD BIOTECHNOLOGY (BT-507)

Time: 3 hrs

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

Q.1 Answer briefly:

- a) What is the future of food biotechnology?
- b) Explain the relationship of water activity with food spoilage and packaging?
- c) Give details on HACCP.
- d) What are the primary source of microorganisms in food?
- e) What are Agar Droplets?
- f) Write down the criteria for an ideal probiotic.
- g) Write the application of protease in food processing.
- h) State applications of SCP.
- i) Write down the importance of chill storage.
- j) Which two industries contributes maximum towards food waste?

2x10

PART-A

Q.2 a) Classify the microorganisms associated with food.

10

- b) Give an account of different genera of bacteria common to food.

10

Q.3 a) Give an account of various extrinsic and intrinsic parameters that affect the growth of microorganism in food.

10

- b) Discuss the microbiology of milk and milk products.

10

Q.4 Explain in detail the different methods used for enumeration of microorganisms in food.

20

PART-B

Q.5 a) Describe the effect of freezing on foods.

10

- b) Write an essay on the production of alcoholic and non-alcoholic beverages.

10

Q.6 a) Why fermented foods are so popular? Classify the fermented foods. Outline the biotechnological process for production of a fermented food from cereal and a milk beverage.

10

b) What are food yeasts and algal proteins? Why are they referred so commonly? What is their utility and explain the process of their production?

10

Q.7 Discuss the role and application of pectin in food industry with appropriate examples.

20

End Semester Examination, Dec. 2018

B. Tech. — Fifth Semester
BIOPROCESS ENGINEERING (BT-508)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Compare the agitation in radial and axial flow. **3**
- b) Discuss the role of a bioprocess engineer. **3**
- c) What is the role of draft tube in airlift type of bioreactor? **2**
- d) Give the significance of the term K_{la} ? **3**
- e) Enlist two of the bio products that show growth associated product formation kinetics. **2**
- f) Describe the technique of sample retrieval from bioreactor. **3**
- g) Discuss some of the high throughput low resolution techniques in downstream processing. **2**
- h) Briefly explain the principle of affinity chromatography. **2**

PART-A

Q.2 Answer the following questions:

- a) What are the objectives of bioreactor design?
- b) Discuss the properties of material required for construction of bioreactors.
- c) How is containment ensured in bioreactors?
- d) Enumerate some of the typical features of biotechnological processes. **5x4**

Q.3 a) Explain in detail the method for determination of K_{la} by dynamic method. **10**
b) Describe the construction and working of any one type of bioreactor for large scale culture of animal cells. **10**

Q.4 a) How do specific growth rates of bacteria depend on limiting substrate concentration? Explain with the help of Monod's model. **10**
b) Explain the working and cell growth kinetics in an ideal CSTR. **10**

PART-B

Q.5 a) What are the general nutritional requirements of microorganisms? **10**
b) Write in detail about the following:

- i) Selection of nitrogen source.
- ii) Medium optimization. **5x2**

Q.6 a) What is the effect of sterilization time and temperature on nutrient quality? **10**
b) Discuss the kinetics of sterilization by depth filters. **10**

Q.7 a) Explain the process of cell disruption by ball mill. Draw a suitable diagram. **10**

b) Give a detailed account of penicillin production by fermentation.

10

End Semester Examination, Dec. 2018

B. Tech. — Fifth Semester

INTRODUCTION TO PHARMACEUTICAL TECHNOLOGY (BT-531)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Write a brief account on:

- a) Why pharmacopeia is important for pharmaceutical industry?
- b) What is first-pass effect? Explain with suitable examples.
- c) Why Solid Polymorphism is important in drug development?
- d) What are the merits and demerits of wet granulation process in tablet manufacturing?
- e) Define bioavailability. What are the main objectives of bioavailability studies? **4x5**

PART-A

Q.2 a) What is IND? Name the different types of IND.

4

- b) How drugs are classified based on their chemical structure and mechanism of action?

8

- c) What are the salient features of quality assurance in pharmaceutical industry?

8

Q.3 a) Different between enteral and parenteral route of drug administration.

4

- b) Explain the oral and intravenous drug administration with C_p plots.

8

- c) Why new drug delivery systems are evolved in drug industry?

8

Q.4 a) What are the factors determining the drug solubility?

2

- b) Why excipients are important for drug formulation? Explain the role of diluents, binders, anti-oxidants and preservatives as excipients with two examples each.

8

- c) Explain the different mechanisms of therapeutic incompatibility of drugs.

10

PART-B

Q.5 a) What are the advantages and limitation of direction compression in tablet manufacturing?

5

b) Explain the different steps to be taken in handling and storage of capsules.
15

Q.6 a) How syrup is manufactured in a pharmaceutical plant?

10

b) Explain the steps involved in automatic ointment manufacturing.
10

Q.7 a) What are biopharmaceuticals? Explain the various forms of biopharmaceutics in the market with examples.

8

b) Explain the various mechanisms involved in drug absorption.
12

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

INTRODUCTION TO BIOMATERIALS (BT-532)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer briefly:

- a) What are tribological studies?
- b) Classify the broad categories of biomaterials on the basis of their composition.
- c) What are haptens? How it is related to hypersensitivity?
- d) What type of cells is preferred for in vitro testing of biomaterials? Give reasons.
- e) Discuss briefly about cardiovascular implants used in angioplasty. **4×5**

PART-A

- Q.2 a) Discuss briefly about various electrical and optical properties of a biomaterial. **10**
- b) Explain the role of integrins in recognition of a biomaterial. **10**
- Q.3 a) What is the difference between brittleness and hardness? How does it affect the performance of a biomaterial? **10**
- b) Explain cell-cell mimicking by a biomaterial. **10**
- Q.4 a) Explain the following briefly:
 - i) Ceramics
 - ii) Biopolymers
 - iii) Cytokine signaling
 - iv) Yield stress
 - v) Lubricity of biomaterial**2×5**
- b) Discuss the mechanism of cytokine responses elicited during biomaterial interactions in vivo. **10**

PART-B

- Q.5 a) Give an account of different types of toxicity. **10**
- b) Can the in vitro and in vivo data obtained for a biomaterial be correlated? Explain. **6**
- c) What is the role of biomaterials in tumorigenesis? **4**
- Q.6 a) How does a metallic biomaterial degrade compared to ceramics? **6**
- b) Explain Virchow's triad. **10**
- c) Name commercially used implants for dental, heart, joints and kidney. **4**
- Q.7 What are the different rules for tissue engineering? Explain using suitable diagram/flowchart. **20**

End Semester Examination, Dec. 2018
B. Tech. (Biotechnology) – Fifth Semester
HUMAN GENOMICS AND PROTEOMICS (BT-533)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer Briefly:

a) Differentiate between physical map and genetic map.

3

b) Define EST. How it is different from SNP?

2½

c) What do you mean by lead time bias? Discuss cancer epidemiology.

2½

d) Enumerate factors that state whether the gene is on or off.

3

e) Explain mechanism by which biological targets are identified.

2

f) Enlist methods used to map protein-protein interaction.

3

g) How pharmacogenomics helps in preparation of personalized medicine?

4

PART-A

Q.2 a) What are gene families? Explain with example.

6

b) Discuss human genome project.

14

Q.3 a) How gene expression profile helps to perform comparative genomics?

12

b) Explain technologies used to prepare gene expression profile.

8

Q.4 a) How p53 is considered as guardian of human genome?

6

b) Enumerate receptors which are responsible for cell differentiation.

14

PART-B

Q.5 a) Discuss protein separation strategies.

8

b) How MALDI-TOF is used in analysis of peptide mass?

12

Q.6 a) What do you mean by phage display?

6

b) How gene expression profile is used in hypothesis generation and testing?

14

Q.7 a) Explain gene targets with suitable example.

8

b) Discuss mechanism by which biological targets are identified.

12

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester
BASIC VIROLOGY (BT-534)

Time: 3 hrs

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

Q.1 Answer briefly:

- a) What is a latent virus? Give examples.
- b) Differentiate between capsid and envelope.
- c) What is a prophage?
- d) Name the DNA sites responsible for lytic and lysogenic cycle.
- e) What are Nucleoside analogs used for?
- f) Name two commonly used antiviral drugs.
- g) What is a zoonotic virus?
- h) Expand TCID50. Mention its usage.
- i) Differentiate between biosafety and containment.
- j) Can antibiotics be used for viral diseases? Give reasons for your answer.

2x10

PART-A

Q.2 a) Why do we culture viruses and how this aim is achieved?

10

- b) Explain different quantification techniques for viruses.

10

Q.3 a) Give an account of replication strategy adopted by Influenza virus. Illustrate with diagram.

10

- b) Describe different types of modern vaccines. What is the need for their emergence and the advantages and disadvantages they have over conventional vaccine?

10

Q.4 What are the adjuvants? Why they are required and how do they improve the efficacy of vaccines.

20

PART-B

Q.5 a) Explain with illustration the biology of bacteriophage vectors.

10

- b) What are baculoviruses? Explain their role in gene therapy.

10

Q.6 Discuss the various levels of biosafety with their unique features citing examples of microbes.

20

Q.7 Explain in detail the epidemiology and pathogenesis of Ebola Virus. Give Illustrations.

20

End Semester Examination, Dec. 2018

B. Tech – Fifth Semester
FOOD MICROBIOLOGY (BT-537)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer briefly:

- a) Explain how biotechnology is applied to food industry?
- b) Give two examples of microbes used in alcoholic beverages.
- c) What is putrefaction?
- d) What are the internal barriers in egg that preserves it?
- e) Define foodborne intoxication.
- f) Differentiate between intrinsic and extrinsic parameters.
- g) How are emulsifiers relevant to food industry?
- h) What are the sources of microbes found in food?
- i) Differentiate between food spoilage and contamination.
- j) State why jams still must be sealed even though bacteria will not grow in them?

2x10

PART-A

Q.2 a) Discuss the role of microorganisms in food industry.

10

b) Give a detailed synopsis of different genera of yeast common to food.

10

Q.3 a) What are the most common methods of sterilization, and how do they work?

10

b) How microscopic methods are used in detection, identification and analysis of foodborne pathogens?

10

Q.4 a) Give an account on spoilage of food by enzymes.

10

b) Discuss microbial spoilage of food. What are the factors which affects food spoilage?

10

PART-B

Q.5 a) Give a detailed account on Dairy microbiology.

10

b) Discuss the role of different organisms in the process of fermentation.

10

Q.6 What do you understand by foodborne intoxication? Discuss the disease caused by *Clostridium botulinum*, *Staphylococcus aureus*, *Clostridium perfringens*, and *Bacillus cereus*.

20

Q.7 a) Discuss the significance of preservatives and antimicrobial agents in food industry.

10

b) How sweeteners help to improve the taste of food? Explain different types of sweeteners in food.

10

End Semester Examination, Dec. 2018

B. Tech. — Fifth Semester
FOOD PROCESS TECHNOLOGY (BT-538)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Name any two performance parameter for the food industry.
- b) What is decimal reduction time?
- c) What do you mean by process optimization?
- d) How can you identify the problem of infestation?
- e) What is water activity?
- f) Write down two ways for storage of fruits and vegetables.
- g) How will you calculate the milk fat?
- h) What is HTST method for milk preservation?
- i) What happened during the stabilizing of egg?
- j) Give significance of GMP for fruit and vegetable production

2×10

PART-A

Q.2 a) Define food process technology. Write down scope of food processing. **10**
b) Discuss general principle of food preservation. **10**

Q.3 Explain the following:

- a) Basic steps for insect control.
- b) Types of control measures for infestation.

10×2

Q.4 a) Describe the storage of fruits and vegetables by giving some example. **10**
b) Give some recent developments in post-harvest technology of fruits. **10**

PART-B

Q.5 a) Discuss different facts and methods related to milk and milk products preservation. **15**
b) Write down short note on tyndalization. **5**

Q.6 a) Discuss the processing and preservation of eggs and its products. **12**
b) What are the different precautions we should take during chicken handing? **8**

Q.7 a) Explain the significance of GAP and GMP for fruit and vegetable production. **14**
b) Discuss quality control of packed foods. **6**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester
PLANT BIOTECHNOLOGY (BT-601A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1 a) Define callus and cellular totipotency.
b) Differentiate between microelements and macroelements.
c) Write down note on symmetrical and asymmetrical hybrids.
d) What is symbiosis and antibiosis?
e) What is the name of the first inter-genetic somatic hybrids between potato and tomato?
f) Name the bacteria known as natural genetic engineer of plants.
g) Breeding associated with molecular markers (nucleic acid) is known as _____.
h) _____ is the gas responsible for the ripening of fruits.
i) What is the name of the first genes available for genetic engineering of crop plants for pest resistance?
j) What gene is inserted in FLAVR SAVR tomato? **2×10**

PART-A

- Q.2 a) What are the phenomena of de-differentiation and re-differentiation? **8**
b) Explain microspore culture for obtaining androgenic haploids. **12**
- Q.3 a) Discuss the scheme for obtaining somaclonal variations without in vitro selection by giving suitable example. **10**
b) Write down different methods for protoplast fusion. **10**
- Q.4 a) Describe the phenomena of nitrogen fixation. **10**
b) How growth promotion can be done by free living bacteria? **10**

PART-B

- Q.5 a) Define mapping. How do you explain gene mapping by two point test cross? **12**
b) Write down any two methods for screening of libraries. **8**
- Q.6 a) Discuss Agrobacterium mediated gene transfer method. **12**
b) Differentiate between transient and stable gene expression. **8**
- Q.7 a) Write down note on any two methods for virus resistance. **12**
b) How transgenic technology can be used for quality improvement? **8**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

ENVIRONMENT BIOTECHNOLOGY (BT-602A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following briefly:

- a) Acid rain.
- b) Removal of heavy metals from waste water by advance technology.
- c) What is composting? Give its physiochemical characteristics.
- d) How biomagnification of xenobiotic molecules occur in food chain?
- e) Biomining.

4×5

PART-A

Q.2 a) What do you understand by ozone depletion? How will it effect the environmental conditions of earth? **10**
b) Give the causes of water pollution. What implications does it have on public health? **10**

Q.3 Explain the physical, chemical and biological processes involve in waste water treatment. **20**

Q.4 What are the characteristics and treatment technologies required for industrial wastes? How can these be managed? **20**

PART-B

Q.5 a) Define biodegradation? State the factors affecting the process of biodegradation. **10**
b) Describe the role of microbes and plants in biodegradation and biotransformation. **10**

Q.6 Explain:

- a) Factors influencing phytoremediation. **10**
- b) In-site and Ex-site technologies in bioremediation. **10**

Q.7 a) What is the role of biotechnology in management of environmental resources? **10**
b) How can biogas be produced? Explain its importance. **10**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

PHARMACEUTICAL TECHNOLOGY (BT-621A1)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions briefly:

a) What is pharmaceutical drug incompatibility?

4

b) Tablet is different from Capsule. How?

2

c) Comment on the novel drug delivery systems?

4

d) Write about the role of any two stabilizers used in formulation of drug.

2

e) Distinguish between pharmacodynamics and pharmacokinetics.

4

f) What is meant by pharmacopis?

4

PART-A

Q.2 a) Write about various steps involved in filing Investigational New Drug Application.
10

b) Throw some light on the clinical research being conducted to test a new formulation of drug.

10

Q.3 Write short notes on:

a) Sustained drug delivery system.

5

b) Drug Dosage Forms.

5

c) Various methods of drug delivery.

10

Q.4 a) Discuss various physical and chemical properties ideal for a pharmacologically active ingredient in detail.

15

b) Highlight the main issues concerned with the ill-effects of drug fillers and additives. **5**

PART-B

Q.5 a) Explain the process of formulation, handling and storage of solid dosage forms.
15

b) Distinguish with suitable examples the difference between manufacturing and formulation of pharmaceutical drug.

5

Q.6 a) Why are liquid dosage forms necessary? How are they manufactured and handled? **10**
b) What are semi-solid suppositories?

10

Q.7 Discuss on the following:

a) Absorption.

10

b) Distribution.

10

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) – Sixth Semester

STEM CELLS IN HUMAN HEALTH (BT-623A1)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions briefly:

- a) Differentiate symmetrical and asymmetrical ES cell renewal.
- b) Specify the role of OCTy in stem cell pluripotency.
- c) What is type 1 diabetes?
- d) What type of disease requires BMT?
- e) Name the sources of adult stem cells.

4×5

PART-A

Q.2 a) Explain the factors involved in ES cell self-renewal. **10**

- b) How fate mapping techniques are used to trace the stem cell lineage? Explain cre-cosp technology used in mapping lineage. **10**

Q.3 How cells use check points to regulate the cell cycle? Explain with suitable diagrams. **20**

Q.4 a) Describe the development of trophoblastic lineage. **10**

- b) What are the characteristics of primordial germ cells? **10**

PART-B

Q.5 Discuss the repopulating patterns of primitive hematopoietic stem cells with suitable cell lineage figures. **20**

Q.6 a) Explain the causes and symptoms of parkinson's disease. **10**

- b) Elaborate various strategies used to treat neurodegenerative diseases. **10**

Q.7 Which hormone is responsible for maintaining glucose homeostasis? Give the causes, symptoms and types of diabetes mellitus. How stem cells can be used to treat diabetes. **20**

End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester
MOLECULAR DIAGNOSTICS (BT-633)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions briefly:

- a) Karl Mullis was awarded nobel prize for _____.
- b) Mutation is an evil. Agree or Disagree? State Reasons.
- c) Differentiate between prognostics and diagnostics.
- d) SSCP refers to _____.
- e) What is Molecular Pathology?
- f) Name two restriction enzymes and mention their recognition sites.
- g) Differentiate between agglutination and precipitation.
- h) Expand AFP and HCG?
- i) What is NGS?
- j) Name two genetic disorders that are caused by chromosomal aberrations.

2x10

PART-A

Q.2 a) What is the role of histones in genome packaging?

10

- b) Explain the result analysis of DNA Sequencing. How do we interpret and troubleshoot sequencing results?

10

Q.3 a) How mutations are detected and how they are responsible for genome instability? **10**
b) Explain the principle and procedure for polymerase chain reaction.

10

Q.4 Give an elaborative description of the principle and applications of various tools available for molecular diagnosis.

20

PART-B

Q.5 a) Discuss the importance of prenatal diagnosis.

10

- b) How heteroduplex analysis helps in disease detection? Explain with the help of diagram.

10

Q.6 a) What are molecular markers? How important they are for molecular diagnostics?

10

b) Describe two major immunoassays and their applications.

10

Q.7 Discuss in detail the types of antigen antibody reaction that form the basis of immunodiagnostics.

20

End Semester Examination, Dec. 2018

B. Tech.–Sixth Semester
CLINICAL MICROBIOLOGY (BT-634)

Time: 3 hrs

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

Q.1 Answer the following questions briefly:

- a) What are toxins? Differentiate between Exotoxins and Endotoxins.
- b) What do you understand by the term host, symbiosis, Commensalisms and Parasitism?
- c) How is cell wall of gram positive different from that of gram negative bacteria?
- d) Write a note on the classification of viruses.
- e) Explain the methods of diagnosis for anaerobic and aerobic intracellular parasites. **4x5**

PART-A

Q.2 a) What are the advantages of bacteria and Fungal microbiota to host?

15

- b) What are virulence factors? Discuss various types of virulence factors in detail.

5

Q.3 Write short notes on (**any two**):

- a) Flagellates.
- b) Parasitic helminthes.
- c) Trematodes.
- d) Cestodes.

10x2

Q.4 a) What are the criteria for the identification of disease causing bacteria?

15

- b) Name two gram positive spore forming bacteria. Write a note on the *Bacillus anthrax* culture characteristics, pathogenesis, lab diagnosis and treatment.

5

PART-B

Q.5 Differentiate between the following:

- a) Rabies and Prions Disease.
- b) Hepatitis Viruses and Herpes Viruses.

10x2

Q.6 Write short notes on the following:

- a) Superficial mycosis.
- b) Cutaneous mycosis.
- c) Endemic mycosis.
- d) Subcutaneous mycosis.

5x4

Q.7 a) How can the diagnosis of viral infection be performed in lab?

10

b) Explain the molecular diagnostic procedure for the identification of a pathogen.

10

End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester

FOOD PACKAGING TECHNOLOGY (BT-637)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions briefly:

- a) What are the requirements of food packaging?
- b) Enlist the general requirements of packaging.
- c) Give the specifications of labeling packaged drinking water.
- d) What is the significance of BIS code and their classification?
- e) State the Modgen formula and give its significance

4×5

PART-A

Q.2 a) Define principal display panel. What is its role in food packaging industry? **10**
b) What are the specifications of labeling infant foods? **10**

Q.3 a) Describe the criteria for selecting of packaging for raw and processed foods. **10**
b) Discuss the interaction of food material with packaging material. **10**

Q.4 What are the factors that control shelf life? How can you extend the shelf life of food products? **20**

PART-B

Q.5 Describe the various methods used for processing and packaging of:
a) Milk and dairy products.
b) Cereal grains. **10x2**

Q.6 a) What are the merits and demerits of using paper and metals as packaging material? **15**
b) Explain the different types of seals available for food packaging. **5**

Q.7 Write short notes on the following:
a) Asseptic packaging.
b) Bag manufacturing. **10x2**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

NUTRACEUTICALS AND FUNCTIONAL FOODS (BT-638)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Write short answers:

- a) Differentiate nutrition and nutraceutics.
- b) Explain the term "functional food" with examples.
- c) Why antioxidants are considered as nutraceutics?
- d) Symbiotics benefits.
- e) Nutraceutics approach for arthritis.

4×5

PART-A

- Q.2 a) How dietary fibres improve the health? **5**
b) Give a brief account of flavonoid family members and its benefits. **15**
- Q.3 a) How genistin from soybean is extracted? **10**
b) What are the richest sources of PUFA? Describe the extraction procedure of PUFA and its medical benefits. **10**
- Q.4 Write short notes on the following;
a) Definition of probiotics, selection criteria and types.
b) What are the ingredients of prebiotics and its medical benefits. **10×2**

PART-B

- Q.5 a) What are the diseases associated with cardiovascular diseases? Give a brief account on CVD. **5**
b) How are nutraceuticals beneficial in improving cardiovascular health? **15**
- Q.6 a) Name the different types of diseases affecting liver functions. **5**
b) Describe the role of nutraceuticals in improving liver function. **15**
- Q.7 a) How are immune functions of a host modified by functional foods? **10**
b) Write a note on nutrigenomics and its possible applications. **10**

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) — Seventh / Eighth Semester
DNA MICROARRAY AND APPLICATIONS (BT-703)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions briefly:

- a) Define normalization. How do you compare two chips when same labeled RNA is applied on them?
- b) Differentiate between Euclidian and Manhattan distances.
- c) List the basic rules of validation analysis.
- d) Discuss briefly any two types of distance matrices.
- e) What is resequencing? State its significance.
- f) How is hypothesis based experiment performed?

4×5

PART-A

- Q.2** a) Explain in detail the principle of SAGE with the help of a diagram. **10**
b) How do you perform image analysis? **10**
- Q.3** a) Define SOM. Explain its mechanism of operation in detail. **10**
b) How is PCA computed? **10**
- Q.4** a) Discuss the methodology of rectifying systematic biases in a microarray experiment. **10**
b) What is fold change? How is it calculated? Give a note on its significance. **10**

PART-B

- Q.5** a) Discuss the advantages and disadvantages of time series and steady state approach. **10**
b) Enlist the limitations of network modeling in detail. **10**
- Q.6** a) Give the significance of system biology in current era in detail. **10**
b) How do you evaluate the performance of a classifier? **10**
- Q.7** Write short notes on the following:
a) Explain the different methods available for interpreting the results. **10**
b) Describe the process of two channel array experiment. **10**

End Semester Examination, Dec. 2018
B. Tech. (Biotechnology) — Eighth Semester
CHEMOINFORMATICS AND DRUG DESIGN (BT-821A1)

Time: 3 hrs. Max Marks: **100**
No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **ANY TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer briefly:

- a) What are nodes and edges in molecular graphs? Explain the types with examples.
- b) Explain the Hammett equation. How equilibrium constants are calculated using benzoic acid.
- c) Briefly explain the neural networks.
- d) How does one classify an unknown molecule by a decision tree?
- e) What is molecular similarity?

4x5

PART-A

Q.2 Explain Lipinski's rule of five in detail and its application in drug designing.
20

Q.3 What are molecular fingerprints? Explain in detail.
20

Q.4 a) What is a PDB? Explain its role in CADD.
10
b) Explain BCUT descriptors.

10

PART-B

Q.5 a) Explain Hansch analysis in detail.
10
b) What are feed forward networks?
10

Q.6 a) What is the role of hydrogen bonding descriptors and polar surface area in the prediction of ADMET properties?
10
b) Explain electronic and topology indices.
10

Q.7 High throughput screening data helps in data screening. Justify the statement.
20

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) – Seventh Semester

CHEMOINFORMATICS AND DRUG DESIGN (BT-821 A1)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer briefly:

- a) What are Kohnen networks? Explain.
- b) Name five databases used in chemoinformatics.
- c) What does ADME stand for? Explain.
- d) How is scoring done in drug designing?
- e) What is virtual screening?

5x4

PART-A

Q.2 How can one calculate physical and chemical properties in chemoinformatics? Discuss in detail.

20

Q.3 How is ΔG calculated in drug designing? What should be its optimal value for finding suitable ligand candidate?

20

Q.4 a) What is partition coefficient? Explain its significance in detail.

10

b) Explain different indices used in determining molecular descriptors.

10

PART-B

Q.5 a) Explain three protein databases used in drug designing.

10

b) What do you understand by drug similarity?

10

Q.6 a) Explain the significance of steric groups and its analysis in drug designing.

10

b) How significant is the neural networks in drug designing?

10

Q.7 What are the different steps involved in molecular docking?

20

End Semester Examination, Dec. 2018

M.Tech. (Biotechnology) – First Semester
APPLIED BIOINFORMATICS (BT-M-102A)

Time: 3 hrs

Max Marks: **75**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **FOUR** more questions out of six, **taking at least ONE question** from each unit. Each question carries equal marks.

- Q.1 Briefly Explain:
- a) Algorithm of FASTA.
 - b) Difference between dot matrix and dot plot.
 - c) Homology modelling.
 - d) Basic operator in Perl programming.
 - e) Define Sequence repeat and inversion. **3x5**

UNIT-I

- Q.2 a) Discuss algorithm of Stacks. How it is different from queue? **10**
b) What do you mean by PUSH and POP function. **5**
- Q.3 a) Explain the algorithm for linked list, linear linked list and circular linked list. **10**
b) How array is useful in writing Bioinformatics program? **5**

UNIT-II

- Q.4 Explain dynamic programming algorithm. Align the given sequence using Smith Waterman algorithm. Where sequences are ACCGTT and AGCGAT and assumptions +2, -1 and 0 for match, mismatch and gap penalty respectively. **15**
- Q.5 a) Discuss Blast algorithm using suitable example. **8**
b) Using Perl programmings transcribe DNA into RNA. **7**

UNIT-III

- Q.6 a) Discuss different method used in phylogenetic analysis. **12**
b) What are the different types of trees used in phylogenetic prediction? **3**
- Q.7 Explain Hidden Markoff model used in multiple sequence alignment. **10**
How UPGMA method helps in Phylogenetic analysis. **5**

End Semester Examination, Dec. 2018

B. Tech. – Second Semester
CONSTRUCTION MATERIALS (C-201)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

- Q.1 a) Explain density index.
b) Define 'brittleness'.
c) Properties of pig-iron.
d) Define 'metamorphic rock'.
e) Explain jumper.
f) Explain matrix and adultrant.
g) What is mineral admixture?
h) Differentiate between coarse sand and fine sand.
i) What is slaking?
j) Make a sketch of bullnose brick. **2×10**

PART-A

- Q.2 a) Enlist the various types of dressing of stones. Explain four with diagram. **10**
b) Explain the working of one type of kiln with neat sketch. **10**
- Q.3 a) How do we conduct field tests for cement? Explain in detail. **10**
b) Explain the following:
i) Encaustic files.
ii) Varieties of terra-cotta.
iii) Glazing.
iv) Porcelain. **10**
- Q.4 a) Explain the macrostructure of a tree with a neat sketch. **10**
b) How proportioning of concrete is done? Explain in detail. **10**

PART-B

- Q.5 a) Name and explain the tests carried out for aggregates (at least two). **10**
b) Explain the tests to judge the quality of mortar (at least two). **10**
- Q.6 a) Write about the properties and uses of wrought iron. **10**
b) Explain the working of vibrators with purpose and functions. **10**
- Q.7 a) Write in brief about treatment of glass. **5**
b) What is the composition of plastic? Explain. **5**
c) Enlist and explain the various tests for bituminous materials (at least two). **10**

End Semester Examination, Dec. 2018

B. Tech. – Third Semester
STRUCTURAL ANALYSIS-I (C-301B)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

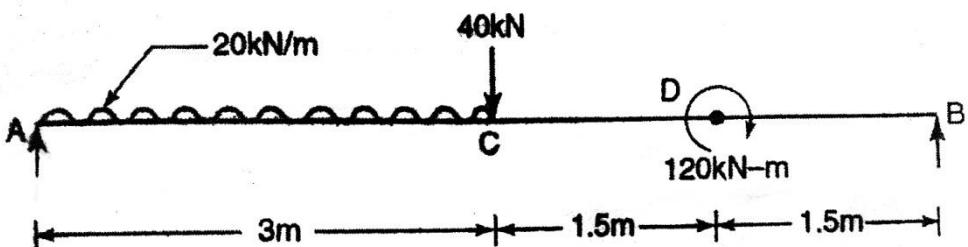
Q.1 Answer all questions:

- Discuss Influence line diagram? Write the uses of ILD.
- What do you understand by Shear force and Bending Moment? Write sign conventions usually followed.
- Illustrate Shorter than span UDL load position for max -ve and +ve shear at a section and absolute shear with the corresponding ILD.
- Examine why do we prefer an Arch over a Beam?
- Develop Bending Moment diagram for a simply supported beam carrying UDL 'w' over whole span 'L'.
- Draw any two types of roof trusses.
- State the Assumptions of Eulers Theory?
- What are Zero Force Members? Why are they required?
- What is a conjugate beam?
- Explain moment area first and second theorem.

2×10

PART-A

Q.2 Create Shear force and Bending Moment Diagram for the following Beam.



20

Q.3 A simply supported beam has a span of 15 m. Uniformly distributed load of 40 kN/m and 5 m long crosses the girder from left to right.

- Draw the influence line diagram for shear force and bending moment at a section 6 m from left end.
- Interpret these diagrams to calculate the maximum shear force and bending moment at this section.

14

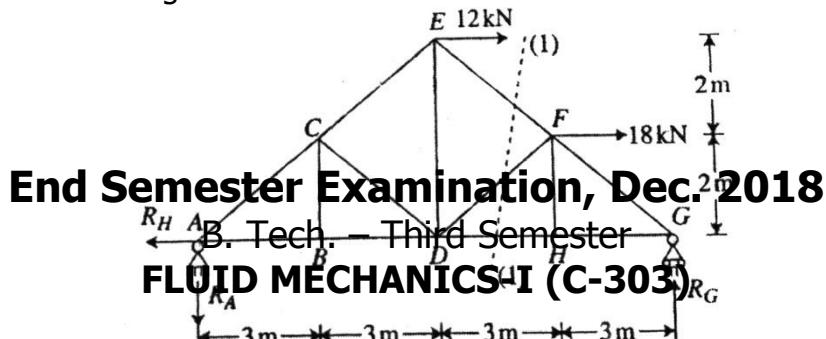
Q.4 A three hinged parabolic arch hinged at the supports and at the crown has a span of 24 m and a central rise of 4 m. It carries a concentrated load of 50 kN at 18 m from left support and a udl of 30 kN/m over the left half portion. Solve

- The vertical and horizontal reactions at the supports.
- The moment at a section 6m from the left support.

10×2

PART-B

- Q.5 Determine the nature and magnitude of forces in the members EF, DF and DH cut by section 1-1 in the truss given below:



Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 Answer the following questions:

- Real fluid and Ideal fluids.
- Newtonian fluid and Non-Newtonian fluid.
- Surface tension and capillarity.
- Stream lines and Streak lines.
- Metacentric height.
- Utility of pitot tube.
- Laminar sub-layer.
- Model and prototype.
- Manometer.
- Boundary Layer.

2x10

PART-A

- Q.2 a) How will you differentiate dynamic viscosity and kinematic viscosity? State and explain Newton's law of viscosity. How does it vary with temperature?

10

- b) Calculate the capillary rise in glass of 2.0 mm diameter when immersed vertically in
- Water
 - in Mercury.

Take surface tension $\sigma=0.0725\text{ N/m}$ for water and $\sigma=0.52\text{ N/m}$ for mercury in contact with air. The specific gravity for mercury is given as 13.6 and angle of contact= 130°

10

- Q.3 a) Define and state equation of continuity. Derive an expression for continuity equation for three dimensional flow with suitable diagram.

10

- b) The velocity potential function (ϕ) is given by:

$$\phi = \frac{-xy^3}{3} - x^2 + \frac{x^3y}{3} + y^2$$

- i) Find the velocity components in x and y direction.
ii) Show that ϕ represents a possible case of flow.

10

- Q.4 a) State and prove Pascal's Law

8

- b) What do you understand by hydrostatic law?

4

- c) A rectangular pontoon is 5 m long, 3 m wide and 1.5 m high. The depth of immersion of pontoon is 0.8 m in sea water. If the centre of gravity is 0.6 m above the bottom of the pontoon, determine the meta centric height. Density of sea water = 1025 kg/m³

8

PART-B

- Q.5 a) What are the assumptions made for Bernoulli's theorem for steady flow of an incompressible fluid. Derive expression for it after stating the theorem

10

- b) Water flows over a rectangular weir 1 m wide at a depth of 120 mm and afterward passes through a triangular right angled weir. Taking C_d for the rectangular and triangular weir as 0.62 and 0.59 respectively, find the depth over the triangular weir.

10

- Q.6 a) What do you mean by boundary layer preparation? What is the effect of pressure gradient on boundary layer separation?

10

- b) Define boundary layer and boundary layer theorem. What is going to happen in case of flat plate is placed and boundary layer is formed?

10

- Q.7 a) State the concept of dimensional analysis. How variables are selected for analysis? State Buckingham's π Theorem

10

- b) How many types of similarities can be there, explain each with suitable examples.

10

End Semester Examination, Dec. 2018

B. Tech. — Third Semester
SURVEYING-I (C-304A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer the following questions:

- a) Write down the primary division of surveying.
- b) Differentiate plan and map.
- c) Define the term bearing.
- d) Mention the different types of compasses.
- e) What are the back sights and fore sights?
- f) Define 'bench Mark'.
- g) Differentiate transit and non-transit theodolite.
- h) What is mean by Latitude and Departure?
- i) Define 'contours'.
- j) Write down the equipments used in plane table surveying.

2x10

PART-A

Q.2 a) What are the instruments used for chain surveying? Explain the functions of each with neat sketch.

10

- b) Describe in detail about obstacles in chain surveying.

10

Q.3 The following are the bearings taken on a closed compass traverse:

Line	Fore Bearing	Back Bearing
AB	80° 10'	259° 00'
BC	120° 20'	301° 50'
CD	170° 50'	350° 50'
DE	230° 10'	49° 30'
EA	310° 20'	130° 15'

Compute the interior angles and correct them for observational errors. Assuming the observed bearing of the CD to be correct adjust the bearing of the remaining sides.

20

Q.4 A following readings are taken with the level with a 4m leveling staff on a continuously sloping ground at 30m interval.

0.680, 1.455, 1.855, 2.330, 2.855, 3.380, 1.055, 1.860, 2.265, 3.540, 0.835, 0.945, 1.530 and 2.250.

The R.L of starting point was 80.750 m. Rule out a page of level book an enter above readings and find out the reduced level of all points. Also, determine gradient between first and last R.L.

20

PART-B

Q.5 a) Define the following terms:

- i) Vertical axis.
- ii) Horizontal axis.
- iii) Line of sight.
- iv) Centering.
- v) Face left / face right observation.

10

b) Explain the process of Repetition method for measuring angle between two points. **10**

Q.6 a) Describe in detail about Radiation method in plane table survey with neat sketch.

10

b) Explain with the help of diagram, intersection method of plane table survey.

10

Q.7 a) Write down the elements of simple circular curve.

10

b) A circular curve has 300 m radius and 60° deflection angle. What is its degree by a) arc definition b) chord definition of standard length 30 m? Also calculate:

- i) Length of curve.
- ii) Tangent length.
- iii) Length of long chord.
- iv) Mid-ordinate.
- v) Apex distance.

2x5

End Semester Examination, Dec. 2017

B. Tech.—Third Semester
CONCRETE TECHNOLOGY (C-305A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following question:

- a) Define "OPC 43" grade.
- b) Freeze and Thaw effect.
- c) Platten effect.
- d) What is dimensional stability?
- e) What is the size of specimen for split tensile test?
- f) What is curing?
- g) What is plasticizer?
- h) Define flash set.
- i) What are well-graded aggregates?
- j) Define fineness modulus.

2×10

PART-A

Q.2 What is hydration of cement? Explain duff Abram's law with graph showing variation of strength with gel/space ratio. **20**

Q.3 a) What are the factors governing use of maximum size of aggregate in reinforced concrete? **10**
b) Explain the features of gap-graded aggregate. **10**

Q.4 a) What are the accelerators? Give some examples. In what types of constructions, accelerators are used? Do accelerators affect the strength of concrete? Justify. **15**
b) Discuss the environment sustainability of mineral admixture. **5**

PART-B

Q.5 a) What are the fundamental factors influencing compressive strength of concrete? **10**
b) What are the different methods for measuring workability? Explain any one in detail. **10**

Q.6 a) How we can prevent alkali aggregate reaction? **10**
b) Explain the procedure for split tensile test. **10**

Q.7 a) Give suitable solutions for the problems encountered in hot conditions. **10**
b) Briefly explain mechanism and application of fiber reinforced concrete. **10**

End Semester Examination, Dec. 2018

B. Tech. — Third Semester

CONCRETE TECHNOLOGY (C-305A)

Time: 3 hrs.

Max Marks: **100**
No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

PART-A

- Q.2** a) What are the advantage and disadvantages of concrete over other construction material? **10**
b) Mention any five types of cement with their application. **10**

Q.3 a) Write short notes on the following:
i) Specific gravity of aggregate.
ii) Water absorption of aggregate.
iii) Grading of aggregates.
iv) Fineness modulus. **2½×4**

b) How aggregates can be classified on the basis of particle size, shape and surface texture. Also mention the best suited aggregates for construction. **10**

Q.4 a) What are the properties of concrete in plastic state? Write Duff-Abram's water cement ratio with its limitations. **10**
b) Define "Workability". What are the factors affecting workability? Can workability of concrete change without changing water cement ratio. **10**

PART-B

Water absorption = 0.42%, Bulk density = 1590 kg/m³, f_{ck} = 20N/mm²

20

Q.7 a) What are the precautions required during:

- i) Hot weather converting.
- ii) Cold weather concreting.

5×2

b) Write the use and applications of ferro and fibre reinforces concrete.

10

20

Q.6 a) Obtain an expression for Euler's crippling load in case of column with both ends fixed. Draw a neat diagram of the deformed shape of the column.

10

b) A hollow alloy tube 4m long with external and internal diameters of 40 mm and 25 mm respectively was found to extend 4.8 mm under a tensile load of 60 kN. Find the buckling load for the tube with both ends pinned. Also find the safe load on the tube, taking a factor of safety as 5.

10

Q.7 a) What is the relationship between real beam and conjugate beam?

4

b) Find out the maximum slope and deflection for a cantilever beam with UDL on entire length using double integration method?

8

c) Find out the maximum slope and deflection of a simply supported beam carrying a concentrated load P at mid span. Use moment area method.

8

End Semester Examination, Dec. 2018

B. Tech. — Third Semester

BUILDING CONSTRUCTION AND MATERIALS (C-302C)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Write short note on partition wall.
- b) Define "Assembly building".
- c) Define "Foundation".
- d) Define "D.P.C".
- e) Draw header bond.
- f) Write short note on muram flooring.
- g) Write short note on coupled roof.
- h) Define "Pitch of roof".
- i) Define "Smart materials".
- j) Draw the diagram of a composite structure section.

2×10

PART-A

Q.2 Explain all components of a building.

20

Q.3 a) Write four purpose of foundation.

6

- b) Classify and explain pile foundation with diagram.

14

Q.4 a) Explain causes of dampness.

4

- b) Describe seven sources of dampness.

14

- c) Enlist method of damp proofing.

2

PART-B

Q.5 a) Describe six points of English bond with figure and show 1, 3, 5 and 2, 4, 6 courses. **10**

- b) Explain three defects of brick masonry. **10**

Q.6 a) Describe the following terms of cement concrete flooring:

- i) Preparation of sub base.
- ii) Laying of base concrete.
- iii) Laying of concrete.

3×3

- b) Enlist five merits of cement concrete flooring. **5**

- c) Describe "Marble flooring". **6**

Q.7 a) How fly-ash block the quality as green building material? **10**

- b) What are the smart materials? Explain by giving examples in detail. **10**

End Semester Examination, Dec. 2018

B. Tech. – Third Semester

BUILDING CONSTRUCTION AND MATERIALS (C-302C)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following:

- a) Draw a neat sketch of roof showing pitch.
- b) How do we explain the difference of assembly building and institutional building?
- c) What is the purpose of constructing partition wall?
- d) With neat sketch show the difference of header bond and stretcher bond.
- e) When do we use mooran flooring?
- f) When we call a roof coupled?
- g) Clearly mention difference between plinth level and ground level.
- h) Elaborate the difference of footing and foundation.
- i) Where do we use composite sections?
- j) Where do we provide damp proofing course? **10×2**

PART-A

Q.2 a) What was the basis for categorizing residential buildings? How many types it has? Explain in detail. **10**
b) What is the difference between sub-structure and superstructure? Explain with components. **10**

Q.3 a) Throw light on the types of pile foundations with suitable diagrams. **10**
b) Why did the concept of improvement of soil properties evolve and how it is done? **10**

Q.4 a) Why do we find dampness in our structures? Explain its causes and sources in detail. **10**
b) With a neat sketch show two methods of damp proofing. **10**

PART-B

Q.5 a) What type of partition wall should be used in a nursing home, class room and residential buildings? **10**
b) What are the advantages of a cavity wall? Write about specifications as well. **10**

Q.6 a) When we call a roof as king post and queen post, draw figure and explain? **10**
b) Suppose you are in a badminton court, what kind of flooring would you suggest and why? **10**

Q.7 a) Epoxy mortar is supposed to be the smart material, explain. **10**
b) What are the properties of fly ash block which make it green building material? **10**

End Semester Examination, Dec. 2018

B. Tech. – Third Semester

STRENGTH OF MATERIALS (C-306C)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1

 - a) Differentiate between lateral and longitudinal strain.
 - b) State Hooke's law.
 - c) Draw the figure for bi-axial stress state.
 - d) What do you understand by Principal stresses?
 - e) Define 'neutral axis'.
 - f) Define 'shear centre'.
 - g) Show the variation of shear stress in an I-section and a T-section
 - h) Define 'core of a section'.
 - i) What is the difference between concentric and eccentric loading?
 - j) Write down the equation of torsion and explain each terms.

2x10

PART-A

- Q.2** A rectangular block $400 \text{ mm} \times 150 \text{ mm} \times 200 \text{ mm}$ is subjected to an axial load as follows: 500 kN compressive in the direction of its length, 1000 kN compressive on the $400 \text{ mm} \times 200 \text{ mm}$ face, 1500 kN tensile on the $400 \text{ mm} \times 150 \text{ mm}$ faces. Assuming poisson's ratio as 0.3 and $E = 2.1 \times 10^5 \text{ N/mm}^2$, find the values of modulus of rigidity and bulk modulus for the material of the block. Also calculate the change in the volume of the block due to application of the load specified. **20**

Q.3 The stresses at a point are: $\sigma_x = -80 \text{ MPa}$ and $\sigma_y = 40 \text{ MPa}$ with $\tau_{xy} = 80 \text{ MPa}$. Find the magnitudes of normal, tangential and the resultant stress on a plane at 50° . Also find the principal stresses **20**

Q.4 A rectangular section 300 mm wide and 400 mm deep is used on a span of 5 m. Find out the uniformly distributed load that this section can carry if the permissible stress is limited to 150 N/mm^2 . **20**

PART-B

- Q.5 A 400 mm \times 500 mm I-girder has 15 mm thick flanges and 15 mm thick web. It is subjected to a shear force of 300 kN at a particular section. Find the ratio of maximum shear stress to minimum shear stress in the web. What is the maximum shear stress in the flange? **20**

Q.6 A short column of rectangular section 300 mm \times 400 mm carries a compressive load of 1000 kN. The load is applied at a point (50, 50) considering the centroid of the section as the origin. Find the stresses at the four corners of the section. **20**

Q.7 a) Write the assumptions made in deriving the equation of torsion. **5**
b) A solid shaft is required to transmit 120 kW power at 200 rpm. Find the suitable diameter of the shaft if the allowable shear stress is 70 N/mm². **15**

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester
STRUCTURAL ANALYSIS-II (C-401B)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

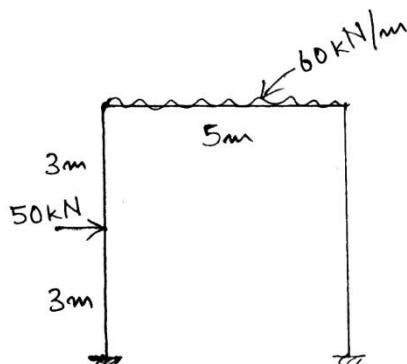
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B**. Marks are indicated against each question.

- Q.1**
- Define degree of freedom.
 - Define the term 'stiffness'.
 - State Maxwell's Reciprocal theorem.
 - Briefly explain strain energy.
 - Define static indeterminacy.
 - Give two reason for sway in portal frame.
 - What are 'indeterminate structures'?
 - Write the expression for 'y' in parabolic arch.
 - Write down the advantages of arch over beams.
 - State Castigliano's 1st theorem.

2×10

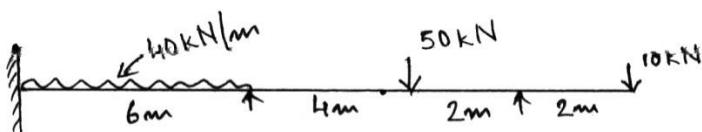
PART-A

- Q.2** Analyze the frame using Slope Deflection Method and draw the BMD. Take EI constant for all members.



20

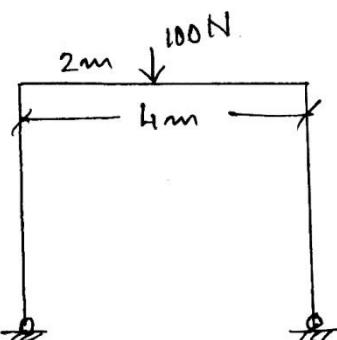
- Q.3** Analyze the beam using Moment Distribution Method and draw the BMD.



$$E = 2 \times 10^5 \text{ N/mm}^2, \quad I = 3.5 \times 10^7 \text{ mm}^4$$

20

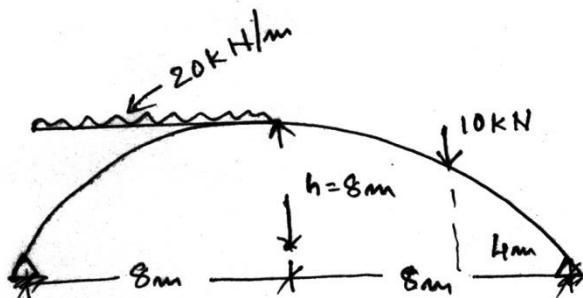
- Q.4** Find the horizontal thrust and draw BMD for the portal frame ABCD of uniform rigidity and hinged at the supports.



20

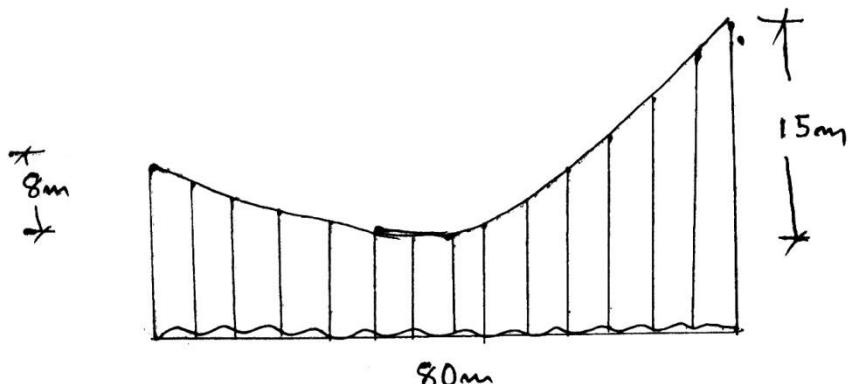
PART-B

- Q.5 a) Derive the expression for horizontal thrust in segmental arch of span 'L' and crown height 'h'.
b) Calculate the horizontal thrust 'H' for the given semicircular arch.



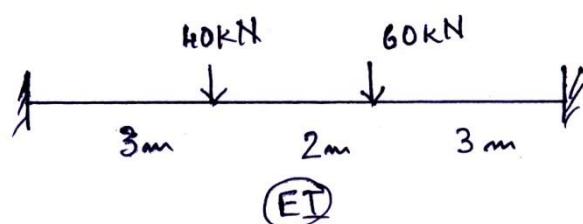
10

- Q.6 A cable of span 80 m has its ends at height 8 m and 15 m above the lower point of the cable. It carries a UDL of 20 kN/m over the entire span. Determine horizontal and vertical reaction at supports. What is the length of the cable?



20

- Q.7 Determine the end moments in the beam using Column Analogy method:



20

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester

SURVEYING-II (C-403)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) What is meant by "Geodetical observations in trigonometric leveling"?
- b) Define "Axis-signal correction".
- c) Define "Co-efficient of refraction".
- d) What is strength of figure in triangulation system?
- e) Write objectives of triangulation surveying.
- f) State the principle of least squares.
- g) Define most probable value of quantity.
- h) What are latitude and longitude?
- i) What is principle point on an aerial photograph?
- j) What are three segments of GPS?

2×10

PART-A

Q.2 a) Discuss the effect of terrestrial refraction and curvature for geodetical observations. Also derive the formula for combined correction for refraction and curvature for geodetic observations in trigonometrical leveling. **10**

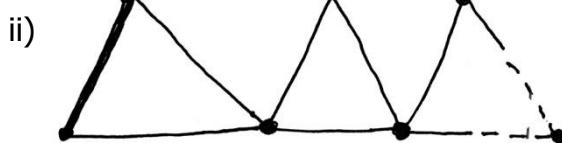
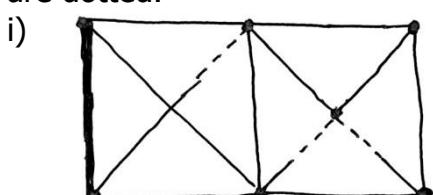
b) To determine the elevation of the top of a flag staff, the following observations were made:

Inst. Station	Reading on B.M.	Angle of elevation	Remarks
A	1.266	10°48'	R.L. of B.M. =
B	1.086	7°12'	248.362

Stations A and B and the top of the aerial pole are in the same vertical plane. Find the elevation of the top of the flag staff, if the distance between A and B is 50m. **10**

Q.3 a) How do you determine the intervisibility of triangulation stations? Two triangulation stations A and B are 60 km apart and have elevations 240m and 280m respectively. Find the minimum height of signal required at B so that the line of sight may not pass near the ground than 2 meters. The intervening ground may be assumed to have a uniform elevation of 200 meters. **10**

- b) Compute the value of C and $\frac{D - C}{D}$ for the following nets shown in figure. The heavy lines are the bases of known length. Directions are not observed where lines are dotted.



10

Q.4 a) Define weight and discuss the rules for assigning weightage to the field observation.
Also write various laws of weight. **10**

b) Find the most probable values of angles A and B from the following observations at a station O:

A = 9°48'36.6"	weight 2
B = 54°37'48.3"	weight 3
A+B = 104°26'28.5"	weight 4

10

PART-B

Q.5 a) Define the following terms:

- i) The celestial sphere.
- ii) Sensible horizon.
- iii) Co-latitude.
- iv) Azimuth.
- v) Declination.

5×2

b) Determine the hour angle and declination of a star from the following data:

- i) Altitude of star = 22°36'.
- ii) Azimuth of star = 42°W.
- iii) Latitude of the place of observation = 40°N.

10

Q.6 a) Explain with reference to aerial photographs. What is meant by end overlap and side overlap and why they are provided? **10**

b) A camera having a focal length of 20cm is used to take a vertical photograph to a terrain having an average elevation of 1500 meters. What is the height above mean sea level at which aircraft must fly in order to get the scale of 1:8000? **10**

Q.7 a) Explain the interaction mechanism of EMR with the earth's surface, stating the basic interaction equation. **10**

b) Write a detailed note on applications of remote sensing and GIS. **10**

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester

DESIGN OF CONCRETE STRUCTURES-I (C-404A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question. IS 456:2000 code for reinforced concrete and use of calculators is allowed.

Q.1 Answer the following questions:

- a) Define "Characteristic strength".
- b) Why is the partial safety factor for concrete greater than that for reinforcing steel in the consideration of ultimate limit state?
- c) Determine the mean target strength required for the mix design of M25 concrete assuming moderate quality control.
- d) Differentiate the working stress method and limit state method of design of RC sections.
- e) Why is it undesirable to design over-reinforced sections?
- f) Draw stress strain blocks for a singly reinforced beam as in limit state method.
- g) What are the advantages of designing T-beams?
- h) What is the effective length of a column restrained against rotation and held in position at both ends?
- i) What is the maximum and minimum percentage of steel for columns? Mention The IS code clause.
- j) Explain briefly punching shear failure of footings.

2×10

PART-A

Q.2 Use working stress method for the following:

- a) A singly reinforced beam 350 mm wide and 550 mm deep has an effective span of 6m and carries an all inclusive load of 20 kN/m. The beam is reinforced with 4 nos. 20 mm dia bars with an effective cover of 35mm. Find the maximum stresses produced in concrete and steel. Take $m = 13.33$. **10**
- b) An RC beam is 250 mm×400 mm is reinforced with 4 nos. 16mm dia bars as compression steel at an effective cover of 50mm and 4 nos. 20 mm dia as tension steel. If the stresses in concrete and steel are not to exceed 7 N/mm^2 and 230 N/mm^2 , determine the moment of resistance of the section. Take $m= 13.33$. **10**

Q.3 Using Limit state design principles, determine whether the section 250 mm×500 mm with a cover of 50 mm is under or over-reinforced with $f_{ck} = 30 \text{ N/mm}^2$. $f_y = 500 \text{ N/mm}^2$, and with:

- a) $A_{st} = 1140 \text{ mm}^2$.
- b) $A_{st} = 1415 \text{ mm}^2$.
- c) $A_{st} = 2413 \text{ mm}^2$
- d) $A_{st} = 3217 \text{ mm}^2$.

5×4

- Q.4 A rectangular beam of section 250 mm width by 500 mm effective depth is reinforced with 4 nos. 25 mm bars, out of which 2 bars are bent at the ends of the beam at 60° . Determine the additional shear requirement required if the factored shear force at the critical section is 350 kN. Consider concrete grade M25 and steel of grade Fe415. **20**

PART-B

- Q.5 Design a slab of clear span between walls $4\text{ m} \times 10\text{ m}$ supported over walls on all four sides of thickness 300 mm. Use M₂₀ concrete and Fe415 steel. Live load = 4 kN/m², superimposed dead load = 4 kN/m². Floor Finishing is of 60mm thickness C.C. flooring. **20**
- Q.6 A column of height 1.5m is pinned at bottom and effectively restrained against rotation but not held in position at top. It is subjected to a factored axial load of 2500 kN under the combination of dead load and live load. Design the column, if using M30 concrete and Fe415 steel. **20**
- Q.7 Design a square isolated footing of uniform thickness for a R.C.C. column of size 500 mm×500 mm bearing a load of 80 tonnes. The safe bearing capacity of the soil may be taken as 120kN/m². Use M20 Concrete and Fe415 Steel. **20**

End Semester Examination, Dec. 2018

B. Tech. – Fourth / Sixth Semester

DESIGN OF STEEL STRUCTURES-I (C-405A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.
IS 800-2007 K steel tables ac allowed

Q.1 Answer the following questions:

- a) What are buildup sections?
- b) What is Gross Area?
- c) Define the term "strut".
- d) Draw a neat diagram of slab base for column.
- e) What is the function of Anchor bolt?
- f) Explain the term "Girt".
- g) Explain the "closed section".
- h) What is Crab Girder?
- i) Explain pure tension field.
- j) Why do we provide horizontal stiffness?

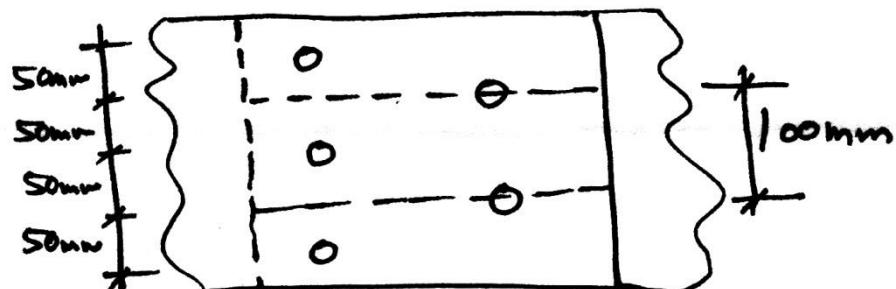
2x10

PART-A

Q.2 a) Explain the disadvantages of welded connections.

5

- b) Determine the strength and efficiency of the lap joint shown below. The bolts are of 20mm diameter and of grade 4.6. The two plate to be jointed are 10 mm and 12 mm thick. Use Fe 410.

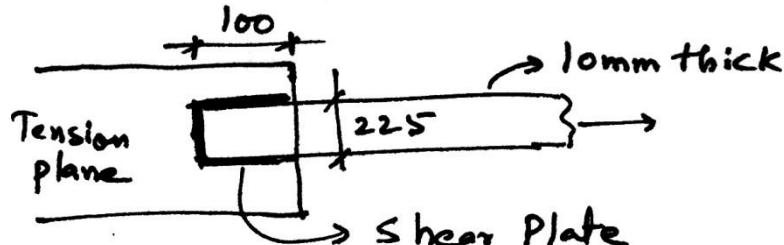


15

Q.3 a) What are the different type of failure in Tension members?

5

- b) Determine the block shear strength of the welded tension member shown below. Use Fe 410.



15

Q.4 a) What is slab base? Draw its sketch.

8

b) Derive the formula for calculation of thickness of column base and column cap.
12

PART-B

Q.5 a) What are Purlins?

5

b) Design a laterally supported beam of span 6m for the following data:
Fe410; $M = 150\text{KN-m}$, shear force $V = 210 \text{ KN}$

15

Q.6 a) What are the different loads on a Gantry Girder?

5

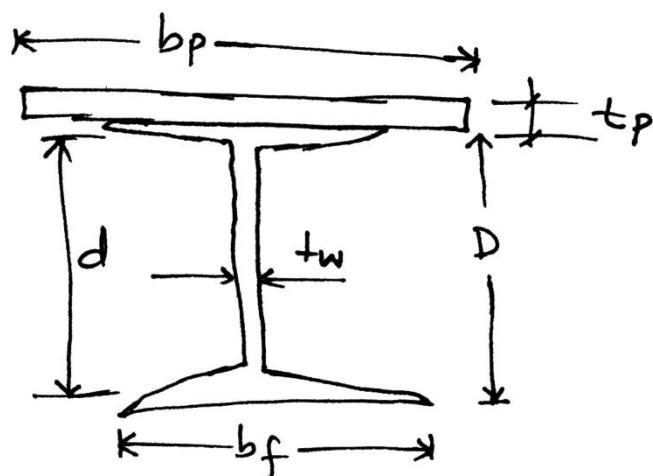
b) Explain in details step by step design procedure for the Gantry Girder.

15

Q.7 a) What are the load carrying stiffeners?

5

b) Determine the plastic section modulii of the section shown below:



15

End Semester Examination, Dec. 2018

B. Tech – Fourth / Fifth Semester
SOIL MECHANICS (C-406)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer the following questions:

- a) Differentiate between void ratio and porosity.
- b) Why water content of soil is determined at $110 \pm 5^{\circ}C$ in laboratory.
- c) What are main index properties of fine grained soil?
- d) What do you mean by Seepage velocity?
- e) Define Isobar.
- f) List various equipments used for compaction of soil.
- g) Write any two difference between compaction and consolidation.
- h) Define the term coefficient of compressibility.
- i) What is Mohr's circle?
- j) What are merits and demerits of direct shear test?

2x10

PART-A

Q.2 a) What is the use of classification of soils? Discuss Indian Standard Classification System.

10

- b) The mass of a chunk of moist soil is 20kg and its volume is $0.011m^3$. After drying in an oven, the mass reduces to 16.5kg. Determine the water content, density of moist soil, the dry density, void ratio and porosity. Take $G = 2.70$.

10

Q.3 a) What is Darcy's law? What are its limitations?

5

- b) Discuss the effect of particle size, void ratio and properties of water on permeability of soil.

5

- c) Determine the average coefficient of permeability in the horizontal and vertical directions for a deposit consisting of three layers of thickness 5m, 1m and 2.5m and having $K_1 = 3 \times 10^{-2} mm/sec$, $K_2 = 3 \times 10^{-5} mm/sec$, $K_3 = 4 \times 10^{-2} mm/sec$ respectively. Assume the layers are isotropic.

10

Q.4 a) Describe the method of calculating the stress at a point below the corner of a rectangular load. How is this method used for finding the stress at points other than that below the corner?

10

- b) State the assumption in use of Boussinesq's theory to determine the vertical stress in a soil due to point load.

5

- c) Write expression for vertical stress at a point due to point load, line load.

5

PART-B

- Q.5 a) Discuss the factors that affect compaction of soil.

10

- b) What is compaction curve? Give its salient features.

5

- c) What are different methods of compaction adopted in the field? Explain.

5

- Q.6 a) What is coefficient of consolidation? What is its use in settlement analysis? How is it determined?

10

- b) What do you mean by preconsolidation? List out the factors that cause preconsolidation and write steps to determine it.

10

- Q.7 a) Explain direct shear test method in detail.

10

- b) What is Mohr's circle? Discuss its important characteristics.

10

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester

ENGINEERING GEOLOGY (C-407)

Time: 3 hrs.

Max Marks: 100

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 Answer the following question:

 - a) List subdivision of geology.
 - b) Name two earth's atmospheric agencies responsible for weathering.
 - c) The mineral with a hardness of 10 in Mohs scale is _____.
 - d) Give two examples of igneous rocks.
 - e) Mention seismic zones of India.
 - f) What are joints in rocks? How do they influence the strength of rocks?
 - g) Define "Artificial recharge".
 - h) What do you mean by dip and strike?
 - i) A river well meander and forms ox-bow lake in the _____ stage.
 - j) Most common method of soft tunneling is _____.

PART-A

- Q.2 a) Using diagram and explanations, describe the internal structure and composition of the earth. **10**
b) Explain importance of geology in civil engineering projects. **10**

Q.3 a) Discuss work activities of a river in different stages. **10**
b) What do you mean by weathering? Discuss its importance in civil engineering projects. **10**

Q.4 Enumerate six main divisions of minerals based on their physical characteristics. Give a brief description of each division with examples. **20**

PART-B

- Q.5 a) Define a fault. Draw a sketch to show the hanging wall, foot wall, heave and throw of a fault. **10**
b) Explain why folding is considered harmful feature for engineering constructions. **5**
c) Define the following terms:
i) Dip. ii) Strike. iii) Outcrops. **5**

Q.6 a) Define briefly the problems of underground water in engineering constructions such as dams and reservoirs, road pavements and water retaining structures. **10**
b) Write note on remote sensing techniques for geological survey. **10**

Q.7 a) What are general geological characteristics of the area that must be known before a tunnel projects is decided. **10**
b) How geological characteristics influence the choice of the dam site? Explain in detail. **10**

End Semester Examination, Dec. 2018

B. Tech – Fourth Semester
FLUID MECHANICS-II (C-408A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Define "Specific volume and Specific gravity".
- b) Define "Dynamic viscosity and Kinematic viscosity".
- c) Define centre of pressure and centre of buoyancy.
- d) Define "Velocity potential function".
- e) Define "Hydraulic gradient line and Energy gradient line".
- f) What is the use of pitot-tube?
- g) What is dimensional homogeneity?
- h) Define "Euler's number".
- i) Define 'specific speed of a pump'.
- j) What do you understand by flow in open channel?

2×10

PART-A

- Q.2** a) Define "Capillarity". Derive an expression for capillary rise and capillary fall. **10**
- b) The dynamic viscosity of oil used for lubrication between a shaft and sleeve is 6 poise. The shaft is of diameter 0.4m and rotates at 190rpm. Calculate the power lost in the bearing for a sleeve length of 90mm. The thickness of the oil film is 1.5mm. **10**
- Q.3** a) Determine the total pressure on a circular plate of diameter 1.5 m which is placed vertically in water in such a way that the centre of the plate is 3 m below the free surface of water. Find the position of centre of pressure also. **10**
- b) Derive an expression for the meta-centric height of a floating body. **10**
- Q.4** a) Define the equation of continuity. Derive an expression for continuity equation in three-dimensions. **10**
- b) If for a two-dimensional potential flow, the velocity potential is given by $f = x(2y - 1)$. Determine the velocity at the point P(4, 5). Determine also the value of stream function Y at the point P. **10**

PART-B

- Q.5** a) Derive an expression for Bernoulli's equation with assumptions. **10**
- b) An oil of specific gravity 0.8 is flowing through a venturimeter having inlet diameter 20cm and throat diameter 10cm. The oil-mercury differential manometer shows a reading of 25cm. Calculate the discharge of oil through the horizontal venturimeter. Take $C_d = 0.98$. **10**
- Q.6** a) What are dimension less numbers and discuss it. Also write their significance. **10**

- b) State Buckingham's TJ theorem. **10**
- Q.7 a) Define "Centrifugal Pump". Explain with neat sketch the constructional details and working of a centrifugal pump. **10**
- b) Derive an expression to measure the rate of flow through an open channel by Chezy's formula. **10**

End Semester Examination, Dec. 2018

B. Tech – Fifth Semester

TRANSPORTATION ENGINEERING-I (C-501A)

Time: 3 Hours

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any **TWO** questions from **PART-B**. Each question carries equal marks.

- Q.1 Answer the following:
- Write down the recommendations of Jaykar Committee.
 - What are the basic requirements of an ideal alignment?
 - Define the term "Right of Way".
 - Explain PIEV theory.
 - Differentiate between channelized and un-channelized intersections.
 - Write down the name of various pavement component materials.
 - Define the desirable properties of paving bitumen.
 - Calculate the value of ruling minimum radius of horizontal curve of a National highway in plain terrain. The ruling design speed is 100 kmph.
 - List different types of road patterns. Give example of any one pattern.
 - List different types of cutbacks. When are these used?

2x10

PART-A

- Q.2 a) Briefly explain the Macadam's method of road construction. Why this method is considered scientific one? **10**
- b) From the following data for a district, calculate the road length required based on Nagpur road plan:
- Total Area = 6300 Km²
 - Agricultural area = 2800 Km²
- The number of villages with population ranges are <500, 501-1000, 1001-2000, 2001-5,000 and above 5001 are 450, 320, 110, 50 and 10 respectively. Length of railway track is 75 km. **10**

Q.3 a) Explain obligatory points with neat sketches. Discuss how these points control the alignment?

10

b) Name different types of surveys that are conducted for locating a new highway with their objectives.

10

Q.4 a) Define the terms "overtaking sight distance". State the factors on which sight distance depends. Also explain the "absolute minimum sight distance".

5

b) The design speed of a highway is 80 kmph. There is a horizontal curve of radius 200 m on a certain locality. Safe limit of transverse coefficient of friction is 0.15.

5

c) Calculate the super elevation required to maintain this speed.

5

d) If the maximum super elevation of 0.07 is not to be exceeded, calculate maximum allowable speed on this horizontal curve as it is not possible to increase the radius.

5

PART-B

Q.5 a) List different tests on road aggregates and mention their advantages and limitations.

10

b) Explain CBR and the test procedure in the laboratory. How are the results of the test obtained and interpreted?

10

Q.6 a) What are the factors to be considered for the design of flexible pavements? Discuss the significance of each.

10

b) Discuss Westergaard's concept of temperature stresses in concrete pavements.

10

Q.7 a) What is the significance of road user characteristics in traffic engineering? Discuss in detail the factors which affect the road user characteristics and their effect on traffic performance.

10

b) How are spot speed studies carried out? What are the various objects and applications of spot speed studies? Explain briefly.

10

End Semester Examination, Dec. 2018

B. Tech. — Fifth Semester

WATER SUPPLY AND TREATMENT PLANT (C-502)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following question:

- a) What do you understand by industrial demand?
- b) What are the factors affecting losses and wastage?
- c) How can you determine dissolved solids?
- d) Define 1 FTU.
- e) Give sequence of treatment for treating turbid surface water with organisms.
- f) Name mixing devices?
- g) What do you understand by fluoridation?
- h) Define 'dual water supply system'.
- i) What is blow off valve and check valve?
- j) What are the steps for designing of distribution system?

2×10

PART-A

Q.2 a) What is meant by design period and population forecasting? Discuss different methods for population forecasting? **10**

- b) The population of a locality as obtained from census report is as follows:

Census Year	1911	1921	1931	1941	1951
Population	350000	466000	994000	1560000	1623000

Estimate the population of the locality in the year 2001 by arithmetic increase method and geometric increase method? **10**

Q.3 a) Write short notes on the following:

- i) pH value of water.
- ii) Hardness.
- iii) Fluorides.
- iv) Colour.

2½×4

b) A treated wastewater having the fluoride concentration 250mg/l with a discharge of 1.5 m³/sec enters into a stream which has also the fluoride concentration of 10 mg/l with the discharge of 20 m³/s. Determine the concentration of fluoride of the stream after the point of injection of the waste water? **5**

c) Explain Jar test with diagram? **5**

Q.4 a) Define Filtration and discuss the design features of rapid sand filter? **10**

b) Design the dimensions of a set of rapid sand gravity filter for treating water for a population of 60000. The water demand is 200 lpcd and max demand is 1.8 times average daily demand. Assume filtration rate 6000 l/hr/m² and assume 40 min is lost in backwashing and 5% of filtered water is required for backwashing? **10**

PART-B

- Q.5 a) Explain the methods of water softening? **10**
b) Explain the Nalgonda technique with diagram? **5**
c) 10gm/l of copperas is consumed with lime at coagulation basin. Determine the quantity of copperas and quick lime required to treat 8 million liter of water. **5**
- Q.6 a) What is water conveyance system and explain system of supply with their advantages and disadvantages? **10**
b) Design a clear water rising main line from water treatment plant to overhead tank for the following data:
Capacity of pump = 1 no @ 50000 GPH
Total length of pipeline = 200 m
Suction head of pump = 5 m
Static head of tank = 25 m
Ground level difference = 0.5 m **10**
- Q.7 Explain the following with their advantages and disadvantages. Also, draw there diagram:
a) Dead end system.
b) Grid Iron system.
c) Ring system.
d) Radial system. **20**

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

IRRIGATION ENGINEERING-I (C-503A / C-503B)

Time: 3 Hours

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any **TWO** questions from **PART-B**. Each question carries equal marks.

Q.1 Answer the following:

- a) Basin flooding.
- b) Base period.
- c) Palco irrigation.
- d) Contour canal.
- e) Water allowance.
- f) Regime channels.
- g) Bedding.
- h) Weir and barrage.
- i) Groynes.
- j) Straight glacis falls.

2x10

PART-A

Q.2 a) Define duty and delta. Establish the relationship between the two.

4

b) Define and differentiate consumptive irrigation requirement and net irrigation requirement.

4

c) The culturable command area for a distributary is 15000 hectares. The intensity of irrigation for Rabi is 40% and for kharif is 15% if the total water requirement of the two crops are 37.5 cms and 120 cms and their period of growth are 160 days and 140 days respectively:

- i) Determine the outlet discharge from average demand of consideration.
- ii) Also, determine the peak demand discharge assuming the Kor water depth for two crops are 13.5 cms and 19 cms and their kor periods are 4 weeks and 2 weeks respectively.

12

Q.3 a) What do you understand by initial regime and final regime?

5

b) Design a regime channel for a discharge of 50 cumecs and silt factor 1.1, using Lacey's theory.

10

- c) Explain the steps of designing an irrigation channel.

5

- Q.4 a) Show the typical layout of diversion head works clearly mentioning all the components.

6

- b) Design a 1.5 mts. Sarda type fall for a canal having a discharge of 12 cumecs with following data:

Bed level upstream = 103.0m, Side slopes of channel = 1:1, Bed downstream= 101.5m Full supply level upstream=104.5' Bed width U/S and D/S = 1.0m, Soil = Good loam, Assume Blight's coefficient=6.

14

PART-B

- Q.5 a) Describe the different modes of failure of hydraulic structures on permeable foundations as given by Bligh. Also describe the suggestive corrective measures in detail.

10

- b) Differentiate between cross head regulator & distributor head regulator with the help of diagram showing the alignment and locations of both.

5

- c) What are cross drainage works? Classify different cross drainage structures according to their relative bed levels.

5

- Q.6 a) What are different types of dams? Explain.

5

- b) Explain the process of filtration in earthen dams with design criteria.

5

- c) An earthen dam made of a homogeneous material has the following data:

Co-efficient of permeability = 5×10^4 cm/sec.

Level of top of dam=200.0m

Level of deepest river bed = 178.0m

HFL of reservoir=197.5m

Width of slope of dam = 4.5m

Upstream slop = 2:1.

Determine the phreatic line for this dam section and discharge passing through the dam.

10

- Q.7 a) Explain trough spillway with clear and neat sketch.

5

- b) Design a suitable section for the overflow portion of a concrete gravity dam having the down-stream face sloping at a slope of 0.7 H: 1V. The design discharge for the spillway is 8000 cumecs. The height of spillway crest is kept at R.L.240m. The average river bed level at the site is 100.0m. The spillway length consists of 6 spans

having a clear width of 10m each. Thickness of each pier may be taken as 2.5m.

15

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester
BRIDGE ENGINEERING (C-504)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

Q.1 Answer the following questions:

- a) What is the cable stayed bridges?
- b) What is wetted perimeter?
- c) What is IRC?
- d) Explain centrifugal force.
- e) What do you understand by Bond length?
- f) What is culvert?
- g) What is plate Girder?
- h) What is Pier?
- i) Explain Scouring.
- j) What is Rocker Bearing?

2x10

PART-A

Q.2 a) Sketch the components of a typical bridge.

10

b) How can you calculate economical span?

10

Q.3 a) What are the IRC standards for Line Loads on Bridge?

10

b) Explain the impact effect for bridge.

10

Q.4 Write down short notes on:

- a) T-Beam bridge.
- b) Components of T-Beam bridge.
- c) Hollow girder bridge.
- d) Balance cantilever bridge.
- e) Continuous girder bridges.

4x5

PART-B

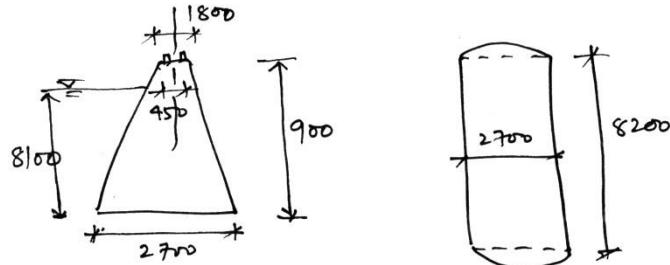
Q.5 a) Explain the box girder bridge in detailed with diagram.

5

b) Design a steel beam culvert with a clear spam of 10 m to carry a broad gauge double track on main line.

15

Q.6 Design a pier for the super structure T-beam of 21.3m span, having well foundation. Dead load from each span is 2250 KN. Reaction due to live load on the span is 900 KN. Maxima mean velocity of the current is 3.6 m/sec. Use M20 grade of concrete and IRC class AA and Class A for line load for the following diagram.



Section view

Plan

view

20

Q.7 a) What are the components of well foundation? Explain each part in brief with a typical well foundation diagram.

10

b) Explain the design procedure for single well and discuss the process of sinking of wells.

10

End Semester Examination, Dec. 2018

B. Tech – Fifth Semester

DESIGN OF CONCRETE STRUCTURE-II (C-601A)

Time: 3 Hours

Max Marks: **100**

No. of pages: 2

Note: Attempt any **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

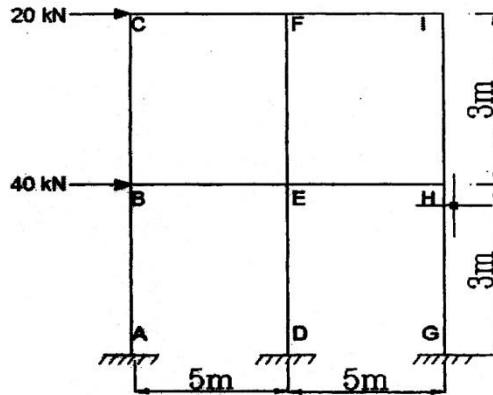
Q.1 Explain the following in brief:

- a) Assumption of cantilever method of analysis of multistory structure.
- b) Define point of contra-flexure
- c) What is the maximum percentage of moment allowed for redistribution in continuous beam as per IS 456:2000
- d) Draw sketch of open newel staircase and dog legged.
- e) What is the purpose of drop in flat slab?
- f) Draw active and passive earth pressure.
- g) Under what condition deep foundation is provided?
- h) Define expansion joint in water tank
- i) Explain external pre-stressing in short.
- j) Mention two advantages of post tensioning method.

2x10

PART-A

Q.2 Analyze the frame by Portal method as shown in the figure:



20

Q.3 Design a continuous beam of span 5 meters carrying imposed load of 10 kN/m and a live load of 12 kN/m. The beam is continuous over three supports. Allow for a redistribution of 30%. Use M20 and Fe415 grade of concrete and steel respectively.

20

Q.4 a) Draw a neat sketch of plan of flat slab and label and also explain the following terms:

- i) Column strip
- ii) Middle strip
- iii) Panel

5x3

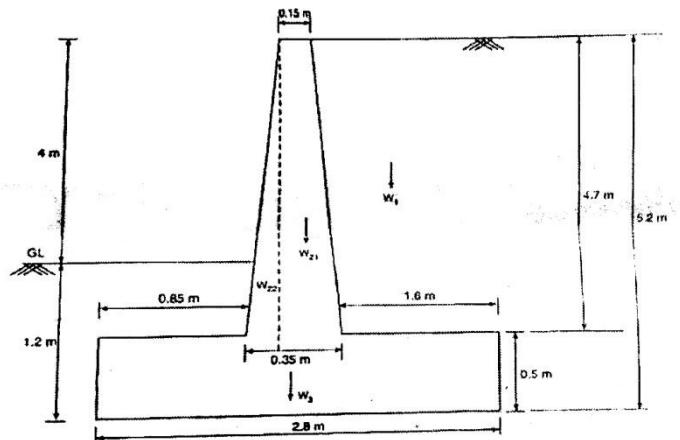
b) Explain the following terms:

- i) Rise and Tread
- ii) Nosing

5

PART-B

Q.5 Perform the stability check in over-topping and sliding of a cantilever retaining wall to retain horizontal earthen embankment of height 4 meter above the ground level. The earthen backfill is having a density of 18 kN/m^3 and angle of internal friction as 30 degree. The safe bearing capacity of the soil is 180 kN/m^3 . The coefficient of friction between soil and concrete is assumed to be 0.45. Use M20 grade of concrete and Fe-415 grade of steel as shown in the figure.



20

Q.6 Design a circular tank with a flexible base for a tank of 450 kilo litres capacity. The depth of water in the tank is 4.5 meter. Use M25 concrete grade and Fe-415 grade of steel. Take unit weight of water as 9.8 kN/m^2 . Allow suitable free board.

20

Q.7 a) What is the principle of pre-stresses concrete? Explain with the help of neat sketch.

10

b) Explain different types of losses that occur in pre-stresses concrete.

10

End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester
DESIGN OF STEEL STRUCTURE-II (C-602)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question. Use of IS code 801, IS811, IS875 (Part-III), IS 804 is allowed.

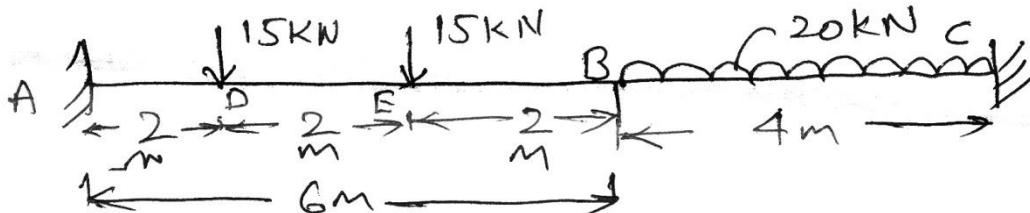
Q.1 Answer the following questions:

- a) Define plastic modulus section.
- b) Numerical value of shape factor triangular and diamond section.
- c) Write down different components of trussed roof.
- d) Briefly explain design loads in industrial building.
- e) Write down permissible stresses in water tank.
- f) Define tower and explain their purpose.
- g) Define self-supporting stack with neat sketch.
- h) Explain single diagonal bracing with neat sketch.
- i) Briefly explain flat-width ratio.
- j) Explain effective design width.

2×10

PART-A

Q.2 a) Briefly explain basic theorems of plastic analysis. **5**
 b) A two span continuous beam of uniform section loaded with ultimate loads as shown in figure. Determine the required plastic moment of resistance.

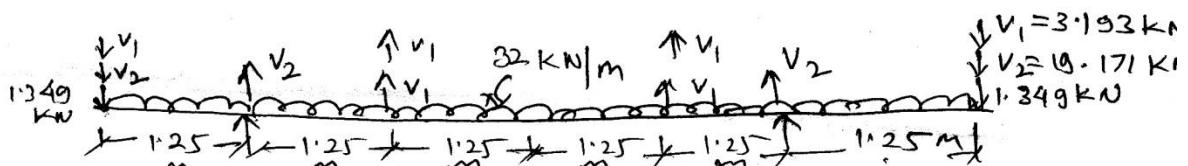


EI = Constant throughout.

15

Q.3 a) Explain internal wind pressure in rectangular clad building with help of permeability. **5**
 b) An industrial building is situated near a wide road close to Faridabad. It has length of 28.3m and breadth of 18.3m measured externally. The height from ground to eaves is 12m. Pitch of truss is 1/5 and the roof overhangs by 300mm on horizontal beyond the walls. Determine the design pressure on various faces of walls and roof for low permeability. **15**

Q.4 a) Design top and lower stay of a rectangular pressed steel tank 7.5m×6.25m×2.5m deep supported at 9.0m above ground level. The design seismic coefficient may be taken as 0.06. **15**
 b) Analyse intermediate longitudinal beams of pressed tank as shown in figure:

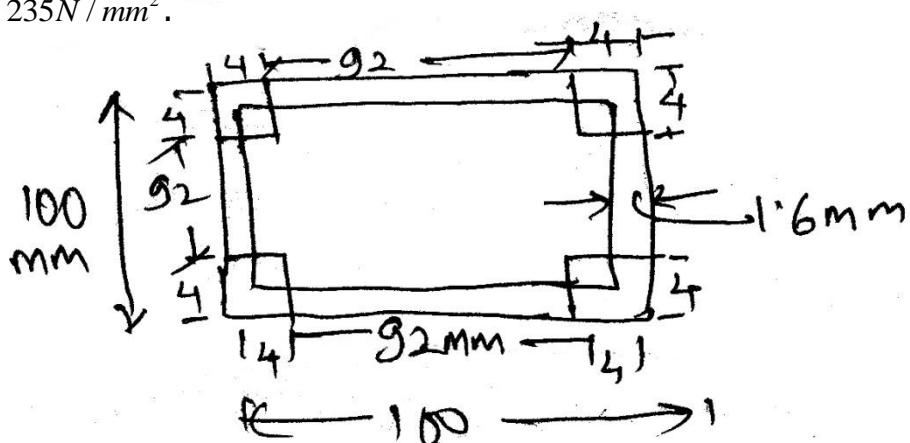


Evaluate bending moment and draw bending moment diagram.

5

PART-B

- Q.5 a) Derive equation for stresses due to self-weight of chimney and stress due to weight of lining. **5**
- b) Design for Delhi a self-supporting steel stack of height 72m above the foundation. The diameter of the cylindrical part of chimney is 3m. The foundation has to rest on medium soil having bearing capacity of 200 kN/m^2 . The thickness of firebrick work lining is 100mm and the lining is supported by the stack throughout the height. The chimney has one breech opening. The topography at the site is almost flat and location is of terrain category 2. Design basic dimension of chimney, computation of wind pressure, determine overturning moment due to wind force, design chimney shell. **15**
- Q.6 a) Briefly describe various loads acting on lattice towers. **5**
- b) Explain with neat sketches configuration and bracings of lattice tower. **5**
- c) A 50m high microwave antenna lattice tower is to be built near Delhi where the terrain at site is nearly a level ground with terrain of category 2. The diameter of the hemispherical antenna disc fixed at the top is 3m. The width of the tower at the top has to 3.5m. Select a suitable configuration for the tower. **10**
- Q.7 a) Briefly explain the following term used in light gauge:
i) Effective width of plate in compression.
ii) Web crippling. **2½×2**
- b) Find the column section properties and allowable load for the column section as shown. The effective length of column is 3.2m. Take $f_y = 235\text{ N/mm}^2$. Take $f_y = 235\text{ N/mm}^2$.



15

End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester
DESIGN OF STEEL STRUCTURE-II (C-602)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.
Use of IS 800:2007, IS-875 (Part-3); IS 804-1958 is allowed.

Q.1 Answer the following questions:

- a) Evaluate shape factor of rectangular section bxd.
- b) Define "Plastic hinge".
- c) Why bracing is provided in industrial building?
- d) Define "Stand pipes"
- e) What is the function of "STAY" in pressed steel tank?
- f) Name at least 2 lining materials in steel stacks.
- g) Enumerate the forces acting on steel chimney.
- h) Define "Mast".
- i) What is the usage of bearing connections in a tower?
- j) Define "Multiple stiffened elements".

2×10

PART-A

Q.2 Find the collapse load over a simple supported beam subjected to eccentric point load by static method as well as kinematic method **20**

Q.3 Neatly sketch 4 types of industrial buildings along with different truss types. Also neatly label the same. **20**

Q.4 An elevated rectangular steel water tank open at top is required to have a capacity of 90,000 litres with a free boards of not less than 150 mm. The bottom of the tank is at 10 m above ground level. Use 1.25 m × 1.25 m standard pressed steel plates. Design the size of tank and upper stays. **20**

PART-B

Q.5 A self supporting steel stack is 80 meters high and its diameter is 3 m at top. Find the design wind pressure at intervals of 10 m from base as per IS: 875 (part 3). The location of place is such that the intensity of wind pressure upto 30 m height is 1.50 kN/m². Also give the diagrammatic representation. **20**

Q.6 Explain the following:

- a) Lattice type structure.
- b) Pole type structure.
- c) Guyed structure.
- d) Span length.

5×4

- Q.7** a) Write the expression of local buckling of thin elements. Define each term in the expression. **10**
- b) Define the following:
a) Stiffened compression element.
ii) Multiple stiffed element. **5×2**

End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester
IRRIGATION ENGINEERING-II (C-603A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Explain in brief:

- a) Degrading river.
- b) Afflux.
- c) Marginal bunds.
- d) Inverted filter.
- e) Ogee falls.
- f) Level crossing.
- g) Gravity dam.
- h) Modes of failure in gravity dams.
- i) Subsidiary spillway.
- j) Uncontrolled spillway.

2x10

PART-A

Q.2 a) A stream has a width of 30m, depth of 3m and a mean velocity of 1.25m/sec. Find the height of weir to be built on the steam floor to raise the water level by 1m. Assume value of discharge coefficient as 0.95.

10

b) Explain the effects of construction of a weir on the regime of river and causes of failure of weirs and their remedies.

10

Q.3 a) Explain permeable groynes and define its various types.

10

b) Design a guide bank required for a bridge on a river having design flood discharge of 50000 cumecs, silt factor of 1.10, bed level of river as 130.00m., high flood level as 140.00m. Also find the volume of stone required per m length of the guide bank.

10

Q.4 a) Design an Ogee spillway for concrete gravity dams, for the following data:

- i) Average river bed level = 250.0 m.
- ii) R. L. of spillway crest = 350.00 m.
- iii) Slope of d/s face of gravity dam = 0.75:1
- iv) Design discharge = 6500 cumecs.
- v) Length of spillway = 5 spans with a clear length of 9 m each.

vi) Thickness of each pier = 2m.

10

b) What is the energy dissipator? Discuss various methods used for energy dissipation below spillways.

10

PART-B

Q.5 a) A syphon aqueduct is to be designed. The following data at the crossing of a canal and drainage are to be used:

- i) Discharge of canal = 40 cumecs
- ii) Bed width of canal = 30 m.
- iii) Full supply depth of canal = 1.6m.
- iv) Bed level of canal = 206.4 m
- v) Side slopes of canal = 1.5 H:1V
- vi) High flood discharge of drainage = 450 cumecs.
- vii) High flood level of drainage = 207.00
- viii) Bed level of drainage = 204.50 m.
- ix) General ground level = 206.50 m.

Design drainage waterway, canal waterway for this structure.

10

b) Explain various types of cross-drainage works.

10

Q.6 a) Explain the design principle of various types of falls.

10

b) Design crest and cistern for unflumed straight glacis non-meter fall for following data:

- i) Full supply discharge = $\frac{u / s}{d / s} = 40 \text{ cumecs}$
- ii) Full supply level = $\frac{u / s}{d / s} = \frac{218.30}{216.80} \text{ m}$
- iii) Full supply depth = $\frac{u / s}{d / s} = \frac{1.8m}{1.8m}$
- iv) Bed width = $\frac{u / s}{d / s} = \frac{26m}{26m}$
- v) Bed level = $\frac{u / s}{d / s} = \frac{216.50}{215.00}$
- vi) Drop = 1.5m
- vii) Permissible exit gradient = $\frac{1}{6}$

10

Q.7 a) Explain in detail about the forces acting on a gravity dam with formula and explanation.

10

b) What are the modes of failure of a concrete gravity dam?

10

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

TRANSPORTATION ENGINEERING-II (C-604A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

Q.1 Write short notes on the following:

- a) Tack coat.
- b) Compaction of subgrade.
- c) Periodic Maintenance.
- d) Bump integrator.
- e) Road gullies.
- f) Road camber and its values.
- g) Freight Corridor.
- h) Rail gauge for B,C, and MG tracks with sketch.
- i) Aerodrome and airport.
- j) Taxiway.

2x10

PART-A

Q.2 a) Give complete procedure for construction of Bituminous Macadam (B.M) road.

10

b) Complete specifications of stone metal for both layers of W.B.M (grading and hardness parameters)

10

Q.3 a) Describe the types and causes of deterioration of flexible and rigid pavements in the post construction period after satisfactory construction.

10

b) Describe the causes and remedial measures for the following localized distresses in flexible pavements.

- i) Potholes
- ii) Ravelling
- iii) Allegator cracking

10

Q.4 a) Describe the measures for drainage of pavement surface, shoulders, side slopes and rainwater from adjoining land in case of National highway.

10

b) Calculate the depth of a trapezoidal lined drain with side slopes 1:1. bed width = 2m, n = 0.015, slope = 1 in 2500.

10

PART-B

Q.5 a) i) Give a complete cross-sectional view giving all dimensions of a single railway B.G track.

5

ii) Give the complete cross-sectional view with complete dimensions of the Railway Girder.

5

b) Describe the functions of sleeper in the railway track. Give the values for the following parameters of B.G Track:

- i) Sleeper Density.
- ii) Average value of end to end spacing.
- iii) Type of concrete.
- iv) Length and Weight.

10

Q.6 a) Briefly describe the five important factors to be considered for the selection of site of airport.

8

b) Calculate the actual length of the runway with the following data:

- i) Airport elevation = R.L 100 m
- ii) Airport surface temp = 28°C
- iii) Basic length of runway = 600 m
- iv) Level difference in two ends of runway = 3.0 m

10

Q.7 a) Describe three important methods of hard rock tunneling mentioning merits and demerits of each. Give sketch.

10

b) Explain two methods of tunneling in soft rock strata with proper sketches.

6

c) Necessity and method of providing ventilation in tunnels, explain.

4

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester
ENVIRONMENTAL ENGINEERING (C-605)

Time: 3 Hours

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all. **Q.1** is **Compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.

Q.1 Answer the following:

- a) What is DWF?
- b) What is sewer and sewerage?
- c) What is a depressed sewer?
- d) Elaborate steps involved in SWM.
- e) Define 'sanitary sewer'.
- f) What is fresh sewage and what is stale sewage?
- g) Write the BOD and TSS standard values for treated sewage discharge as per CPCB-India.
- h) What is the purpose of aeration of polluted water?
- i) What is self-purification capacity of a river?
- j) Define 'Eutrophication'.

2x10

PART-A

Q.2 a) Briefly discuss about the adverse effects of air pollution. Discuss in detail about the sources of air pollution with examples.

10

- b) Calculate the effective height of a stack given the following data:
 - i) Physical stack is 203 m tall with 1.07 m inside diameter
 - ii) Wind velocity is 3.56 m/s
 - iii) Air temperature is 13°C
 - iv) Barometric pressure is 1000 millibars
 - v) Stack gas velocity is 9.14 m/s
 - vi) Stack gas temperature is 149°C

10

Q.3 a) Why the generation of refuse varies from place to place? Discuss with example.

4

- b) What is composting? Give the methods employed for composting. Describe the method of composting by trenching in brief.

6

- c) In a solid waste management system, per capita solid waste under community bin collection system is 450 gm/day. Given that the density of solid waste is 650 kg/m³ and the population of that municipality ward is 2,00,000. Design the size and nos. of

community bin required for that ward. Consider 5-persons per family and 1-bin is to be provided for 25 families.

10

- Q.4 a) Discuss briefly advantages and disadvantages of various types of sewerage systems. What are the factors affecting the DWF?

10

- b) Design an outfall sewer running full in the separate system for a town with a population of 1,00,000 persons with water supply rate of 180 lpcd. The sewer is to be brickwork rendered smooth with cement mortar ($n=0.012$) and the slope is 1 in 1000.

10

PART-B

- Q.5 a) Determine one day BOD and 1st stage BOD of waste water, BOD_5 at 20° C is 180 mg/l. Assume $K_1 = 0.225d^{-1}$ base e.

10

- b) Discuss the objectives of analysis of sewage. Explain all types of main characteristics of sewage.

10

- Q.6 a) Discuss about the biological activities in functioning of a tricking filter.

6

- b) What are the operational problems found in a tricking filter?

4

- c) Design the activated sludge unit treatment with the following data for a town of population of 65000 (i) average sewage flow = 210 litres/c/day, (ii) BOD of the raw sewage = 210 mg/l, (iii) suspended solids in raw sewage=300 mg/l, (iv) BOD removal in primary treatment = 40%, (v) overall BOD removal = 90%.

10

- Q.7 a) Water are the preventive measures to be taken to control water pollution?

10

- b) A city with population of 1,00,000 and a water supply rate of 180 lpcd is located on a stream with a flow of 0.8m³/sec. The BOD of sewage is 200 mg/l. The DO and BOD content of stream above the outfall sewer is 7.8 and 2 mg/l.

- i) Find how many kg of oxygen per day is available above the outfall?
ii) What is the total kg of BOD per day in the stream just below the outfall assuming no oxidation takes place?
iii) Express total BOD in mg/l.

10

End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester
IT SERVICE DELIVERY (CS-606)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) List out various delivery models, with example.
- b) Discuss various activities and benefits of the capacity management.
- c) Define 'business continuity management'.
- d) Discuss the benefits of IT SCM.
- e) List out the things, SLM must serve.
- f) Enlist all the elements of procedure document associated with SLM.
- g) Define 'ITIL framework'.
- h) Discuss the elements of risk management preparation and planning in BCM.
- i) What is disaster recovery plan?
- j) Discuss value and supply chain processes.

2×10

PART-A

- Q.2** a) Define the term "multiple vendor interlock". Discuss its elements. How is multiple vendor environment managed? **10**
- b) Discuss SIAM (Service Integration and Management). Explain the drivers for adopting SIAM focused models. **10**
- Q.3** a) List out these service management processes, which are integrated with availability management. Explain them. **10**
- b) Explain all the elements of procedure documents in capacity management. **10**
- Q.4** a) Highlight and discuss the elements of SLA process flowchart in detail. **15**
- b) Give neat flowchart, explaining each step of SLM implementation. **5**

PART-B

- Q.5** a) Which 4 R's, if carried out smoothly in BCM implementation, can make BCM to be carried out smoothly. **10**
- b) Why business continuity standards are required? Discuss the common regulations, which have been laid down for running the BCM. **10**
- Q.6** a) List all the elements involved in the procedure document of IT service continuity management. Explain them. **10**
- b) What is disaster recovery plan? Discuss its elements in detail. **10**
- Q.7** Write short notes on (**any four**) of the following:
a) Demand and supplier.

- b) Integration of ITSCM with other processes.
- c) Risk analysis and management.
- d) Contingency planning.
- e) Tools and techniques for improving service availability.

5x4

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

IT APPLICATION DISCOVERY AND DEPENDENCY MANAGEMENT (CS-607)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

Q.1 Briefly answer.

- a) What is CIM stands for and what are the layers CIM schema?
- b) Define 'restricted qualifier'.
- c) What is CMDB?
- d) Management data repository must register itself to what service?
- e) What is TADDM?
- f) Which management process provide capacity of key CIs?
- g) Name the different phases which occur during the discovery lifecycle?
- h) Name the advantages of agent-less CI discovery.
- i) What are the features of agent-based auto discovery?
- j) How to install OS agent remotely? Is it mandatory to deploy OS-agent prior to non-OS-agent?

2×10

PART-A

- Q.2** a) What are the basics of common information model? Explain in detail. **10**
b) What is CIM Meta schema? Explain in detail. **10**
- Q.3** a) Explain in detail CMDB as the foundation for IT management processes. **10**
b) Explain in detail basics of federated CMDBs. **10**
- Q.4** a) Explain in detail the basics of automatic discovery. **10**
b) What type of modification can be done on Common Information Modes (CIM)? **10**

PART-B

- Q.5** a) What is agent-less auto discovery and what different probes are used in agent-less auto discovery? Explain in detail. **10**
b) What are the advantages and disadvantages of agent-less auto discovery? Also state the pros and cons of agent-less auto discovery. **10**
- Q.6** a) Explain in detail agent-based auto discovery. Also state the pros and cons of agent-based auto discovery. **10**
b) Explain the procedure for agent installation on networked devices. **10**
- Q.7** a) Explain the three activities involved in reconciliation of CIS in CMDB. **10**

b) What is unique identification of CIs? What are the computer system naming rules for unique identification of CIs? Also explain any four standard UIDs. **10**

End Semester Examination, Dec. 2018

BBA (GEN) / (Banking) BBA (G) IB) / B.Com. (Hons.) and
Industry Integrated — Fourth Semester
BUSINESS PROCESSES (CS-610)

Time: 2 hrs.

Max Marks: **50**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **PART-A** is compulsory. Attempt any **FOUR** questions from **PART-B**. Marks are indicated against each question.

PART-A

Q.1 Answer the following questions:

- a) List at least three components of SAP system.
- b) What is OLTP?
- c) How many sessions can be opened at a time on a SAP system?
- d) List all the information mentioned on "Status bar of a SAP system".
- e) What is meant by master data? Give an example.
- f) What is a transactional code?
- g) What is meant by product lifecycle management?
- h) What is the difference between sourcing and procurement?
- i) What is the significance of business intelligence tool?
- j) Briefly explain the sales order management process.

1×10

PART-B

Q.2 Explain in detail SAP ERP system and the various solutions it incorporates. Also discuss evolution of SAP ERP. **10**

Q.3 State the purpose of organizational structure in SAP system. Using a diagram, explain every element involved in organizational structure. **10**

Q.4 List and describe the forms of help in the SAP system. **10**

Q.5 Explain in detail the tasks associated with a procurement cycle in SAP. **10**

Q.6 Outline the tasks associated with SAP ERP human capital management. **10**

Q.7 Explain the different services SAP offers and the function of SAP service marketplace. **10**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester
BUSINESS PROCESSES (CS-610)

Time: 2 hrs.

Max Marks: **50**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1
- a) Give the difference between application and component.
 - b) What do you understand by R3 system in SAP?
 - c) What does following transaction codes signifies?
 - i) /n
 - ii) /o
 - d) What is sales order document?
 - e) What are the benefits of SAP SRM?
 - f) What does RFQ stands for in production life cycle?
 - g) Differentiate between assets and liabilities.
 - h) Define business intelligence.
 - i) What is SAP SRM?
 - j) What is material master data?

1×10

PART-A

- Q.2 What is SAP ERP system? Explain different SAP solutions in detail. **10**
- Q.3 Explain the screen structure of SAP easy access. Also explain the field help features (F1 and F4) in SAP. **10**
- Q.4 What is production order? Explain the task associated with production with the help of diagram. **10**

PART-B

- Q.5 What is procurement? Explain with the help of diagram procurement cycle. **10**
- Q.6 Explain purchase to pay process in financial accounting. **10**
- Q.7 Write short notes on:
 - a) OLTP vs OLAP.
 - b) SAP services.

5×2

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester
CLOUD DEPLOYMENT MODEL (CS-622)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1 a) Explain what is the full form and usage of “Eucalyptus” in cloud computing.
b) What is cloud bursting?
c) Explain the brief services offered by cloud computing.
d) What is NOVA?
e) Compare the following:
 i) Bare Metal hypervisor, hosted hypervisor.
 ii) Grid computing, cloud computing. **4×5**

PART-A

- Q.2 a) What is cloud computing? Enlist and explain three service models and four deployment models of cloud computing. **10**
b) What are the characteristic of cloud architecture that differs from traditional cloud architecture? **5**
c) Explain the challenges of cloud computing. **5**
- Q.3 a) Explain how does IBM takes its entry in the era of cloud and give the features and characteristics of platform of IBM (IBM smart cloud). **10**
b) Illustrate the advantages and limitations of private cloud. **5**
c) What is role of virtualization in the deployment of cloud? **5**
- Q.4 a) What is public cloud? What are the advantages and limitations of public cloud? **10**
b) Illustrate the limitations of public cloud:
 i) Low degree of security and control.
 ii) Lacks of control on infrastructure.
 iii) Network latency and accessibility.
 iv) Highest long term cost. **10**

PART-B

- Q.5 a) How back up and disaster recovery plan offered by a cloud vendor works in a cloud computing environment? **10**
b) What are the major key points should be taken in consideration while selecting a vendor for the public cloud deployment? **10**
- Q.6 a) What are the pros and cons of a hybrid cloud? **10**
b) Give a live scenario where choosing a hybrid cloud is beneficial? **10**

- Q.7**
- a) What are the key components of openstack? Explain each in detail. **10**
 - b) Define 'users', 'role' and 'tenants' in openstack. **5**
 - c) Mention what are the networking options used in openstack. **5**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

BACKUP AND DISASTER RECOVERY (CS-623)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 a) Compare ATL with VTL.
b) What are the components of a virtual machine?
c) Explain physical structure of LTO-6.
d) Monitoring, Alerting and Notification plays an important role in achieving HA. Explain.
e) What are the criteria's of HA? **4×5**

PART-A

- Q.2 a) What are the different disk storage devices used for backing up the data? **10**
b) What are the characteristics of disk storage devices? **7**
c) What are access centric drives? Give example. **3**
- Q.3 a) Explain backup. What are the different types of backup? **12**
b) Compare backup with Archiving. **4**
c) Explain recovery point objective. **4**
- Q.4 a) Explain high availability. Why high availability is required? **8**
b) What are the components that affects HA? **6**
c) Reliability, serviceability and availability are the key terms for HA systems. Explain. **6**

PART-B

- Q.5 a) What is HA clustering? What are its advantages? **10**
b) What are the different types of HA solutions? **10**
- Q.6 a) What is disaster recovery? What are the different types of disasters? How can we ensure business continuity? **10**
b) What is the importance of disaster recovery? **10**
- Q.7 a) Explain replication. What are the different types of replication used in DR? Explain with a neat diagram. **10**
b) What is a DR technology tree? Explain high availability and virtualization. **10**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester
DIGITAL FORENSICS (CS-626)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

Q.1 Answer the following:

- a) List various types of digital data.
- b) List tools for network forensic.
- c) What does it mean if someone says that he was victim of DDOS?
- d) Key logger examines which layers of OSI model.
- e) When we shutdown the system, which information is lost?
- f) Expert witness format is an example of _____.
- g) What is steganalysis?
- h) What are common forms of loss of data?
- i) _____ was implemented in order to allow compatibility with the hierarchical file system (HFS).
- j) What is the purpose of polyinstantiation? **2×10**

PART-A

- Q.2 a) As an forensic investigator which rules you should follow in case of a cyber-crime? **10**
b) Which information should be provided by the victim in case of hacking? Justify your answer by giving suitable examples. **10**
- Q.3 a) How wireshark can be used for forensic investigation? List some important display filters. **10**
b) How timestamp attack can be mitigated? Explain in detail. **10**
- Q.4 a) Explain different laws and regulation of IT Act. **10**
b) Write short notes on the following.
i) Acquisition of evidence.
ii) Analysis of the evidence. **10**

PART-B

- Q.5 a) Describe data acquisition process? How do we perform RAID acquisition? **10**
b) How cyber crime is defined in IT Act? Give structure of IT Act in India. **10**
- Q.6 a) How do we collect and analyze the evidences in mobile forensics? **10**
b) Differentiate steganography and steganalysis. How steganalysis is performed practically? **10**
- Q.7 a) List various tools for memory data examinations. Explain any one in detail. **10**

b) How do we discover and extract malware in Linux systems?

10

End Semester Examination, Dec 2018

B. Tech. — Sixth Semester

INFORMATION SECURITY AUDIT AND MONITORING (CS-627)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) What is the role of an CGO? Discuss in detail.
- b) Discuss culture in the methodology of BISA.
- c) Discuss information security as a business enabler.
- d) Describe audit evidence.
- e) What do you understand by identity and access management?

4×5

PART-A

Q.2 a) Draw information security framework and discuss why it is needed in information security? **10**
b) Discuss industry best practices in BISA. **10**

Q.3 Discuss the following control objective of ISO in detail:

- a) Management direction for information security.
- b) Mobile device policy.

10×2

Q.4 a) How can the cardholder data be protected? Discuss the two control objective of PCI-DSS. **10**
b) Discuss the requirement “Protect all systems against malware and regularly update anti-virus software or programs” in detail. **10**

PART-B

Q.5 a) Describe the baseline control “Removable media” and “Metrics” in BFSI security. **10**
b) Describe UASL agreement in security in telecom sector. **10**

Q.6 Discuss audit planning and audit execution in detail. **20**

Q.7 Discuss in detail the business skills, communication skills and interpersonal skills for auditors. **20**

End Semester Examination, Dec 2018

B. Tech. — Sixth Semester
IT SYSTEM SECURITY (CS-628)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Differentiate between memory token and smart token.
- b) What is the concept of hybrid cryptography system? Explain with example.
- c) What is the purpose of rootkit?
- d) How encryption is done in IPsec?
- e) Why Gartner's magic quadrant is useful in endpoint security? **4×5**

PART-A

- Q.2 a) What are the critical pillars in the endpoint security in BYOD (Being your own device)? **10**
- b) Explain the different modes in endpoint encryption. **10**
- Q.3 Consider a hypothetical IT department in the ministry of electronics and IT. Explain the complete scenario to deal with IT security issues in its operating environment. **20**
- Q.4 a) What is a sandboxing technique? Why is it required? **10**
- b) Differentiate between security system in windows and mobile OS. **10**

PART-B

- Q.5 Enlist and explain the strength and limitations of the following in terms of security:
i) Bit defender.
ii) IBM.
iii) Eset. **20**
- Q.6 a) Explain the security architectures of Oracle application server. **10**
b) How SSL session is negotiated? Enlist all the steps. **10**
- Q.7 a) What are the different database attacks? Explain each in detail. **10**
b) How can the database be made secure? Write the different measures also. **10**

End Semester Examination, Dec 2018

B. Tech. — Sixth Semester
COMPILER DESIGN (CS-701)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Write a regular expression for an identifier.
- b) List various compiler construction tools.
- c) Differentiate token and pattern.
- d) Define 'context free grammar'.
- e) What is flow graph?
- f) Write an algorithm to find FIRST of the grammar.
- g) What do you mean by handle pruning?
- h) Define "Symbol table".
- i) Explain left factoring with an example.
- j) Differentiate Compiler and Interpreter.

2×10

PART-A

Q.2 a) Write down the output of each phase of the compiler for the expression:

$$a \asymp b + c * 60$$

8

b) Construct DFA to recognize the language $(a/b)^*abb$.

7

c) Write algorithm for minimizing the number of states of a DFA.

5

Q.3 a) Construct SLR parsing table for the following grammar G:

$$G : E \xrightarrow{\quad} E + T / T$$

12

$$T \xrightarrow{\quad} T * F / F$$

$$F \xrightarrow{\quad} (E) / id$$

b) Explain ambiguous grammar G:

$$E \xrightarrow{\quad} E + E / E * E / (E) / - E / id \text{ for the string } id + id * id$$

8

Q.4 a) Define "Elementary data type" and also write specification and implementation of EDT.

10

b) How subprogram sequence can be controlled? Explain in detail.

10

PART-B

Q.5 a) Explain synthesized attributes with the help of an example.

2

b) Explain syntax directed translation scheme with an example.

8

c) Write a short note on various representations of three address code.

10

Q.6 a) Define "Error" with its types and also explain different error recovery techniques available.

10

- b) Explain how linked list is different from self-organizing list. **5**
- c) Why do we need symbol table? Explain **5**
- Q7 a) Define "DAG". Explain DAG representation of basic block. Also draw DAG for the following statement:
 $a := (a + b * c) \hat{+} (b * c) + b * c * a;$ **10**
- b) Explain "Loophole optimization". **5**
- c) What are different code generator design issues? Explain. **5**

End Semester Examination, Dec. 2018

B. Tech. – Seventh Semester

SOFTWARE DEVELOPMENT PROCESS (CS-702)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1 a) Explain encapsulation using UML notation. **4×5**
b) Why we will use swimlanes in activity diagram?
c) What do you mean by reflexive relationship?
d) How inheritance is created in rational rose?
e) What are the goals of iterative planning process?

PART-A

- Q.2 a) Give the advantages of object oriented methodologies over traditional methodologies. **5**
b) Explain different types of concepts used in object oriented methodologies by using UML notations. **15**
- Q.3 a) Draw and explain activity diagram of ATM. **10**
b) Explain different components of use case diagrams and their relationships with the help of example. **10**
- Q.4 a) Explain “naming relationships” and “role names”. **5**
b) Draw and explain the class diagram of ATM. **15**

PART-B

- Q.5 a) Draw and explain the sequence diagram of online shopping. **10**
b) Draw and explain the collaboration diagram of online shopping. **10**
- Q.6 a) Explain the need and different views of architecture in detail. **15**
b) Explain the requirement of combining classes, splitting classes and eliminating classes. **5**
- Q.7 a) Explain iteration planning process. **15**
b) Explain emergence of pattern. **5**

End Semester Examination, Dec 2018

B. Tech. — Sixth Semester

SOFTWARE DEVELOPMENT PROCESS (CS-702)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Explain the advantage of object oriented software development methodologies.
- b) Explain swimlanes with the help of example.
- c) Explain multiplicity indicators and role names with the help of examples.
- d) How you will analyse the object behavior? Explain in detail.

4×5

PART-A

- Q.2 a) Draw and explain any two traditional software life cycle models. **10**
- b) Explain the concept of inheritance and polymorphism. **10**
- Q.3 a) Explain different components of activity diagram. **10**
- b) Draw and explain activity diagram of ATM. **10**
- Q.4 a) Explain the state and behavior of class diagram with the help of example. **10**
- b) Explain different types of relationships used in class diagrams. **10**

PART-B

- Q.5 a) Draw and explain the sequence diagram of on-line shopping. **10**
- b) Draw and explain the collaboration diagram of ATM. **10**
- Q.6 a) Explain combining classes, splitting classes and eliminating classes. **10**
- b) Explain the different views of 4+1 architecture. **10**
- Q.7 a) What are the benefits and goals of iteration planning process? **10**
- b) Explain different phases of iteration planning process. **10**

End Semester Examination, Dec. 2018

B. Tech. — Sixth / Seventh Semester

SYSTEM PROGRAMMING AND SYSTEM ADMINISTRATION (CS-703)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Differentiate between compilers and interpreters.
b) Define dynamic binding.
c) What are the various file extensions supported by unix operating system?
d) What are software tools?
e) What do you understand by standare I/P?
f) How do we stop a backgroup process in unix?
g) Give an example of absolute and relative path names.
h) What is demand paging?
i) Define assembler.
j) Discuss features of unix. **2x10**

PART-A

- Q.2 a) Discuss the role of system software in computers. **10**
b) Define program generators and debug monitors. **10**
- Q.3 a) What are loaders? Explain general loader scheme and compare it to compile-and-go loaders. **10**
b) Draw the flow chart of pass 2 of assembler. Explain. **10**
- Q.4 a) Write short notes on:
i) I Nodes.
ii) Vi editor. **10**
b) Discuss the unix file system in context of blocks and frgments. **10**

PART-B

- Q.5 a) Explain the unix directory system in details. **10**
b) Write a shell script for calculating factorial of a number. **5**
c) How can we compare and sort files in UNIX? **5**
- Q.6 a) Who is a system administrator? How do we create group, add users and change the passwords in UNIX system. **10**
b) Discuss the relative and absolute method for changing file permissions. **10**
- Q.7 a) What are the steps for maintaining an operating system? **10**
b) Write in brief about:
i) Xcon-device drives.
ii) System software. **5x2**

End Semester Examination, Dec. 2018

B. Tech. – Seventh Semester

INFORMATION SECURITY INTELLIGENCE AND COMPLIANCE ANALYTICS (CS-705)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) Describe the characteristics of Big data.
- b) Restate importance of analyzing big data.
- c) What are the factors that affect big data success?
- d) List four roles of SPLUNK.
- e) Define HDFS in detail.

4x5

PART-A

Q.2 a) What are nuances faced by big data? Explain various factors affecting big data nuances.

8

- b) Discuss why security analytics in business process is important. Explain the functions of security analytics tools. What are advantages of security analytics? **12**

Q.3 a) What are the factors affecting N/W configuration Management?

5

- b) Define the tool that is used by Big Data scientist for data mining. Also state its features and work done by it.

15

Q.4 Explain the process of big data acquisition in detail with help of neat labeled diagram.

20

PART-B

Q.5 Why protecting big data analytics is important? Explain in detail various features of big data security analytics.

20

Q.6 a) What are various precautions taken in practicing big data?

10

- b) Describe the difference between expediency and accuracy.

10

Q.7 a) Analyze the basics of in-memory processing for big data.

10

b) Describe the in-depth process followed by Big data pipeline.

10

End Semester Examination, Dec. 2018

B. Tech – Seventh Semester
IT NETWORK SECURITY (CS-706)

Time: 3 Hours

Max Marks: **100**

No. of pages: 1

Note: Attempt any **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following:

- a) Differentiate between Switch, Router and Gateway with an example?
- b) What is SYN flooding?
- c) Explain the importance of BASTION host in firewalls.
- d) What are the special features of Net view?
- e) What is the importance of Penetration Testing in Business?

4x5

PART-A

Q.2 a) Explain the TCP/IP model by characterizing each layer with its functions and various attacks.

10

- b) What is a network? How many types of networks are there? Discuss various network topologies?

10

Q.3 a) Explain the process of handshaking in SSL.

5

- b) What is NFS? Discuss its advantages and disadvantages?

5

- c) How DHCP plays a significant role in network security? Discuss.

10

Q.4 a) What are the different types of Firewalls? Explain the hardware and software firewall with an example?

10

- b) Describe the working of VPN with its components?

10

PART-B

Q.5 a) Briefly explain the various WAN technologies.

10

b) Differentiate between WEP, WPA and WPA2. What are the advantages and disadvantages of wireless networks?

10

Q.6 Write short notes on the following:

a) Open view.

10

b) Net Manager.

10

Q.7 a) Why penetration testing is essential? Explain the stages of testing?

10

b) Explain the various types and methods of penetration testing?

10

End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester

NETWORK SECURITY AND MANAGEMENT (CS-721A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **ANY TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) What is the necessity of public key and private key in cryptography?
- b) Define security service and security mechanism.
- c) Differentiate between tunnel mode and transport mode.
- d) Discuss the design principle of block cipher technique.
- e) What are the confusion and diffusion properties of modern ciphers?

4×5

PART-A

Q.2 a) What is encryption and decryption? Draw a block diagram showing the mechanism of converting a plaintext into encrypted 4 decrypted forms. **10**

- b) Encrypt the message "All is well" using key
$$\begin{vmatrix} 17 & 17 & 5 \\ 21 & 18 & 21 \\ 2 & 2 & 19 \end{vmatrix}$$
. **10**

Q.3 a) What is avalanche effect? **4**
b) Compare CBC mode with CFB mode and also explain which one is better. **8**
c) Given $p=19$, $q=23$ and $e=3$ use RSA algorithm to find n , $Q(n)$ and d . **8**

Q.4 a) What is firewall and what are its different types? Discuss the design principle of firewall. **10**
b) Define intrusion detection and also give the classification of intrusion detection. **10**

PART-B

Q.5 a) Give the structures of HMAC and also explain the application of HMAC. **10**
b) What are the threats associated with digital signature scheme? What is the difference between arbitrated digital signature and direct digital signature? **10**

Q.6 a) What is IPsec protocol? Explain in detail with operation mode and its application. Draw the frame format of IPsec also. **10**
b) Explain the different data compression techniques in detail. **10**

Q.7 Write short notes on the following:

- a) Comparison of SNMPV1 and SNMPV2.
- b) Network management model. **10×2**

End Semester Examination, Dec. 2018

B. Tech. — Sixth / Seventh Semester

NETWORK SECURITY AND MANAGEMENT (CS-721A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) What is the necessity of public key and private key in cryptography?
- b) Define security service and security mechanism.
- c) Differentiate between tunnel mode and transport mode.
- d) Discuss the design principle of block cipher technique.
- e) What are the confusion and diffusion properties of modern ciphers?

4×5

PART-A

Q.2 a) What is encryption and decryption? Draw a block diagram showing the mechanism of converting a plaintext into encrypted and decrypted forms. **10**

- b) Encrypt the message "All is well" using key
$$\begin{array}{|ccc|} \hline 17 & 17 & 5 \\ \hline 21 & 18 & 21 \\ \hline 2 & 2 & 19 \\ \hline \end{array}$$
 using Hill Cipher. **10**

Q.3 a) What is avalanche effect? **4**
b) Compare CBC mode with CFB mode and also explain which one is better. **8**
c) Given $p=19$, $q=23$ and $e=3$ use RSA algorithm to find n , $Q(n)$ and d . **8**

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PART-B

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b) What are the threats associated with digital signature scheme? What is the difference between arbitrated digital signature and direct digital signature? **10**

Q.6 a) What is IPsec protocol? Explain in detail with operation mode and its application. Draw the frame format of IPsec also. **10**
b) Explain the different data compression techniques in detail. **10**

Q.7 Write short notes on the following:

- a) Comparison of SNMPV1 and SNMPV2.
- b) Network management model.

10×2

End Semester Examination, Dec. 2018

B. Tech – Seventh Semester

NETWORK SECURITY AND MANAGEMENT (CS-721A)

Time: 3 Hours

Max Marks: **100**

No. of pages: 1

Note: Attempt any **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following:

- a) What is Cryptanalysis?
- b) Is the data block and key length different in DES?
- c) Can encryption and decryption be done with same key in public key cryptography? Explain briefly.
- d) What is message digest?
- e) Which scheme uses encryption one by one character?
- f) How electronic transaction can be made more secure?
- g) How data compression can affect transmission?
- h) Discuss the limitations of firewalls.
- i) Differentiate between HASH function and MAC
- j) What is purpose of S box in DES?

2x10

PART-A

Q.2 a) Show encryption and decryption using transposition cipher
PT - Network security and management
Key- 531246

10

- b) Explain OSI security architecture in detail.

10

Q.3 a) Define DES and discuss in detail.

10

- b) Show encryption and decryption using RSA.

P=3 Q=7 e=5 M=6
10

Q.4 a) What is firewall? Discuss different types of firewall.

10

- b) Define virus. Give different phases of life of a virus. Also differentiate virus with worm.

10

PART-B

- Q.5 a) What are different ways to provide authentication?
10
- b) How digital signatures provide security. Discuss in detail.
10
- Q.6 a) What is need of IPsec? Give architecture of IPsec in detail.
10
- b) Explain the process of dual signatures in secure electronic transactions.
10
- Q.7 a) Discuss network management model. Also discuss SNMPV1.
10
- b) How administrator can do risk management what are the possible ways to identifying risk. Explain in detail.
10

End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester
SOFTWARE TESTING (CS-723A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **ANY TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) When should a tester start testing in a project?
- b) What is the difference between CMMI and ISO standards?
- c) What is race condition related to software testing?
- d) What is the difference between alpha and beta testing?
- e) What are the stages of an inspection process?
- f) What is recovery testing? Give some examples.
- g) What are the elements of security testing?
- h) Explain the deyeared states of bug.
- i) Define bug and why do they occur?
- j) Discuss the advantages and disadvantages of automation testing.

2×10

PART-A

Q.2 a) Briefly discuss the objectives and limitations of testing. **5**
b) Explain life cycle of bugs with the help of diagram. **5**
c) Explain performance and integration testing in detail. **10**

Q.3 a) What do you understand by quality assurance management? Explain in detail. **10**
b) What is CMMI? What is the difference between CMMI and CMM? **10**

Q.4 a) A program reads an integer number within the range [1, 100] and determines whether it is a prime number or not. Design test cases for this program using BVC (boundary value checking), robust testing and worst case testing methods. **10**
b) A program reads three numbers A, B, C within the range [1, 50] and prints largest number. Design test cases for this program using equivalence class partitioning method of functional testing. **10**

PART-B

Q.5 a) Draw and explain the flowchart to show overall mutation testing process. **6**
b) What is cyclomatic complexity? How can we relate this to independent paths? **4**
c) Discuss the data flow testing in detail with example and design all test cases from independent paths. **10**

Q.6 a) Write down the differences between static and dynamic testing? **5**
b) Write short notes on following automation testing tools:
i) Load runner.
ii) Quick test professional (QTP).

- iii) Selenium. **5×3**
- Q.7 a) What is the difference between testing procedural software and object oriented software? **10**
- b) What will be the criteria for performing unit testing, integration testing and system testing of a web application? **10**

End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester

SOFTWARE TESTING (CS-723A)

Time: 3 hrs. Max Marks: **100**
No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 Answer the following questions: **2×10**
- a) When should a tester start testing in a project?
 - b) What is the difference between CMMI and ISO standards?
 - c) What is race condition related to software testing?
 - d) Difference between alpha and beta testing?
 - e) What are the stages of an inspection process?
 - f) Define recovery testing? Give some examples.
 - g) Give the elements of security testing?
 - h) Explain the deyeared state of bug.
 - i) Define bug and why do they occur?
 - j) Discuss the advantages and disadvantages of automation testing.

PART-A

- Q.2 a) Briefly discuss the objectives and limitations of testing. **5**
- b) Explain life cycle of bugs with the help of diagram. **5**
- c) Explain performance and integration testing in detail. **10**
- Q.3 a) What do you understand by quality assurance management? Explain in detail. **10**
- b) What is CMMI? What is the difference between CMMI and CMM? **10**
- Q.4 a) A program reads an integer number within the range [1, 100] and determines whether it is a prime number or not. Design test cases for this program using BVC (boundary value checking), robust testing and worst case testing methods. **10**
- b) A program reads three numbers A, B, C within the range [1, 50] and prints largest number. Design test cases for this program using equivalence class partitioning method of functional testing. **10**

PART-B

- Q.5 a) Draw and explain the flowchart to show overall mutation testing process. **6**
- b) What is cyclomatic complexity? How can we relate this to independent paths? **4**

- c) Discuss the data flow testing in detail with example and design all test cases from independent paths. **10**
- Q.6 a) Write down the differences between static and dynamic testing? **5**
 b) Write short notes on following automation testing tools:
 i) Load runner.
 ii) Quick test professional (QTP).
 iii) Selenium. **5x3**
- Q.7 a) What is the difference between testing a procedural software and object oriented software? **10**
 b) What will be the criteria for performing unit testing, integration testing and system testing of a web application? **10**

End Semester Examination, Dec. 2018

B. Tech – Seventh Semester

SOCIAL WEB AND MOBILE ANALYTICS (CS-727)

Time: 3 Hours

Max Marks: **100**

No. of pages: 1

Note: Attempt any **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1 Answer the following:
- a) How web analytics is different from mobile analytics? Explain each with an example.
 - b) Explain different drill-down capabilities of a dashboard.
 - c) What are the benefits of email marketing?
 - d) Explain cold calling. What are the problems associated with cold calling email?
 - e) What is the impact of social media analytics? What are the different techniques used for it? **5x4**

PART-A

- Q.2 a) Why analytics is important? What are the different types of analytics? Explain each with an example. **10**
 b) What are the different analytics platforms used for social media and web analytics? **10**
- Q.3 a) How a waterfall strategy can be implemented for social media analytics? **10**
 b) What is a metrics? How does a standard metric differs from a critical web metrics? **10**

Q.4 a) Explain the following terms with an appropriate example:

- a) Semantic_and sentiments analysis.
- b) Sentiment terms and Guidelines.
- c) Segmentation.
- d) Content creation and tracking.
- e) Social media content creation process.

5x4

PART-B

Q.5 a) Explain with a neat diagram the WAP gateway and GGSN support.

10

- b) i) Why WAP gateway is required.
- 5
- ii) What is the role of GGSN support?

5

Q.6 a) What is a multi-channel campaign optimization? What are the challenges involved in it?

10

- b) What is content categorization? How is it done?

10

Q.7 What is email marketing? Why is it required and what are the features of email marketing tools?

20

End Semester Examination, Dec. 2018

B. Tech – Seventh Semester

IT DATA CENTRE TRANSFORMATION (CS-728)

Time: 3 Hours

Max Marks: **100**

No. of pages: 1

Note: Attempt any **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

Q.1 Attempt the following:

- a) What is ATS in electrical infrastructure?
- b) Give description of HVAC.
- c) Discuss the various security issues related to data centre.
- d) What are Hypervisors?
- e) What do you mean by Hot aisle and Cold aisle?

4x5

PART-A

Q.2 a) Describe data centre. Explain the key components of data centre.

10

b) How data centre is formed? Why there is a need for data centre transformation?
10

Q.3 a) How will you optimize IT infrastructure using cloud computing?

10

b) Discuss the procedure to optimize cooling across the data centre.
10

Q.4 a) Explain liquid cooled server. How is it designed?

10

b) What is Proxmox? How it can be used to perform server virtualization?
10

PART-B

Q.5 a) Discuss the challenges for today's Data Centre. Write attributes of smart Data Centre.

10

b) What do you mean by power usage effectiveness? Write its measurement levels.
10

Q.6 a) Explain the key element for data centre environment monitoring.

10

- b) What is HVDC? Write the advantages of HVDC over AC.
10
- Q.7 a) What is green Data Centre? Write its requirements.
10
- b) How virtualization is used to optimize server in data centre?
10

End Semester Examination, Dec. 2018

B. Tech. (CSE-IBM) – Seventh Semester

TECHNOLOGY AND TOOLS FOR INFRASTRUCTURE MANAGEMENT (CS-729)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

- Q.1 Answer Briefly:
- a) Explain why Infrastructure-as a service (IaaS) is necessary for an organization.
 - b) What is virtual chat?
 - c) What do you mean by asset management?
 - d) Explain the significance of using ITSM Tools for IT Infrastructure Management.
 - e) Why HEAT is considered an Unified Endpoint Management?
 - f) Which module is responsible for monitoring activities and events in IT Infrastructure?
 - g) How change management is helpful in effective workflow?
 - h) Which functionality of HPOV makes it unique?
 - i) What is IT monitoring meant for?
 - j) State the minimum requirements of HEAT software ITSM tool.
- 2x10**

PART-A

- Q.2 a) What do you mean by virtualization? Why achieving virtualization is necessary for an organization?
10
- b) State the differences between software defined applications and web-scale infrastructure.
5
- c) Explain why web-scale infrastructure is necessary for an organization.
5

- Q.3 a) Draw and explain labelled diagram of BMC (remedy).
10
- b) What is change management? Explain change management automation process in detail.
10

- Q.4 a) What are custom applications and platform administrations?
5

b) What benefits does BMC Remedy offers?
5

c) Explain Cherwell's problem management process with diagram.
10

PART-B

- Q.5 a) What is the need of IT infrastructure monitoring?
10

b) Discuss the features and benefits of HP open view (HPOV).
10

Q.6 a) What are the requirements of IP Host ITSM tool? Also, discuss the main features of IP Host ITSM tool in detail.
10

b) What are the tools required for IT service desk management to overcome the challenges faced by an organization?
10

Q.7 a) Write down the features of ServiceNow.
10

b) Discuss the roles and responsibilities of each of the following personal in context to case study:

i) Service Desk Manager.	ii) Configuration Manager.
iii) Change Manager.	iv) Problem manager.
v) Release Manager.	

End Semester Examination, Dec. 2018

B. Tech. — Fifth Semester
BUSINESS INTELLIGENCE (CS-741)

Time: 3 hrs. Max Marks: **100**
No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 Answer the following questions: **2×10**
- a) Define "Report".
 - b) What is cross tab?
 - c) List any five benefits of BI.
 - d) What is association rule mining?
 - e) List some ways of performing advance analytic.
 - f) What does BI report contain?
 - g) What do you understand by mobile BI?
 - h) What is fact table?
 - i) Explain drill down operation.
 - j) What are various alerts in BI?

PART-A

- Q.2 a) Differentiate between OLAP and OLTP. What are the different types of OLAP in data warehouse? **10**
- b) What do you understand by analytics? Explain various types of analytics with example. **10**
- Q.3 a) Explain various approaches of building a data warehouse. **10**
- b) Contrast data warehouse with data marts. **10**
- Q.4 a) What are the major reasons that make real time BI a necessity? **6**
- b) Explain the types of dashboards with the help of examples. **7**
- c) What do you understand by metadata? Explain various types of metadata. **7**

PART-B

- Q.5 a) Explain project planning activities with the help of suitable diagram. **10**
- b) What are the common project risks? Explain any two in details. **10**
- Q.6 a) Explain the different types of charts in a BI reports and also write their applications. **10**
- b) What are the operations that can be performed on BI report? **10**
- Q.7 a) What is data warehouse? Explain its advantage and disadvantages and also explain data warehouse architecture. **10**
- b) What is EPM? Explain in detail. **10**

End Semester Examination, Dec. 2018

B. Tech. – Fifth / Eighth Semester

BUSINESS INTELLIGENCE (CS-741)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) Define Business Intelligence.
- b) What is fact based decision making?
- c) What is cross tab?
- d) Give advantage of BI over traditional business systems.
- e) Distinguish between ROLAP and MOLAP.
- f) Why should dashboards be used in decision making process?
- g) Explain the use of Alerts.
- h) List different backup strategies.
- i) Distinguish between drill-up and drill-down operations using example.
- j) What are Metrics?

2x10

PART-A

Q.2 a) How Business Intelligence is helping organizations in better decision making? Explain any five applications of BI.

10

b) Contrast the role of Business Analyst and Data Scientist with software engineers.

10

Q.3 a) Explain ETL process in detail.

5

b) Define Data Warehouse. What are the various characteristics of Data warehouse? Explain Snowflake Schema in detail.

15

Q.4 a) Write short notes on:

- i) BI Alerting
- ii) BI Guided Analysis
- iii) BI Driven Risk Analysis
- iv) BI Driven Decision Analysis

10

b) What are “ad-hoc Query” tools? Differentiate between business query and reporting tools.

10

PART-B

Q.5 a) Explain Project planning activities with the help of suitable diagram

10

b) Describe how to design and plan a BI project? Also, Explain tasks of a BI project.
10

Q.6 a) Explain K-N Balanced scorecard. Write limitations of K-N Balanced Scorecard.

15

b) Write a short note on 'map report'.

5

Q.7 Explain the following:

a) Server Administration

6

b) Enterprise performance Management

7

c) Test Mining

7

End Semester Examination, Dec. 2018

B. Tech – Seventh Semester
MERGING THE CLOUD (CS-746)

Time: 3 Hours

Max Marks: **100**

No. of pages: 1

Note: Attempt any **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following:

- a) Define deterrent control.
- b) What are the challenges of IT function in cloud transformation?
- c) What is federated provisioning?
- d) Explain ARIMA
- e) Define polling agent.
- f) What is patching? Name the tools for patch management.
- g) What is virtualization?
- h) What is service orchestration?
- i) Differentiate between internal and external access security.
- j) What is the role of service catalog manager?

2x10

PART-A

Q.2 a) Discuss smart metering-workflow in detail.

8

b) Comment on the role of cloud provisioning in a cloud environment. Also explain how cloud provisioning works.

12

Q.3 Answer the following:

a) Discuss the possible cloud computing solutions for enterprise.

8

b) What are the steps for running a PC health checkup?

8

c) Comment, why manual patching is mandatory in enterprise framework.

4

Q.4 a) Discuss the role of Administrator and Catalog Administrator in setting-up a service catalog.

10

b) What is troubleshooting? Explain the following terms in troubleshooting:

- i) Half splitting
- ii) Reproducing
- iii) Intermittent Symptoms

iv) Multiple problems

10

PART-B

Q.5 a) Briefly explain application hosting on cloud.

10

b) Discuss the cloud computing implementation using IBM smart cloud for service provider offerings.

10

Q.6 a) Explain the steps for designing a cloud service catalogue.

7 b) With the help of a diagram, explain the operational view for cloud service usage **7**

c) Write short note on service development and on boarding.

6

Q.7 a) Briefly explain the following types of attacks:

- i) SQL Injection attacks
- ii) Cross-Site Scripting (XSS) attacks
- iii) Man In the Middle (MIM)
- iv) Sniffer attacks

10

b) Briefly explain patch management in cloud.

10

End Semester Examination, Dec. 2018

B. Tech. — Sixth / Seventh Semester

MANAGING THE CLOUD (CS-746)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) What is the role of system administration?
- b) Define "Virtualization".
- c) Differentiate between external access security and internal access security.
- d) Define "Advance provisioning".
- e) What are the cloud computing benefits to client/consumer?
- f) Define "Storefront".
- g) What is cloud usage monitor?
- h) What are the objectives of managing security and resiliency?
- i) Define "Downtime".
- j) What are the cloud challenges for patch management? **2×10**

PART-A

- Q.2 a) Discuss the general architecture of cloud work management. **10**
- b) Explain the four dimension of cloud provisioning. **10**
- Q.3 a) Discuss the architecture of smart metering. **10**
- b) What are the benefits of using applications manager's cloud monitoring features? **5**
- c) Explain how cloud computing affects the job roles in the infrastructure support team. **5**
- Q.4 a) Discuss the challenges and critical success factors of service catalog management process. **10**
- b) Write short notes one DevOps. **5**
- c) What are the principles of configuration management? **5**

PART-B

- Q.5 a) Discuss the shared system capabilities for cloud security. **10**
- b) Briefly explain aggregation business model. **5**
- c) Discuss the importance of cloud computing to the service ecosystem. **5**
- Q.6 a) Discuss the need for developing an optimum service catalog. **7**
- b) What is the need to align any organization to the cloud strategy? **7**
- c) Differentiate between Brownfield and Greenfield. **6**
- Q.7 a) What are the different cloud security controls? **7**
- b) Discuss the security risk associated with cloud. **7**

c) Discuss the patch management in cloud.

6

End Semester Examination, Dec. 2018

B. Tech. – Seventh Semester

CLOUD PERFORMANCE TUNING (CS-747)

Time: 3 hrs

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

- Q.1 a) What are the elements of cloud infrastructure?
b) What is unloaded latency?
c) Differentiate between process and program.
d) Explain the security issues in cloud computing.
e) Name the different cloud service providers.
f) Explain intel smart memory access.
g) comment on the term 'memory over commitment'.
h) Mention different CPU scheduling algorithms.
i) Define the term 'hypervisor'.
j) What is the benefit of caching in performance tuning?

2x10

PART-A

- Q.2 a) Explain the component and technique which help operating system to run on a multiple single hardware at the same time.

10

- b) Describe heterogeneous computing and hibernation in computing.
c) How the following cloud infrastructure components helps in performance tuning:
i) Hardware ii) Storage iii) Operating system.

10

- Q.3 a) Explain the architecture of Opteron revision F processor.

10

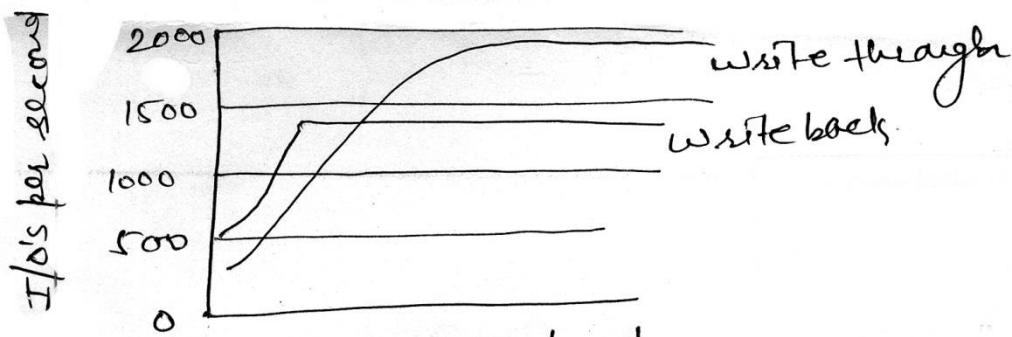
- b) What do you mean by 64 bit computing? What are the benefits of 64 bit computing over 32 bit computing?

10

- Q.4 a) According to advanced configuration power interface, discuss three states that can be used to reduce power consumption on CPU.

10

- b) What is 'write backs' and " write through mode". Explain how write back mode is faster. Explain the scenario given in below diagram.



Compare write- through versus write back

→ 8KB random I/O

→ Mix: 67/33 R/W

Compare write through and write back modes under increasing load.

10

PART-B

- Q.5 a) What are the various scheduling criterias?

10

- b) Explain queuing model.

3

- c) What are the various types of latencies that effect performance of real time systems?

7

- Q.6 a) Define hyper-threading. What are the operating systems that support hyper-threading?

10

- b) Explain the following terms in relation with tuning practices of VM memory:

- i) Ballooning.
- ii) Memory over commitment.

10

- Q.7 a) What is database tuning? Why it is required to tune the database.

10

- b) Discuss the various types of database tuning.

10

End Semester Examination, Dec. 2018

B. Tech. – Seventh Semester

INTRODUCTION TO IOT (CS-764)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) Explain Technical overview of RFID.
- b) How device authentication can be done?
- c) Discuss wearable devices in detail.
- d) Write briefly the working of satellite communications.

5x4

PART-A

Q.2 a) Explain IoT conceptual model with suitable diagram.

10

b) How IoT communication can be achieved? Demonstrate with an example.

10

Q.3 a) Define the term “automation” in context to IoT and mention its implementation at in home.

10

b) How Asset Management can be done with the help of IoT?

10

Q.4 a) Explain various design approaches used for IoT service layer APIs.

5

b) Briefly explain IoT application development process with suitable diagram.

15

PART-B

Q.5 a) What is ZigBee and explain the types in detail.

10

b) Explain different network devices which are used in IoT applications.

10

Q.6 a) Write main requirements of IoT communication process.

10

b) Compare and contrast between USIM card and SIM card.

10

Q.7 a) Explain M2M service connection procedure based on TLS-PSK.

10

b) How secure communication can be achieved in IoT?

10

End Semester Examination, Dec. 2018

B. Tech. — Seventh Semester
INTRODUCTION TO IOT (CS-764)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **ANY TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) How IOT helps to protect your home or office building?
- b) Explain infrastructure of IOT devices in detail.
- c) How Ival act as a precondition for M2M service bootstrap?
- d) Define main components of hardware and software design of IOT with diagram. **5x4**

PART-A

- Q.2 a) What is IOT and how it is different from telemetry? **8**
- b) Explain different communication networks in context to IOT. **12**
- Q.3 a) What is SCADA software? Explain it in detail with block diagram. **12**
- b) How IOT is applied in logistics? Explain with example. **8**
- Q.4 a) Explain IOT application development process in detail. **12**
- b) Define various requirements of API's and protocols with respect to the IOT service layer. **8**

PART-B

- Q.5 a) Define "Sensors" and how they are used in IOT applications. Explain various sensors which are used in IOT applications. **15**
- b) Explain architecture of wireless networks. **5**
- Q.6 a) While designing wireless sensors network, number of design challenges are faced. Explain them in detail. **10**
- b) Explain different software platforms available for M2M applications. **10**
- Q.7 a) What do you mean by security threats and explain different security threats for IOT. **10**
- b) Write short note on "M2M service connection procedure based on TLS-PSK". **10**

End Semester Examination, Dec. 2018

B. Tech. – Seventh Semester

INTRODUCTION TO IoT (CS-764)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) Define IoT and explain component based IoT reference model.
- b) Discuss main variants in validation.
- c) How sensors are important in IoT application?
- d) Explain issues that can be occurred during wireless sensor design?

4x5

PART-A

Q.2 a) Discuss IoT connectivity and software providers in detail.

10

- b) Demonstrate applications of IoT in different domains?

10

Q.3 a) What is telemetry process? Explain its components in detail with suitable diagrams. **12**

- b) Explain NEXT-Generation kiosks-self-service technology in detail.

8

Q.4 a) Write short notes on "IoT Hosted Services".

8

- b) Explain different API's and protocols used in IoT application development process.

12

PART-B

Q.5 a) How Wi-fi works? Explain different topologies involved in it.

10

- b) Define RF wireless sensors and discuss RF powered sensor node architecture in detail.

10

Q.6 a) Write short note on "State of the art" of the RFID based healthcare application.

8

- b) Explain various challenges of IoT connectivity and how they can be managed.

12

Q.7 a) Discuss IoT security Framework in detail.

10

b) Explain different procedures involved in Secure Booting.

10

End Semester Examination, Dec. 2018

B. Tech. – Seventh Semester

SECURITY IN CLOUD (CS-765)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Briefly Answer:

- a) Define Logic Bombs.
- b) Why there is a need for key management in public key cryptography?
- c) Differentiate between a virus and a worm.
- d) Define the term "Multi-Tenancy".
- e) What is a Caesar cipher? Explain with the help of an example.
- f) Define PKI.
- g) Differentiate between logical and physical block addressing in solid state drives.
- h) What do you mean by IAM?
- i) Define CIA Triad?
- j) Discuss the significance of AAA for security.

2x10

PART-A

Q.2 a) Explain how OS authenticates its users.

5

b) Discuss the computer security classifications for OS security.

8

c) Discuss the responsibility of application layer to secure user data. How does application code review helps to improve application security

7

Q.3 a) Discuss the core technologies of cloud computing. What are different vulnerabilities that exist in these technologies?

8

b) Discuss major security risks and security benefits with respect to cloud computing.

7

c) If you are given a chance to become a security analyst. What basic security techniques you will keep in mind to secure your cloud.

5

Q.4 a) Define AAA. Discuss various authorization approaches and authentication techniques in detail.

10

b) How would you ensure that cloud networks and connections are secure?

5

c) Discuss the core components of AAA system in detail.

5

PART-B

Q.5 a) What do you mean by federated Identity management.

5

b) Discuss objectives and challenges of different phases of IAM life cycle.

15

Q.6 a) What are digital signatures? How are they used with PGP.

5

b) What are digital certificates? Why are they required.

10

c) Discuss X 509 certificate format.

5

Q.7 a) Discuss 2-way SSL authentication in detail.

10

b) What do you mean by a passphrase? What is the significance of Key splitting.

10

End Semester Examination, Dec. 2018

B. Tech. — Sixth / Seventh / Eighth Semester
ARTIFICIAL INTELLIGENCE (CS-801)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

Q.1 Answer the following question:

- a) Give an example of system that think like human or think rationally.
- b) What are frames and scripts in AI?
- c) Define forward and backward chaining.
- d) What does the language of FOPL consists of?
- e) What are the techniques to represent knowledge?
- f) Define "Heuristic".
- g) Write the applications of expert system?
- h) What is the best way to go for game playing problem?
- i) List the two general approaches used by AI researchers.
- j) What is Bayesian network? Explain its usage.

2×10

PART-A

Q.2 a) "AI is interdisciplinary in nature and their foundations are in various fields". Justify the statement with valid reasons. **10**
b) Write a program in prolog to append two lists. **10**

Q.3 a) Differentiate simple hill climbing and steepest hill climbing. Solve block world puzzle steepest ascent hill climbing. **10**
b) What are cryptarithmetic problems? Solve the puzzle:
+ CROSS
 ROADS
 DANGER

Also write algorithm to solve such problems. **10**

Q.4 a) Discuss the issues in knowledge representation. **10**
b) Assume the following facts:

- i) Steeve only like easy courses.
- ii) Science courses are hard.
- iii) All the courses in the Maths department are easy.
- iv) MA201 is a Maths course.

Use resolution to answer the question "what courses would steeve like"? **10**

PART-B

Q.5 Write short notes on the following:

- a) Fuzzy based reasoning system.
- b) Limitations of monotonic system.
- c) Reasoning using certainty factors.
- d) Default reasoning.

5×4

- Q.6 a) Explain rule based expert system architecture in detail. **10**
b) What are the intelligent agents? How to find the rationality of intelligent agent?
Explain learning agents. **10**
- Q.7 a) Explain various components and applications of NLP. **10**
b) What is the significance of ab pruning in game tree? **10**

End Semester Examination, Dec. 2018

B. Tech. – Sixth / Seventh / Eighth Semester
ARTIFICIAL INTELLIGENCE (CS-801)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

- Q.1 a) Briefly discuss the limitations of Monotonic systems.
b) Explain characteristics of Expert systems.
c) Compare forward and backward reasoning.
d) What are Heuristic search techniques? Discuss the need of heuristic searching.
e) Why Alpha-beta Pruning is required? Justify your answer briefly.

4x5

PART-A

- Q.2 a) Explain 'Water Jug Problem' in detail with the help of suitable example.

10

- b) Write a prolog program for:
i) Merging two sorted lists.
ii) String concatenation.

5x2

- Q.3 a) Differentiate between simple Hill climbing and steepest Hill climbing .

5

- b) Explain the concept of Problem Reduction with the help of AO* Algorithm. **10**
c) Which technique allows us to solve the major parts of problem first and then go back and solve the small problems that arise in giving the big pieces together?
Briefly discuss.

5

- Q.4 a) Assume the following facts:

- i) Steve only likes easy courses.
ii) Science courses are hardly.
iii) All the courses in the basketweaving department are easy.
iv) BK 301 is a basketweaving course.

Use Resolution to answer the question, "What course would steve like?"

10

- b) What are the Issues in Knowledge Representation? Explain Briefly.

5

- c) Differentiate between Declarative and Procedural Representation.

5

PART-B

Q.5 a) Discuss Bayesian statistics theory for Statistical Reasoning in detail.

10

b) Write note on Fuzzy based 'Reasoning'.

10

Q.6 a) Discuss in detail the structure of Goal – Based Agent with suitable diagram.

10

b) Explain various properties of Environment in detail.

10

Q.7 Write short notes on:

i) Minimax search procedure.

ii) Alpha-Beta cutoffs.

iii) Uses of National Language Processing.

iv) Syntactic Analysis Vs Semantic Analysis.

5x4

End Semester Examination, Dec. 2018

B. Tech. – Seventh Semester
DIGITAL IMAGE PROCESSING (CS-822)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Attempt (**any ten**) question:

- a) Compare image enhancement and image restoration.
- b) Give the relation for degradation model for continuous function.
- c) Differentiate pseudo color image processing and full color image processing.
- d) Give the importance of compression.
- e) What are the applications of image segmentation?
- f) Explain the effect of noise in edge detection.
- g) Define log transformation and write its use in image processing.
- h) Discuss image compression why it is needed?
- i) List out different masks which are used to compute the gradient.
- j) Describe weber ratio.
- k) Mention advantages of filtering in frequency domain.
- l) Define brightness and saturation.

2×10

PART-A

- Q.2** a) Illustrate the fundamental steps involved in digital image processing. **12**
 b) Prove that both the 2-D continuous and discrete fourier transforms are linear operations. **8**
- Q.3** a) State and explain the features of median filtering. Compute the O/P of the median filter in the following cases.
 i) $y_{(m)} = [2, 4, 8, 3, 2]$
 ii) $w = [-1, 0, 1, 2]$
 iii) $y_{(m)} = [8, 2, 4, 3, 4]$
 iv) $w = [-1, 0, 1]$ **12**
 b) Explain how fourier transforms are useful in digital image processing and explain the properties of fourier transform. **8**
- Q.4** a) Draw the block diagram for image restoration and also discuss its need. **10**
 b) Illustrate the concept of inverse filtering and also mention the limitations of it. **10**

PART-B

- Q.5** a) Describe the significance of thresholding in image segmentation. **10**
 b) Determine the Huffman code assignment procedure for the following data.

Symbol	Probability
a_0	0.1

a_1	0.4
a_2	0.06
a_3	0.1
a_4	0.04
a_5	0.3

10

- Q.6 a) Calculate the DFT of the following image

0	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

10

- b) Discuss run-length encoding with suitable examples. How does it remove interpixel redundancy? **10**

- Q.7 a) What do you understand by representation of an image? **7**
 b) Explain the basics of intensity thresholding in image segmentation. **7**
 c) Differentiate between region and boundary. Describe regional descriptor in detail. **6**

End Semester Examination, Dec. 2018

B. Tech. – Seventh Semester

NATURAL LANGUAGE PROCESSING (CS-824)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt **ANY TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1 a) Give two applications of natural language understanding. **2×10**
b) Define lexicography.
c) What is semantic ambiguity?
d) Give an example of type0 grammar.
e) Give tow commercial applications of NLP.
f) What is left associative grammar?
g) How knowledge can be represented in an expert system?
h) Give an example of machine translation using common language.
i) What is natural language processing?
j) Give an example of recursive enumerable grammar.

PART-A

- Q.2 a) Differentiate between syntax, semantic and pragmatic with the help of example. **10**
b) Draw the two structural representation of sentence "Rice flies like sand". **10**

Q.3 a) Explain Chomsky hierarchy in detail. **10**
b) Prove Bayes rule by using the definition of conditional probability. Also prove that if A and B are independent then $\text{PROB}(A/B) = \text{PROB}(A)$. **10**

Q.4 a) Write the early algorithm of passing. **10**
b) Comment on "Passing as a search procedure". **10**

PART-B

- Q.5 a) Draw the semantic network of the following:
"John Gave Mary a book. The book was not the one Mary likes, so she punched John. That made her sorry for him". **10**
b) Explain part of hierarchy in semantic network with the help of example. **10**

Q.6 a) Give the different stages of direct machine translation system for Japanese to English. **10**
b) What is a translation process? Explain in brief different approaches of machine translation. **10**

Q.7 a) Define natural language query. Explain different phases of processing a natural language query. **10**
b) Explain the components and working of intelligent tutoring system. **10**

End Semester Examination, Dec. 2018

B. Tech. — Fifth / Seventh Semester

DISTRIBUTED OPERATING SYSTEM (CS-825)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Discuss in brief the various parameters used to characterize the real time scheduling algorithm.
- b) Discuss five fundamental issues in distributed system.
- c) What are the various causes of deadlock?
- d) Explain fault tolerance using active replication. Also explain TMR.
- e) Differentiate between MIMD and SIMD.

4×5

PART-A

Q.2 a) How logical clocks and physical clocks are useful in distributed systems? Describe in detail. **10**

- b) Discuss the various system models by which the processors can be organized in a distributed system. **10**

Q.3 a) Give the technical differences between network OS and distributes OS. **10**
b) Explain the election algorithm in detail with the help of bully ring algorithm. **10**

Q.4 a) Discuss the graph theoretic deterministic model used for processor allocation. **10**

- b) In your opinion, what are the issues associated with real time distributed systems and how these issues can be efficiently managed. **10**

PART-B

Q.5 a) Designing file system in distributed system is a critical task. Discuss the various issues that need to be considered. **10**

- b) How cache consistency is maintained in distributed file system. **10**

Q.6 a) Discuss shared variables and shared memory with context of distributed system. **10**

- b) Name various consistency models in distributed shared memory. Discuss any five models. **10**

Q.7 a) Explain the communication in MACH. **10**

- b) Discuss UNIX emulation in MACH. **10**

End Semester Examination, Dec. 2018

B. Tech – Seventh Semester
MOBILE COMPUTING (CS-826)

Time: 3 Hours

Max Marks: **100**

No. of pages: 1

Note: Attempt any **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

Q.1 Answer the following:

- a) Define Cell.
- b) What is IPv4?
- c) Name various wireless technologies used in mobile computing.
- d) What are cards?
- e) What is Abis – Interface used for?
- f) Explain the file structure of mobile computing?
- g) What is VoIP?
- h) What do you mean by handoff?
- i) Differentiate between 3G and 4G techniques.
- j) What is WAP gateway?

2x10

PART-A

Q.2 Explain in detail the GSM architecture discussing the Layers, Interfaces and Modules.
20

Q.3 a) What is mobile IP? How does it work?

10

- b) Explain the functioning of cellular rocket digital packet data.

10

Q.4 Draw the architecture of WAP. Explain the software and hardware components along with protocols.

20

PART-B

Q.5 a) Differentiate between XML and WML using suitable examples.
10

- b) Write a program in WML in which two paragraphs are separated.
10

Q.6 Discuss in details ASP and dynamic ASP sites with the help of suitable examples.
20

**Q.7 Explain the concept, functionality and application of pervasive computing.
20**

End Semester Examination, Dec. 2018

B. Tech. – Seventh / Eighth Semester
BIG DATA ANALYTICS (CS-828 / CS-828A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1 a) How does HDFS ensure security and integrity of data?
b) What are the major sources of big data?
c) What is indirect batch reporting?
d) What is the function of reducer?
e) What are the models used for solving clustering problems?
f) What is the function of YARN?
g) What are the major risks associated with big data analysis?
h) What is azure ML? Describe it briefly.
i) Name any two query languages for Hadoop.
j) What is the difference between business intelligence and big data analysis? **2×10**

PART-A

- Q.2 a) What are the applications of big data analytics? Explain. **5**
b) What are the characteristics of big data? **5**
c) Explain data analytics life cycle in detail. **10**
- Q.3 a) For what purpose we use Naïve Baye algorithm? Explain Naïve Bayes algorithm in detail. **10**
b) What are the performance measure to evaluate linear and logistic regression model. **10**
- Q.4 a) Explain Hadoop architecture in detail. **10**
b) What are the steps to setup Hadoop cluster? Explain in detail. **10**

PART-B

- Q.5 a) Explain the concept of data loading into HDFS. **10**
b) Write map and reduce methods to count the number of occurrence of a word in a file. **10**
- Q.6 a) What is the difference between big data reporting and big data analysis? **5**
b) Explain live exploration of big data. **5**
c) Explain direct batch reporting in Hadoop. Explain. **10**
- Q.7 a) What is machine learning? Explain it with help of 2 or 3 examples. **8**
b) What is Apache spark? Discuss its features. How is it different from Hadoop? **12**

End Semester Examination, Dec. 2018

B. Tech. – Seventh / Eighth Semester
BIG DATA ANALYTICS (CS-828A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) What is big data? Explain characteristics of big data.
b) Define 'clustering'.
c) What is hadoop cluster?
d) What are differences between reporting and analysis?
e) Write a short note on regression.
f) Why is big data analytics important?
g) Discuss the need of NOSQL database.
h) Mention different activities performed in reduce phase.
i) List features of Hadoop.
j) Write short note on HBase.

2×10

PART-A

- Q.2 a) Discuss at least five application areas of big data. **10**
b) Explain benefits and barriers in adopting big data technologies. **5**
c) Discuss the need for standards for big data. **5**
- Q.3 a) Explain linear regression model in detail with the help of suitable example. **8**
b) What is Naive Bayes algorithm? How Naïve Bayes algorithm works? What are pros and cons of using Naïve Bayes? Discuss. **12**
- Q.4 a) Explain the architecture of Apache Pig with the help of a diagram. **12**
b) Write query to:
i) Create table in Hadoop.
ii) Load data in the table created. **4×2**

PART-B

- Q.5 a) How does map reduce work? Explain map reduce processing paradigm with the help of example. **12**
b) Explain functioning of Namenode in HDFS. **8**
- Q.6 a) What is direct batch reporting in Hadoop? How is Hadoop different from conventional BI? **10**
b) Discuss Hadoop Architecture in detail. **10**
- Q.7 a) Differentiate between spark and spark ML. **10**
b) How machine learning techniques are different from traditional techniques? Explain with suitable examples. **10**

End Semester Examination, Dec. 2018

B. Tech. – Seventh / Eighth Semester

BIG DATA ANALYTICS (CS-828B)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1 a) What is the role of combiner function in map reduce? **2×10**
b) Discuss the need of top operation in JAQL.
c) Mention the advantages of using big data tools.
d) What are different types of big data? Explain with examples.
e) Differentiate between H base and RDBMS.
f) Define 'JSON'.
g) Differentiate between normal assignment and materialized assignment.
h) List features of a query language.
i) Explain export command of sqoop.
j) Write a query to create delimited table in pig. **2×10**

PART-A

- Q.2 a) Differentiate between structured and unstructured data. Discuss the advantages and drawbacks of working with structured and unstructured data. **8**
b) Discuss velocity and variety characteristics of big data. **6**
c) Big data (Hadoop) will replace traditional RDBMS and data warehouse. Comment on this. **6**
- Q.3 a) Explain Hadoop architecture with help of suitable diagram. Outline the important features of Hadoop. **10**
b) Differentiate between the following:
i) Big table and HDFS.
ii) Replication and sharding. **5×2**
- Q.4 a) Discuss load operator used in pig with proper example. **8**
b) Mention three core operators of jaqL; filter, transform and aggregate by explaining their working with one example each at command line interface (CLI) mode. **12**

PART-B

- Q.5 a) Discuss how data transfer happens from HDFS to HIVE? Write command line interface commands. **8**
b) Write short notes on:
i) SQuOOP
ii) Big R
iii) Zookeeper **4×3**
- Q.6 a) Explain how IBM infosphere streams work. **5**
b) Write notes on:
i) Streams console.
ii) Streams studio. **2½×2**
c) Explain main features of streams processing language (SPL). Also discuss different kinds of operators used in SPL. **10**

- Q.7 a) Discuss the need of windows in stream processing: What are different types of windows in infosphere streams? **10**
- b) Write short notes on **(any two):**
- i) Aggregate operator.
 - ii) Barrier operator.
 - iii) Pair operator. **5×2**

End Semester Examination, Dec. 2018

M. Tech. – Third Semester
ARTIFICIAL INTELLIGENCE (CS-M-204)

Time: 3 hrs.

Max Marks: **75**

No. of pages: **1**

Note: Attempt **FIVE** questions in all. Marks are indicated against each question.

- Q.1 a) Differentiate prolog programming language with any other AI programming language. **5**
b) Describe with proper diagram:
i) Utility based agent.
ii) Goal based agent. **5×2**
- Q.2 a) Differentiate informed and uniformed search with proper examples. **5**
b) Give reason why A* algorithm can't be used for problem reduction and write AO* algorithm in detail for problem reduction. **10**
- Q.3 What is Dempster-Shafer theory? Find out the value of M3 using the same if M1 is {Flue, cold, allergy} = 0.7 θ = 0.3.
M2 is {allergy, Flue, cold} = 0.6 θ = 0.4 **15**
- Q.4 Convert the following statements into logic forms and convert then into CNF also.
a) Mohan likes all kinds of food.
b) Mango is a food.
c) Chicken is a food.
d) Any thing anyone eats and is not killed is alive.
e) Mohan eats everything bill eats. **3×5**
- Q.5 a) Explain the architecture of rule based system in detail. **10**
b) How reasoning can be done using forward chaining. **5**
- Q.6 a) Briefly explain the depth limited search and iterative deepening depth first search. **10**
b) Define a game as a kind of search problem. **5**
- Q.7 a) Explain min-max algorithm for game playing. Give reason why alpha-beta pruning is required. **10**
b) Describe the application of AI in medical science, vision and reasoning. **5**

End Semester Examination, Dec. 2018

M. Tech. (CSE) - Third Semester
INTRUSION DETECTION SYSTEM (CS-M-302)

Time: 3 hrs

Max Marks: **75**

No. of pages: 1

Note: Attempt any **FIVE** questions in all. Each question carries equal marks.

Q.1 a) Why IDS and IPS are important? Also, discuss how they relate to Defence in depth.

4

b) Differentiate between IDS and IPS.

4

c) What do you understand by SYN Floods?

7

Q.2 a) What is clustering? How it can be used in IDS or IPS?

4

b) Discuss tierd architecture of IDS in detail.

8

c) How support vector machine is useful for IDS

3

Q.3 a) Discuss components and architecture of HIDS.

8

b) Elaborate model for intrusion analysis. Also discuss rule based detection.

5

c) What are Hybrid responses in IPS?

2

Q.4 a) Give step by step procedure to compile and install SNORT.

7

b) Give three command line option with description.

4

c) What are plugins?

4

Q.5 a) Explain architecture of both IDS and IPS. Also discuss what are architectural difference in these two.

10

b) What is agent in IDS? Why are they needed?

5

- Q.6 a) What do you understand by threat briefing?
5
- b) Give evidentiary issues related to IDS.
5
- c) Discuss standard of Due care.
5
- Q.7 a) Discuss different types of attacks.
7
- b) Explain the need and types of IDS
8
- Q.8 Write short notes on:
a) IP address spoofing
b) Co-operative IDS
c) Throttling
5x3

End Semester Examination, Dec. 2018

M. Tech. - Third Semester
BUSINESS INTELLIGENCE (CS-M-331)

Time: 3 hrs

Max Marks: **75**

No. of pages: 1

Note: Attempt any **FIVE** questions in all. Each question carries equal marks.

- Q.1 a) What are the two different categories of BI roles? Explain BI program team roles.
7
b) Briefly explain the different divisions of meta data with examples.
8
- Q.2 a) Is it important to analyze unstructured data? Justify with an example.
8
b) What is UIMA and how UIMA bridges the gap between structured and unstructured data?
7
- Q.3 a) Picture a retail company that sells a variety of products. The company would like to analyze sales data by region, product, time and by sales person. Draw star and snow flake schema to depict it.
8
b) What are the challenges faced by an OLTP system?
7
- Q.4 a) Differentiate between Ralph kimball's approach with WH Inmon's approach to build a data warehouse.
7
b) Explain two main approaches to data integration with proper example.
8
- Q.5 a) Elaborate and differentiate between data warehousing and business intelligence.
7
b) How is KPI different from critical success factor? Explain.
8
- Q.6 What is dashboard? Explain the different types of dashboard. How enterprise gets benefitted from it?
15
- Q.7 a) Why should you normalize your database? Explain by citing.
7

b) How is logical model different from physical model? Explain.

8

Q.8 Explain the following:

- a) Degenerate dimension.
- b) Slice operation.
- c) Non additive fact.

5x3

End Semester Examination, Dec 2018

M. Tech. – Third Semester
BUSINESS INTELLIGENCE (CS-M-331)

Time: 3 hrs.

Max Marks: **75**

No. of pages: **1**

Note: Attempt any **FIVE** questions in all. Each question carries equal marks.

- Q.1 a) Define Business Intelligence. Explain the important features of business intelligence in detail.

7

- b) How can BI be used to enhance customer experience? Explain with an example.
8

- Q.2 a) What is XML? Explain with the help of an example.

7

- b) Can XML data be converted into a structured format? Explain with an example.
8

- Q.3 a) Construct an ER diagram for a car insurance company that has a set of customers, each of which owns one or more cars, each car has associated with it zero or any number of recorded accidents.

7

- b) State the difference in data models for OLTP and OLAP.
8

- Q.4 a) What is data warehouse? What are various goals of data warehouse?

7

- b) Define data profiling. When and how is data profiling conducted? Explain.
8

- Q.5 Explain different schemas used to represent dimensional modeling with an example.

15

- Q.6 a) What is the difference between data warehousing and business intelligence?

7

- b) Explain four components of metric data: subject, stratum, quantum and application.

8

- Q.7 a) Compare and contrast score cards and dashboard.

7

- b) What are the features of good metric?
8

- Q.8 Explain the following:
- a) Role changing dimensions.
 - b) Data transformation.
 - c) Data quality.

5x3

End Semester Examination, Dec. 2018

B. Sc. (Data Science) -First Semester
STATISTICS-I (DS-101)

Time: 3 hrs

Max Marks: **75**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Using Ogive we can determine a particular measure of central tendency, namely _____.
1
- b) For drawing Histograms, the class interval should be _____.
1
- c) What are the corrections for the first four moments?
2
- d) Find the AM and GM of the first n natural numbers.
1
- e) Relation between moment about mean and moment about a number.
1
- f) Determine the value of median from the following series:
1½

Marks	0 – 10	10 – 15	15 – 20	20 – 25	25 - 30
No. of students	7	5	8	38	42

- g) Can two uncorrelated variable be independent
2
- h) If the regression coefficients are 0.6 and 0.4, find correlation coefficients.
2
- i) Distinguish between Multiple and Partial Correlation.
3½

PART-A

Q.2 The following data relate to loan advance to 40 farmers by the Co-operative Bank (the figures are in hundred rupees):

12	8	10	9	5	14	12	10	14	20
18	19	10	7	6	9	10	12	13	15
18	12	8	12	17	20	15	12	14	17
11	15	18	17	19	12	15	5	5	9

- i) Construct a frequency table taking 5 as the class interval.

5

- ii) Draw increasing and decreasing ogives: what is the significance of their point of intersection?

10

- Q.3 a) Draw a histogram and frequency polygon from the following table:

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40– 50	50– 60	60 - 70
No. of students	4	8	11	15	12	7	3

10

- b) Draw a stem and leaf diagram using the set of data below:

148 147 145 103 113
135 93 87 111 110
119 107 113 110 104

5

- Q.4 a) Obtain the Karl Pearson's measure of Skewness for the following data:

10

Values	5 - 10	10 – 15	15 – 20	20 – 25	25 – 30	30 -35	35- 40
Frequency	6	8	17	21	15	11	2

- b) Standard deviation is the best measure of dispersion, why? **5**

- Q.5 Find the Kurtosis based on moments for the following distribution:

Marks:	0 – 10	10 – 20	20 – 30	30 – 40	10– 50	50 - 60	60- 70
No. of students:	8	12	20	30	15	10	5

15

PART-B

- Q.6 Ten students got the following percentage of marks in Economics and Statistics. Calculate the coefficient of correlation.

Marks in Economics:	78	36	98	25	75	82	90	62	65	39
Marks in Statistics:	84	51	91	60	68	62	86	58	53	47

15

- Q.7 a) Show that the limit of correlation coefficients is {-1, 1}. **10**

- b) Establish the formula $r = \frac{\sigma_x^2 + \sigma_y^2 - \sigma_{x-y}^2}{2\sigma_x\sigma_y}$, where r is the coefficient of correlation between x and y and σ_x, σ_y and σ_{x-y} are concerned standard deviations. **5**

- Q.8 Calculate the line of regression of x and y coefficients from the following table:

x	1	2	3	4	5	6	7	8
y	7	10	12	14	17	20	24	28

Q.9 a) Establish the formula for angle between two lines of regression,
 $\tan \theta = \frac{1-r^2}{r} \frac{\sigma_x \sigma_y}{\sigma_x^2 + \sigma_y^2}$, where r is the coefficient of correlation and σ_x and σ_y are concerned standard deviations.

7½

b) Given that $b_{xy} = 0.25$, $\text{var}(x) = 4$, $\text{var}(y) = 36$, find the correlation between x and y .

7½

End Semester Examination, Dec. 2018

B. Sc. (Data Science) – First Semester
MATHEMATICAL TECHNIQUES (DS-102)

Time: 3 hrs.

Max Marks: **75**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1**
- a) Explain $\tan^{-1} x$ in powers of x . **2**
 - b) If $z = x \log y$, show that $\frac{\partial^2 z}{\partial x \partial y} = \frac{\partial^2 z}{\partial y \partial x}$. **3**
 - c) Show that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$. **2**
 - d) $\Gamma(n+1) = n!$ **2**
 - e) Give the negation of the following statement.
 - i) $p : 2 + 3 > 1$
 - ii) $q : \text{it is cold}$ **2**
 - f) The truth value of given statement is
 'If 9 is prime then 3 is even'.
 - a) False **2**
 - b) True
 - g) Let $A = \{a, b, c\}$, $B = \{d, e\}$, $C = \{a, d\}$. Find $(A \cap B) \times C$. **2**

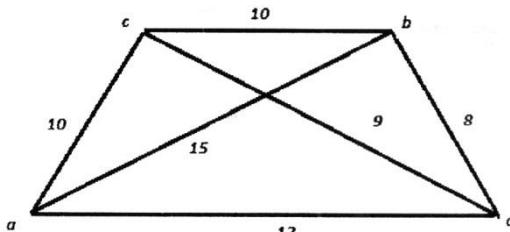
PART-A

- Q.2** a) Find the graph that has the following adjacency matrix:

$$\begin{bmatrix} 1 & 2 & 1 & 2 \\ 2 & 0 & 2 & 1 \\ 1 & 2 & 1 & 0 \\ 2 & 1 & 0 & 0 \end{bmatrix}$$

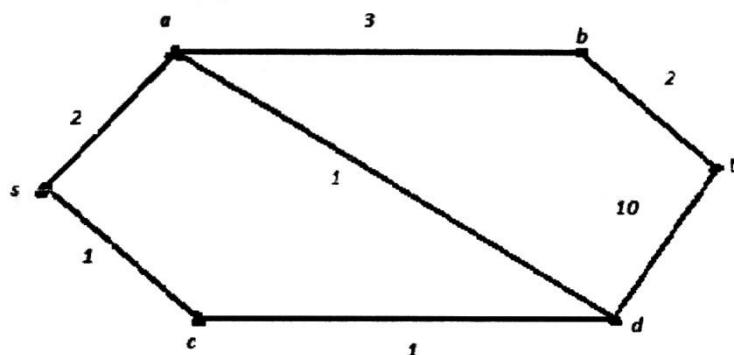
10

- b) Find a Hamiltonian circuit of minimal weight for the graph shown below:



5

- Q.3** Find the shortest path from s to t and its length for the given below:



- Q.5 Find the truth value of each proposition if and only if p and r true and q is false.

a) $\neg p \wedge \neg q$

b) $\neg p \wedge (q \vee r)$

PART-B

- Q.6 a) Show that the function $u = xy + \frac{a^3}{x} + \frac{a^3}{y}$ has a minimum value at (a, a) . 10

b) If $x^y + y^x = a^b$, find $\frac{dy}{dx}$. 5

Q.7 a) Explain e^{xy} at $(1, 1)$ in powers of $(x-1)$ and $(y-1)$. 10

b) if $u = x + y + z$, $uv = y + z$, and $uvw = z$, show that $\frac{\partial(x, y, z)}{\partial(u, v, w)} = u^2v$. 5

Q.8 a) Evaluate $\iint x^2 y^2 dxdy$ over the circle $x^2 + y^2 \leq 1$. 10

b) Change the order of integration $\iint_0^\infty \phi(x, y) dxdy$ 5

Q.9 a) Find the area bounded by the parabolas $y^2 = 4 - x$ and $x^2 = 4 - 4x$. 7½

b) Relation between Beta and Gamma functions. 7½

End Semester Examination, Dec. 2018

B. Sc. (Data Science) – First Semester
PROGRAMMING IN C (DS-103)

Time: 3 hrs.

Max Marks: **75**

No. of pages: 2

Note: Attempt **FIVE** questions in all; taking at least **ONE question** from each **UNIT**.
Q.1 is compulsory. Marks are indicated against each question.

- Q.1 a) What is ASCII code? Explain their importance in computers.
b) Draw a flowchart for finding percentage of marks in six subjects.
c) Define 'recursion'. Explain its importance with a suitable example.
d) Differentiate between compiler and interpreter.
e) What is a ternary operator(?)? Give suitable example. **4×4**

UNIT-I

- Q.2 Convert the following:
a) $(11000111)_2 \rightarrow (?)_4$
b) $(1101001)_2 \rightarrow (?)_8$
c) $(4ADB6C)_{16} \rightarrow (?)_{10}$
d) $(34256)_8 \rightarrow (?)_2$
e) $(546)_{10} \rightarrow (?)_2$
f) $(10110100)_2 \rightarrow (?)_{16}$ **2×6**
g) $(10110010.011)_2 \rightarrow (?)_{10}$ **3**

- Q.3 a) State the block diagram of a computer system. Explain the functions of different components of computer system. **8**
b) Draw a flowchart to illustrate the logic for converting a number from base (10) to a new base using the division remainder technique. **7**

UNIT-II

- Q.4 a) Write a program that accepts positive integer from user and prints "ODD" or "EVEN" as an output based on the value to the number. **6**
b) Write a program to swap values of two variables without using a third variable. **6**
c) List the fundamental data types along with their minimum stipulated size. **3**

- Q.5 a) Consider the following rates charged by a mobile operator for data packs in integral units of GB:

Data usage (GB)	Rate
1 GB	₹148
2 GB	₹255
3 GB	₹355
4 -6 GB	₹455

7 GB onwards ₹700

Write a program using switch case-that an integer from keyboard and prints the corresponding rate after validation. **8**

- b) Define an array. Write a program that read a square matrix from the user and display its transpose. **7**

UNIT-III

- Q.6 a) Discuss function prototype, function call and function definition by taking suitable examples. **7**
b) Differentiate between iterative and recursive functions with examples. **8**

- Q.7 a) Write a function prime that returns one (1) if its argument is a prime number and return zero (0) otherwise. **6**
b) Define a structure personal which contain person-name, date-of-joining and salary. Using this structure write a program for reading information of one person from the user and display it on the screen. **9**

UNIT-IV

- Q.8 a) What is a pointer? How do we declare a pointer? Write mechanism of accessing variables through pointers. **7**
b) Write a program to swap values of two variables by passing them as a reference to a function [use of pointer]. **8**
- Q.9 a) Explain any four functions described in string-h header file with examples. **8**
b) Describe puts() and gets() functions on strings by taking suitable examples. **7**

End Semester Examination, Dec. 2018

B. Sc. (Data Science) – First Semester

THEORY OF PROBABILITY (DS-104)

Time: 3 hrs.

Max Marks: **75**

No. of pages: **3**

Note: Attempt **FIVE** questions in all; taking at least **ONE question** from each **UNIT**.
Q.1 is compulsory. Marks are indicated against each question.

- Q.1 a) A printed circuit board has 8 different locations in which a component can be placed. If 4 different components are to be placed on the board, how many different designs are possible? **3**
- b) If $P(A/B)=0.2$, $P(A/B')=0.3$ and $P(B)=0.8$. What is $P(A)$? **3**
- c) In a voice communication system with 50 lines, the random variable is the number of lines in use at a particular time. Determine the range of random variable. **3**
- d) The number of e-mail messages received per hour has the following distribution:

x=No. of Messages	10	11	12	13	14	15
F(x)	0.08	0.15	0.30	0.20	0.20	0.07

- i) Determine the mean of the number of messages received per hour. **3**
- ii) Determine the standard deviation of the number of messages received per hour. **3**

UNIT-I

- Q.2 a) Orders of a computer are summarised by the optional features that are requested as follows: **8**

	Proportion of Orders
No Optional feature	0.3
One Optional feature	0.5
More than one Optional feature	0.2

- i) What is the probability that an order requests at least one optional feature?
ii) What is the probability that an order does not request more than one optional feature.
b) If A, B, C are mutually exclusive events with $P(A)=0.2$, $P(B)=0.3$ and $P(C)=0.4$, determine the following:
i) $P(A \cup B \cup C)$
ii) $P(A \cap B \cap C)$
iii) $P[(A \cup B) \cap C]$ **7**

- Q.3 The analysis of shafts for a compressor is summarized by conformance to specifications:

	Roundness Conforms	
Surface finish Conform	Yes	No
Yes	345	5
No	12	8

- a) If a shaft is selected at random then what is the probability that it conforms to surface finish requirements?

- b) What is the probability that the selected shaft conforms to surface finish requirements or to roundness requirements.
 c) What is the probability that selected shaft conforms to both surface finish and roundness requirements.

15

UNIT-II

- Q.4 A lot of 100 semiconductor chips contains 20 defective chips and 2 are selected randomly, without replacement from the lot. **15**
- a) What is the probability that the first one selected is defective?
 b) What is the probability that the second one selected is defective given that the first one was defective?
 c) What is the probability that both are defective?
 d) How does the answer to part (b) change if chips selected were replaced prior to the next selection?
- Q.5 a) An email filter is planned to separate valid e-mails from spam. The word 'free' occurs in 60% of the spam messages and only 4% of the valid messages. Also 20% of the messages are spam. Determine the following probabilities:
 i) The message contains 'free'
 ii) The message is spam given that it contain 'free'
 iii) The message is valid given that it doesn't contain 'free' **12**
- b) If $P(A/B)=0.4$, $P(B)=0.8$ and $P(A)=0.5$. Are the events A and B independent? **3**

UNIT-III

- Q.6 a) From the following data; verify that the functions given are probability mass functions, and also determine the requested probabilities:
- | | | | | | |
|------|-----|-----|-----|-----|-----|
| x | -2 | -1 | 0 | 1 | 2 |
| F(x) | 0.2 | 0.4 | 0.1 | 0.2 | 0.1 |
- i) $p(x \leq 2)$
 ii) $p(x > -2)$
 iii) $p(-1 \leq x \leq 1)$
 iv) $P(x \leq -1 \text{ or } x = 2)$ **7**
- b) $f(x) = \frac{2x+1}{25}$, $x=0, 1, 2, 3, 4$
 i) $P(x=4)$
 ii) $P(x \leq 1)$
 iii) $P(2 \leq x < 4)$
 iv) $P(x > -10)$ **8**

- Q.7 a) Two new product designs are to be compared on the basis of revenue potential. Marketing believes that the revenue from design A can be predicted quite accurately to be \$3 millions. The revenue from design B will be \$7 million with probability 0.3, but there is 0.7 probability that the revenue will be only \$2 million. Marketing concludes that revenue potential of design B is more difficult to assess. Which design do you prefer? **10**
- b) Determine the probability mass function of x from the given cumulative distribution function:

$$f(x) = \begin{cases} 0 & x < -2 \\ 0.2 & -2 \leq x < 0 \\ 0.7 & 0 \leq x < 2 \\ 1 & 2 \leq x \end{cases}$$

5

UNIT-IV

- Q.8 a) Each sample of water has a 10% chance of containing a particular organic pollutant. Assume that the samples are independent with regard to the presence of the pollutant. Find the probability that in the next 18 samples, exactly 2 contain the pollutant. **8**
- b) Suppose that the current measurements in a strip of wire are assumed to follow a normal distribution with a mean of 10 milliamperes and a variance of 4(milliamperes)². What is the probability that a measurement exceeds 13 milliamperes? Given: $P(Z \leq 1.5) = 0.93319$ **7**
- Q.9 a) In a large corporate computer network, user log-ons to the system can be modeled as a poisson process with a mean of 25 log-ons per hour. What is the probability that there are no log-ons in an interval of six minutes? **10**
- b) Suppose that x has an exponential distribution with $\lambda = 2$. Determine the following:
 i) $p(x \leq 0)$ ii) $p(x \geq 2)$ iii) $p(x \leq 1)$
 iv) $p(1 < x < 2)$ **5**

End Semester Examination, Dec. 2018

B. Tech. – First/Second Semester

ELEMENTS OF BIOTECHNOLOGY (BT-101A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Briefly Answer:

- a) How gene cloning is helpful?
- b) Define Stem cell.
- c) Draw well labeled diagram of Golgi bodies.
- d) Why are chromosomes called hereditary vehicles?
- e) Define bioethics.

4x5

PART-A

Q.2 a) Draw well labeled diagram of animal cell.

10

b) Enlist five differences between mitosis and meiosis?

10

Q.3 Discuss evolution of life. What are different theories and evidences?

20

Q.4 a) Describe various types of chromosomal aberrations.

15

b) What are induced mutations?

5

PART-B

Q.5 a) Discuss DNA Replication with suitable diagram.

15

b) Enumerate five applications of gene bank

5

Q.6 a) Describe the procedure for DNA fingerprinting.

10

b) How DNA fingerprinting helps in crime detection?

10

Q.7 a) Enlist the importance of biotechnology in human health and its commercial and entrepreneurship potentials.

12

b) Elaborate the biosafety risk classification and its significance.

End Semester Examination, Dec. 2018

**B. Tech. — Second Semester
BIOMOLECULES (BT-201)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following question:

- a) Define pH. Who devised the pH scale?
- b) Name and write down the structure of a compound that contains polar covalent bonds.
- c) Name and write down the structure of basic heterocyclic amino acids.
- d) Zwitter ion can't migrate into electric field. Why?
- e) Why frequent and prolonged use of aspirin is discouraged from enzymatic inhibition point of view?
- f) Name and write down the structure of a 6C compound containing polyhydroxy aldehyde.
- g) What is the criteria implemented to assign D or L configuration in monosaccharides?
- h) Name and write down the structure of omega 6 fatty acids.
- i) State the reason why purine always pairs with pyrimidines.
- j) Name and write down the structure of any purine derivative present in RNA

2×10

PART-A

Q.2

- a) Derive HH equation. Write down the significance of HH equation. **10**
- b) Knowledge of biochemistry can be helpful in deciphering a disease. Explain with suitable example. **5**
- c) With the help of an example show how conjugated acids and conjugated base works? **5**

Q.3 With the help of schematic diagram classify proteins on the basis of their structural organization. **20**

Q.4

- a) Write a note on enzyme classification (EC) Numbers using example. **12**
- b) Define enzyme kinetics and derive Michaelis-Menten Equation **8**

PART-B

Q.5

- a) Classify monosaccharides on the basis of number of carbon present in their backbone. Give an example of each of them. **10**
- b) Write a note on classification of polysaccharide on the basis of their uses. **10**

Q.6

- a) What are fatty acids? Classify them on the basis of chain length and saturation. **8**
- b) Explain with the help of chemical structure about the amphipathic nature of phospholipids. **6**

- c) What are lipoproteins? Name its different types. Which among them is considered as good and why? **6**
- Q.7 a) Compare the essential and contrasting features of B-DNA, A-DNA and Z-DNA. **12**
b) What are the structural features of tRNA. Discuss the roles of different arms. **8**

End Semester Examination, Dec. 2018

B. Tech. — Second Semester
GENETICS AND CYTOGENETICS (BT-202)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Differentiate between dominant alleles and recessive alleles.
- b) Write down the definition of genotype and phenotype.
- c) Differentiate between mutation and recombination.
- d) Define monosomic and nullisomic aneuploidy.
- e) What are metacentric and acrocentric chromosomes?
- f) What is linkage group?
- g) Give two examples of chemical mutagens.
- h) Discuss gene frequency.
- i) Define gene pool.
- j) What is qualitative inheritance?

2×10

PART-A

Q.2 Write short note on the following:

- a) Mendel's law of independent assortment and segregation.
- b) Dominant and recessive epistasis.

2×10

Q.3 a) Describe chemical composition and structure of chromosomes. **10**

- b) Explain chromosomal theory of inheritance. **10**

Q.4 Explain the following:

- a) Polytene and Lampbrush chromosomes with diagram. **16**
- b) Non-repetitive DNA. **4**

PART-B

Q.5 a) Write down detail note on gene mapping by giving suitable example. **12**

- b) What are the limitations of recombination? **4**

- c) Discuss gene order. **4**

Q.6 a) Discuss difference between maternal effect and maternal inheritance with example. **15**

- b) Write a short note on cytoplasmic male sterility (CMS). **5**

Q.7 a) Elaborate different steps used for determining gene frequency. List down different factors effecting gene frequency. **15**

- b) Give an account of quantitative inheritance. **5**

End Semester Examination, Dec. 2018

B. Tech. – Third Semester
CELL BIOLOGY (BT-301A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 Answer briefly: **4×5**
- a) Cytokinesis.
 - b) Crosstalk.
 - c) Cytoskeleton.
 - d) Peroxisomes.
 - e) Integral and peripheral membrane proteins.

PART-A

- Q.2 What are the different mechanisms of transport via cell membrane? Discuss it. **20**
- Q.3 a) What are resealed and white ghosts? **4**
b) Write short notes on:
 i) Robert hooke.
 ii) Fluid mosaic model. **5×2**
c) Differentiate between plant and animal cells. **6**
- Q.4 Give the structure and functions of:
a) Nucleus.
b) Ribosome. **10×2**

PART-B

- Q.5 a) Discuss the steps of muscle contraction and relaxation mechanisms. **15**
b) Enlist the function of secondary messenger in cell signalling. **5**
- Q.6 a) Discuss different types of cancer in detail. **10**
b) What types of genes get mutated in cancer? **6**
c) Define the terms:
 Tumon.
 Neoplasia. **2×2**
- Q.7 a) Discuss about the different cell adhesion molecules. **6**
b) What do you know by encitotoxicity? **4**
c) Discuss the role of ECM in animal cells. **10**

End Semester Examination, Dec. 2018

B. Tech. – Third Semester
MICROBIOLOGY (BT-302A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) What characteristics are used to place prokaryotes in different sections of Bergey's Manual?
b) What is a gas vacuole? Relate its structure to its function.
c) Distinguish between fimbriae and sex pili, and give the function of each.
d) How does Yeasts differs from molds?
e) What is a turbidostat?
f) Differentiate between an antiseptic and a disinfectant.
g) What is the difference between F⁺ X F⁻ and Hfr X F⁻.
h) What chemical intermediate links glycolysis to the TCA cycle?
i) What are auxotrophs?
j) Define thermal death point (TDP) thermal death time (TDT). **2×10**

PART-A

- Q.2 a) How did the spontaneous generation of microorganisms disproved by Spallanzani, Pasteur and Tyndall? **10**
b) On what criteria bacteria were placed into four divisions based on their cell wall chemistry in Bergey's Manual of Systematic Bacteriology? Elaborate the characteristics features of each. **10**
- Q.3 a) Describe in some detail the composition and structure of peptidoglycan, gram-positive cell walls, and gram-negative cell walls. Include labeled diagrams in the answer. **12**
b) Discuss the flagella distribution patterns, flagella structure and synthesis, and the way in which flagella operate to move a bacterium? **8**
- Q.4 a) Draw a typical bacterial growth curve. Label the stages of growth and briefly describe what processes are occurring in each stage. **8**
b) Briefly describe endospore formation and germination. What is the importance of the endospore? What might account for its heat resistance? **12**

PART-B

- Q.5 a) DNA from a strain *Bacillus subtilis* with the genotype trp⁺tyr⁺ is used to transform a recipient strain with the genotype trp⁻tyr⁻. The following numbers of transformants were recovered.

Genotype	Number of transformed cells
trp ⁺ tyr ⁻	154
trp ⁻ tyr ⁺	312
trp ⁺ tyr ⁺	354

What do these results suggest about the linkage of trp and try genes?

10

- b) What is bacterial conjugation and how was it discovered? Describe how the bacterial genome can be mapped using Hfr conjugation? **10**
- Q.6 Summarize the major features of the glycolytic pathway and the pentose phosphate path way. Include the starting points, the products of the pathways, the critical or unique enzymes, the ATP yields, and the metabolic roles each pathway has. **20**
- Q.7 a) How does an autoclave work?. What conditions are required for sterilization by moist heat, and what three things must one do when operating an autoclave to help ensure success? **5**
- b) Describe each of the following agents in terms of its mechanism of action and common uses:
- i) Phenolics
 - ii) Alcohols,
 - iii) Halogens (iodine and chlorine)
 - iv) Heavy metals,
 - v) Quaternary ammonium compounds.
- 3×5**

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) – Third Semester
BIOCHEMISTRY (BT-303C)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer Briefly:

a) What is the role of ATP in metabolic reactions?

3

b) State the significance of deamination reaction by giving an example.

3

c) Give the fates of pyruvate in aerobic and anaerobic conditions.

4

d) Distinguish between substrate level and oxidative phosphorylation.

4

e) What causes ketosis?

3

f) How is AMP synthesized from IMP in a denovo pathway?

3

PART-A

Q.2 a) Justify the statement "Living organisms obey the first and second law of thermodynamics"

10

b) What is standard Gibbs free energy change? State its significance.

10

Q.3 a) How is histidine metabolized?

10

b) What leads to the accumulation of branched chain amino acids in blood and urine?

10

Q.4 a) Explain in detail the process of glycogenesis.

10

b) Mention the significance of glyoxylate cycle. Draw and explain the cycle.

10

PART-B

Q.5 a) Describe Q cycle.

10

b) How is ATP synthesized?

10

Q.6 a) Give the pathway for the degradation of alpha carbon of fatty acids.

10

b) Outline the various steps involved in the cholesterol biosynthesis?

10

Q.7 a) How are purines metabolized?

10

b) Explain the de novo pathway for the synthesis of pyrimidines.

10

End Semester Examination, Dec. 2018

B. Tech. — Third Semester

BIO ANALYTICAL TECHNIQUES (BT-305B)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) How the environmental factors can affect the measurements of an instrument? **2**
- b) What are the principles of light microscope and Electron microscope? **3**
- c) Differentiate between void volume, inner volume and total volume in gel chromatography. **2**
- d) Compare density gradient and differential centrifugation. **3**
- e) What do you understand by HPLC? **2**
- f) What is capillary electrophoresis? **2**
- g) Explain the Lambert-Beer law. **3**
- h) Write short notes on the autoradiography. **3**

PART-A

Q.2 a) Differentiate between the following:

- i) Zero shift error and span error of an instrument.
- ii) Accuracy and Precision. **6×2**

- b) Explain the functional elements of an instrument. **8**

Q.3 a) Explain in detail the principle and working of light field microscopy. **10**

- b) What do you understand by sedimentation? How molecules are sedimented in centrifugation? **10**

Q.4 a) Elaborate the principle of ion exchange chromatography. Discuss about the anion and cation exchangers with examples and also explain how these exchangers could be used for the separation of the protein mixture. **10**

- b) Describe the principle, column types, instrumentation and applications of gas chromatography. **10**

PART-B

Q.5 a) How an isoelectric focusing (IEF) technique used in the separation of different proteins? **10**

- b) Compare the two dimensional (2D) and the Immuno-electrophoresis (IE) techniques. **10**

Q.6 a) Elucidate the basic principle, working and construction of UV spectroscopy. **10**

- b) Describe in detail IR spectroscopy technique. **10**

Q.7 a) What are the various instruments used for radioactivity? **10**

b) Write a note on 'radioactive waste management'.

10

End Semester Examination, Dec. 2018

B. Tech. — Third Semester

BIO ANALYTICAL TECHNIQUES (BT-305B)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) How the environmental factors can affect the measurements of an instrument? **2**
- b) What are the principles of light microscope and Electron microscope? **3**
- c) Differentiate between void volume, inner volume and total volume in gel chromatography. **2**
- d) Compare density gradient and differential centrifugation. **3**
- e) What do you understand by HPLC? **2**
- f) What is capillary electrophoresis? **2**
- g) Explain the Lambert-Beer law. **3**
- h) Write short notes on the autoradiography. **3**

PART-A

Q.2 a) Differentiate between the following:

- i) Zero shift error and span error of an instrument.
- ii) Accuracy and Precision. **6×2**

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PART-B

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Q.7 a) What are the various instruments used for radioactivity? **10**

b) Write a note on 'radioactive waste management'.

10

End Semester Examination, Dec. 2018

B. Tech. – Third Semester
CONCEPTS IN IMMUNOLOGY (BT-307)

Time: 3 hrs

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

Q.1 Answer the following in brief:

- a) Differentiate between primary and secondary immune response.
- b) What do you understand by anaphylatoxins?
- c) Why immediate and delayed type hypersensitivity are named so?
- d) Differentiate between isotypic and allotypic determinants.
- e) What antigens do cytotoxic T (T_c) cells recognize?
- f) Define HLA restriction.
- g) What is meant by the term DNA vaccine?
- h) Define Immunogenicity.
- i) Explain immunological tolerance.
- j) What do you understand by SCID? Give its full form.

2x10

PART-A

Q.2 a) Describe the structure and function of lymph and lymph nodes.

10

b) Provide a brief summary of the role of the innate immune system in defense against invading pathogens.

10

Q.3 a) What are Complements? Discuss any one system involved in the defense mechanism?

10

b) Describe the structure, characteristics and functions of IgM.

10

Q.4 a) Elaborate on the molecular basis of Antibody Diversity. Write a note on class switching.

10

b) Explain the structure of MHC I. How antigens are processed through cytosolic pathway?

10

PART-B

Q.5 a) What is hybridoma technology? Describe the steps involved in its application for the production of monoclonal antibodies.

10

- b) Explain the concept of antigenic drift and shift in viral infections. Discuss in short the immunotherapy for infectious diseases caused by protozoan giving examples. **10**

10

Q.6 Discuss principle, procedure and application of the following:

- a) Western Blot.
 - b) Immunoelectrophoresis.

10x2

Q.7 a) What is autoimmunity? Explain the immunopathology of Rheumatoid arthritis.

10

- b) What is recombinant vector vaccine? Explain.

10

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester
MOLECULAR BIOLOGY (BT-401A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1 a) DNA polymerase I is not the replicative polymerase. Comment.
b) What is abortive initiation of transcription?
c) Define negative and positive control of transcription initiation with suitable examples.
d) What will be the phenotype of an *E coli* strain in which the trp codons in the leader region were mutated so that they coded for serine instead?
e) How do the cot curves depict the evolutionary complexity in prokaryotes?
f) UV induced mutations are corrected by which type of DNA repair system?
g) What is the difference between L1 element and Tn3 element?
h) How does a eukaryotic ribosome select its start codon? **2½×8**

PART-A

- Q.2 a) Describe how eukaryotic chromatin is organized within chromosomes so that the genome can fit within a nucleus. Illustrate your answer with drawings of the various folding stages of chromatin. **12**
b) How do bacteria, lacking a nucleus, organize and pack their genome into the cell? **8**
- Q.3 Describe the nature and functions of the following replication components and intermediates:
a) DNA polymerases I and III.
b) Leading and lagging strand.
c) Telomerase.
d) Eukaryotic polymerases. **5×4**

- Q.4 Briefly explain the following with respect to transcription:
a) RNA polymerase holoenzyme and core enzyme. **3**
b) Open complex and closed complex. **3**
c) Promoters recognized by RNA polymerase III. **6**
d) Polyadenylation. **8**

PART-B

- Q.5 a) Briefly describe the events that occur in each of the following growth conditions:
i) *E. coli* in a medium containing lactose but no glucose.
ii) *E. coli* in a medium containing both lactose and glucose. **10**
b) Explain the mechanism of gene regulation that occurs via changes in DNA or chromatin structure. **10**

- Q.6 Describe the important events that occur during the three stages of protein synthesis in bacteria. What factors play critical roles in the three stages? How the process is different from that occurring in eukaryotes? **20**
- Q.7 What features distinguish a transposon from a retroelement? Describe their structure and mechanism of transposition. **20**

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester
INDUSTRIAL MICROBIOLOGY (BT-403A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) What is fermentation? Mention some fermentation products with their uses.
- b) How the screening of industrially important microorganisms could be done?
- c) Explain the traditional approach for the production of alcoholic beverages.
- d) What are the factors one should consider for making the fermentation process economics?
- e) Write a note on the industrial production of penicillin.

4×5

PART-A

- Q.2** a) Describe in detail the various components parts of a fermentation processes. **10**
b) Differentiate between batch and fed-batch fermentation. **10**
- Q.3** a) Describe the methods used for the improvement of industrially important microbial stains. **10**
b) What are different methods used for the preservation of microbial strains? **10**
- Q.4** a) What are the microbial strains used for the production of ethanol? Explain the biosynthesis of ethanol in detail. **10**
b) Discuss different types of proteases and their industrial applications in detail. **10**

PART-B

- Q.5** a) Give a detailed account of tetracycline mode of action and industrial production. **10**
b) Briefly explain the occurrence and economic significance of vitamin B₁₂. **10**
- Q.6** a) Write short notes on the following:
i) Biopolymers. ii) Biofertilizer5. **5×2**
b) Define "Single cell protein" with its advantages and disadvantages in detail. **10**
- Q.7** a) What are the basic objectives used in the development of a fermentation process economically viable? **10**
b) Explain in detail about the market potential for a fermentation process. **10**

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester
INDUSTRIAL MICROBIOLOGY (BT-403A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) What is fermentation? Mention some fermentation products with their uses.
- b) How the screening of industrially important microorganisms could be done?
- c) Explain the traditional approach for the production of alcoholic beverages.
- d) What are the factors one should consider for making the fermentation process economics?
- e) Write a note on the industrial production of penicillin.

4×5

PART-A

- Q.2** a) Describe in detail the various components parts of a fermentation processes. **10**
b) Differentiate between batch and fed-batch fermentation. **10**
- Q.3** a) Describe the methods used for the improvement of industrially important microbial stains. **10**
b) What are different methods used for the preservation of microbial strains? **10**
- Q.4** a) What are the microbial strains used for the production of ethanol? Explain the biosynthesis of ethanol in detail. **10**
b) Discuss different types of proteases and their industrial applications in detail. **10**

PART-B

- Q.5** a) Give a detailed account of tetracycline mode of action and industrial production. **10**
b) Briefly explain the occurrence and economic significance of vitamin B₁₂. **10**
- Q.6** a) Write short notes on the following:
i) Biopolymers. ii) Biofertilizer5. **5×2**
b) Define "Single cell protein" with its advantages and disadvantages in detail. **10**
- Q.7** a) What are the basic objectives used in the development of a fermentation process economically viable? **10**
b) Explain in detail about the market potential for a fermentation process. **10**

End Semester Examination, Dec. 2018
B. Tech. — Fourth Semester
THERMODYNAMICS OF BIOPROCESS (BT-405A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Define the zero, second, third and fourth law of thermodynamics. Mention the equations as applicable.
- b) What is flux and force?
- c) State and explain Prigogine's theorem.
- d) With a help of neat schematic diagram, explain the various types of equilibrium.
- e) Describe cooperative transitions and partition function.

4×5

PART-A

- Q.2 a) Explain the effect of temperature on free energy change. **10**
b) What is a heat engine? How do you derive the maximum work? **10**
- Q.3 a) Define and derive the equation for partial molar property. **10**
b) State and explain Henry's law and Raoult's law by giving their equations. **10**
- Q.4 a) Why closed systems are failure in biology? Enumerate the difference between steady state and equilibrium. **10**
b) Thermodynamics in describing biological processes. **10**

PART-B

- Q.5 a) What are constitutive equations? Explain. **10**
b) Discuss the equations for flux and force in a continuous system. **10**
- Q.6 a) Write briefly about Boltzmann distribution. **10**
b) Describe the thermodynamics of active transport. **10**
- Q.7 Explain the following terms:
a) Thermo analysis of oxidative phosphorylation.
b) Ordering in time and space far from equilibrium. **10×2**

End Semester Examination, Dec. 2018

B. Tech. — Fourth Semester

BIOINFORMATICS AND COMPUTER APPLICATIONS (BT-406)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Name two Genomic databanks.
- b) What do you mean by LAN?
- c) What type of information one can extract from primary database?
- d) How pair wise sequence alignment is related to homology studies?
- e) Enlist two features of Needleman and Wunch algorithm.
- f) What is the role of DDBJ?
- g) Expand the PIR format.
- h) Enumerate the advantages of X-ray crystallography.

2½×8

PART-A

- Q.2 a) How internet, intranet and extranet are different from each other? **10**
b) Discuss networking protocol. How OSI model is different for TCP/IP? **10**
- Q.3 a) How cDNA is different from genomic DNA? **6**
b) Discuss any DNA sequencing method in detail. **14**
- Q.4 a) Explain PDB and EMBL databank in detail. **10**
b) 'Databases are heart of bioinformatics'. Justify. **10**

PART-B

- Q.5 Align the given sequence using Smith-Waterman programming algorithm for the given sequences GTCGTT and GGCGAT upto trace back using +!, -1 and 0 for match, mismatch and gap penalty respectively. **20**
- Q.6 a) How multiple sequence alignment is helpful in evolutionary studies? Justify using an example. **8**
b) What are the different methods used for multiple sequence alignment? **12**
- Q.7 Write short notes on the following:
a) Protein classification.
b) Protein structure determination method. **10×2**

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

RECOMBINANT DNA TECHNOLOGY (BT-501A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer briefly:

- a) Differentiate between Isoschizomers and Neochischizomers.
- b) Name the selectable marker genes that are used in agrobacterium mediated transformation.
- c) What do you understand by the term "disarmed plasmid"? Why is disarming necessary in Ti plasmid derived vectors?
- d) Define nucleic acid probe. How can it be used in screening of DNA libraries?
- e) What are tailor made protein?
- f) How retrotransposons are different from DNA based transposons?
- g) Differentiate between expression vector and cloning vector?
- h) What do you understand by "Cell free expression system"?
- i) What do you understand by the term "Animal Pharming"?
- j) Expand RISC and write down its role.

2×10

PART-A

- Q.2**
- a) Write in detail about various tools used in rDNA technology. **15**
 - b) With the help of examples show which all types of ends can be generated with restriction enzyme digestion? **5**
- Q.3**
- a) Write in detail about the lytic and lysogenic cycle of λ bacteriophage. Discuss the molecular mechanism involved during switching between the cycles? **15**
 - b) What are selectable marker genes? Write about their role in pBR322 vectors. **5**
- Q.4**
- a) Using a schematic diagram explain sequencing method employing PCR. **10**
 - b) What detailed methodology will you employ to study only the expressed genes of an organism? **10**

PART-B

- Q.5** Discuss about the chemical, physical and biological gene transfer techniques used for DNA delivery. **20**
- Q.6**
- a) Write in detail with the help of a diagram about promoter system used in mammalian expression vectors and enumerate its advantages. **15**
 - b) E. coli is a prokaryotic organism and suffers a setback when it is used to produce eukaryotic proteins. Discuss about the setbacks and how can these be overcome? **5**
- Q.7** Write short notes on the following:
- a) Gene Therapy **7**

- b) Transgenic Animals
- c) Gene silencing

**7
6**

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) – Fifth Semester
DOWNSTREAM PROCESSING (BT-505A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer briefly:

- a) What is the effect change in upstream processes on downstream process?
- b) Compare the economics of downstream processing of chemicals and bioproducts.
- c) Name any two separation techniques based on size of the biomolecules.
- d) What are the important factors to be considered for selection of separation techniques applied for food products?
- e) Name any one flocculent and explain its application.
- f) What is a filter aid?
- g) Explain the principle of reverse osmosis.
- h) Why is ammonium sulphate salt chosen as a protein precipitant?
- i) What is the difference between polyacrylamide and agarose gel media for electrophoresis?
- j) How does drying increase shelf life?

2x10

PART-A

Q.2 a) Explain with the help of suitable example different steps in downstream processing.

10

- b) Describe the economic importance of downstream processing in bioprocessing.
5
- c) Discuss major difficulties in downstream processing.

5

Q.3 Explain any one separation technique based on the following physicochemical characteristics of bioproducts:

- | | |
|-------------------|-------------|
| i) Size | ii) Density |
| iii) Charge | |
| iv) Solubility | v) Affinity |
| vi) Boiling point | |
- 20**

Q.4 a) Compare mechanical, physical and chemical methods of cell disruption. Give suitable examples.

10

- b) Describe filtration by rotary vacuum filter using a suitable diagram.

10

PART-B

- Q.5**

 - a) Explain the principle and application of protein precipitation. **5**
 - b) Compare solvent extraction and aqueous two phase extraction processes **5**
 - c) Define adsorption isotherms. Briefly explain linear, Langmuir and Freundlich adsorption isotherm **10**

Q.6

 - a) Discuss the principle and important applications of any one chromatography techniques.
 - i) ion exchange
 - ii) affinity chromatography.**10**
 - b) Give in detail account on construction and working of High Pressure Liquid chromatograph. **10**

Q.7

 - Write detailed notes on:
 - a) Fractional distillation
 - b) Mier's theory of crystallization**10**

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) – Fifth Semester

ANIMAL BIOTECHNOLOGY (BT-506A)

Time: 3 hrs.

Max Marks: 100

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

- Q.1 Answer Briefly:**

 - a) What are the advantages and disadvantages of using serum in media?
3
 - b) How are viable cells separated from non-viable cells?
3
 - c) Distinguish between transformation and transfection.
4
 - d) Why do we perform karyotyping? Explain its role in animal cell culture.
4
 - e) Describe the role of stromal cells in tumorigenesis.
3
 - f) Enlist the applications of adult stem cells.
2

PART-4

- Q.2** a) Explain the different routes of contamination in animal cell culture and how to you prevent its occurrence.

b) How do you prepare animal growth and maintenance media?

10

Q.3 a) Describe the various steps involved in creating immortal cell lines.

10

b) What is the application of keratinocytes culture? Briefly describe the methodology for generating keratinocyte cell lines.

10

Q.4 Explicate the process of generating test tube baby.

20

PART-B

Q.5 a) Discuss the advantages and disadvantages of gene therapy.

10

b) Can PCR help in identifying a genetic disorder? Explain through an example.

10

Q.6 a) Draw and explain the various antisense molecules used in antisense technology.

10

b) How does a tumor establish its vascular supply?

10

Q.7 a) What are the various sources of stem cells? Give examples.

10

b) Classify stem cells based on their potential to differentiate.

10

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester
FOOD BIOTECHNOLOGY (BT-507)

Time: 3 hrs

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

Q.1 Answer briefly:

- a) What is the future of food biotechnology?
- b) Explain the relationship of water activity with food spoilage and packaging?
- c) Give details on HACCP.
- d) What are the primary source of microorganisms in food?
- e) What are Agar Droplets?
- f) Write down the criteria for an ideal probiotic.
- g) Write the application of protease in food processing.
- h) State applications of SCP.
- i) Write down the importance of chill storage.
- j) Which two industries contributes maximum towards food waste?

2x10

PART-A

Q.2 a) Classify the microorganisms associated with food.

10

- b) Give an account of different genera of bacteria common to food.

10

Q.3 a) Give an account of various extrinsic and intrinsic parameters that affect the growth of microorganism in food.

10

- b) Discuss the microbiology of milk and milk products.

10

Q.4 Explain in detail the different methods used for enumeration of microorganisms in food.

20

PART-B

Q.5 a) Describe the effect of freezing on foods.

10

- b) Write an essay on the production of alcoholic and non-alcoholic beverages.

10

Q.6 a) Why fermented foods are so popular? Classify the fermented foods. Outline the biotechnological process for production of a fermented food from cereal and a milk beverage.

10

b) What are food yeasts and algal proteins? Why are they referred so commonly? What is their utility and explain the process of their production?

10

Q.7 Discuss the role and application of pectin in food industry with appropriate examples.

20

End Semester Examination, Dec. 2018

B. Tech. — Fifth Semester
BIOPROCESS ENGINEERING (BT-508)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Compare the agitation in radial and axial flow. **3**
- b) Discuss the role of a bioprocess engineer. **3**
- c) What is the role of draft tube in airlift type of bioreactor? **2**
- d) Give the significance of the term K_{la} ? **3**
- e) Enlist two of the bio products that show growth associated product formation kinetics. **2**
- f) Describe the technique of sample retrieval from bioreactor. **3**
- g) Discuss some of the high throughput low resolution techniques in downstream processing. **2**
- h) Briefly explain the principle of affinity chromatography. **2**

PART-A

Q.2 Answer the following questions:

- a) What are the objectives of bioreactor design?
- b) Discuss the properties of material required for construction of bioreactors.
- c) How is containment ensured in bioreactors?
- d) Enumerate some of the typical features of biotechnological processes. **5x4**

Q.3 a) Explain in detail the method for determination of K_{la} by dynamic method. **10**
b) Describe the construction and working of any one type of bioreactor for large scale culture of animal cells. **10**

Q.4 a) How do specific growth rates of bacteria depend on limiting substrate concentration? Explain with the help of Monod's model. **10**
b) Explain the working and cell growth kinetics in an ideal CSTR. **10**

PART-B

Q.5 a) What are the general nutritional requirements of microorganisms? **10**
b) Write in detail about the following:

- i) Selection of nitrogen source.
- ii) Medium optimization. **5x2**

Q.6 a) What is the effect of sterilization time and temperature on nutrient quality? **10**
b) Discuss the kinetics of sterilization by depth filters. **10**

Q.7 a) Explain the process of cell disruption by ball mill. Draw a suitable diagram. **10**

b) Give a detailed account of penicillin production by fermentation.

10

End Semester Examination, Dec. 2018

B. Tech. — Fifth Semester

INTRODUCTION TO PHARMACEUTICAL TECHNOLOGY (BT-531)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Write a brief account on:

- a) Why pharmacopeia is important for pharmaceutical industry?
- b) What is first-pass effect? Explain with suitable examples.
- c) Why Solid Polymorphism is important in drug development?
- d) What are the merits and demerits of wet granulation process in tablet manufacturing?
- e) Define bioavailability. What are the main objectives of bioavailability studies? **4x5**

PART-A

Q.2 a) What is IND? Name the different types of IND.

4

- b) How drugs are classified based on their chemical structure and mechanism of action?

8

- c) What are the salient features of quality assurance in pharmaceutical industry?

8

Q.3 a) Different between enteral and parenteral route of drug administration.

4

- b) Explain the oral and intravenous drug administration with C_p plots.

8

- c) Why new drug delivery systems are evolved in drug industry?

8

Q.4 a) What are the factors determining the drug solubility?

2

- b) Why excipients are important for drug formulation? Explain the role of diluents, binders, anti-oxidants and preservatives as excipients with two examples each.

8

- c) Explain the different mechanisms of therapeutic incompatibility of drugs.

10

PART-B

Q.5 a) What are the advantages and limitation of direction compression in tablet manufacturing?

5

b) Explain the different steps to be taken in handling and storage of capsules.
15

Q.6 a) How syrup is manufactured in a pharmaceutical plant?

10

b) Explain the steps involved in automatic ointment manufacturing.
10

Q.7 a) What are biopharmaceuticals? Explain the various forms of biopharmaceutics in the market with examples.

8

b) Explain the various mechanisms involved in drug absorption.
12

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

INTRODUCTION TO BIOMATERIALS (BT-532)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer briefly:

- a) What are tribological studies?
- b) Classify the broad categories of biomaterials on the basis of their composition.
- c) What are haptens? How it is related to hypersensitivity?
- d) What type of cells is preferred for in vitro testing of biomaterials? Give reasons.
- e) Discuss briefly about cardiovascular implants used in angioplasty. **4×5**

PART-A

- Q.2 a) Discuss briefly about various electrical and optical properties of a biomaterial. **10**
- b) Explain the role of integrins in recognition of a biomaterial. **10**
- Q.3 a) What is the difference between brittleness and hardness? How does it affect the performance of a biomaterial? **10**
- b) Explain cell-cell mimicking by a biomaterial. **10**
- Q.4 a) Explain the following briefly:
 - i) Ceramics
 - ii) Biopolymers
 - iii) Cytokine signaling
 - iv) Yield stress
 - v) Lubricity of biomaterial**2×5**
- b) Discuss the mechanism of cytokine responses elicited during biomaterial interactions in vivo. **10**

PART-B

- Q.5 a) Give an account of different types of toxicity. **10**
- b) Can the in vitro and in vivo data obtained for a biomaterial be correlated? Explain. **6**
- c) What is the role of biomaterials in tumorigenesis? **4**
- Q.6 a) How does a metallic biomaterial degrade compared to ceramics? **6**
- b) Explain Virchow's triad. **10**
- c) Name commercially used implants for dental, heart, joints and kidney. **4**
- Q.7 What are the different rules for tissue engineering? Explain using suitable diagram/flowchart. **20**

End Semester Examination, Dec. 2018
B. Tech. (Biotechnology) – Fifth Semester
HUMAN GENOMICS AND PROTEOMICS (BT-533)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer Briefly:

a) Differentiate between physical map and genetic map.

3

b) Define EST. How it is different from SNP?

2½

c) What do you mean by lead time bias? Discuss cancer epidemiology.

2½

d) Enumerate factors that state whether the gene is on or off.

3

e) Explain mechanism by which biological targets are identified.

2

f) Enlist methods used to map protein-protein interaction.

3

g) How pharmacogenomics helps in preparation of personalized medicine?

4

PART-A

Q.2 a) What are gene families? Explain with example.

6

b) Discuss human genome project.

14

Q.3 a) How gene expression profile helps to perform comparative genomics?

12

b) Explain technologies used to prepare gene expression profile.

8

Q.4 a) How p53 is considered as guardian of human genome?

6

b) Enumerate receptors which are responsible for cell differentiation.

14

PART-B

Q.5 a) Discuss protein separation strategies.

8

b) How MALDI-TOF is used in analysis of peptide mass?

12

Q.6 a) What do you mean by phage display?

6

b) How gene expression profile is used in hypothesis generation and testing?

14

Q.7 a) Explain gene targets with suitable example.

8

b) Discuss mechanism by which biological targets are identified.

12

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester
BASIC VIROLOGY (BT-534)

Time: 3 hrs

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

Q.1 Answer briefly:

- a) What is a latent virus? Give examples.
- b) Differentiate between capsid and envelope.
- c) What is a prophage?
- d) Name the DNA sites responsible for lytic and lysogenic cycle.
- e) What are Nucleoside analogs used for?
- f) Name two commonly used antiviral drugs.
- g) What is a zoonotic virus?
- h) Expand TCID50. Mention its usage.
- i) Differentiate between biosafety and containment.
- j) Can antibiotics be used for viral diseases? Give reasons for your answer.

2x10

PART-A

Q.2 a) Why do we culture viruses and how this aim is achieved?

10

- b) Explain different quantification techniques for viruses.

10

Q.3 a) Give an account of replication strategy adopted by Influenza virus. Illustrate with diagram.

10

- b) Describe different types of modern vaccines. What is the need for their emergence and the advantages and disadvantages they have over conventional vaccine?

10

Q.4 What are the adjuvants? Why they are required and how do they improve the efficacy of vaccines.

20

PART-B

Q.5 a) Explain with illustration the biology of bacteriophage vectors.

10

- b) What are baculoviruses? Explain their role in gene therapy.

10

Q.6 Discuss the various levels of biosafety with their unique features citing examples of microbes.

20

Q.7 Explain in detail the epidemiology and pathogenesis of Ebola Virus. Give Illustrations.

20

End Semester Examination, Dec. 2018

B. Tech – Fifth Semester
FOOD MICROBIOLOGY (BT-537)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer briefly:

- a) Explain how biotechnology is applied to food industry?
- b) Give two examples of microbes used in alcoholic beverages.
- c) What is putrefaction?
- d) What are the internal barriers in egg that preserves it?
- e) Define foodborne intoxication.
- f) Differentiate between intrinsic and extrinsic parameters.
- g) How are emulsifiers relevant to food industry?
- h) What are the sources of microbes found in food?
- i) Differentiate between food spoilage and contamination.
- j) State why jams still must be sealed even though bacteria will not grow in them?

2x10

PART-A

Q.2 a) Discuss the role of microorganisms in food industry.

10

b) Give a detailed synopsis of different genera of yeast common to food.

10

Q.3 a) What are the most common methods of sterilization, and how do they work?

10

b) How microscopic methods are used in detection, identification and analysis of foodborne pathogens?

10

Q.4 a) Give an account on spoilage of food by enzymes.

10

b) Discuss microbial spoilage of food. What are the factors which affects food spoilage?

10

PART-B

Q.5 a) Give a detailed account on Dairy microbiology.

10

b) Discuss the role of different organisms in the process of fermentation.

10

Q.6 What do you understand by foodborne intoxication? Discuss the disease caused by *Clostridium botulinum*, *Staphylococcus aureus*, *Clostridium perfringens*, and *Bacillus cereus*.

20

Q.7 a) Discuss the significance of preservatives and antimicrobial agents in food industry.

10

b) How sweeteners help to improve the taste of food? Explain different types of sweeteners in food.

10

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester
PLANT BIOTECHNOLOGY (BT-601A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 a) Define callus and cellular totipotency.
b) Differentiate between microelements and macroelements.
c) Write down note on symmetrical and asymmetrical hybrids.
d) What is symbiosis and antibiosis?
e) What is the name of the first inter-genetic somatic hybrids between potato and tomato?
f) Name the bacteria known as natural genetic engineer of plants.
g) Breeding associated with molecular markers (nucleic acid) is known as _____.
h) _____ is the gas responsible for the ripening of fruits.
i) What is the name of the first genes available for genetic engineering of crop plants for pest resistance?
j) What gene is inserted in FLAVR SAVR tomato? **2×10**

PART-A

- Q.2 a) What are the phenomena of de-differentiation and re-differentiation? **8**
b) Explain microspore culture for obtaining androgenic haploids. **12**
- Q.3 a) Discuss the scheme for obtaining somaclonal variations without in vitro selection by giving suitable example. **10**
b) Write down different methods for protoplast fusion. **10**
- Q.4 a) Describe the phenomena of nitrogen fixation. **10**
b) How growth promotion can be done by free living bacteria? **10**

PART-B

- Q.5 a) Define mapping. How do you explain gene mapping by two point test cross? **12**
b) Write down any two methods for screening of libraries. **8**
- Q.6 a) Discuss Agrobacterium mediated gene transfer method. **12**
b) Differentiate between transient and stable gene expression. **8**
- Q.7 a) Write down note on any two methods for virus resistance. **12**
b) How transgenic technology can be used for quality improvement? **8**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

ENVIRONMENT BIOTECHNOLOGY (BT-602A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following briefly:

- a) Acid rain.
- b) Removal of heavy metals from waste water by advance technology.
- c) What is composting? Give its physiochemical characteristics.
- d) How biomagnification of xenobiotic molecules occur in food chain?
- e) Biomining.

4×5

PART-A

Q.2 a) What do you understand by ozone depletion? How will it effect the environmental conditions of earth? **10**
b) Give the causes of water pollution. What implications does it have on public health? **10**

Q.3 Explain the physical, chemical and biological processes involve in waste water treatment. **20**

Q.4 What are the characteristics and treatment technologies required for industrial wastes? How can these be managed? **20**

PART-B

Q.5 a) Define biodegradation? State the factors affecting the process of biodegradation. **10**
b) Describe the role of microbes and plants in biodegradation and biotransformation. **10**

Q.6 Explain:

- a) Factors influencing phytoremediation. **10**
- b) In-site and Ex-site technologies in bioremediation. **10**

Q.7 a) What is the role of biotechnology in management of environmental resources? **10**
b) How can biogas be produced? Explain its importance. **10**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

PHARMACEUTICAL TECHNOLOGY (BT-621A1)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions briefly:

a) What is pharmaceutical drug incompatibility?

4

b) Tablet is different from Capsule. How?

2

c) Comment on the novel drug delivery systems?

4

d) Write about the role of any two stabilizers used in formulation of drug.

2

e) Distinguish between pharmacodynamics and pharmacokinetics.

4

f) What is meant by pharmacopis?

4

PART-A

Q.2 a) Write about various steps involved in filing Investigational New Drug Application. **10**
b) Throw some light on the clinical research being conducted to test a new formulation of drug.

10

Q.3 Write short notes on:

a) Sustained drug delivery system.

5

b) Drug Dosage Forms.

5

c) Various methods of drug delivery.

10

Q.4 a) Discuss various physical and chemical properties ideal for a pharmacologically active ingredient in detail.

15

b) Highlight the main issues concerned with the ill-effects of drug fillers and additives.

5

PART-B

Q.5 a) Explain the process of formulation, handling and storage of solid dosage forms.

15

b) Distinguish with suitable examples the difference between manufacturing and formulation of pharmaceutical drug.

5

Q.6 a) Why are liquid dosage forms necessary? How are they manufactured and handled? **10**
b) What are semi-solid suppositories?

10

Q.7 Discuss on the following:

a) Absorption.

10

b) Distribution.

10

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) – Sixth Semester

STEM CELLS IN HUMAN HEALTH (BT-623A1)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions briefly:

- a) Differentiate symmetrical and asymmetrical ES cell renewal.
- b) Specify the role of OCTy in stem cell pluripotency.
- c) What is type 1 diabetes?
- d) What type of disease requires BMT?
- e) Name the sources of adult stem cells.

4×5

PART-A

Q.2 a) Explain the factors involved in ES cell self-renewal.

10

- b) How fate mapping techniques are used to trace the stem cell lineage? Explain cre-cosp technology used in mapping lineage.

10

Q.3 How cells use check points to regulate the cell cycle? Explain with suitable diagrams. **20**

Q.4 a) Describe the development of trophoblastic lineage.

10

- b) What are the characteristics of primordial germ cells?

10

PART-B

Q.5 Discuss the repopulating patterns of primitive hematopoietic stem cells with suitable cell lineage figures.

20

Q.6 a) Explain the causes and symptoms of parkinson's disease.

10

- b) Elaborate various strategies used to treat neurodegenerative diseases.

10

Q.7 Which hormone is responsible for maintaining glucose homeostasis? Give the causes, symptoms and types of diabetes mellitus. How stem cells can be used to treat diabetes. **20**

End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester
MOLECULAR DIAGNOSTICS (BT-633)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions briefly:

- a) Karl Mullis was awarded nobel prize for _____.
- b) Mutation is an evil. Agree or Disagree? State Reasons.
- c) Differentiate between prognostics and diagnostics.
- d) SSCP refers to _____.
- e) What is Molecular Pathology?
- f) Name two restriction enzymes and mention their recognition sites.
- g) Differentiate between agglutination and precipitation.
- h) Expand AFP and HCG?
- i) What is NGS?
- j) Name two genetic disorders that are caused by chromosomal aberrations.

2x10

PART-A

Q.2 a) What is the role of histones in genome packaging?

10

- b) Explain the result analysis of DNA Sequencing. How do we interpret and troubleshoot sequencing results?

10

Q.3 a) How mutations are detected and how they are responsible for genome instability? **10**

- b) Explain the principle and procedure for polymerase chain reaction.

10

Q.4 Give an elaborative description of the principle and applications of various tools available for molecular diagnosis.

20

PART-B

Q.5 a) Discuss the importance of prenatal diagnosis.

10

- b) How heteroduplex analysis helps in disease detection? Explain with the help of diagram.

10

Q.6 a) What are molecular markers? How important they are for molecular diagnostics?

10

b) Describe two major immunoassays and their applications.

10

Q.7 Discuss in detail the types of antigen antibody reaction that form the basis of immunodiagnostics.

20

End Semester Examination, Dec. 2018

B. Tech.—Sixth Semester
CLINICAL MICROBIOLOGY (BT-634)

Time: 3 hrs

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

Q.1 Answer the following questions briefly:

- a) What are toxins? Differentiate between Exotoxins and Endotoxins.
- b) What do you understand by the term host, symbiosis, Commensalisms and Parasitism?
- c) How is cell wall of gram positive different from that of gram negative bacteria?
- d) Write a note on the classification of viruses.
- e) Explain the methods of diagnosis for anaerobic and aerobic intracellular parasites. **4x5**

PART-A

Q.2 a) What are the advantages of bacteria and Fungal microbiota to host?

15

b) What are virulence factors? Discuss various types of virulence factors in detail. **5**

Q.3 Write short notes on (**any two**):

- a) Flagellates.
- b) Parasitic helminthes.
- c) Trematodes.
- d) Cestodes.

10x2

Q.4 a) What are the criteria for the identification of disease causing bacteria?

15

b) Name two gram positive spore forming bacteria. Write a note on the Bacillus anthrax culture characteristics, pathogenesis, lab diagnosis and treatment. **5**

PART-B

Q.5 Differentiate between the following:

- a) Rabies and Prions Disease.
- b) Hepatitis Viruses and Herpes Viruses.

10x2

Q.6 Write short notes on the following:

- a) Superficial mycosis.
- b) Cutaneous mycosis.
- c) Endemic mycosis.

d) Subcutaneous mycosis.

5x4

Q.7 a) How can the diagnosis of viral infection be performed in lab?

10

b) Explain the molecular diagnostic procedure for the identification of a pathogen.

10

End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester
FOOD PACKAGING TECHNOLOGY (BT-637)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions briefly:

- a) What are the requirements of food packaging?
- b) Enlist the general requirements of packaging.
- c) Give the specifications of labeling packaged drinking water.
- d) What is the significance of BIS code and their classification?
- e) State the Modgen formula and give its significance

4×5

PART-A

- Q.2** a) Define principal display panel. What is its role in food packaging industry? **10**
b) What are the specifications of labeling infant foods? **10**
- Q.3** a) Describe the criteria for selecting of packaging for raw and processed foods. **10**
b) Discuss the interaction of food material with packaging material. **10**
- Q.4** What are the factors that control shelf life? How can you extend the shelf life of food products? **20**

PART-B

- Q.5** Describe the various methods used for processing and packaging of:
a) Milk and dairy products.
b) Cereal grains. **10×2**
- Q.6** a) What are the merits and demerits of using paper and metals as packaging material? **15**
b) Explain the different types of seals available for food packaging. **5**
- Q.7** Write short notes on the following:
a) Asseptic packaging.
b) Bag manufacturing. **10×2**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

NUTRACEUTICALS AND FUNCTIONAL FOODS (BT-638)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Write short answers:

- a) Differentiate nutrition and nutraceutics.
- b) Explain the term “functional food” with examples.
- c) Why antioxidants are considered as nutraceutics?
- d) Symbiotics benefits.
- e) Nutraceutics approach for arthritis.

4×5

PART-A

Q.2 a) How dietary fibres improve the health? **5**
b) Give a brief account of flavonoid family members and its benefits. **15**

Q.3 a) How genistin from soybean is extracted? **10**
b) What are the richest sources of PUFA? Describe the extraction procedure of PUFA and its medical benefits. **10**

Q.4 Write short notes on the following;

- a) Definition of probiotics, selection criteria and types.
- b) What are the ingredients of prebiotics and its medical benefits.

10×2

PART-B

Q.5 a) What are the diseases associated with cardiovascular diseases? Give a brief account on CVD. **5**
b) How are nutraceuticals beneficial in improving cardiovascular health? **15**

Q.6 a) Name the different types of diseases affecting liver functions. **5**
b) Describe the role of nutraceuticals in improving liver function. **15**

Q.7 a) How are immune functions of a host modified by functional foods? **10**
b) Write a note on nutrigenomics and its possible applications. **10**

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) — Seventh / Eighth Semester
DNA MICROARRAY AND APPLICATIONS (BT-703)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions briefly:

- a) Define normalization. How do you compare two chips when same labeled RNA is applied on them?
- b) Differentiate between Euclidian and Manhattan distances.
- c) List the basic rules of validation analysis.
- d) Discuss briefly any two types of distance matrices.
- e) What is resequencing? State its significance.
- f) How is hypothesis based experiment performed?

4×5

PART-A

- Q.2** a) Explain in detail the principle of SAGE with the help of a diagram. **10**
b) How do you perform image analysis? **10**
- Q.3** a) Define SOM. Explain its mechanism of operation in detail. **10**
b) How is PCA computed? **10**
- Q.4** a) Discuss the methodology of rectifying systematic biases in a microarray experiment. **10**
b) What is fold change? How is it calculated? Give a note on its significance. **10**

PART-B

- Q.5** a) Discuss the advantages and disadvantages of time series and steady state approach. **10**
b) Enlist the limitations of network modeling in detail. **10**
- Q.6** a) Give the significance of system biology in current era in detail. **10**
b) How do you evaluate the performance of a classifier? **10**
- Q.7** Write short notes on the following:
a) Explain the different methods available for interpreting the results. **10**
b) Describe the process of two channel array experiment. **10**

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) — Seventh / Eighth Semester
DNA MICROARRAY AND APPLICATIONS (BT-703)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions briefly:

- a) Define normalization. How do you compare two chips when same labeled RNA is applied on them?
- b) Differentiate between Euclidian and Manhattan distances.
- c) List the basic rules of validation analysis.
- d) Discuss briefly any two types of distance matrices.
- e) What is resequencing? State its significance.
- f) How is hypothesis based experiment performed?

4×5

PART-A

- Q.2** a) Explain in detail the principle of SAGE with the help of a diagram. **10**
b) How do you perform image analysis? **10**
- Q.3** a) Define SOM. Explain its mechanism of operation in detail. **10**
b) How is PCA computed? **10**
- Q.4** a) Discuss the methodology of rectifying systematic biases in a microarray experiment. **10**
b) What is fold change? How is it calculated? Give a note on its significance. **10**

PART-B

- Q.5** a) Discuss the advantages and disadvantages of time series and steady state approach. **10**
b) Enlist the limitations of network modeling in detail. **10**
- Q.6** a) Give the significance of system biology in current era in detail. **10**
b) How do you evaluate the performance of a classifier? **10**
- Q.7** Write short notes on the following:
a) Explain the different methods available for interpreting the results. **10**
b) Describe the process of two channel array experiment. **10**

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) — Eighth Semester

CHEMOINFORMATICS AND DRUG DESIGN (BT-821A1)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **ANY TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer briefly:

- a) What are nodes and edges in molecular graphs? Explain the types with examples.
- b) Explain the Hammett equation. How equilibrium constants are calculated using benzoic acid.
- c) Briefly explain the neural networks.
- d) How does one classify an unknown molecule by a decision tree?
- e) What is molecular similarity?

4x5

PART-A

Q.2 Explain Lipinski's rule of five in detail and its application in drug designing.

20

Q.3 What are molecular fingerprints? Explain in detail.

20

Q.4 a) What is a PDB? Explain its role in CADD.

10

- b) Explain BCUT descriptors.

10

PART-B

Q.5 a) Explain Hansch analysis in detail.

10

- b) What are feed forward networks?

10

Q.6 a) What is the role of hydrogen bonding descriptors and polar surface area in the prediction of ADMET properties?

10

- b) Explain electronic and topology indices.

10

Q.7 High throughput screening data helps in data screening. Justify the statement.

20

End Semester Examination, Dec. 2018

B. Tech. (Biotechnology) – Seventh Semester

CHEMOINFORMATICS AND DRUG DESIGN (BT-821 A1)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer briefly:

- a) What are Kohnen networks? Explain.
- b) Name five databases used in chemoinformatics.
- c) What does ADME stand for? Explain.
- d) How is scoring done in drug designing?
- e) What is virtual screening?

5x4

PART-A

Q.2 How can one calculate physical and chemical properties in chemoinformatics? Discuss in detail.

20

Q.3 How is ΔG calculated in drug designing? What should be its optimal value for finding suitable ligand candidate?

20

Q.4 a) What is partition coefficient? Explain its significance in detail.

10

b) Explain different indices used in determining molecular descriptors.

10

PART-B

Q.5 a) Explain three protein databases used in drug designing.

10

b) What do you understand by drug similarity?

10

Q.6 a) Explain the significance of steric groups and its analysis in drug designing.

10

b) How significant is the neural networks in drug designing?

10

Q.7 What are the different steps involved in molecular docking?

20

End Semester Examination, Dec. 2018

M.Tech. (Biotechnology) – First Semester
APPLIED BIOINFORMATICS (BT-M-102A)

Time: 3 hrs

Max Marks: **75**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **FOUR** more questions out of six, **taking at least ONE question** from each unit. Each question carries equal marks.

- Q.1 Briefly Explain:
- a) Algorithm of FASTA.
 - b) Difference between dot matrix and dot plot.
 - c) Homology modelling.
 - d) Basic operator in Perl programming.
 - e) Define Sequence repeat and inversion. **3x5**

UNIT-I

- Q.2 a) Discuss algorithm of Stacks. How it is different from queue? **10**
b) What do you mean by PUSH and POP function. **5**
- Q.3 a) Explain the algorithm for linked list, linear linked list and circular linked list. **10**
b) How array is useful in writing Bioinformatics program? **5**

UNIT-II

- Q.4 Explain dynamic programming algorithm. Align the given sequence using Smith Waterman algorithm. Where sequences are ACCGTT and AGCGAT and assumptions +2, -1 and 0 for match, mismatch and gap penalty respectively. **15**
- Q.5 a) Discuss Blast algorithm using suitable example. **8**
b) Using Perl programmings transcribe DNA into RNA. **7**

UNIT-III

- Q.6 a) Discuss different method used in phylogenetic analysis. **12**
b) What are the different types of trees used in phylogenetic prediction? **3**
- Q.7 Explain Hidden Markoff model used in multiple sequence alignment. **10**
How UPGMA method helps in Phylogenetic analysis. **5**

End Semester Examination, Dec. 2018

M. Tech. (Biotechnology) — Third Semester

ANIMAL BIOTECHNOLOGY (BT-M-302)

Time: 3 hrs.

Max Marks: **75**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; taking at least **ONE** question from each **UNIT**. **Q.1 is compulsory.** Each question carries equal marks.

Q.1 Answer the following questions briefly:

- a) What is pre implantation genetic diagnosis? State its significance.
- b) Enlist the applications of tissue engineering?
- c) How is cryopreservation performed?
- d) Name the technology that was used to produce Dolly. Briefly describe the method.
- e) Why do we stimulate ovaries production for IVF? How is it done?

3×5

UNIT-I

Q.2 a) What are the various considerations for designing animal bioreactor? **10**
b) Briefly describe the MTT Assay. **5**

Q.3 a) Explain the safety and regulatory aspects of xenotransplantation. **10**
b) How are the iPSCs generated? **5**

UNIT-II

Q.4 a) How are murine and chimeric monoclonal antibodies generated? Give examples of each. **10**
b) What are the different types of gene therapy? **5**

Q.5 a) Define karyogram? What information can you derive from the banding patterns created by various stains? **10**
b) List the various applications of transgenic animals in the area of medicine **5**

UNIT-III

Q.6 a) Describe the various necessities and design of an animal house. **10**
b) What are the guidelines to be followed in animal house for animal care? **5**

Q.7 a) What role does a physiological model play in drug testing? **10**
b) Write a short note on the current trends in animal experimental biology **5**

End Semester Examination, Dec. 2018

M. Tech. — Third Semester

MOLECULAR BREEDING AND TRANSGENIC PLANTS (BTM-322B)

Time: 3 hrs.

Max Marks: **75**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **FOUR** more questions out of six, **taking at least one question** from each **UNIT**. Marks are indicated against each question.

Q.1 Answer the following:

- a) Differentiate between complete and incomplete dominance.
- b) What do you mean by tagging of genes?
- c) Give two strategies for improving biotic stress resistance.
- d) Define the concept of disarmed in gene transfer
- e) How do you analyze stabilities and instabilities in transgene expression? **3x5**

PART-A

- Q.2 a) Discuss the concept of gene pool and heterosis in brief. **4**
b) Explain the process of inbreeding depression in plants. **4**
c) What are various techniques for crop improvement? Explain in detail. **7**
- Q.3 a) Explain single gene and multiple gene concepts in plant breeding. **6**
b) What is the use of polyploidy and distant hybridization plant breeding? **6**
c) Describe the technique of embryo rescue in brief. **3**
- Q.4 a) Explain different methods of direct DNA transfer in plants. **10**
b) Write down two examples for insect resistance in plants **5**

PART-B

- Q.5 a) Elaborate *Agrobacterium* mediated gene transfer method in plants. **10**
b) Describe the use of plant viruses as cloning vector. **5**
- Q.6 Write short notes on the following:
a) Transient gene expression.
b) Gene silencing.
c) Golden rice. **5x3**
- Q.7 a) Write down a note on 'biosafety testing of transgenic plants'. **7**
b) What is the relevance of transgenic crops in Indian agriculture? **8**

End Semester Examination, Dec. 2018

M.Tech. (Biotechnology) – Third Semester

MOLECULAR BREEDING AND TRANSGENIC PLANTS (BT-M-322B)

Time: 3 hrs

Max Marks: **75**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **FOUR** more questions out of six, **taking at least ONE question** from each unit. Each question carries equal marks.

Q.1 Answer briefly the following:

- a) Differentiate between complete and incomplete dominance.
- b) What do you mean by tagging of genes?
- c) Give two strategies for improving biotic stress resistance.
- d) Define the concept of disarmed in gene transfer.
- e) How do you analyze stabilities and instabilities in transgene expression?

3x5

UNIT-I

- Q.2** a) Discuss the concept of gene pool and heterosis. **4**
b) Explain the process of inbreeding depression in plants. **4**
c) What are various techniques for crop improvement? **7**

- Q.3** a) Explain single gene and multiple gene concepts in plant breeding. **6**
b) What is the use of polyploidy and distant hybridization plant breeding? **6**
c) Describe the technique of embryo rescue. **3**

UNIT-II

- Q.4** a) Explain different methods of direct DNA transfer in plants. **10**
b) Write down two examples for insect resistance in plants. **5**

- Q.5** a) Elaborate *Agrobacterium* mediated gene transfer method in plants. **10**
b) Describe the use of plant viruses as cloning vector. **5**

UNIT-III

- Q.6** Explain briefly:
a) Transient gene expression.
b) Gene silencing.
c) Golden rice. **5x3**

- Q.7** a) Write down note on biosafety testing of transgenic plants. **7**

b) What is the relevance of transgenic crops in Indian agriculture?

8

End Semester Examination, Dec. 2018

M. Sc. (Biotechnology) — First Semester

CELL AND MOLECULAR BIOLOGY (BT-S-101A)

Time: 3 hrs.

Max Marks: **60**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; taking at least **ONE** question from each **unit**. **Q.1 is compulsory.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Enlist different prokaryotic transcription factor and explain their roles. **3**
- b) How DNA repair mechanism is carried out using base excision? **2**
- c) Enumerate steps followed in the construction of YAC library. **3**
- d) Differentiate between endocrine and paracrine signaling. **2**
- e) How initiation factors are responsible in initiation of translation mechanism? **2**

UNIT-I

Q.2 a) How components of plasma membrane regulate membrane fluidity? **4**
b) Give an account of cell organelles involved in secretary pathway. **8**

Q.3 a) Discuss diagrammatically about G protein linked receptors. **6**
b) Briefly explain how CAMP is involved in convergence, divergence and crosstalk among different signaling pathway? **6**

UNIT-II

Q.4 a) Discuss different types of RNA polymerase found in eukaryotes. **8**
b) What do you mean by mRNA stability? **4**

Q.5 Illustrate mechanism of DNA replication with well labeled diagram. **12**

UNIT-III

Q.6 a) Discuss “Translation Machinery”. **4**
b) Using suitable diagram give an account of different steps involved in translation of eukaryotes. **8**

Q.7 Write short notes on the following:

- a) Sanger sequencing method.
- b) BAC. **6×2**

End Semester Examination, Dec. 2018
M.Sc. (Biotechnology) – First Semester
MICROBIAL PHYSIOLOGY AND GENETICS (BT-S-102A)

Time: 3 hrs

Max Marks: **60**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Taking at least **ONE** question from each **UNIT**. All questions carry equal marks.

Q.1 Briefly answer the following:

- a) What are the Pasteur contributions?
- b) What are nutrients? How autotrophs differ from heterotroph?
- c) List the most common kind if inclusion bodies found in bacteria. Relate the structure of a gas vacuole to its function.
- d) Describe the structure of the bacterial endospore using a labeled diagram.
- e) What are the generation or doubling time and the mean growth rate constant?
- f) How lysogenic phages are different from lytic phages?

2x6

UNIT-I

Q.2 a) Discuss the ways in which microorganisms are classified based on their requirements for energy and electrons.
6
b) What are pure cultures? How selective media is differing from differential media?
6

Q.3 a) Describe and compare the five-kingdom classification system with the three-domain system.
6
b) Write a short note on 'ribotyping'.
6

UNIT-II

Q.4 a) Describe the ultra-structure of gram positive and gram negative flagella with labeled diagram.
6
b) Briefly explain about the mycoplasma and hyperthermophile archaea.
6

Q.5 a) Define 'growth'. Describe the four phases of the growth curve in a closed system and discuss the causes of each.
8
b) How is the rate of growth of a microbial population controlled in a chemostat and in a turbidostat?

4

UNIT-III

Q.6 a) Write short notes on the following:

2x4

- i) Penicillins.
- ii) Cephalosporins.

b) What are Hfr, F⁺ and F' bacterial strain?

4

Q.7 a) Differentiate between the following:

2x4

- i) Frame shift Mutation and Nonsense Mutation.
- ii) Generalized Transduction and Specialized Transduction.

b) Discuss the life cycle of RNA Phage.

4

End Semester Examination, Dec. 2018

M.Sc. (Biotechnology) – First Semester
BIOMOLECULES (BT-S-103A)

Time: 3 hrs

Max Marks: **60**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Taking at least **ONE** question from each **Unit.** Marks are indicated against each question.

Q.1 Briefly answer the following:

- a) Why buffers are considered important in biochemical reactions?
- b) Name and write the structure of carbohydrate present in cotton.
- c) Name and write the structure of any two branched chain amino acid.
- d) What is the significance of Ramachandran maps?
- e) On what basis the PPP have been divided into two phases.
- f) Why is TCA cycle known to be amphibolic in nature?

6x2

UNIT-I

Q.2 a) Write a note on 'classification of lipids'.

6

- b) Enumerate the salient features of double helical model of DNA.

6

Q.3 Classify amino acids on the basis of charge with the help of structure.

12

UNIT-II

Q.4 a) Write a note on 'various chromatographic technique used in protein purification'. **8**
b) Write a note on 'structural hierarchy in proteins'. **4**

Q.5 a) Write a note on 'protein sequencing'.

4

- b) How can spectroscopy and electrophoresis be used to analyze bimolecules?

8

UNIT-III

Q.6 Write in detail about various pathways involved in the complete oxidation of glucose during respiration.

12

Q.7 a) Derive M.M equation. What is the significance of K_m ?

8

- b) How the pH of blood is maintained in the human body?

4

End Semester Examination, Dec. 2018

M.Sc. (Biotechnology) – First Semester
BIOANALYTICAL TECHNIQUES (BT-S-104A)

Time: 3 hrs

Max Marks: **60**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Taking at least **ONE** question from each **UNIT**. All questions carry equal marks

Q.1 Answer Briefly:

- a) What makes the resolution and magnification very high in Electron Microscope as compared to the light Microscope?
- b) What is the relevance of 'Relative Centrifugal Force' in centrifugation?
- c) How is the process of separation and elution in Affinity Chromatography different from other types of chromatographic techniques?
- d) What are the advantages of Native PAGE over Reducing PAGE?
- e) State the use of monochromator or filter in Spectroscopy.
- f) What is meant by radio labeling of biomolecules? Give example.

6×2

UNIT-I

Q.2 a) Describe the light path and image formation in a phase contrast microscope.
10
b) Give its advantages over compound microscope.

2

Q.3 a) Elaborate the technique of differential centrifugation.
8
b) How are cellular organelles separated through this technique?
4

UNIT-II

Q.4 a) Explain the theoretical plate model of column chromatography.
6
b) Mention the factors affecting efficiency of separation of analytes in HPLC.
6

Q.5 Describe the process of SDS-PAGE and discuss the role of denaturants in this technique in detail.

12

UNIT-III

Q.6 a) Explain the principle and instrumentation of an Infra-Red spectrophotometer.
b) How does this technique help in identification of compounds? **6**

Q.7 Write notes on:

- a) Proportional counters.
- b) Autoradiography.

6×2

End Semester Examination, Dec. 2018

M.Sc. (Biotechnology) – First Semester
BIOSTATISTICS (BT-S-105A)

Time: 3 hrs

Max Marks: **60**

No. of pages: 1

Note: Attempt any **FIVE** questions in all; **Q.1 is compulsory.** Taking at least **ONE** question from each Unit. All questions carry equal marks.

Q.1 Answer briefly:

- a) What are the equations for calculating skewness?
- b) What do you understand by regression of y on x?
- c) How is ANOVA different from chi square test?
- d) Which of the following are in the category of continuous or discrete data:
 - i) Number of books brought by students
 - ii) The height measurements of soccer players
 - iii) The shoe size measurement of soccer players

3x4

UNIT-I

- Q.2 a) Calculate the mean deviation of the data 2, 9, 9, 3, 6, 9, 4 from the mean. **5**
- b) Calculate Range and Q.D of the following observations:
20, 25, 29, 30, 35, 39, 41, 48, 51, 60, 70 **5**
- c) Give two examples of quantitative and qualitative data. **2**

- Q.3 a) Calculate variance of the following data:

8

Class Interval	4-8	8-12	12-16	16-20
f	3	6	4	7

- b) What is kurtosis? What are the different types of kurtosis? **4**

UNIT-II

- Q.4 a) A zookeeper hypothesizes that changing the intensity of the light in the primate exhibits will reduce the amount of aggression between the baboons. In exhibit A, with a lower light intensity, he observes 36 incidences of aggression over a one month period. In exhibit B, with normal lights, he observes 42 incidences of aggression. Should he support or reject his hypothesis? Null Hypoth: There is no statistically significant difference between the observed results and the expected results. Given: Deg. Of freed-1, critical value at .05 = 3.84 **8**
- b) Write briefly about advantages and disadvantages of non parametric methods **4**

Q.5 a) Give a description of what the p-value represents in hypothesis testing.

4

b) Researchers asked 10 men and 10 women in their study to categorize 30 cartoons as either "funny" or "not funny". Below are fictional data for 9 people:

Percentage of cartoons labeled as "funny".

Women: 84, 97, 58, 90 Men: 88, 90, 52, 97, 86

Carry out independent sample t test for this scenario, using a two-tailed test and a significant level of 0.05.

8

UNIT-III

Q.6 a) What does correlation measure? Explain the role of scatter diagrams

6

b) How are regression and correlation different?

6

Q.7 Calculate the Pearson's correlation for the following data:

A	0	2	4	6	8	10	12
B	4	4	6	10	10	8	7

12

End Semester Examination, Dec. 2018

M.Sc. (Biotechnology) – Second Semester
BIOPROCESS TECHNOLOGY (BT-S-202A)

Time: 3 hrs

Max Marks: **60**

No. of pages: 1

Note: Attempt any **FIVE** questions in all; **Q.1 is compulsory.** Taking at least **ONE question** from each Unit. Marks are indicated against each question.

Q.1 Answer briefly:

- a) Define limiting nutrient.
- b) Elucidate the interdisciplinary nature of bioprocess technology.
- c) Differentiate between steady state and equilibrium.
- d) What is the function of baffles in a bioreactor?
- e) What would you do to improve the rate of convective mass transfer?
- f) Give the units of i) Specific growth rate ii) Diffusivity

2x6

UNIT-I

Q.2 a) Give a detailed account of unit operations in:

- i) Upstream.
- ii) Downstream Processing.

6

b) Why is continuous culture not popular in process industries? Enlist some of the types of process industries that employ continuous culture.

6

Q.3 a) Explain the correlation between specific growth rate and specific product formation rate in bioprocesses.

6

b) Derive energy balance equation for an adiabatic process.

6

UNIT-II

Q.4 Describe in detail the design of a typical stirred tank reactors emphasizing:

- i) Material of construction.
- ii) Agitation.
- iii) Aeration.
- iv) Online monitoring.

3x4

Q.5 Describe the design and applications of following types of bioreactors:

- i) Airlift bioreactor.

ii) Fluidized bed bioreactors.

12

UNIT-III

Q.6 a) Give the characteristics of ideal growth medium.

6

b) Explain the strategies for optimization of microbial growth medium.

6

Q.7 a) Explain in detail the principles of diffusive mass transfer.

6

b) Describe the dynamic gassing out method for determination of KLa.

6

End Semester Examination, Dec. 2018

M.Sc. (Biotechnology) – Second Semester
IMMUNOLOGY (BT-S-203A)

Time: 3 hrs

Max Marks: **60**

No. of pages: 1

Note: Attempt any **FIVE** questions in all; **Q.1 is compulsory**. Taking at least **ONE** question from each **UNIT**. Each questions carry equal marks.

Q.1 Answer the following:

- a) If microorganisms do penetrate the body, two main defensive operations come into play, name them.
- b) Define immunogenicity.
- c) Which cells can present antigen to CD4+T cells?
- d) What is a pleiotropic effect?
- e) What are the causes of hypersensitive disease?
- f) What do you understand by SCID? Give its full form.

2x6

UNIT-I

Q.2 What are complement proteins? What are the different pathways of complement activation? Explain any one of the pathway. **12**

Q.3 a) What is the difference between central and peripheral T-lymphocyte tolerance?
b) What are different antigen presenting cells? Explain different types of dendritic cells.
6x2

UNIT-II

Q.4 a) Discuss the antigen processing either by MHC class I or class II pathway.
b) Explain clonal selection theory of antibody formation in detail. **6x2**

Q.5 Explain the principles, procedure and applications of ELISPOT in medicine. **12**

UNIT-III

Q.6 Describe the immunological responses to a bacterial pathogen which has infected a mucosal surface. **12**

Q.7 a) Explain the immunopathology of Rheumatoid arthritis.
b) Discuss the importance of clinical organ transplantation in 21st century. **6x2**

End Semester Examination, Dec. 2018

M.Sc. (Biotechnology) – Third Semester
ANIMAL BIOTECHNOLOGY (BT-S-301A)

Time: 3 hrs

Max Marks: **60**

No. of pages: 1

Note: Attempt any **FIVE** questions in all; **Q.1 is compulsory.** Taking at least **ONE** question from each **Unit.** All questions carry equal marks.

Q.1 Answer briefly:

- a) List down the major difference between cultured cells and cells in vivo.
- b) What is effect of hypo-osmotic cell culture medium on cells?
- c) Why is clomid used in karyotyping?
- d) Define 'crisis' in cell immortalization.
- e) How is cell cloning media different from the normal cell culture?
- f) What is FACS?

2x6

UNIT-I

- Q.2** a) Describe in detail the structure of animal cells. **6**
b) Why are Non-essential amino acids added to animal cell culture medium? **6**

- Q.3** a) What are the major components of balanced salt solutions? **6**
b) Discuss a general layout of an animal cell culture lab. **6**

UNIT-II

- Q.4** Describe in detail various techniques used for cell separation. **12**
- Q.5** a) Describe Multicellular Tumor Spheroids (MCTS) as tumor models. **6**
b) What are scaffolds? Enlist their desirable qualities and examples. **6**

UNIT-III

- Q.6** a) Discuss the important applications of *in vitro* animal cell culture. **6**
b) With the help of a flow chart describe the method of production of cell culture based vaccines. **6**
- Q.7** a) Describe the construction and working of hollow fiber bioreactor. **6**
b) Explain important considerations for maintaining stem cells cultures and preventing induction of differentiation? **6**

End Semester Examination, Dec. 2018

M. Sc. (Biotechnology) — Third Semester
PLANT BIOTECHNOLOGY (BT-S-302A)

Time: 3 hrs.

Max Marks: **60**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; taking at least **ONE** question from each unit. **Q.1 is compulsory.** Marks are indicated against each question.

Q.1 Answer (**any four**) of the following questions:

- a) What do you mean by embryo rescue?
- b) Differentiate between cybrid and hybrid.
- c) Define the concept of disarmed in gene transfer.
- d) What is satellite RNA protection?
- e) What are microsatellites?

3×4

UNIT-I

Q.2 a) Explain the technique of embryo culture with diagram. **8**
b) Describe enzymatic method for protoplast isolation. **4**

Q.3 a) Discuss microspore culture for obtaining androgenic haploids. **7**
b) Write down significance of germplasm conservation. **5**

UNIT-II

Q.4 a) Explain Agro-bacterium mediated gene transfer method in detail. **10**
b) What are binary vectors? **2**

Q.5 a) Describe particle bombardment and microinjection methods for direct DNA transfer. **10**
b) Write down note on caulimo virus. **2**

UNIT-III

Q.6 a) Explain any two methods for insect resistance and virus resistance. **10**
b) How we can increase the shelf life of fruits? **2**

Q.7 Discuss the technique of RAPD along with its applications. **12**

End Semester Examination, Dec. 2018

M. Sc. (Biotechnology) – Third Semester

ENVIRONMENT BIOTECHNOLOGY (BT-S-303A)

Time: 3 hrs.

Max Marks: **60**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; taking at least **ONE question** from each **UNIT**.

Q.1 is compulsory. All questions carry equal marks.

Q.1 Answer briefly:

- a) Hotspot.
- b) Xenobiotics.
- c) 5 R's.
- d) Aerated grit chamber.

3x4

UNIT-I

Q.2 a) Write down the parameters of waste water.

4

b) Differentiate membrane bioreactor with rotating biological contractors.

8

Q.3 Discuss the phases of anaerobic digestion. What are the reactors on this process?

12

UNIT-II

Q.4 What are different plasmids for PAHS degradation?

4

b) Discuss two different types of GEMS.

8

Q.5 a) Enlist the advantages of phyto remediation.

5

b) Explain bioventing process.

7

UNIT-III

Q.6 Discuss the biogeographical classification of India.

12

Q.7 a) What is bioprospecting?

3

b) Discuss the major threats towards biodiversity in detail.

9

End Semester Examination, Dec. 2018

M.Sc. (Biotechnology) – Third Semester

FOOD AND ENZYME BIOTECHNOLOGY (BT-S-304A)

Time: 3 hrs

Max Marks: **60**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **FOUR** more questions out of six, **taking at least ONE question** from each unit. Each question carries equal marks.

Q.1 Answer briefly:

- a) What are abzymes?
- b) Give two examples of bacterial associated with food.
- c) What is meant by neutraceuticals?
- d) Define binding site and mention its characteristics.
- e) What is allosteric site?
- f) Name two models for ES complex formation.

2x6

UNIT-I

- | | | |
|------------|---|----------|
| Q.2 | a) What are the various types of microbes associated with food? | 6 |
| | b) How do we enumerate food borne organisms? | 6 |
| Q.3 | a) What are the various methods for food preservation? | 6 |
| | b) What is the relationship between of biotechnology and food industry? | 6 |

UNIT-II

- | | | |
|------------|--|----------|
| Q.4 | a) Explain the mechanism of enzyme action. | 6 |
| | b) What is enzyme activity? What are the various factors that affect enzyme activity? | 6 |
| Q.5 | a) What are the various types of enzyme inhibitions? Explain the kinetics involved in each inhibition. | 6 |
| | b) Discuss and derive Michaelis-Menten equation. | 6 |

UNIT-III

- | | | |
|------------|--|------------|
| Q.6 | Discuss in detail the use of catalases and proteases in food industries. | 12 |
| Q.7 | Comment on: | |
| | a) The role of enzymes in baking industry. | |
| | b) Process of sugar and starch conversion. | 6x2 |

End Semester Examination, Dec. 2018

M. Sc. (Biotechnology) — Third Semester

STEM CELL AND REGENERATIVE MEDICINE (BT-S-305B1)

Time: 3 hrs.

Max Marks: **60**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; taking at least **ONE** question from each **Unit**. **Q.1 is compulsory.** Each question carries equal marks.

Q.1 Briefly answer the following:

- a) How mouse embryonic fibroblast maintains the embryonic stem cell pluripotency?
- b) What is the difference between ST-p^{HSC} and LT-p^{HSC}?
- c) What are the ligands of gp130 in maintaining ES pluripotency?
- d) What is hemangioblast?
- e) How Oct4 is important in ES cell self-renewal?
- f) Differentiate between IDDM and NIDDM.

2x6

UNIT-I

- Q.2 a) How P13K/AKT signaling pathway maintains ES pluripotency? Explain with suitable diagram. **6**
- b) What are different types of stem cells? **3**
- c) How HSCs are isolated from peripheral blood? **3**
- Q.3 a) Explain the Wnt signaling pathway in maintaining ES self-renewal and pluripotency with suitable diagram. **6**
- b) How nanog is important for ES cell physiology? **4**
- c) What are the factors involved in ES pluripotency? **2**

UNIT-II

- Q.4 a) What is repopulation of hematopoietic stem cells? **2**
- b) Explain with suitable cell lineage diagrams, how p^{HSC}s are repopulated into erythroid series? **6**
- c) Briefly explain how BMT is performed. **4**
- Q.5 a) How ES cell commitment to B-lympho-poiesis is regulated? **6**
- b) Describe in detail the biomarker patterns of MSC during undifferentiated and differentiated states. **6**

UNIT-III

- Q.6 a) Why iPSC is considered break through discovery in medical and pharmaceutical field? **2**
- b) How iPSc are generated? **5**
- c) What are the potential medical applications of iPSC? **5**
- Q.7 a) Describe the strategies that can be used to repair neurodegenerative diseases. **4**

- b) Explain the etiology and symptoms of Parkinson's disease (PD).
c) How Parkinson disease can be cured by stem cells?

4
4

End Semester Examination, Dec. 2018

B. Tech – First / Second Semester

ELEMENTS OF ELECTRONIC ENGINEERING (EC-101A)

Time: 3 Hours

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any two from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following:

- a) How would you define space charge and diffusion capacitance?
- b) Illustrate VI characteristics of an ideal diode.
- c) Differentiate between latch and a flip flop.
- d) Solve $(A+B)(A+C)(B+C)$.
- e) Justify: Silicon is preferred over germanium.
- f) Deduce the relation between α and β .
- g) Construct a voltage follower.
- h) Distinguish between Unipolar and Bipolar transistors.
- i) Differentiate combinational and sequential circuits using examples.
- j) Define slew rate and discuss its significance.

2x10

PART-A

Q.2 a) Describe the break down mechanism in case of a diode. Discuss various mechanisms of breakdown with neat diagrams.

10

b) Design a half wave and centre tapped full wave rectifier and determine
i) I_{dc} ii) V_{dc} iii) PIV

10

Q.3 a) Design and construct a common emitter transistor configuration and explain its working using input and output characteristics.

10

b) In a certain transistor the collector current is 0.98 mA and has base current 20 mA. Calculate the value of current amplification factor α and β emitter current.

5

c) State early effect or base width modulation. How would you explain its affect on the output characteristics of BJT in CE configuration?

5

Q.4 a) Design the following gates using NAND and NOR gates:

- i) OR ii) AND iii) EX-OR

6

b) Convert the following:

$$\text{i) } (ACEF.EE)_{16} = (\)_2$$

$$\begin{array}{lll} \text{ii)} & (1101.01)_2 & = & ()_{10} \\ \text{iii)} & (364.12)_8 & = & ()_{16} \\ \text{iv)} & (0.132)_{10} & = & ()_2 \end{array}$$

4

- c) Design the following flip flops and construct the truth tables for the same:
 (i) J-K (ii) S-R (iii) T and (iv) D

10

PART-B

- Q.5 a) Analyze the characteristics of an ideal operational amplifier.

10

- b) Design the following using operational amplifier and calculate the output for the same:
 (i) Integrator (ii) Summing Amplifier

10

- Q.6 a) List the specifications of D/A converter. Explain the working of binary weighted R-2R ladder D/A converter.

10

- b) Discuss successive approximation type A/D converter.

10

- Q.7 Write short notes on (**any two**) of the following:

- a) Comparison of microprocessor and microcontroller.
- b) Internal architecture of 8085 microprocessor.
- c) Op-amp as differentiator
- d) Bridge rectifier.

10x2

End Semester Examination, Dec. 2018

B. Tech. – Second Semester
ANALOG ELECTRONICS (EC-201)

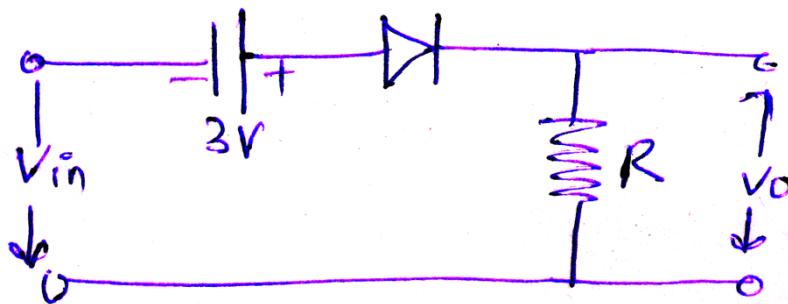
Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1** a) Draw output waveform for circuit shown in figure 1, if the peak value of a.c. input is 15V. Show all voltage levels in the output.



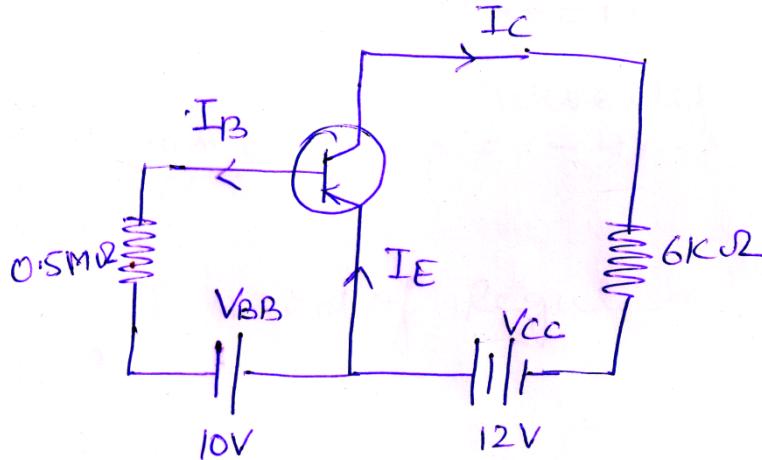
- b) Define the role of switching time of PN diode.
 c) Write principle of emission of light in LED.
 d) Why schottky diode is named as hot carrier diode? Draw its constructional diagram.
 e) Tabulate differences between Emitter, Base and Collector.
 f) Derive relation between α and β .
 g) Derive expression for stability factor of transistor common emitter configuration.
 h) What are the compensation technique, which are used for stabilization of operating point?
 i) Why depletion mode MOSFET is known as ON device?
 j) What is the need of regulated power supply? Draw its block diagram. **2x10**

PART-A

- Q.2** a) Draw and explain in brief V-I characteristic of PN junction diode. **4**
 b) Derive expression for diode current equation. **10**
 c) A Ge diode has reverse saturation current of $3\mu\text{A}$. Calculate the form and bias voltage at the room temp of 27°C . 1% of the rated current is flowing through the forward biased diode. The diode forward rated current is 1A. **6**
- Q.3** a) In a full wave rectifier the input is from 30-0-30V transformer. The load and diode forward resistance are 100Ω and 10Ω respectively. Calculate average voltage and efficiency. **6**
 b) What is the role of clipping circuit in electronic circuit? Explain biased clipper with the help of circuit diagram and suitable derivation. **6**

- c) What is a filter? Why for filtration, capacitor is placed in shunt and inductor in series configuration. Explain series inductor filters for full wave rectifier circuit with suitable derivation. **8**

- Q.4 a) Explain input and output characteristics of common emitter configuration of PNP transistor. **10**
 b) For given circuit diagram draw the dc load line and locate the quiescent or dc working point. Given – transport factor (β) : 50 and neglect V_{BE} .



10

PART-B

- Q.5 a) Derive expression for stability factor for collector to base bias configuration. **10**
 b) A germanium transistor is to be operated at zero signal $I_C = 1\text{mA}$. If the collector supply $V_{CC} = 10\text{V}$, what is the value of R_B in base resistor method? Take $\beta = 100$. If another transistor of same batch with $\beta = 50$ is used, what will be the new value of zero signal collector current for same R_B . **10**
- Q.6 a) Explain static characteristic of JFET for n-channel FET. **7**
 b) Derive expression for drain current equation of n-channel JFET. **7**
 c) Sketch the transfer curve defined by $I_{DSS} = 10\text{mA}$ and $V_P = -4\text{V}$. Also identify type of JFET. **6**
- Q.7 a) What is the need of regulated power supply? **4**
 b) How transistor works as regulator in regulated power supply circuit. **10**
 c) Draw a voltage supply circuit using full wave bridge rectifier, capacitor filter and IC regulator to provide an output of +5V.
 Assume diode as IN4007, $C_{in} = 25\mu\text{F}$, $C_{out} = 0.1\mu\text{F}$ **6**

End Semester Examination, Dec. 2018

B. Tech. – Second Semester

DIGITAL ELECTRONICS AND CIRCUITS (EC-202)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 a) What are minimum numbers of bits required to encode the decimal digits 0 through 9? Justify.
 b) What is positive logic system?
 c) State De-Morgan's theorem.
 d) Convert $(A+B)(B+\bar{C})(A+C)$ expression to standard POS form.
 e) Draw OR gate using NAND gates only.
 f) Differentiate between toggling and race around condition.
 g) How many flip-flops are required to design mod-16 ring counter?
 h) Define resolution (step size) of % resolution of D/A converter.
 i) Differentiate between encoder and multiplexer.
 j) Which is the fastest logic family? Why? **2×10**

PART-A

- Q.2 a) Express the following decimal numbers in binary, Gray, BCD and excess-3 codes:
 i) 15
 ii) 28
 iii) 47 **8**
 b) Prove that $(A+\bar{B}+\bar{C})(A+\bar{B}C)=A+\bar{B}C$ **5**
 c) Describe the minimum distance required for error detecting and correcting codes. The seven bit hamming code is received as 0010100. Assume that even parity has been used. Check whether it is correct or not. If not find the correct code. **7**

- Q.3 a) Minimize the following expression using k-map as well as QM method.
 $f(A, B, C, D) = \sum m(1, 4, 7, 10, 13) + \sum d(5, 14, 15)$
 Also design the circuit for minimized expression using only NAND gates. **12**
 b) Design 32:1 multiplexer using four 8:1 multiplexers and some additional circuitry if required. **8**

- Q.4 a) Show that JK flip-flop can be operated as toggle flip-flop.
 b) Draw and explain master slave flip-flop in detail.
 c) Perform the following flip-flop conversions:
 i) SR to JK
 ii) JK to T **10**

PART-B

- Q.5 a) Design Mod-10 synchronous UP counter using T flip-flops. **12**

- b) What are different applications of shift register? Explain bidirectional shift register in detail. **8**
- Q.6** a) Draw and explain 4-bit weighted resistor digital to analog converter. **8**
b) List and describe the specifications of D/A converter. **4**
c) Explain the working of Dual slope digital to analog converter. **8**
- Q.7** a) With the help of neat diagram, explain the working of two I/P TTL NAND gate. What are advantages of TTL Totem pole configuration? **12**
b) What is the need of interfacing? Interface TTL with CMOS and CMOS with TTL. **8**

End Semester Examination, Dec. 2018

B. Tech. – Third Semester

ELECTRONIC DEVICES AND CIRCUITS (EC-301)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- Why silicon is preferred over Germanium.
- Define depletion region of a diode.
- Describe dark current of Photodiode.
- Give reasons for thickness variation of base, emitter and collector.
- Show relation between alpha (α) and beta (β) of a transistor.
- Why CC transistor is called emitted follower.
- Discuss basis of classification of amplifier.
- Derive expression for closed loop gain of Positive feedback amplifier.
- State barkhausen criterion of oscillation.
- Discuss the principle of Crystal oscillator. Draw its equivalent circuits.

2x10

PART-A

Q.2 a) Explain volt-ampere curve of P-N Junction diode.

7

- b) A Germanium diode has a reverse saturation current of $3\mu A$. Evaluate the forward bias voltage at the room temperature of $27^{\circ}C$ and 1% of the rated current is flowing through the forward biased diode. The diode forward rated current is 1A.

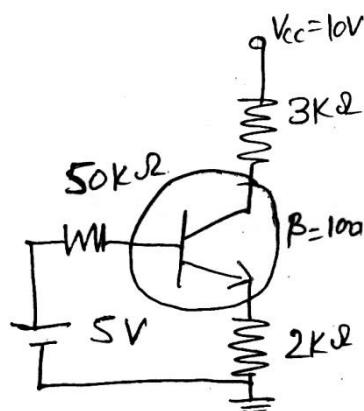
7

- c) Compare Photo diode and Light emitting diode.

6

Q.3 a) Investigate input and output characteristics of common emitter configuration of n.p.n transistor. Clearly indicate the cut-off, active and saturation region in graph. **10**

- b) Determine I_B , I_C and V_{CE} for (figure-1) shown. Assume $\beta = 100$, $V_{BE(SAT)} = 0.8V$ and $V_{CE(active)} = 0.7V$



10

- Q.4 Formulate expression for voltage gain of RC coupled amplifier (2-stage) for:
a) Low frequency range.
b) Mid frequency range.
c) High frequency range.

20

PART-B

- Q.5 a) Find maximum collector efficiency of class-A transformer coupled power amplifier. **12**
b) Justify usage of Push-Pull amplifier over the normal power amplifier

8

- Q.6 a) Discuss merits and demerits of negative feedback amplifier

12

- b) For an Emitter follower given, $R_E = 5K\Omega$, $R_S = 1K\Omega$, $h_{ie} = 1K\Omega$, $h_{fe} = 100$ $h_{re} = 2 \times 10^{-4}$
and $h_{oe} = 20\mu A/V$. Determine, Z_{in} , Z_{out} , A_v and A_i

8

- Q.7 Describe the role of negative feedback in Wein bridge oscillator. Determine resonance frequency of it with suitable equivalent circuit.

20

End Semester Examination, Dec. 2018

B. Tech. – Third Semester

DIGITAL ELECTRONICS (EC-302A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following:

- a) Justify advantages of digital signal over analog signal.
- b) State and prove demorgan's theorem and simplify $y = A + \bar{A}B$.
- c) What is gray code? Why is it used for solving Karnaugh map?
- d) Design 4:1 multiplexer using 2:1 multiplexer.
- e) Differentiate between combinational and sequential circuits with example.
- f) Explain the difference between toggling and race around condition. What are the remedies to remove race around condition?
- g) Define 'modulus of a counter'. How many flip-flops are required to design a MOD-9 counter?
- h) Four bit DAC has maximum full scale output of 15V. Find out its resolution and percentage resolution.
- i) Illustrate the advantages of flash type ADC over successive approximation type ADC.
- j) Which is the fastest logic family and why?

2x10

PART-A

Q.2 a) Prove that:

- i) $(A + B)(A + C) = A + BC$
- ii) $\bar{A}D + ABD = \bar{A}D + BD$
- iii) $\bar{A}B + \bar{A}\bar{B} + \bar{B} = A\bar{C} + \bar{B}D$

2x3

b) Subtract the following decimal numbers using 1's and 2's complement methods:

- i) $(35)_{10} - (12)_{10}$
- ii) $(12)_{10} - (35)_{10}$

4x2

c) A hamming code 1110101 is received at receiver end. Identify whether it is correct/incorrect. If Incorrect, find the correct hamming code. (Assume even parity has been used).

6

Q.3 a) Simplify the following logic expression using k-map as well as OM method:

$$f(A, B, C, D) = \sum m(1, 3, 5, 8, 9, 11, 15) + d(2, 13).$$

14

b) Design and realize circuit of full adder using half adder.

6

Q.4 a) Justify how JK flip-flop can be operated as toggle flip-flop?

5

b) Design J-K flip-flop using:

- i) S-R flip-flop.
- ii) D flip-flop.
- iii) T flip-flop.

3x3

c) Derive the excitation table of:

- i) S-R flip-flop.
- ii) J-K flip-flop.
- iii) T flip-flop.

2x3

PART-B

Q.5 a) What are shift register counters? Draw and explain the working of four bit Johnson counter.

10

b) Design synchronous decade counter using J-K flip-flop with all necessary steps.

10

Q.6 a) Elaborate specifications of digital to analog converter with example.

8

b) Design the circuit of 4 bit weighted resistor type digital to analog converter and explain its working.

6

c) Draw and explain the working of three bit successive approximation type analog to digital converter. Also, specify its disadvantage.

6

Q.7 a) Why ECL is called Emitter coupled logic? Explain its working as NOR/OR logic.

8

b) Design the following logic gates using CMOS technology:

- i) NAND Gate.
- ii) NOR Gate.
- iii) Buffer.

3x4

End Semester Examination, Dec. 2018

B. Tech. – Third Semester

SIGNALS AND SYSTEMS (EC-303A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

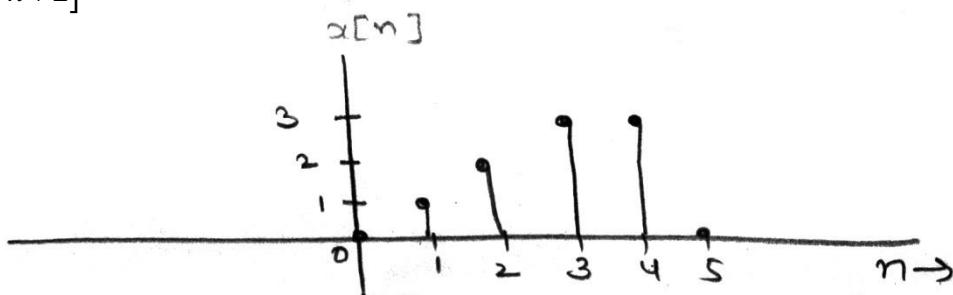
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Distinguish between periodic and aperiodic signals.
 b) What is the relationship between impulse, step and ramp signals?
 c) How would you define static and dynamic systems?
 d) What approach would you use to check the time invariance of a given system?
 e) Tabulate few important Laplace transform pairs.
 f) State initial value and final value theorems of Laplace transform.
 g) Write and illustrate the exponential form of Fourier series representation of a continuous time periodic signal.
 h) Does Fourier transform exist for all aperiodic signals? If not, what are the conditions to be satisfied for the existence of Fourier transform?
 i) Compute Fourier transform of signum function.
 j) Consider the given sequence $x(n)$, calculate the DTFT $x(n)=4, -2 \leq n \leq 2$ 0, otherwise.

2×10

PART-A

- Q.2 a) A discrete time signal $x[n]$ is shown in figure. Sketch and label each of the following signals.
 i) $x[2n]$
 ii) $x[n-2]$
 iii) $x[-n]$
 iv) $x\left[\frac{n}{2}\right]$
 v) $x[-n+2]$



10

- b) Check whether the following signals are periodic or not. If a signal is periodic determine its fundamental period.

i) $x(t) = \cos t + \sin \sqrt{2}t$

ii) $x[n] = \cos \frac{\pi}{3}n + \sin \frac{\pi}{4}n$

iii) $x(t) = \sin^2 t$

iv) $x[n] = e^{f\left(\frac{\pi}{4}\right)n}$

10

- Q.3 a) Test the linearity, invariance and causality of the following systems:

i) $y(n) = -ax(n-1) + x(n)$

ii) $y(n) = x(n^2) + x(-n)$

10

- b) A system having impulse response $h(n) = \{3, 3, -2, 2\}$ is initiated with an input $x(n) = \{2, -2, 3, 3\}$. Calculate its output $y[n]$.

10

- Q.4 a) Consider a continuous time [LTI] system for which the input $x(t)$ and $y(t)$ are related by:

$$y''(t) - 2y'(t) - 3y(t) = x(t)$$

- i) Evaluate the system function $H(s)$.

- ii) Determine the impulse response $h(t)$ for each of the following cases.

- 1) The system is causal.
- 2) The system is stable.
- 3) The system is neither causal nor stable.

- b) State and prove time convolution theorem of Laplace transform.

10

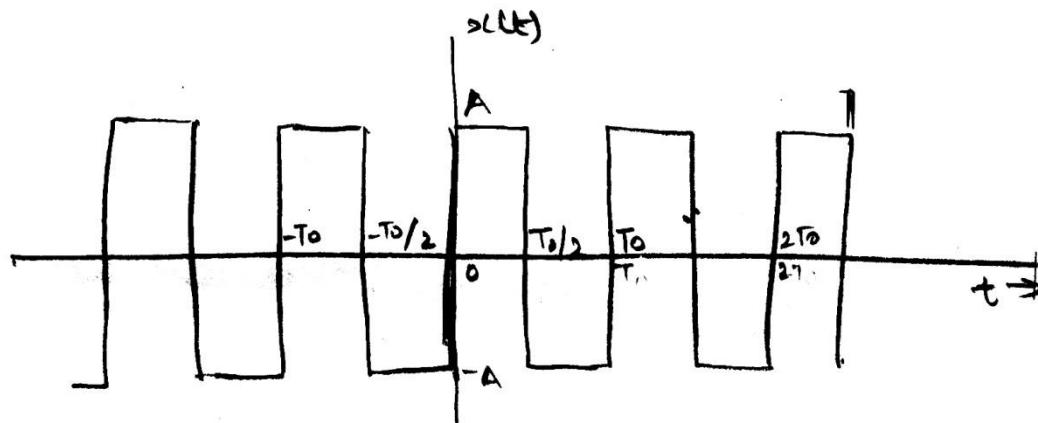
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PART-B

- Q.5 a) Consider the periodic square wave $x(t)$ shown in figure.

- i) Find the complex exponential Fourier series of $x(t)$.

- ii) Find the trigonometric Fourier series of $x(t)$.



10

- b) Verify Parseval's identity or Parseval's theorem for the Fourier transform.

$$\int_{-\infty}^{\infty} |x(t)|^2 dt = \frac{1}{2\pi} \int_{-\infty}^{\infty} |\hat{x}(w)|^2 dw$$

10

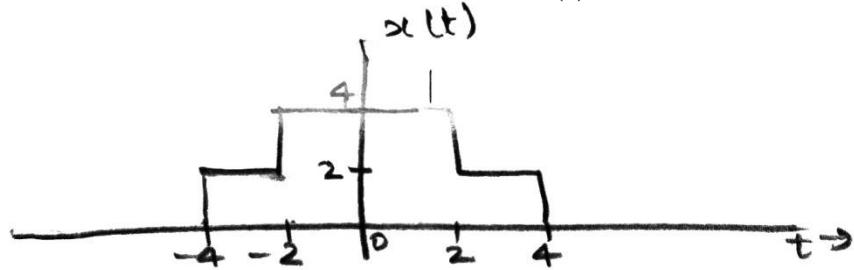
Q.6 a) Calculate the Fourier transform of the following signals

i) $x(t) = e^{-at} u(t), a > 0$

ii) $x(t) = \frac{1}{a^2 + t^2}$

10

b) Compute the Fourier transform of the signal $x(t)$ shown in figure.



10

Q.7 a) Consider a discrete time [LTI] system with impulse response $h[n] = \left(\frac{1}{2}\right)^n u(n)$. Use DTFT to determine the response of the system when the input is $x[n] = \left(\frac{3}{4}\right)^n u(n)$. **10**

b) Calculate the DTFT of the following sequences:

i) $x(n) = \left(\frac{1}{2}\right)^{n-2} u(n-2)$

ii) $x(n) = \cos(\omega_0 n) u(n)$

iii) $x(n) = 3^n u(n)$

iv) $x(n) = \delta(n+3) - \delta(n-3)$

10

End Semester Examination, Dec. 2018

B. Tech. – Third / Fourth Semester

ELECTROMAGNETIC FIELD AND WAVES (EC-304A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 a) If $\vec{A} = 2\hat{a}_x - 3\hat{a}_y + 5\hat{a}_z$ and $\vec{B} = -4\hat{a}_x + 6\hat{a}_y + 3\hat{a}_z$. Find:
i) $\vec{A} \cdot \vec{B}$ and ii) $\vec{A} \times \vec{B}$.
b) State divergence theorem.
c) Two point charges of $2nC$ each are separated 1 mm apart. Calculate the magnitude of repulsive force?
d) What is an equipotential surface?
e) Write down magnetic boundary conditions.
f) The magnitude of \vec{H} at a radius of 1 m long wire is 1 A/m. Calculate the current in the wire.
g) Write Maxwell's equation for static field.
h) What is a Poynting vector?
i) The electromagnetic wave travel faster in conductor than the dielectric. True or False. Justify.
j) Define primary and secondary constants of a transmission line. **2×10**

PART-A

- Q.2 a) Given $\vec{A} = 5\hat{a}_x$ and $\vec{B} = 4\hat{a}_x + t\hat{a}_y$; find 't' such that the angle between \vec{A} and \vec{B} is 45° . **8**
b) Given $\vec{A} = x^2 y \hat{a}_x + (x - y) \hat{a}_z$;
 $\vec{B} = xz \hat{a}_x$ and $\phi = xy^2 z^3$.
Find:
i) $\nabla \times \vec{A}$
ii) $\nabla \cdot \vec{B}$ and
iii) $\nabla \phi$ **12**

- Q.3 a) Derive an expression for electric field intensity due to a uniformly charged sphere. **10**
b) Obtain the relationship between \vec{E} and V . **5**
c) State and prove uniqueness theorem of electrostatic field solutions. **5**

- Q.4 a) State Biot-Savart's law and indicate the units of quantities in the equation. **5**
b) Obtain the magnetic field intensity (\vec{H}) due to infinitely long straight filament of current 'I' using ampere's circuital law. **10**
c) Explain magnetic boundary conditions for static magnetic field. **5**

PART-B

- Q.5 a) Derive the equation of continuity for time varying field. 7
 b) Show that $\oint_L \vec{E} \cdot d\vec{l} = - \int_S \frac{\partial \vec{B}}{\partial t} \cdot d\vec{s}$. 5
 c) Explain instantaneous, average and complex poynting vector. 8
- Q.6 a) The electric field intensity associated with a uniform plane wave travelling in perfect dielectric is given as $E_x(z, t) = 10 \cos(2\pi \times 10^7 t - 0.1\pi z) \text{ V/m}$. Find the velocity of propagation and the magnetic field component associated with the wave. 10
 b) With suitable diagram and mathematical expressions. Explain:
 i) Linear polarization.
 ii) Circular polarization.
 iii) Elliptical polarization. 10
- Q.7 a) Derive an expression for characteristic impedance (Z_o) for a lossless transmission line. 6
 b) For a transmission line, the following parameters per unit length are:
 $R = 10.4\Omega$, $L = 3.66mH$, $G = 0.08\text{mho}$ and $C = 0.00835\mu F$. Calculate Z_o , α , β and phase velocity at $\omega = 500 \text{ rad/sec}$. 10
 c) Write short note on "Smith Chart". 4

End Semester Examination, Dec. 2018

B. Tech. – Third Semester

ANALOG ELECTRONICS CIRCUITS-I (EC-321)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Among common base, common emitter and common collector which configuration is preferred and why? **10**
b) Define base spreading resistance of a transistor.
c) Distinguish between JFET and BJT.
d) State Millers theorem and its dual.
e) Interpret 3dB.
f) Can two diodes be connected back to back to work as a transistor? Justify.
g) Calculate I_C and I_E given $\alpha_{dc} = 0.98$, $I_{CB0} = 4\mu A$ and $I_B = 50\mu A$.
h) Deduce the relation between a.c. drain resistance (r_d), transconductance (g_m) and amplification factor (μ).
i) Elaborate the need of cascading.
j) Justify the advantage of push pull amplifier. **2×10**

PART-A

- Q.2 a) Formulate Eber's moll equations and sketch the model to show that the equations can be justified. **10**
b) Define h-parameters of a transistor, why they are called hybrid parameters. Discuss hybrid equivalent model of common emitter configuration and determine h-parameters from its static characteristics curve. **10**
- Q.3 a) Explain small signal high frequency hybrid π model of common emitter configuration. **10**
b) Justify emitter follower at high frequency is good to drive capacitive loads. Determine voltage gain, upper 3dB frequency and input admittance of emitter follower at high frequency. **10**
- Q.4 a) Draw FET small signal model and compare it with BJT small signal model. **7**
b) The device parameters for an n-channel JFET are as follows. Maximum current $I_{DSS} = 10 mA$, Pinch off voltage $V_P = -4V$. Calculate the drain current for
i) $V_{GS} = 0V$
ii) $V_{GS} = -1V$
iii) $V_{GS} = -4V$ **9**
c) Justify: FET is used as VVR. **4**

PART-B

- Q.5 a) Analyze and calculate the input impedance, output impedance, voltage gain, current gain and power gain of common base transistor amplifier using h-parameter analysis. **10**
- b) Analyze the role of input capacitor, coupling capacitor and emitter bypass capacitor in a single stage RC coupled amplifier. Sketch the circuit in support. **6**
- c) Explain phase distortion. Why it is not significant in audio amplifier and causes attenuation in video amplifiers? **4**
- Q.6 a) Describe the working of two stage RC coupled amplifier. Analyze the frequency response for the same. Deduce the upper and lower cutoff frequencies as well. **14**
- b) Explain Darlington amplifier. **6**
- Q.7 Discuss the following briefly (**any two**): **10×2**
- a) Cross over distortion.
 - b) Complementary push-pull configuration.
 - c) Efficiency of class B power amplifier.
 - d) Harmonic distortions in power amplifiers.

End Semester Examination, Dec. 2018

B. Tech. – Fourth / Fifth Semester

MICROPROCESSOR AND INTERFACING (EC-401B)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) Differentiate between microprocessor and microcontroller.
- b) What is memory banking? Discuss its advantages.
- c) How many memory locations can be addressed with i) 11 address lines and ii) 14 address lines?
- d) What do you understand by pipelining? Write its advantages.
- e) Differentiate between maskable and non maskable interrupts.
- f) Discuss the role of PC and SP in 8085 microprocessor.
- g) What do you understand by memory segmentation in 8086 microprocessor?
- h) What is the function of control register in 8255 1C?
- i) What is the difference between hardware triggered strobe and software triggered strobe mode of operation of 8253/54?
- j) What do you understand by DMA operation?

2x10

PART-A

Q.2 a) Draw and explain the pin diagram of 8085 microprocessor.

8

b) Explain the addressing modes of 8085 microprocessor with examples.

6

c) Draw and explain the timing diagram of MVI C,45H.

6

Q.3 a) Explain the function of following pins of 8086 microprocessor:

- i) \overline{TEST}
- ii) MN / \overline{MX}
- iii) ALE
- iv) $\overline{BHE} / S7$
- v) $LOCK$

10

b) Explain the bus interface unit and execution unit of 8086 microprocessor with the help of a diagram.

10

Q.4 a) Draw and explain the interrupt structure of 8086 microprocessor.

10

b) Write a program for 8086 microprocessor to find the smallest number from an array.

10

PART-B

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester
ANALOG ELECTRONIC CIRCUIT (EC-403)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1 a) Define differential gain and common mode gain.
b) What is the concept of virtual ground?
c) What is peak detector?
d) Why 555 timer are called so?
e) What is Barkhausen criterion of oscillation?
f) Differentiate between active and passive filters.
g) If differential gain is 10^6 and common node gain is 10^4 calculate CMRR.
h) What is floating load in case of voltage to current converter?
i) Why precision rectifier is called super diode?
j) Draw the symbol and equivalent circuit of crystal oscillator. **2×10**

PART-A

- Q.2 a) List the characteristics of ideal operational amplifier. Explain block diagram of op-amp and give the working of each block. **10**
b) Using a.c. analysis calculate the voltage gain for differential input balanced output differential amplifier. **10**
- Q.3 a) Explain the working of op-amp as:
i) Differentiator.
ii) Summing amplifier. **5×2**
b) Explain the working of instrumentation amplifier. **10**
- Q.4 a) Explain the working of monostable multivibrator using waveform. **10**
b) What is Schmitt trigger? Explain its working along with its waveforms. **10**

PART-B

- Q.5 a) What is a Band Pass filter? Draw and explain its transfer function. **10**
b) Analyze the parameters for Sallen key filter. **10**
- Q.6 a) Explain triangular waveform generator with the help of circuit diagram. **10**
b) Explain the working of PLL. **10**
- Q.7 a) Design $\pm 15V$ fixed power supply. **10**
b) Give a brief on SMPS using circuit diagram. **10**

End Semester Examination, Dec. 2018

B. Tech. – Third / Fourth Semester

COMMUNICATION ENGINEERING-I (EC-404)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Define communication. Differentiate between analog and digital communication.
 b) State and prove time scaling property of Fourier transform.
 c) Evaluate the Fourier transform of the following function:

$$x(t) = e^{-at}u(t)$$

 d) In an AM-SC system the modulating signal is a single tone sinusoid $E_m \cos w_m t$ which modulates a carrier signal $E_c \cos w_c t$. Plot the spectrum of the modulated wave.
 e) Give the comparison of various AM techniques.
 f) The modulating frequency in frequency modulation is 15 kHz and $\beta = 5$. Calculate the transmission bandwidth of FM signal.
 g) Define phase modulation. How is it related to frequency modulation?
 h) Explain how image frequency signals are received in a super heterodyne receiver? How can these signals be rejected?
 i) Differentiate between low level and high level modulation.
 j) If the resistance value is doubled and temperature is maintained constant, what will be the effect on the available thermal noise power per unit bandwidth. **2×10**

PART-A

- Q.2 a) What is modulation? Discuss the need for modulation. **8**
 b) Define system. Explain the properties of continuous time LTI system. **8**
 c) Determine whether or not the following signal are periodic, in case its periodic specify its fundamental period.

i)
$$x(t) = 3\cos\left(5t + \frac{\pi}{6}\right)$$

ii)
$$x(n) = \cos\left(\frac{n}{8}\right)\cos\left(\frac{n\pi}{8}\right)$$

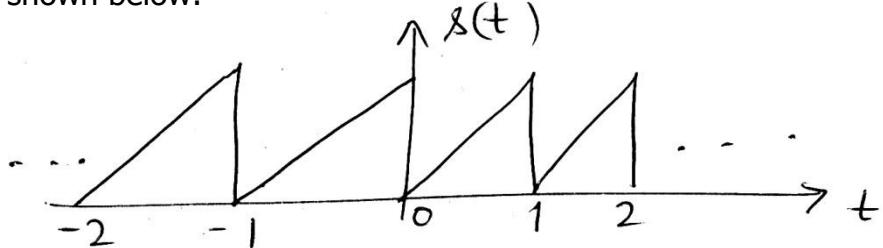
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- Q.3 a) A 5 KW unmodulated carrier is simultaneously modulated by two audio signals with modulation index 60% and 30%. Find the transmitted power and effective modulation index. Also, find the antenna current with and without modulating signal assuming antenna resistance of 10Ω . **7**
 b) Explain synchronous demodulation method. Evaluate the effect of phase and frequency error in the local oscillator on synchronous DSB demodulation. **7**
 c) Draw the block diagram of a phase cancellation SSB generation and explain how the carrier and unwanted sidebands are suppressed. What change is required to suppress the other sideband? **6**

- Q.4 a) What are the drawbacks of direct method of FM generation? Illustrate with suitable block diagram Armstrong method for FM generation. Why is it called indirect method? 7
- b) Analyze the working of ratio detector. 8
- c) The equation of FM wave is given by: $s(t) = 10 \sin [2\pi(10^8)t + 5 \sin 2\pi(10^3)t]$. Calculate:
 i) Carrier frequency.
 ii) Modulating frequency.
 iii) Frequency deviation.
 iv) Modulation index
 v) Power dissipated in 1Ω resistor. 1x5

PART-B

- Q.5 a) Derive the exponential Fourier series from the trigonometric Fourier series for the waveform shown below:



10

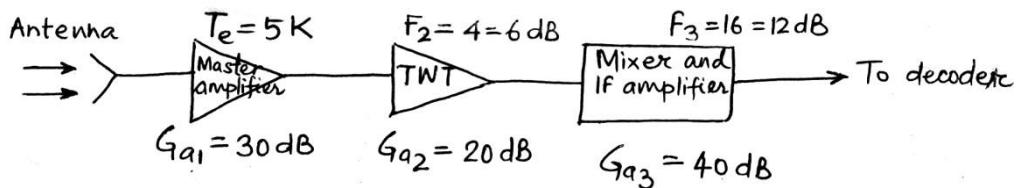
- b) Evaluate the Fourier transform of the function

$$f(t) = te^{-at}u(t)$$

10

- Q.6 a) Name the constituent stages of AM radio transmitter and briefly give the function of each stage. 7
- b) What is intermediate frequency? Discuss in detail the criteria for selecting intermediate frequency. 6
- c) Define AGC. How AGC is obtained in a practical diode detector? Justify your answer with a neat diagram. 7

- Q.7 a) Define noise. Describe different types of internal and external noise. 10
- b) A typical microwave receiver used in satellite communication is shown below. Evaluate:
 i) The overall noise-figure of the receiver and
 ii) The overall equivalent temperature of the receiver. Assume the ambient temperature $T = 17^\circ\text{C}$.



10

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester

ELECTROMAGNETIC THEORY (EC-421)

Time: 3 hrs.

Max Marks: 100

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B.** Marks are indicated against each question.

- Q.1

 - Give the physical significance of divergence.
 - Given $\vec{A} = x^2 y \hat{a}_x + (x - y) \hat{a}_z$. Find the curl of \vec{A} .
 - State coulomb's law of force.
 - What is the value of tangential component of \vec{E} at boundary?
 - Prove that $\oint_s \vec{B} \cdot d\vec{s} = 0$.
 - Write the equation off continuity for static and time varying field.
 - What is poynting vector? Explain its significance.
 - Calculate the depth of penetration in copper at a frequency of $3 \times 10^6 \text{ Hz}$ and resistivity of $3 \times 10^{-3} \text{ ohm-cm}$.
 - What are the conditions for short circuited line?
 - Define characteristic impedance of a transmission line.

PART-A

- Q.2 a) What do you understand by gradient, divergence and curl? Explain the physical significance of each of them. **10**

b) Verify the stokes theorem for $\vec{A} = (x^2 + y^2)\hat{ax} - 2xy\hat{ay}$ taken around a rectangular surface bounded by $x = \pm a$; $y = 0$, $y = b$. **10**

Q.3 a) A positive point charge of $5\mu\text{C}$ is situated in air at origin. Calculate the electric field intensity at a point on the z-axis 10 meters from the origin. **10**

b) Derive an expression for electric field intensity due to infinite sheet of charge having charge density ρ_s . **10**

Q.4 a) Determine the magnetic field intensity on the axis of a circular loop placed at origin. **10**

b) Determine the boundary conditions for normal and tangential components of magnetic field Intensity at the interface of two different magnetic media. **10**

PART-B

- Q.5 a) Explain significance of Maxwell's equations. Also explain the concept of displacement current or current density. **10**
 b) Write down Maxwell's equation for harmonically varying field. **4**
 c) show that $\nabla \cdot \vec{J} = \frac{-\partial \rho_v}{\partial t}$ for time varying field. **6**

- Q.6 a) Derive an expression for wave equation in lossy dielectric medium and explain all the parameters related to the wave. **10**
- b) Explain skin depth. Find the skin depth at a frequency 1.6 MHz in aluminium whose $\sigma = 38.2 \text{ Ms/m}$ and $\mu_r = 1$. Also, find propagation constant and wave velocity in this medium. $\left(\text{Assume } \alpha = \beta = \frac{1}{\delta} \right)$. **10**
- Q.7 a) A transmission line operating at a frequency of 1000 MHz has $Z_o = 160\Omega$, $\alpha = 0.08 \text{ Np/m}$ and $\beta = 3 \text{ rad/m}$. Find the primary constants of the transmission line. **10**
- b) Derive an expression for relationship between VSWR and reflection coefficient. **6**
- c) Write short note on smith chart. **4**

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester

HARDWARE DIGITAL DESIGN (EC-422)

Time: 3 hrs.

Max Marks: 100

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1

 - a) What is VHDL? Why is it used?
 - b) Define sensitivity list. Where is it used?
 - c) Perform the operation:
0 1 1 0 0 1 0 1 SRA +3
0 1 1 0 0 1 0 1 ROR +3
 - d) Draw flow chart of VHDL design flow.
 - e) What do you mean by component instantiation, name their types?
 - f) What do you mean by operator overloading? Give example.
 - g) What are the advantages of PLD over fixed function IC?
 - h) Write an entity for BCD to excess-3 code converter.
 - i) Differentiate between process and wait statement, can they be used simultaneously in a program.
 - j) Why and where test bench are used?

2×10

PART-A

- Q.2** a) Define various constructs required for writing VHDL code with example. **5**
b) What are various styles of modeling in VHDL? Also, elaborate the importance of each of them. **10**
c) What is the need of HDL? Explain the capabilities of VHDL. **5**

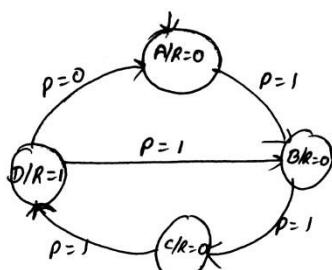
Q.3 a) Differentiate between 'signal' and 'variable' with the help of an example. **5**
b) Explain various data objects used in VHDL with example. **5**
c) What is subprogram overloading? Compare it with operator overloading. **10**

Q.4 a) Write VHDL code for full adder. **10**
b) Write VHDL code for 16:1 multiplexer. **10**

PART-B

- Q.5 a) Design and implement SISO shift register. **10**
b) Write VHDL code for decode counter in data flow modeling. **10**

Q.6 a) Design following logic using Moore machine and then write its VHDL code:



- 12**
- b) What are conversion functions? Why are they required? Explain with example. **8**
- Q.7** a) Implement a simple microcomputer system using VHDL. **10**
- b) What is an FPGA? How is it different from CPLD? What are its advantages and drawbacks? **10**

End Semester Examination, Dec. 2018

B. Tech. – Fourth Semester

ANALOG ELECTRONIC CIRCUIT-II (EC-423)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 a) What is feedback in amplifiers? What is the need of using feedback?
b) Define sensitivity of feedback amplifier. Derive the expression for the same.
c) Tabulate differences between voltage series, voltage shunt, current series and current shunt on the basis of input impedance; output impedance and gain.
d) What is barkhausen criterion for oscillation?
e) If $A = 300$, $R_i = 1.5K$; $R_o = 50\Omega$ and $\beta = \frac{1}{15}$, calculate input and output impedance for voltage series feedback amplifier.
f) Determine the oscillation frequency of a Hartley oscillator with $L_1 = 1mH$, $L_2 = 100mH$, $M = 50mH$ and $C = 100pF$.
g) Calculate CMRR if differential gain is 10^6 and common mode gain is 10^5 .
h) What is multivibrator? List them all and write its main characteristics.
i) Draw the circuit of voltage follower.
j) Why three stages of RC network is required to design RC phase shift oscillator? **2x10**

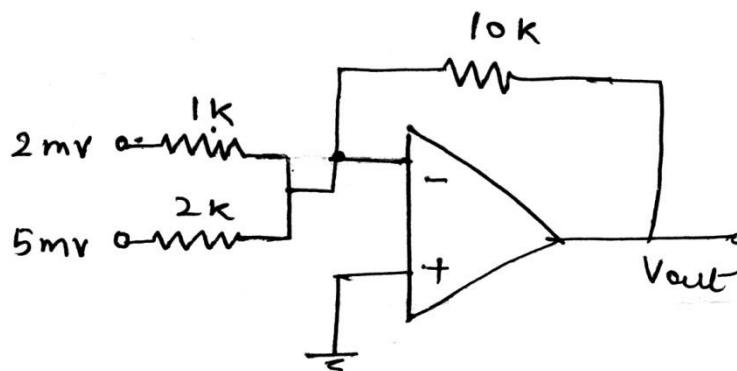
PART-A

- Q.2 a) What is negative feedback? List all types of negative feedback configuration and derive an expression for voltage gain, input and output impedance for any two types of amplifiers. **10**
b) List few advantages of negative feedback in amplifier. **8**
c) Voltage gain of amplifier with feedback is 50dB and decreases to 40dB with feedback. Calculate β . **2**
- Q.3 a) Explain the working of Colpitt's oscillator and calculate the frequency of oscillation. **10**
b) Find the frequency of oscillation of a Wien Bridge oscillator with $R = 20K$ and $C = 100 pF$. **5**
c) For a Hartley oscillator $C = 100 pF$, and $L_2 = 1 \times 10^{-8} H$. Determine the frequency of oscillation. Neglect mutual inductance. **5**

- Q.4 a) Using d.c. analysis, calculate the current and voltage at quiescent point for DIBO differential amplifier. Derive the expression for voltage gain for the same using a.c. analysis. **14**
- b) For DIUO, calculate the current and voltage at quiescent point and the voltage gain for the following specifications.
 $R_C = 2.2K$, $R_E = 4.7K$, $Rin_1 = Rin_2 = 50\Omega$, $\beta = 100$,
 $+V_{CC} = 10V$; $-V_{EE} = -10V$; $V_{BE} = 0.7V$; $r_e = 25\text{ mV} / I_E \text{ mA}$ **6**

PART-B

- Q.5 a) Explain the working of operational amplifier as
 i) Integrator.
 ii) Voltage to current converter with floating load. **5x2**
- b) List the characteristics of ideal operational amplifier. **5**
- c) Calculate the output voltage for figure.



5

- Q.6 a) Explain the working of logarithmic amplifier. Derive the expression for output voltage. **6**
- b) Explain the working of mono stable multivibrator with output waveforms. **8**
- c) Explain full wave precision rectifier with suitable circuit diagram and output waveforms. **6**

- Q.7 Write short notes on any two:
 a) Second order high pass filter.
 b) Sallen key topology.
 c) Frequency response of active filters.
 d) Band pan filter. **10x2**

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

ANTENNA AND WAVE PROPAGATION (EC-501A / EC-501B)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) State Maxwell's equations for time varying fields.
 b) Why is Heatian dipole referred as the starting point of antenna analysis?
 c) Calculate the radiation efficiency of an antenna if the input power is 100W and the power dissipated in it is 1W.
 d) Differentiate between directive gain and power gain.
 e) State pattern multiplication theorem.
 f) What are the advantages and disadvantages of parabolic reflector antenna?
 g) Compare end fire and broadside array.
 h) Explain the bending of waves in ionospheric layer.
 i) The noise figure of an amplifier is 2dB at T=290K. Evaluate the effective noise temperature.
 j) What are the different methods for antenna gain measurement? **2×10**

PART-A

- Q.2 a) Derive an expression for the fields of a current element, 'I₀dI' kept at origin, oriented along x-axis and radiating into free space. **10**
 b) A short dipole of length 0.1λ is kept symmetrically about the origin, oriented along the z-direction and radiating 1 kW power into free space. Calculate the power density at $r = 1$ km along $\theta = 45^\circ$ and $\phi = 90^\circ$. **10**
- Q.3 a) The radiation intensity of an antenna is given by $I(\theta, \phi) = \sin^n \theta$, where 'n' is an integer. Calculate the direction of maximum radiation. If $n = 3$, what is the half power beam width of the antenna? **10**
 b) Obtain the relationship between gain and effective aperture area. **10**
- Q.4 a) Analyze a n-element end fire array. Derive an expression for directivity of the same when the elements are equally spaced. **10**
 b) What is a binomial array? Find the excitation coefficients of a binomial array of six elements. **10**

PART-B

- Q.5 a) Evaluate the input resistance of a ' $\frac{\lambda}{2}$ ' folded dipole and show that it is four times that of a single half wave dipole. **10**

- b) Design a helical antenna operating in the axial mode that gives directivity of 14dB at 2.4 GHz. For a helical antenna, calculate the input impedance, half power beam width, beamwidth between the nulls and the axial ratio. **10**
- Q.6 a) Discuss the various modes of propagation in detail. **10**
b) Derive an expression for skip distance in terms of critical frequency and maximum usable frequency. **10**
- Q.7 a) Explain the gain transfer method to measure antenna gain. **10**
b) What do you understand by antenna measurement range? Discuss in detail. **10**

End Semester Examination, Dec. 2018
 B. Tech. — Fifth Semester
ANTENNA AND WAVE PROPAGATION (EC-501B)

Time: 3 hrs. Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **ANY TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1** Answer the following questions: **2×10**
- What is antenna? Why it is essential part of any communication system?
 - Define “Omni-directional antenna”.
 - Define “Linear Array”.
 - Differentiate between “Near Field” and “Far Field' of antenna.
 - Define “Noise Temperature”.
 - Define “Flare angle of horn antenna”.
 - List factors affecting propagation of radio waves.
 - What is duct propagation?
 - Define “Frequency Independent Antenna”.
 - Explain polarization types in brief.

PART-A

- Q.2** a) Derive an expression for wave equations in terms of EM potentials. **10**
 b) Develop Hertzian Dipole. Predict the electric and magnetic field quantities of infinitesimal and radiation pattern. **10**
- Q.3** a) Prove that intrinsic impedance of free space is 377Ω . **10**
 b) Explain and conclude the following terms:
 i) Radiation Resistance.
 ii) Gain.
 iii) Directivity.
 iv) Effective aperture. **2½×4**

- Q.4** a) Deduce an expression for the far field of a continuous array of point sources of uniform amplitude and phase. Summarize and prove mathematically for finding directions of pattern nulls of the array. **15**
 b) Write differences between “Broadside array and End-fire array”. **5**

PART-B

- Q.5** a) Sketch the structure of Yagi-Uda Array for a frequency of 200 MHz. **10**
 b) What is folded dipole antenna? Describe the current distribution and radiation pattern of folded dipole. **10**
- Q.6** a) Explain briefly the following:
 i) Virtual height.
 ii) Critical frequency.
 iii) Maximum usable frequency. **5×3**
 b) Derive mathematical expression for skip distance. **5**

- Q.7** a) Explain the procedure to measure directivity in detail. **10**
 b) Explain gain transfer method to measure gain of antenna. **10**

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

DIGITAL SIGNAL PROCESSING (EC-502A/ EC-502B)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- Discuss the effect of finite word length in DSP.
- Determine the z-transform of $x(n) = u(n)$.
- What do you understand by ROC?
- Determine N-point DFT of $x(n) = a^n$ for $0 \leq n \leq N-1$.
- Differentiate between DIT and DIF algorithm.
- Discuss various applications of digital Filters.
- Explain the effect of truncating an infinite Fourier series into finite Fourier series.
- Describe Hamming, Hanning and Blackmann window functions along with their expressions.
- Compare direct form I and direct form II realization of IIR systems.
- Discuss about the basic building blocks of realization structures.

2x10

PART-A

Q.2 a) Enlist various application areas of DSP. Explain the role of DSP in Image processing. **10**
b) Describe the Von-Neumann and Harvard architectural details of DSP processors.

10

Q.3 a) Determine the z-transform of the sequence given by:

$$x(n) = \begin{cases} 2^n, & n < 0 \\ \left(\frac{1}{2}\right)^n, & n = 0, 2, 4 \\ \left(\frac{1}{3}\right)^n, & n = 1, 3, 5 \end{cases}$$

10

- b) Compute $x(n)$, if $X(z) = \frac{z+2}{2z^2 - 7z + 3}$ when ROC is given.
- $|z| > 3$
 - $|z| < \frac{1}{2}$

10

- Q.4 a) Design a DIT-FET (decimation in time) algorithm to determine 8-point DFT of the following sequence:
 $x(n) = \{1,1,1,1,0,0,0,0\}$

10

- b) Use a four point DFT and IDFT approach to determine the circular convolution of the following sequences: $x(n) = (1, 2, 3, 1)$ and $x_2(n) = (4, 3, 2, 2)$

10

PART-B

- Q.5 a) Derive an impulse invariant transformation mapping of a stable analog filter to a stable digital IIR filter. Illustrate the concept of many to one mapping in this technique.

10

- b) Design a digital filter using bilinear transformation from an analog filter with following transfer function $H(s) = \frac{1}{(s + 0.2)^2 + 16}$

10

- Q.6 a) Consider a low pass filter with the following desired frequency response:

$$H_d(e^{jw}) = \begin{cases} e^{-j2w}, & -\frac{\pi}{4} \leq w \leq \frac{\pi}{4} \\ 0, & \frac{\pi}{4} < w \leq \pi \end{cases}$$

Design a FIR filter by determining its frequency response $H(e^{jw})$ for $M=5$ using hamming window function.

10

- b) Explain Fourier series method for designing of FIR filter.

10

- Q.7 a) Obtain FIR linear phase realization (with minimum number of multipliers) of the system function $H(z) = 6 + z^{-1} + 4z^{-2} + 2z^{-3} + 4z^{-4} + z^{-5} + 6z^{-6}$

10

- b) Design the direct form I and II realizations for third-order IIR transfer function:

$$H(z) = \frac{0.28z^2 + 0.319z + 0.04}{0.5z^3 + 0.3z^2 + 0.17z - 0.2}$$

10

End Semester Examination, Dec. 2018

B. Tech. — Fifth Semester

DIGITAL SIGNAL PROCESSING (EC-502A / EC-502B)

Time: 3 hrs.

Max Marks: 100

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

2x10

PART-A

- Q.2 a) Describe the need and applications of multirate signal processing. Design a decimator and interpolator to vary the sampling rate by a factor of L and M, respectively.

10

- b) Compare digital signal processing with analog signal processing. Draw and explain the block diagram of DSP system.

10

- Q.3 a) Determine the convolution of the pair of signals by means of z-transform:

$$x_1(n) = \left(\frac{1}{2}\right)^n u(n), \quad x_2(n) = \cos \pi n \quad u(n)$$

10

- b) Compute z-transform and interpret ROC of the input sequence $x(n) = u(n) - u(n-1)$ using time shifting property of z-transform.

-
10

- Q.4 a) Design a 8-point decimation in frequency FFT algorithm to compute DFT of:

$$x(n) = \{1, 1, 1, 1, 1, 1, 1\}.$$

10

- b) Find output response (linear convolution) $y(n)$ of a system if $h(n) = \{1, 1, 1\}$ and $x(n) = \{1, 2, 3, 1\}$ by using concentric circle method with zero padding.

10

PART-B

- Q.5 a) Design and realize a digital filter using impulse invariant technique whose analog system functions is:

$$H(s) = \frac{5}{(s+2)(s+7)}. \text{ Assume } T=15.$$

10

- b) Derive bilinear transformation mapping of stable analog to stable digital IIR filter. Analyze the results for stability. Illustrate the concept of frequency warping.

10

- Q.6 a) Describe designing and realization of a digital FIR filter using rectangular window technique.

10

- b) Discuss the concept of Gibbs oscillations. How these can be eliminated.

2

- c) What do you understand by linear phase response? Derive the necessary condition to prove that phase of FIR filter is linear.

8

- Q.7 a) Consider the system function of an IIR filter as:

$$H(z) = \frac{z^2 + z + 1}{\left(z + \frac{1}{2}\right)\left(z + \frac{1}{6}\right)}.$$

Determine the parallel realization of above function.

10

- b) Obtain the cascade realization using minimum number of multipliers for transfer function of an FIR system given by:

$$H(z) = \left(1 + \frac{1}{2}z^{-1} + z^{-2}\right)\left(1 + \frac{1}{4}z^{-1} + z^{-2}\right)$$

10

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester
DIGITAL SYSTEM DESIGN (EC-503A)

Time: 3 Hours

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any **TWO** questions from **PART-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) What is the difference between VHDL and verilog?
- b) Illustrate with an example how signals are differed from variable.
- c) Discuss the significance of wait for Ons statement.
- d) Design a VHDL code for the following Boolean expression in behavioral style of modeling $Y = (A \oplus B)C$.
- e) Define sensitivity list. Is it always required in a process?
- f) Why are block statements used in concurrent modeling?
- g) How a constant is declared and initialized in VHDL. Also differentiate between constant and deferred constant.
- h) What is the function of LUT in FPGA?
- i) Differentiate between ASIC and fixed function ICs.
- j) Why are generics required in VHDL?

2x10

PART-A

Q.2 a) List various steps required for designing a digital integrated circuit.

10

b) What are various styles of modeling in VHDL? Specify the importance of each of them and give example.

10

Q.3 a) What are packages in VHDL? How are these formed and used in VHDL modeling?

6

b) Distinguish between functions and procedures. Explain with suitable example.

7

c) Write VHDL code for 3-input xor gate and add a 25 ns inertial delay to the xor assignment statement.

7

Q.4 a) What are data types? List and explain them with example.

10

b) Implement a 2-bit parity generator using structural modeling.

5

c) Implement a full adder circuit using behavioral model.

5

PART-B

Q.5 a) Design and implement a Parallel-In Parallel-Out shift register using VHDL.

10

b) Write VHDL code for 3 bit binary UP/Down counter in behavioral model.

10

Q.6 a) What are the basic components of a micro computer? Explain the operation of micro-computer.

10

b) Implement an Arithmetic and logic unit using VHDL which should be able to perform atleast eight operations.

10

Q.7 a) How FPGA is different from CPLD? Discuss its advantages and drawbacks?

8

b) What are the different logic levels available in standard logic type?

4

c) Construct VHDL module for a ROM with four inputs and three outputs.

8

End Semester Examination, Dec. 2018

B. Tech.—Sixth Semester

WIRELESS COMMUNICATION (EC-506)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer the following questions:

- a) What is the role of HLR, VLR and AUC in GSM system?
- b) What is EIRP?
- c) What does ARFCN stand for in GSM system? How many users are supported by one ARFCN?
- d) Define forward channel, reverse channel, downlink and uplink in mobile communication.
- e) List various types of 2 G and 2.5 G standards.
- f) Write the expression for power received in a two ray ground reflection model.
- g) What are the factors affecting small-scale fading?
- h) What are the various modes of propagation in communication channel?
- i) If 50 MHz spectrum is allocated from the band of 800 MHz of a cellular operator, with channel bandwidth 60 KHz for communication. Calculation total number of channels available.
- j) Differentiate 3G and 4 G standards.

2x10

PART-A

Q.2 a) Explain signal processing in GSM system with a labeled diagram.

10

b) Explain in brief: i) paging system ii) Cordless systems.

10

Q.3 Write short notes on:

a) EDGE. b) 4G/LTE. c) WCDMA. d) WLAN.

5x4

Q.4 a) Explain various types of fading channels in detail for doppler speed and multipath propagation.

10

b) Derive an expression for free-space path loss propagation model.

7

c) Find the far field distance for an antenna with maximum dimension 3m and operating frequency of 800 MHz.

3

PART-B

Q.5 a) What do you understand by diversity techniques? Explain them in detail.

10

b) Define equalization. List its various types. Also, explain the fundamentals and role of equalization in communication receivers.

10

Q.6 a) Explain briefly the concept of frequency reuse. Prove that $C=MS$ where 'M' is number of times the cluster is replicated and 'S' is the number of duplex channels available for use.

6

b) If a total of 40 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses 30 KHz simplex channels to provide full duplex channels (Voice and control channels), compute the number of channels available per cell if a system uses i) 4-cell reuse ii) 7-cell reuse.

4

c) Derive an expression for signal-to-interference ratio and system capacity between co-channel cells in a cellular system.

10

Q.7 Write short notes on:

- a) Spread spectrum access techniques.
- b) Packet radio protocol-pure and slotted ALOHA.

10x2

End Semester Examination, Dec. 2018

B. Tech. – Fourth / Fifth Semester

COMMUNICATION ENGINEERING-II (EC-508)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 a) Define sampling. Explain a sample and hold circuit?
b) What is the difference between TDM and FDM?
c) What are different types of digital modulation techniques? Enumerate the advantages of digital communication.
d) Write down the expression for probability of error of baseband signal receiver.
e) What do you mean by cumulative density function? Discuss its properties.
f) A random variable has an exponential PDF given by $f(x) = 2ae^{-3b|x|}$, where a and b are constants. Find the relationship between a and b ?
g) What do you mean by ergodic process? Compare it with wide sense stationary process.
h) Find the capacity of a telephone channel with bandwidth $W = 3000$ Hz and signal to noise ratio of 39 dB.
i) Show that $H(X, Y) = H(X/Y) + H(Y)$.
j) Find the channel capacity of a binary symmetric channel. **2×10**

PART-A

- Q.2 a) What is pulse modulation? Explain how PPM is generated from PWM signal? **7**
b) What is companding? How does it help in improving S/N ratio?
Consider the special case of full load sinusoidal modulating signal of amplitude A_m , which utilizes all the quantization levels provided, show that:
 $S/N \text{ in } dB = 1.8 + 6N$
where $N = \text{no. of bits per sample.}$ **8**
c) Write short note on – DPCM. **5**
- Q.3 a) What do you mean by M-ary signaling. Explain QPSK transmitter and receiver in detail. **12**
b) Describe GMSK modulation scheme. Write its application. **8**
- Q.4 Define matched filter. Derive the expression for probability of error, P_e and transfer function $H(f)$ of matched filter. **20**

PART-B

- Q.5 a) An analog signal bandlimited to 4 KHz is sampled at the Nyquist rate. The samples are quantized into eight levels. These levels are assumed to be independent and

occur with probabilities $P_1 = P_3 = P_5 = \frac{1}{16}$, $P_2 = P_4 = P_6 = \frac{1}{8}$ and $P_7 = P_8 = \frac{7}{32}$. Find the information rate of the source. 5

- b) A source X generates five equally likely messages. Construct Shannon fano code and calculate code efficiency. Compare your result with Huffman code. 6
- c) State and prove Shannon Hartley theorem. Show that as bandwidth approaches infinity, $C = 1.44 \frac{S}{\eta}$. 9

Q.6 a) A random variable X is uniformly distributed between a and b . Find:

- i) CDF of X
- ii) Mean and variance.

10

b) The joint pdf of x and y is given by:

$$f_{xy}(x, y) = xye^{-(x^2+y^2)/2} u(x) \cdot u(y)$$

- i) Find the marginal pdfs $f_x(x)$ and $f_y(y)$.

- ii) Are X and Y independent. 6

c) State and explain central limit theorem. 4

Q.7 a) Consider the random process

$$V(t) = \cos(\omega_0 t + \theta)$$

where θ is a random variable with a probability density

$$f(\theta) = \frac{1}{2\pi}, -\pi \leq \theta \leq \pi$$

= 0, else where

Show that the first and second moments of $V(t)$ are independent of time and hence $V(t)$ is a stationary process. 5

b) Write short notes on:

- i) Random process transmission through linear filter. 10
- ii) Cross spectral density. 5

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

MICROCONTROLLER AND INTERFACING (EC-521)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1 a) What is the default value of stack pointer? Also state is the conflict between stack and register banks?
b) Differentiate between bit addressable and byte addressable RAM? Specify the instruction for accessing bit addressable and byte addressable RAM.
c) Write a program for a nested loop to perform an action 1000 times.
d) Compare MOVX and MOV instructions with example.
e) Which is more expensive, parallel or serial data transfer and why?
f) What is the difference between a long jump (LJMP), a short jump (SJMP) and absolute jump (AJMP)?
g) Find the value of TMOD to operate as timer in the following modes.
i) Mode2-Timer 0, Mode 2-Timer 1
ii) Mode 0-Timer 1.
h) For a XTAL input of 22 MHz, what is the baud rate if TH1 is loaded with-10?
i) Specify the important functions of the SCON register?
j) Assume that the IP register has all O's. Explain what happens if both INT0 and INT1 are activated at the same time? **2×10**

PART-A

- Q.2 a) Which bits of the PSW register are user defined? **3**
b) Describe the functioning of port3 in 8051 micro controller micro controller with the help of its PIN diagram. **10**
c) What do you mean by the term quasi bi-directional port? Why the port0 of 8051 is true bi-directional? **7**
- Q.3 a) Compare the following two instructions in terms of addressing mode and function performed:
i) MOV A, # 46H
ii) MOV A, 46 H **4**
b) Write a subroutine Multiply 25 by 10 using the technique of repeated addition. **8**
c) Explain following instructions with example:
i) SWAP
ii) ANL
iii) MVL
iv) ADDC **8**

- Q.4 a) Indicate the rollover value of the timer for each of the following mode.
- i) Mode 0
 - ii) Mode 1
 - iii) Mode 2
- b) With a frequency of 22 MHz, generate a frequency of 100 KHz on pin P23. Use Timer1 in mode 1. 10

PART-B

- Q.5 a) Write a program to transfer a letter 'y' serially at 9600 baud continuously, and also to send a letter 'N' through port 0, which is connected to a display device. 10
- b) Design a communication interface between 8051 microcontroller and RS-232 with the help of MAX-232. 10
- Q.6 a) "Interrupt based data transfer method is more advantageous than polling" true or false. Justify your answer. 10
- b) Write a program in which the 8051 micro controller reads data from P1 and writes it to P2 continuously while giving a copy of it to the serial COM port to be transferred serially. Assume that XTAL = 11.059 MHz, baud rate = 9600. 10
- Q.7 a) Design an 8051 micro controller based system with 8K bytes of program ROM and 8K bytes of data ROM. 10
- b) Interface 8051 micro controller with LCD to send letters 'M', 'D' and 'E'. 10

End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

COMMUNICATION SYSTEMS-I (EC-522)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Discuss the need for modulation of signals in a communication system and its applications.
b) What do you understand by bandwidth of a signal?
c) Analyze the percentage of power saving in SSB transmission as compared to DSB signal.
d) Differentiate between coherent and non-coherent detection.
e) In a FM system, if modulation index ' m_f ' is doubled and the modulating frequency is halved / what will be its effect on the maximum frequency deviation.
f) Illustrate the function of AGC in a radio receiver. Explain simple and delayed AGC.
g) What do you understand by intermediate frequency? Discuss its significance in signal reception.
h) Describe the principle of operation of Armstrong FM transmitter.
i) An amplifier operating at the frequency range from 18 to 20 MHz has a $10\text{ k}\Omega$ input resistor. Determine the rms noise voltage at the input to this amplifier if the ambient temperature is 27°C .
j) Draw a receiver model for coherent detection of DSB-SC system. Explain its utility in communication system.

PART-A

- Q.2 a) Formulate various blocks of transmitter and receiver section of a communication system. Discuss the function of each block in detail. **12**
b) Compare various features of analog and digital modulation techniques. **8**

Q.3 a) What do you understand by vestigial sideband transmission? Design and explain the working of VSB modulator and demodulator. Explain how it is used for transmission of TV signals. **10**
b) The equation of an amplitude modulated wave is given by:
$$s(t) = 40[1 + 0.6\cos(2\pi 10^3 t)]\cos(4\pi 10^6 t)$$

Determine modulating signal frequency, carrier signal frequency, carrier power, total sideband power and bandwidth of AM wave. **10**

Q.4 a) Describe the principle of FM signal detection using foster seeley discriminator circuit. Analyze the deductions with the help of vector diagrams. **10**

- b) A 107.6 MHz carrier signal is frequency modulated by a 7 KHz sine wave. The resultant FM signal has a frequency deviation of 50 KHz. Determine:
i) The carrier swing of FM signal
ii) The highest and lowest frequencies attained by the modulated signal and
iii) The modulation index of FM wave.
- 10**

PART-B

- Q.5 a) Explain the working of AM and FM super-heterodyne receiver with the help of block diagram. **12**
b) Elaborate the concept of pre-emphasis and De-emphasis with the help of frequency response characteristics and respective circuit diagram for FM transmitter and receiver. **8**
- Q.6 a) Design a current model of noisy resistor and derive the necessary relations. **10**
b) In a cascaded two stage amplifier, the first stage has a noise figure of 3dB and a power gain of 16dB. The 2nd stage has a noise figure of 6dB and a power gain of 10dB. Determine the overall noise figure and power gain in dB. **10**
- Q.7 a) Develop a receiver model of amplitude modulation system to analyze noise performance of a system using envelope detection. **12**
b) Illustrate the threshold effect in AM and FM communication receivers. **8**

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester

PRINCIPLES OF RADAR SYSTEMS (EC-624)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 a) If a radar has an average power of 75W, duty cycle of 0.15, what will be its peak power.
b) Define blind speed for an MTI radar.
c) What will happen to the maximum unambiguous range of a radar if its p.r.f is increased?
d) What are second time around echoes?
e) Define Doppler frequency.
f) Mention any two limitations of a CW radar.
g) Define noise figure.
h) If an echo signal is received in a radar after 800 μ sec. What will be its target range?
i) What do you understand by a tracking radar?
j) Why is a large sized antenna preferred in a radar? **2×10**

PART-A

- Q.2 a) Describe in brief the frequencies of operation of a radar. Also discuss the major applications of radar. **10**
b) Explain with a diagram the basic principle of operation of a radar. **10**
- Q.3 a) Explain in detail the various system losses. **10**
b) What are the various factors that help in prediction of range performance of a radar? **10**
- Q.4 a) With the help of a block diagram describe in detail the operation of a FMCW radar. What are its applications? **12**
b) A CW radar is operating at a frequency of 6 GHz when an aircraft is approaching the radar at a radial velocity of 600 km/hr. Find the Doppler shift frequency. **8**

PART-B

- Q.5 a) Explain the principle of operation of a pulsed Doppler radar with the help of a block diagram. **10**
b) Two MTI radar systems are operating at the same p.r.f but different operating frequencies. Blind speeds of these radars are such that second blind speed of first radar is equal to fourth blind speed of second radar. Find the ratio of their operating frequencies. **10**
- Q.6 a) What is range tracking? Explain the process of range tracking in detail. **10**

b) What is the principle of operation of a conical scan tracking radar? Discuss briefly its operation with the help of a block diagram. **10**

Q.7 Write short notes on:

- a) Radar receivers.
- b) Radar displays.
- c) Low noise front ends.
- d) Radar duplexers.

5x4

End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester
CONSUMER ELECTRONICS (EC-625)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1 a) What is the frequency of horizontal and vertical sweep oscillator in our Indian TV system?
b) Define dispersion and recombination of light.
c) Why we use IF amplifier stage in radio receiver and TV receiver?
d) How many types of bar codes are available? Name them.
e) State working principle of microwave ovens.
f) Why DTH signal distort during rain?
g) Why we use dB scale for sound signal?
h) What is persistence of vision?
i) Explain luminance signal.
j) What do you mean by modulo-6 counter? **2×10**

PART-A

- Q.2 a) The voltage gain of an amplifier, when it feeds a resistive load of $1.0\text{k}\Omega$ is 40 dB. Determine the magnitude of the output signal voltage and the signal power in the load when the input signal is 10 mV. **4**
b) List characteristics of ideal loudspeaker. **6**
c) Explain construction of various types of microphones listing their advantage and disadvantage. **10**
- Q.3 a) Explain different control pulses and composite video signal used to transmit monochrome TV signal. **10**
b) What is interlace scanning and why we perform interlace scanning instead of normal scanning? **10**
- Q.4 a) Explain the working of delta gun colour picture tube. **10**
b) Which TV system is used in India? Compare NTSC, PAL and SECAM TV systems. **10**

PART-B

- Q.5 a) Explain the process of VHS tape transport mechanism. **10**
b) Write short notes on VCD and DVD. **10**
- Q.6 a) State the principle used by refrigerator and also explain its working. **10**
b) Explain working of digital clocks with the help of a neat diagram. **10**
- Q.7 Write short notes on (**any two**):
a) FAX machines.

- b) Printers.
- c) Xerox machine.

10×2

End Semester Examination, Dec. 2018
B. Tech. — Sixth Semester
EMBEDDED SYSTEMS (EC-626)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.

- Q.1 Answer the following questions:

 - a) Differentiate between embedded microcontroller and external memory microcontroller.
 - b) Differentiate between CISC and RISC.
 - c) Explain the term CPU in detail.
 - d) Describe working register of PIC microcontroller.
 - e) What are the instructions for bit operations? Explain in brief.
 - f) What are subroutine I/P and O/P parameters?
 - g) What is brown out reset?
 - h) Differentiate between defines and macros.
 - i) What do you understand by terms post-scalar in PIC16F877A?
 - j) What value should be loaded into TMRO register to achieve the delay of 180us using 3.58MHz frequency and 1:1 pre-scalar?

PART-A

- Q.2**

 - a) Explain the difference between microprocessor and microcontroller on the basis of following:
 - i) Hardware limitations.
 - ii) Software.
 - iii) Operating frequency.10
 - b) Explain PIC microcontroller families. 5
 - c) What do you mean by the term IDE? 5

- Q.3** a) Draw the basic block diagram of PIC microcontroller and explain its working. **10**
b) Explain different types of registers used in PIC microcontroller. **5**
c) Discuss the different causes of reset in PIC microcontroller. **5**

- Q.4** a) What are different types of instructions used in PIC? Explain in detail. **10**
b) What is event driven programming? **5**
c) Explain the basic operation sequence of adding two numbers together. **5**

PART-B

- Q.5** a) Explain the operation of Timer 0 in PIC 16. **10**
 b) Write a note on watch dog timer. **10**

- Q.6** a) Describe synchronous serial port (SSP) communication module. **10**
 b) Explain the following:
 i) Parallel slave port (PSP).
 ii) In-circuit serial programming (ICSP). **5x2**

- Q.7** Explain interfacing of any two of the following with PIC microcontroller:

- a) DC motor.
- b) Stepper motor.
- c) Serial port.
- d) LED's.

10×2

End Semester Examination, Dec. 2018
B. Tech. — Sixth / Seventh Semester
MICROWAVE ENGINEERING (EC-701A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 Answer the following questions:

 - a) What are active microwave components? Give examples.
 - b) Give two properties of S Matrix.
 - c) A radar has a duty cycle of 0.2 and peak power of 100W, what will be its average power?
 - d) Define “Negative resistance device”.
 - e) Explain the term: “Wave impedance”.
 - f) Two identical directional couplers are used in a waveguide to sample the incident and reflected powers. The O/P of the two couplers is found to be 2.5mw and 0.15mw. Find the value of VSWR in the waveguide.
 - g) What is velocity modulation?
 - h) Give two applications of circulators.
 - i) Consider a waveguide of $8\text{cm} \times 4\text{cm}$. Given cut off wavelength of $\text{TE}_{10} = 16\text{cm}$, $\text{TM}_{11} = 7.16\text{cm}$. What modes will propagate at a free space wavelength of 10cm?
 - j) Define “Microstripline”.

PART-A

- Q.2** a) Discuss the advantages of microwaves. **10**
b) Explain the applications of microwave communication in detail. What are the frequencies used? **10**

- Q.3 a) Show that a waveguide acts as a high pass filter. 12
 b) The TE_{10} mode is propagated in a rectangular waveguide having dimensions $a = 6\text{cm}$ and $b = 4\text{cm}$. By means of a travelling detector the distance between a maxima and minima is found to be 4.55cm . Find the frequency of the wave. 8

- Q.4 a) Derive the scattering matrix of a magic. What is a magic Tee. **10**
 b) Derive the expression of resonant frequency of a rectangular cavity resonator. **10**

PART-B

- Q.5** a) Explain the construction and working of a relax klystron. **10**
 b) Describe giving its construction and working travelling wave tube. **10**

- Q.6** Write short notes on the following:

- a) TUNNEL DIODE.
 - b) GUNN DIODE.
 - c) IMPATT DOIDE.
 - d) VARACTOR DOIDE.

5×4

- Q.7** a) Explain the techniques for measurement of impedance of a microwave signal. **10**

b) Derive the simple form of radar range equation.

10

End Semester Examination, Dec. 2018

B. Tech. – Fifth / Seventh Semester

MICROCONTROLLER AND APPLICATIONS (EC-702)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Design a code to copy the contents of TCON register into R2 register using register indirect addressing mode.
b) Differentiate microprocessor and microcontroller on the basis of hardware requirement.
c) Examine the program and explain the status of A and B registers.
- ```
org 00H
MOVA, # 36
MOV B, # 02H
MVL AB
end
```
- d) Describe the use of EA pin of 8051 microcontroller.  
e) Compare mode1 and mode2 operations of timer in 8051 microcontroller.  
f) Contrast data and address buses of microcontroller.  
g) Define Program Status Word (PSW) register.  
h) List the interrupts used in 8051 microcontroller along with their priority order.  
i) Examine the maximum and minimum delay generated using mode2 operation of timer.  
j) Discuss various modes of operations in serial communication. **2×10**

### **PART-A**

- Q.2 a) Construct the internal block diagram of 8051 microcontroller and explain each block in detail. **10**  
b) Draw the pin diagram of 8051 microcontroller and explain all the pins in it. **10**
- Q.3 a) What is the need of addressing modes? Define each addressing mode of 8051 with suitable examples. **10**  
b) List all the conditional jump instruction of 8051 microcontroller with suitable examples. **10**
- Q.4 Construct the code for the following square wave using 8051 timer.



Given that, XTAL = 12 MHz

**20**

### **PART-B**

- Q.5 a) How many serial interrupt has 8051 microcontroller? Name them. **2**

- b) Distinguish between half duplex and full duplex mode of communication. **5**
- c) Design a program to transfer serially the message "the earth is but one country and mankind its citizens" continuously at a 57600 baud rate. **13**
- Q.6 a) When an interrupt is activated, what steps are taken by the 8051 microcontroller to service it? Discuss in detail. **10**
- b) Explain the following registers:  
i) IE register.  
ii) TCON register. **3×2**
- c) What will be the priority of the interrupts after execution of the following instruction:  
`MOV IP, # 00001100B.` **4**
- Q.7 Design the interfacing circuit for LCD with 8051 microcontroller. Also develop the code for sending "HELLO" to the LCD using delay. **20**

**End Semester Examination, Dec. 2018**  
**B. Tech. — Seventh Semester**  
**WIRELESS AND MOBILE COMMUNICATION (EC-704)**

Time: 3 hrs. Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1** Answer the following questions: **4×5**
- a) Differentiate between SDMA and TDMA.
  - b) What do you understand by mobile cellular systems?
  - c) List the factors influencing small scale fading.
  - d) Differentiate between scattering and diffraction in radio propagation.
  - e) Why is CDMA preferred over GSM?

**PART-A**

- Q.2** a) Discuss the evolution of mobile radio communication. **10**  
b) Describe the process of call which is to be made by a landline user to a mobile user. **10**
- Q.3** a) Define fast fading and slow fading. Differentiate between these two types of fading. **10**  
b) What do you understand by large scale fading? Explain the 2-ray ground reflection model for path-loss prediction. **10**
- Q.4** a) Explain briefly about 3G CDMA techniques. **10**  
b) Draw and explain the architecture of GSM. Also discuss the concept of signal processing in GSM. **10**

**PART-B**

- Q.5** Explain the following cellular concepts in detail: **20**
- a) Frequency reuse.
  - b) Channel assignment.
  - c) Handoff strategies.
- Q.6** a) What are the characteristics of speech that enable speech coding? Discuss the criteria used for choosing speech coders for mobile communication systems. **10**  
b) Differentiate between waveform coders and decoders with examples. **10**
- Q.7** Discuss the following spread spectrum modulation techniques: **10×2**
- i) Direct-sequence spread spectrum (DS-SS).
  - ii) Frequency hopped spread spectrum (FHSS).

**End Semester Examination, Dec. 2018**  
**B. Tech. — Sixth Semester**  
**RADAR ENGINEERING (EC-721)**

Time: 3 hrs.

**Max Marks:**      **100**

*No. of pages:* 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 Answer the following questions:

  - a) State Doppler frequency effect.
  - b) What is the maximum unambiguous range of a Radar whose pulse repetition period is 800 Msec?
  - c) What is a matched filter?
  - d) What are the methods used in a MIT radar to reduce clutter residue?
  - e) On what parameters the range resolution and angle resolution of a Radar depends?
  - f) If the frequency of received echo-signal is lower than the frequency of the transmitted signal identify if the target is approaching towards the radar or moving away from it.
  - g) If a Radar has an average power of 75W and duty cycle of 0.15, what will be its peak power?
  - h) What are the limitations of a CW radar?
  - i) Why is a large sized antenna preferred in a Radar?
  - j) Define “System losses” of a Radar.

## **PART-A**

- Q.2** a) Explain the working of a simple radar with the help of a block diagram. **10**  
b) What are the major applications of radar? Discuss each application in detail? **10**

**Q.3** a) Calculate the maximum range of a Radar at 3cm wavelength, radiating a peak power of 500kW. Minimum detectable signal of receiver is  $10^{-12}$ W, the capture area of antenna is  $5\text{m}^2$  and radar cross sectional area of target is  $20\text{m}^2$ . **10**  
b) What is threshold detection concept in radar? Explain briefly what is false alarm. How does its setting affects the radar performance? **10**

**Q.4** a) Describe the principle of operation of a FMCW radar with the help of a block diagram. **10**  
b) Derive an expression for doppler frequency. What are its applications? **10**

## **PART-B**

c) Noise figure.

d) Range ambiguities.

**5x4**

**End Semester Examination, Dec. 2018**  
 B. Tech. — Sixth / Seventh Semester  
**ELECTRONIC SYSTEM DESIGN (EC-722)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1** Answer the following questions: **2×10**
- Convert  $(6D5B)_{16} = ( ? )_8 = ( ? )_2$
  - Subtract  $(26)_8$  from  $(96)_8$  using 2's complement.
  - What is the difference between PLA and PAL?
  - Design a NOR gate using CMOS logic.
  - What do you mean by rise time and fall time?
  - Draw a circuit of full adder using half adder.
  - Write the excitation table for S-R and J-K flip-flop.
  - Differentiate between synchronous and asynchronous sequential circuit.
  - Explain one hot encoding technique.
  - Define cycles and races in brief.

**PART-A**

- Q.2**
- What is digital hardware? Explain the design process for digital hardware. **10**
  - Use algebraic manipulation to find the minimum SOP expression for the following function:  

$$F(A,B,C) = AC + \overline{ABC} + AC + \overline{ABC} + \overline{AB}\overline{C} + \overline{AB} + ABC .$$
 **4**
  - Convert the followings:
    - $[225.963]_{10}$  to binary, octal.
    - $[6EF.AD]_{16}$  to binary, octal.**3×2**
- Q.3**
- $F(X_1, X_2, X_3) = \sum m(0,3,4,5,7)$ . Implement this function by using CMOS logic. **10**
  - Explain the architecture of CPLD in detail. **10**
- Q.4**
- Design and implement a 3 line to 8 line decoder. **10**
  - What is a multiplexer? Realize the given function by using one 8:1 MUX.  

$$F(A,B,C,D) = \sum m(1,3,4,9,10,13,15) .$$
 **10**

**PART-B**

- Q.5**
- Design a Mod 10 up-down counter and explain it. **10**
  - Convert JK flip-flop to T flip-flop. **6**
  - Draw a circuit diagram of universal shift register. **4**
- Q.6**
- Explain and design a serial adder using mealy FSM. **10**
  - Explain state diagram and state assignment for synchronous sequential circuits with example. **10**
- Q.7**
- Explain various types of hazards and their significance in electronic systems. **10**
  - Explain state reduction in detail with the help of an example. **10**

**End Semester Examination, Dec. 2018**  
**B. Tech. — Sixth Semester**  
**OPTICAL COMMUNICATION (EC-723A)**

Time: 3 hrs.

**Max Marks:** 100

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1** Answer the following questions:

  - Write four applications of optical communication system.
  - What is the difference between acceptance angle, critical angle and numerical aperture?
  - Define the terms “Scattering”. What are its types?
  - List components used in an optical communication system.
  - A multimode step index fiber with core diameter 50um, relative refractive index difference 1% has a normalized frequency of 52.1. Calculate the approximate number of modes.
  - Define the terms w.r.t. lasers.
    - Absorption.
    - Random emission.
  - At what wavelength the attenuation and dispersion are minimum in an optical fiber? Indicate with the help of diagrams.
  - Response time of photo detectors depends on three factors. List them.
  - List various types of LASERS and detectors.
  - Enlist few system design considerations for optical communication systems.

## PART-A

- Q.2** a) Explain the block diagram for a digital link of optical fiber communication. **10**  
b) Discuss advantages and disadvantages of optical fiber communication systems. **10**

- Q.3 a) List three major causes of attenuation in an optical fiber and explain their mechanisms. **10**  
 b) A multimode step index fiber with a core diameter of 60 $\mu\text{m}$  and a relative refractive index of difference 1% is operating at a wavelength of 0.90 $\mu\text{m}$ . If the refractive index of core is 1.5, determine the normalized frequency for fiber. **10**

- Q.4** a) Sketch the schematic of structure of edge emitting LED and explain its operation. **10**  
 b) Derive an expression for internal quantum efficiency of LED. **10**

## **PART-B**

- Q.5** a) What are the features of a good optical source? Discuss briefly injection laser characteristics. **10**  
b) Explain the distributed feedback lasers. How they differ from distributed Bragg reflection? **10**

- Q.6** a) Explain the detection process in P-N photodiode and compare it with the PIN photodiode. **10**  
b) Derive an expression for responsivity of photodetectors. How it related to quantum efficiency? **10**

- Q.7** a) What are the digital modulation formats used in optical fiber communication system? Explain briefly any two. **10**  
b) Write short notes on the following:  
i) System design considerations

ii) Fiber couplers and connectors.

**5×2**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **OPTICAL COMMUNICATION (EC-723B)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) State the frequency spectrum used by optical fibre communication.
- b) List the major components of optical fibre communication system.
- c) Write the expression for cut-off wavelength for any fibre.
- d) Classify the various types of scattering losses.
- e) A P-n photodiode has a quantum efficiency of 50% at a wavelength of  $0.9\mu m$ . Calculate its responsivity.
- f) Which of the two light sources – LED and LASERS, are most suitable for high data rate transmission and why?
- g) How is refractive index related to the velocity of light?
- h) Define Fermi energy level.
- i) Differentiate between spontaneous and stimulated emissions for optical sources.
- j) Determine signal attenuation in dB through the fiber with mean output optical power of  $3\mu W$  and mean input optical power of  $90\mu W$ .

**2x10**

### **PART-A**

Q.2 a) Discuss the major components of system design consideration for optical fibre communication system.

**10**

- b) With the help of diagrams illustrate intensity modulation in analog optical fibre communication system and enlist few applications of optical fibre communication system.

**10**

Q.3 a) Derive the expression for numerical aperture of a fibre and write its relation with critical angle.

**7**

- b) Differentiate between skew rays and meridinal rays.

**7**

- c) The numerical aperture of an optical fibre is 0.39. If the difference in refractive indices of material of case and cladding is 0.05. Calculate refractive index of material of case.

**6**

Q.4 a) Why bends of small radius cause fibre bend loss? Justify with equations.

**10**

- b) Describe Attenuation in relation to optical fibre communication system.

**5**

- c) A single mode fibre operating at wavelength 1.3mm is found to have total material dispersion of 2.81ns and a total waveguide dispersion of 0.495ns. Determine the received pulse width and approximate bit rate of the fibre if the transmitted pulse has a width of 0.5ns.

**5**

**PART-B**

- Q.5 a) Analyze the structure of Edge emitting LED.

**8**

- b) State the characteristics of a good optical source.

**2**

- c) Derive the expression for Internal Quantum Efficiency of light emitting diodes.

**10**

- Q.6 a) Draw representative diagram of Fabey-Perot laser and explain its operation.

**10**

- b) Distinguish between Light emitting diode and LASER.

**5**

- c) Outline briefly the injection laser characteristics.

**5**

- Q.7 a) Demonstrate the working principle of P-I-N photo detection and explain any one type of P-I-N detector.

**10**

- b) Categorize the various types of noises in photo diodes.

**7**

- c) List the characteristics of photo detectors.

**3**

**End Semester Examination, Dec. 2018**  
 B. Tech. — Sixth / Seventh / Eighth Semester  
**VLSI DESIGN (EC-724)**

Time: 3 hrs. Max Marks: **100**  
 No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1** Answer the following questions: **2×10**
- What are the limitations of assembling the circuit by using discrete components?
  - Draw y-chart use in designing of VLSI circuits.
  - What is ion-implantation technique?
  - What is base width modulation?
  - Define pass transistor and draw its symbolic diagram.
  - Draw PMOS and NMOS inverter circuit.
  - Implement half adder using PAL.
  - Name different types of ROMs. Also differentiate them.
  - Write rules for drawing stick diagram in brief.
  - Define 2-phase clocking system.

**PART-A**

- Q.2** **8**
- Discuss transport phenomenon for CZ crystal growth technique.
  - Compare diffusion with ion implantation.
  - Define resolution. List various lithographic techniques and explain any one of them.
- Q.3** **10**
- Derive expression for drain current of MOSFET for different regions of operation.
  - Define figure of merit of MOS transistor and find its mathematical expression.
- Q.4** **10**
- Explain band bending for MOSFET with the help of energy band diagram.
  - What do you mean by latch-up problem in CMOS circuit? How can it be avoided.

**PART-B**

- Q.5** **6**
- Implement NOR gate using PMOS.
  - What are the steps followed for design of logic gates using CMOS technology. Explain with examples.
  - Explain dynamic logic structure for CMOS circuits.
- Q.6** **10**
- Implement 3-bit adder circuit using PMOS technology. Also explain its truth table.
  - Implement the circuit of T-flip-flop at circuit level.
- Q.7** **10**
- Design the following function using PLA:  

$$F_0 = \sum m(0,1,4,6)$$

$$F_1 = \sum m(2,3,4,6,7)$$

$$F_2 = \sum m(0,1,2,6)$$

$$F_3 = \sum m(2,3,5,6,7)$$
  - Design a BCD to excess 3-code converter counter using PAL and PLA.



# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **DATA COMMUNICATION AND NETWORKING (EC-725)**

Time: 3 hrs

Max Marks: **100**

*No. of pages: 2*

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

**Q.1** Answer the following questions:

- a) The transport layer creates a communication between the source and destination. Discuss the three events involved in this connection.
- b) For '10' devices in a network, find the number of cable links necessary for ring and star topology.
- c) Name different types of frames used in HDLC.
- d) Represent the notation of 10 Base 5.
- e) Mention any two functions which a bridge cannot perform.
- f) Categorize different types of web documents.
- g) Suppose a message 1001 1100 1010 0011 is transmitted using Internet checksum. Evaluate the value of checksum.
- h) Generate the Hamming code for "1101" data signal.
- i) Assume a Go-back-N protocol is used with a window size of '4' and that the ACK for packet '2' gets lost. Show the events until packet '2' is acknowledged at the sender side.
- j) Differentiate between router and switch.

**2x10**

### **PART-A**

**Q.2** a) Write note on various internetworking devices. Why switch is considered to be an intelligent device as compared to hub?

**4**

- b) Interpret different methods of error control.

**8**

- c) Mention on which layer of the OSI model the following interconnecting devices operates.

- |              |             |              |
|--------------|-------------|--------------|
| i) Repeaters | ii) Bridges | iii) Routers |
| iv) Gateways |             | <b>8</b>     |

**Q.3** a) Develop OSI reference model? Elaborate the functions and protocols used in OSI model.

**12**

- b) Design a stop and wait ARQ protocol and how it is different from go-back-n ARQ?

**8**

- Q.4 a) How ISDN network is different from PSTN network? Design the architecture of ISDN network along with its protocols.

**12**

- b) Justify the need of CSMA/CD protocol used for error detection.

**4**

- c) Compare the frame format for 802.3 and 802.11 protocol.

**4**

### **PART-B**

- Q.5 a) How many voice-band channels are required for the formation of group in FDM hierarchy? Design the structure for the formation of group in FDM hierarchy.

**12**

- b) Construct PCM-based TDM system used in T-carrier system. Calculate the line speed for T-1 carrier system.

**8**

- Q.6 a) How ICMP and IGMP differ from each other? In which OSI layer do these protocols work?

**10**

- b) Determine the class of each of the following addresses.

|                           |          |          |
|---------------------------|----------|----------|
| i) 10011101<br>11001111   | 10001111 | 1111110  |
| ii) 11011101<br>11001111  | 10001111 | 11111101 |
| iii) 11101011<br>11001111 | 10001111 | 11111110 |
| iv) 11110101<br>11001111  | 10001111 | 11111100 |

**5**

- c) Demonstrate different services offered by network layer. Elaborate the BGP routing in detail.

**5**

- Q.7 a) Why is SMTP not used for transferring email messages from the recipient's mail server to the recipient's personal computer?

**6**

- b) Cite the difference between LAN and VLAN. Mention various applications of VLAN.

**14**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **DATA COMMUNICATION AND NETWORKING (EC-725)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1 Answer the following questions:**

- a) What are the most popular routing algorithms?
- b) What are the benefits of subnetting a network?
- c) State in which layer of the TCP/IP reference model the following protocols are present.
  - i) TCP
  - ii) SMTP
- d) Suppose that a message 1011 1110 1110 0011 is transmitted using Internet Check sum (4-bit word). What is the value of the checksum?
- e) For n devices in a network, what is the number of cable links required for a star and ring topology?
- f) What is network? What are the three criteria necessary for an effective and efficient network?
- g) Define 'data communication'.
- h) Give an example of unguided media.
- i) Suppose the bandwidth of a channel is 8 M Hz. If the signal to noise ratio is found to be 15dB. Find the maximum channel capacity.
- j) How do guided media differ from unguided media?  
.

**2x10**

### **PART-A**

**Q.2** a) Which type of transmission are used by E-mail and Chat Room? Differentiate between both types of transmission.

**3**

- b) Generate the hamming code for 1110 data signal.

**5**

- c) Define computer networks? Discuss various types of network topologies in computer network? Also outline various advantages and disadvantages of each topology.

**12**

**Q.3** a) Design a Selective reject ARQ protocol and how it is different from stop and wait ARQ protocol?

**10**

- b) What is bit stuffing and why it is needed in HDLC? Discuss the frame format for HDLC. **5**
- c) List various types of Asynchronous protocols and explain any one in detail.

**5**

Q.4 a) How ISDN network is different from PSTN network? Design the architecture of ISDN network along with its protocols.

**12**

b) Design layered architecture of ATM. Mention its various applications.

**8**

**PART-B**

Q.5 a) Distinguish between Synchronous and Statistical TDM systems. Illustrate it with an example.

**3**

b) How many voice band channels are required for the formation of super group in FDM hierarchy? Design the structure for the formation of super group in FDM hierarchy.

**12**

c) Describe unipolar, NRZ, bipolar RZ, NRZ-1, Manchester, Bipolar AMI encoding by applying on the information sequence 111100.

**5**

Q.6 a) In classful addressing how is an IP address in Class A, Class B and Class C divided. Discuss various protocols used in network layer of TCP/IP model.

**10**

b) What are the protocols used in network layer? Elaborate the BGP routing in detail. **10**

Q.7 a) Write notes on:

- i) Internet security Protocol
- ii) Voice over IP

**8**

b) Design the architecture of Firewall and also mention its various applications.

**6**

c) Discuss various types of email protocols in detail.

**6**

# **End Semester Examination, Dec. 2018**

B. Tech. — Seventh Semester

## **ADVANCES IN WIRELESS COMMUNICATION (EC-726)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Define the terms:
- i) Simplex
  - ii) Half duplex.
  - iii) Full duplex transmission.
- b) What are the factors affecting small scale fading?
- c) Define forward channel, reverse channel, downlink and uplink frequency in mobile communication system.
- d) Define Co-channel re-use ratio.
- e) List the various types of traffic and control channels in GSM system.
- f) What do you mean by ARFCN in GSM system?
- g) Write the expression for power received in a two-ray ground reflection model.
- h) Define coherence bandwidth and coherence time.
- i) List the various types of 1 G wireless communication systems.
- j) If a total of 33 MHz of bandwidth is allocated to a particular FDD cellular system which uses 25 KHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses 4 cell reuse factor.

**2x10**

### **PART-A**

- Q.2 a) Explain GSM system architecture with a neat diagram.

**10**

- b) Explain the working of:

- i) Paging system.
- ii) Cordless system.

**10**

- Q.3 a) What do you understand by multiple access techniques? List them and explain TDMA technique in detail.

**7**

- b) Consider a global system for mobile, which is TDMA/FDD system that uses 25 MHz for the forward link which is broken into radio channels of 200 KHz. If 8 speech channels are supported by a single radio channel and if no guard band is assumed find the number of simultaneous users that can be accommodated in GSM.

**3**

- c) What are spread spectrum multiple access techniques? List them and explain any one in detail.

**10**

- Q.4 a) Explain the evolution of mobile communication system from 2G to 3G upgrade path with the help of a labeled diagram.  
b) Write short notes on (**any two**):  
i) WLAN  
ii) 4G/LTE  
iii) 3GPP standards  
iv) 2.5G standards.

**5x4**

### **PART-B**

- Q.5 a) Explain the concept of frequency reuse. Prove that  $C=MS$  where 'M' is the number of time the cluster is replicated and 'S' is the number of duplex channels available for use.

**6**

- b) List and explain the various techniques used to improve the coverage and capacity of a cellular system.

**14**

- Q.6 a) Derive the expression for path loss and power received in a free-space propagation model.

**8**

- b) Find the far-field distance for an antenna with maximum dimension of 1m and operating frequency of 900 MHz.

**2**

- c) Explain in detail the various types of fading channels based on Doppler spread and multipath propagation delay.

**10**

- Q.7 a) What are diversity techniques? List them and explain space diversity in detail.

**10**

- b) Define equalization. List the various types of equalization and explain with the help of block diagram, the simplified communication system using adaptive equalizer at the receiver.

**10**

# End Semester Examination, Dec. 2018

B. Tech – Seventh Semester

## **ADVANCES IN WIRELESS COMMUNICATION (EC-726)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 2*

Note: Attempt any **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

**Q.1** Answer the following:

- a) Compare TDD and FDD.
- b) Define co-channel cell
- c) What is 1G system? List few of them.
- d) Define coherence bandwidth and coherence time.
- e) Differentiate between soft and hard handoff.
- f) Interpret interleaving in GSM system.
- g) Consider US AMPS system with 416 channels being allocated to cellular operators. The channel bandwidth is 30 KHZ and guard band is of 10 KHZ. Calculate the total bandwidth available with the operator.
- h) If transmitter produces 50W of power, express the transmit power in units of:
  - i) dBm
  - ii) dBW.
- i) List three basic Propagation mechanisms.
- j) What is diversity? Name few diversity techniques.

**2x10**

### **PART-A**

**Q.2** a) Demonstrate the call flow sequence for a digital cellular system:

- i) From mobile to landline
- ii) Landline to mobile.

**10**

- b) List various channels in GSM system. Explain the role of control channels in detail. **10**

**Q.3** a) What is spread spectrum modulation technique? List various techniques and explain the working of DS-SS.

**8**

- b) Calculate the maximum throughput that can be achieved using pure and slotted ALOHA protocols. Illustrate the same graphically.

**8**

- c) A normal GSM has 3 starts bits, 3 stop bits, 26 training bits and 8.25 bits. Along with this data two bursts of 58 bits of encrypted data is transmitted at 270.833 Kbps in the channel, evaluate frame efficiency.

**4**

- Q.4 a) With the help of diagram, illustrate the upgrade path from 2G to 3G technology; giving brief explanation of each evolution.

**10**

- b) Discuss the following with respect to wireless communication:
- i) Bluetooth and PAN.
  - ii) 4G and LTE.

**10**

**PART-B**

- Q.5 a) Analyze the major types of system generated cellular interference. Assume the distance between the co-channel cell is 'D' and the radius of hexagonal cell is 'R'. Drive the expression for the worst case signal to interference ratio S/I.

**10**

- b) For a given path loss exponent n=4, calculate the frequency reuse factor and cluster size for minimum S/I of 15 dB.

**3**

- c) Determine how the coverage and capacity in the cellular system could be improved. **7**

- Q.6 a) For ground reflection two ray model, the received power falls off with distance raised to the fourth power. Justify.

**15**

- b) Determine the factors influencing small scale fading

**5**

- Q.7 Write short notes on **(any two):**

- a) Simplified communication system using adaptive equalizer.
- b) Diversity techniques.
- c) Types of small scale fading.
- d) Free space propagation model.
- e) Okumura or Hata model.

**10x2**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **MICRO ELECTRO MECHANICAL SYSTEM (MEMS) (EC-727)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Distinguish between MEMS technology and microelectronics. **2×10**  
b) Discuss the historical development of MEMS manufacturing process.  
c) What do you understand by wafer bonding?  
d) List the properties of magnetic materials.  
e) Justify the use of silicon dioxide in MEMS fabrication process.  
f) Explain the need of plasma enhanced process in MEMS fabrication process.  
g) Explain the working principle of photoresists.  
h) Describe micro actuation with shape memory alloy.  
i) State applications of microgrippers.  
j) Compare Nano and micro scale techniques.

### **PART-A**

- Q.2 a) Illustrate the working principle of any two MEMS applications. **10**  
b) Describe the advantages and limitations of radio frequency MEMS based communication system. **10**
- Q.3 a) Why Silicon is used as a substrate material" for MEMS devices? Explain in detail. **10**  
b) Explain the properties of magnetic materials for MEMS. **5**  
c) Interpret doping process. List the materials generally used for doping. **5**
- Q.4 a) Discuss various deposition methods used in micro fabrication and explain any one with necessary diagram. **10**  
b) List various types of lithography. Explain in detail X-ray lithography with its major features. **10**

### **PART-B**

- Q.5 a) Describe the function of:  
i) Pressure sensors.  
ii) Optical sensors. **5×2**  
b) Explain the principle and working of a sensor used to measure the temperature. **10**
- Q.6 a) Analyze the performance response and specify applications of microactuators. **10**  
b) Illustrate the working of miniature microphones with a neat sketch. **10**
- Q.7 a) Evaluate the thermal properties of nanomaterials using a suitable characterization process. **10**  
b) Discuss various challenges in nanoscale engineering. **5**

c) List various applications of nanoproducts.

**5**

**End Semester Examination, Dec. 2018**  
**B. Tech. — Seventh Semester**  
**ANDROID AND ITS APPLICATIONS (EC-730)**

Time: 3 hrs.

**Max Marks:**      **100**

*No. of pages:* 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1** Answer the following questions:

  - a) What is an activity?
  - b) What are the tools that are placed in an android SDK?
  - c) Explain the role of intent in android programming.
  - d) What is an android manifest file?
  - e) Describe the linear layout in android.
  - f) What is view group in android?
  - g) Explain how a button view can be used in an android application.
  - h) How is a web browser embedded in an activity class?
  - i) What is SQLite database?
  - j) Explain the role of shared preference class.

**2×10**

## PART-A

- Q.2** a) Explain android architecture in detail. **10**  
b) Enlist some native android libraries used in android architecture. **10**

**Q.3** a) Design an android application using intent object to invoke the built in browser and open google.com in it. **10**  
b) Explain fragments in android programming. **10**

**Q.4** a) What is the difference between relative layout and frame layout? **10**  
b) Create a simple stop watch application on android platform. **10**

## **PART-B**

- |     |                                                                                                                                                                                                            |          |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Q.5 | a) Explain how date picker view can be used in an android application.<br>b) Design an android application for performing addition of two numbers.                                                         | 10<br>10 |
| Q.6 | a) Write a short note on ‘grid view’.<br>b) Design an android application to perform switching of images on a button press.                                                                                | 10<br>10 |
| Q.7 | a) Explain how internal storage can be used in an android application for storing data.<br>b) Create a simple registration form using edit text, radio button and store the user value in SQLite database. | 10<br>10 |

## End Semester Examination, Dec. 2018

B. Tech. — Seventh Semester

### **ADVANCED TELEVISION ENGINEERING (EC-801A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1** Answer the following questions: **2×10**
- a) What do you understand by persistence of vision?
  - b) Calculate the interlace error for a system in which the second field is delayed by 8 M Sec.
  - c) State any four compatibility issues.
  - d) Give reason why TV transmission is carried out in the UHF and VHF band.
  - e) Specify two advantages of HDTV.
  - f) Calculate the transmitted power for a system working with a modulation index of 50 of having a carrier power of 2 wats.
  - g) Define deflection angle of a picture tube.
  - h) Discuss the concept of dark current in a vidicon camera tube.
  - i) State “Grassman’s Law”.
  - j) Briefly analyze the significance of sync processing and AFC circuit.

#### **PART-A**

- Q.2** a) Draw the block diagram of a TV receiver system and explain each block. **10**
- b) Illustrate the details of horizontal blanking and sync pulses. Label on it:
- i) Front porch.
  - ii) Horizontal sync pulse.
  - iii) Back porch.
  - iv) Active line period.
- Why are the front porch and back porch intervals provided before and after the horizontal sync pulse? **10**

- Q.3** a) Analyze that in the 625-B system a total channel bandwidth of 11.25 MHz would be necessary if both the sidebands of the amplitude modulated picture signal are fully radiated along with the frequency modulated picture signal. **12**
- b) Discuss the demerits of vestigial side band transmission. **8**

- Q.4** a) Sketch the sectional view of a picture tube that employs electrostatic focusing and electromagnetic deflection and label all the electrodes. **10**
- c) With the help of a diagram summarizes the working of image orthicon camera tube. **10**

#### **PART-B**

- Q.5** a) Explain with the help of a diagram the construction and working of PIL color picture tube. **10**
- b) Describe the following terms in brief:
- i) Chrominance.
  - ii) Primary colors.
  - iii) Additive color mixing.
  - iv) Luminance.

- v) Complementary colors. **2×5**
- Q.6** a) Discuss the merits and demerits of positive and negative amplitude modulation and justify the choice of negative modulation in most TV systems. **10**
- b) Enumerate the factors that influence the choice of picture IF = 38.9 MHz and sound IF = 33.4 MHz in the 625-B monochrome TV system. **10**
- Q.7** Write short notes on the following: **5×4**
- a) Cable television.
  - b) CCTV.
  - c) Digital TV.
  - d) Picture phone and facsimile.

## **End Semester Examination, Dec. 2018**

B. Tech. — Seventh Semester

## **DATA COMMUNICATION (EC-802)**

Time: 3 hrs.

Max Marks: **100**

*No. of pages:* 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

### **Q.1 Answer the following questions:**

- a) Line encode the bit stream "111001" using Differential Manchester encoding.
  - b) Draw the frame format for BSC.
  - c) Generate the Hamming code for "1101" data signal.
  - d) How many voice-bands are required for the formation of super groups? Explain.
  - e) Derive the relationship between bit rate and band rate for ASK.
  - f) Illustrate the steps used for checksum method.
  - g) Briefly outline the advantages of fibre optical communication.
  - h) Expand the following terms:
    - i) VOD
    - ii) DNS
  - i) Compare analog and digital signals.
  - j) Give an example of DTE and DCE.

2x10

## **PART-A**

Q.2 a) Describe in detail different types of unguided media.

10

b) Mention different types of standards used in serial interface.

10

Q.3 a) Interpret different ways of providing the error control. Elaborate with an example. **12**

b) Draw and compare the formats of line encoding.

- i) NRZ-L      ii) NRZ-I      iii) AMI      iv) Differential Manchester.

Use “1111001” data stream.

8

Q.4 a) Discuss the role of serial interfaces.

6

b) Mention various applications of serial interface.

4

c) Write notes on:

- i) X.21
  - ii) Parallel Interface.

10

## **PART-B**

- Q.5 a) Classify different types of frames used in SDLC protocol.
- 15**
- b) Determine the bit pattern for the control field of an information frame sent from a secondary station to the primary for the following:
- Secondary is sending information frame 3.
  - Secondary is not sending its final frame.
  - Secondary is confirming correct reception of frames 2 and 3 from the primary (nr-4).

**5**

- Q.6 a) Calculate the line speed for T-1 carrier system. Design the structure of PCM-based TDM system.

**10**

- b) Design the structure for the formation of super group in FDM hierarchy.
- 10**

- Q.7 a) What is SDH? Elaborate the structure of SDH.

**10**

- b) Write notes on:
- ISDN
  - SS7.

**10**

# **End Semester Examination, Dec., 2018**

B. Tech. – Seventh Semester

## **SATELLITE COMMUNICATION (EC-821A)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 1*

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any two from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following:

- a) State Kepler's law of planetary motion.
- b) List the factor that effect the uplink design and the downlink design in geostationary satellite communication.
- c) Distinguish between pre-assigned and demand assigned multiple access technique.
- d) Define satellite and list advantages of satellite communication.
- e) Describe the following terms
  - i) Eccentricity
  - ii) Sub-satellite point.
- f) Explain the properties of PN sequences.
- g) A satellite is rotating in an elliptical orbit with a perigee of 1000 km and an apogee of 4000 km. Calculate its orbital period. Take mean earth radius = 6400km.
- h) Write in brief about MSAT
- i) Compare noise temperature and noise figure.
- j) A speech signal with 3KHz bandwidth frequency modulates an RF carrier with 30 KHz deviation. Determine the FM improvement obtained.

**2x10**

### **PART-A**

Q.2 a) Draw the block diagram of a satellite communication system and explain its operation in detail.

**10**

b) Differentiate between active and passive satellites.

**5**

c) List the various frequency bands being used in satellite communication.

**5**

Q.3 a) Discuss the various orbital elements which are required to specify the location of a satellite in its elliptic orbit around the earth?

**12**

b) Describe the various orbital effects in communication systems performance.

**8**

Q.4 a) Derive general link equations. Find out expression for C/N and G/T ratios and state the importance of these ratios on satellite link design.

**10**

b) In a satellite link the uplink C/N is 20 dB and the downlink C/N is 16dB. Calculate the overall C/N for this link.

**5**

c) Define EIRP? A satellite downlink at 12 GHz operates with a transmit power of 6W and antenna gain of 48.2 dB. Determine EIRP in dBW.

**5**

### **PART-B**

Q.5 a) Classify the different types of digital modulation techniques. Why QPSK is more popular in satellite communication?

**10**

b) Compare the performance of FM/FDM SCPC and CSSB systems.

**3**

c) Derive the expression for a digital satellite link and describe how it is dependent on the system bandwidth.

**7**

Q.6 a) Distinguish between multiple access and multiplexing techniques.

**5**

B Categorize various multiple access techniques and explain any one in detail.

**10**

c) Inter-modulation products are not present in TDMA system. Justify the statement. **5**

Q.7 Briefly discuss the following topics:

a) GPS b) Earth sensing satellite. c) VSAT d) Laser satellite communication. **5x4**

**End Semester Examination, Dec. 2018**  
**B. Tech. — Eighth Semester**  
**DIGITAL IMAGE PROCESSING (EC-822)**

Time: 3 hrs.

**Max Marks:**      **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1** is compulsory. Attempt ANY **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1** Answer the following questions:

  - a) Define gray level intensity and pixels in DIP.
  - b) What is the difference between scene and image?
  - c) Define “Brightness adaptation”.
  - d) What is meant linear histogram stretching?
  - e) Why we require 2D-DFT for DIP?
  - f) How pseudo inverse filtering is different from inverse filtering?
  - g) State the need of image compression.
  - h) What is median filter? Mention its application.
  - i) Describe sobel operator of image segmentation.
  - j) What is pattern filtering approach?

**2×10**

## PART-A

- Q.2** a) Explain in detail the human visual system. Also describe a simple image formation model. **10**  
b) Explain and describe general purpose image processing and its components. **10**

**Q.3** a) Define following image enhancement by point processing:  
i) Identity transformation.  
ii) Digital negative.  
iii) Gray level slicing.  
iv) Contrast stretching. **2½×4**  
b) Explain low pass median filter using a pseudo image. **10**

**Q.4** a) Explain image restoration and degradation model in detail. **10**  
b) State the importance of wiener filter and derive its expression. **10**

## **PART-B**

iii) Histogram equalization.

**10×2**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester  
**EMBEDDED SYSTEM DESIGN (EC-822A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Answer the following questions:

- a) Classify the microcontrollers on the basis of memory. Also give some examples.
- b) List the unique features of PIC Microcontroller.
- c) Describe the Intel hex file and its six parts.
- d) Define Assembler and compiler.
- e) Name different methods of clocking PIC Microcontroller.
- f) Define OPTION register and explain its each bit.
- g) Draw the block diagram of Princeton Architecture.
- h) Explain T2CON register of PIC Microcontroller.
- i) What do you understand by the term 'Interrupt handler'?
- j) How PWM can be used to control the speed of dc motor?

**2x10**

## **PART-A**

**Q.2** a) Differentiate CISC and RISC architectures along with their application. Also state their advantages and disadvantages.

**10**

- b) Compare Microcontroller and Microprocessor on the following parameters:
  - i) Clock frequency.
  - ii) Software Size.
  - iii) Power Consumption.
  - iv) Hardware requirements.
  - v) Applications.

**10**

**Q.3** a) Illustrate the need of addressing modes on microcontrollers. Explain each addressing mode of 8051 microcontroller with suitable example.

**10**

- b) Examine the given program and analyse the output.

```
org OOH
MOV RO, #10H
MOV A, #01H
Repeat: RRC A
 DJNZ RO, Repeat
 end
```

Also state the status of Accumulator and PSW upon completion of the program.

**10**

- Q.4 Generate 20 KHz of square wave at P1.3 using interrupt and flash the LED's connected at Port 3 simultaneously  
X TAL = 11.0592 MHz.

**20**

**PART-B**

- Q.5 a) What is the default value of Program counter in PIC16? Explain the concept of pipelining and its advantages.

**10**

- b) List all the CPU Registers of PIC 16. Illustrate each register and its corresponding bits.

**10**

- Q.6 a) How many times available in PIC16? Name them and list their features. Also draw the circuitry for timer 2 and explain.

**10**

- b) Discuss the following registers of PIC16F877A:
- i) TICON
  - ii) INTCON
  - iii) PIR1
  - iv) TMR2.

**10**

- Q.7 a) Draw the connections between 8051 and external RAM. Also explain the signals used to make it functional.

**10**

- b) Justify the need of Analog to digital and digital to analog conversion. Sketch the connections between ADC0804 and 8051 microcontroller.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech – Seventh / Eighth Semester  
**MOBILE COMPUTING (EC-823)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 1*

Note: Attempt any **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1 a) Distinguish between unicasting and broadcasting  
b) Define agent advertisement  
c) What is re-integration in CODA?  
d) Define broadcast disk  
e) Write the expression for co-channel reuse ratio.  
f) For a given spectrum of 50 MHz and channel bandwidth of 200 KHz, calculate the number of physical channels in GSM system.  
g) List various classes of WTP. Define any one.  
h) Interpret three stages of client in CODA file system.  
i) Differentiate between client and the server.  
j) Define mobile computing.

**2x10**

## **PART-A**

- Q.2 a) From the mobility point of view, design the architecture of GSM system and explain the role of HLR, VLR and AUC. **10**  
b) Describe various spread spectrum multiple access techniques in detail. **10**
- Q.3 a) With the help of various access scenarios and generic model of WATM, analyze the working of WATM. **10**  
b) Elaborate the process of IP packet delivery from and to the mobile mode. **10**
- Q.4 a) Explain the working of Indirect TCP along with its advantages and disadvantages. **10**  
b) Describe push Architecture. **10**

## **PART-B**

Q.5 Discuss various major transport mechanisms used in digital audio broadcasting system.  
Elaborate the frame structure.

**20**

Q.6 a) Compare proactive and reactive protocols. Analyze the working of dynamic source routing protocol.

**10**

b) Give an overview of Adhoc reseting protocols in detail.

**10**

Q.7 Write short notes on any two:

- a) DVB for high speed internet
- b) Various layers and architecture of WAP1.x
- c) Kangaro Joey Model
- d) Team transaction model

**10x2**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh / Eighth Semester

## **ADVANCED MICROPROCESSOR AND MICROCONTROLLER (EC-824A)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 1*

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any two from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following:

- a) Calculate the last address of a memory segment whose starting address is 30040H.
- b) Differentiate between 8051 and 80196 microcontroller.
- c) State general features of 80196 microcontroller.
- d) Explain the purpose of using cache memory? How it effect the performance of microprocessor?
- e) What is the importance of peripheral control block (PCB) in 80186 microprocessor?
- f) Compare and contrast the 80186 and 80286 microprocessor.
- g) How many address lines are used in protected virtual address mode in 80286microprocessor?
- h) Define the function of ARDY and LOCK pin of 80186 microprocessor.
- i) Construct the basic architecture of descriptor.
- j) List the additional features of 80486 as compared to 80386.

**2x10**

### **PART-A**

**Q.2** a) Illustrate and explain the format of relocation register of PCB of 80186.

**10**

b) Determine the memory location address by the following real mode register combination:

i) DS =

2000 H and EAX = 0000 3000 H

ii) SS = 8000 H and ESP = 0000 9000 H

**10**

**Q.3** a) How many 16 bits timers are present within the 80186, and which timer connects to the system clock?.

**5**

b) Develop a program that cause shifting of peripheral control block to memory locations 10000 H – 100 FFH.

**5**

c) List and explain various addressing modes used in 16 bit microprocessor.

**10**

- Q.4 a) Describe how the 80386 switches from real mode to protected mode? **5**
- b) List the special function registers of 80386 and describe the function of PG and ET bit of CRO. **5**
- c) Design a write protected code segment with privilege level 10, starting at an address 20ABOOD1 H and ending at address 20AD 11D1 H. **10**

**PART-B**

- Q.5 a) Compare the register set of 80386 with 80486 microprocessors. **10**
- b) Illustrate the organization of the 80486 memory, showing parity. **10**
- Q.6 a) Explain the memory mapping of 80196 for registers, vectors, RAM and ROM. **10**
- b) Design the architecture of 80196 microcontrollers. **10**
- Q.7 Write short notes on the following:
- a) State maskable and non-maskable interrupts in 80196. Explain how software timer interrupts works? **10**
- b) Differentiate between pre auto and post auto indexing addressing mode. **6**
- c) Identify the addressing mode in below instructions:
- |                      |             |
|----------------------|-------------|
| i) ADD AX, BX, [CX]+ | ii) POPF    |
| iii) LD AX, [BX]     | iv) EXTW DX |
- 4**

**End Semester Examination, Dec. 2018**  
**B. Tech. — Eighth Semester**  
**NANOTECHNOLOGY (EC-833)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1** Answer the following questions: **2×10**
- a) Define “Moore’s Law”.
  - b) List any four characterization techniques of nonmaterials.
  - c) Differentiate between CVD and PVD techniques.
  - d) Why is photolithography not suitable for nanofabrication?
  - e) Give any two excellent properties of carbon nano-tubes.
  - f) List the biomedical applications of nanotechnology.
  - g) What are nanomedicines? How are they manufactured?
  - h) What do you mean by primary, secondary and backscattered electrons in relation with SEM?
  - i) Discuss targeted drug delivery using nanoparticles.
  - j) What are the advantages of RF sputtering over DC sputtering?

**PART-A**

- Q.2** a) Write a short notes on “Nanotechnology a scientific revolution”. **10**  
b) What are the differences between top down approach and bottom up approach for synthesis of nanostructures? **10**
- Q.3** a) Discuss the enhancement of mechanical properties of a material with its decreasing size. **10**  
b) Show mathematically that the surface area to volume ratio of nanoparticle is much higher than that of bulk one. **10**
- Q.4** a) List the methods of synthesizing carbon nanotubes and explain any one of them with a neat sketch. **10**  
b) Discuss in detail about the properties and applications of gold and silver nanoparticles. **10**

**PART-B**

- Q.5** a) Propose a modified design approach of a microscope to characterize nanomaterials. **10**  
b) Discuss any one suitable type of lithography technique for fabrication of nanodevices. **10**
- Q.6** a) Explain the applications of nanoelectronics in advanced computational and communication paradigms. **10**  
b) Why is nanotechnology an important tool for cancer research? Discuss in detail. **5**  
c) Write a note on ethical and commercial aspects of nanotechnology. **5**
- Q.7** Write short notes on (**any two**) of the following: **10×2**
- a) Molecular beam epitaxy.
  - b) Chemical vapor deposition.
  - c) Nanocomposites.

# **End Semester Examination, Dec. 2018**

B. Tech. — Eighth Semester

## **ADVANCES IN SATELLITE COMMUNICATION (EC-836)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) Give the reason, as to, why uplink frequency is different from downlink frequency? Also, explain why uplink frequency is kept higher than down link frequency?
- b) Calculate the radius of a geostationary satellite.
- c) Explain the following terms:
  - i) Ascending and descending node.
  - ii) Apogee and perigee.
- d) Define EIRP? A satellite downlink at 12 GHz operates with a transmit power of 6 W and antenna gain of 48.2 dB. Calculate EIRP in dBW.
- e) Describe SCPC system.
- f) Enumerate the advantages of frequency modulation in satellite communication.
- g) Briefly explain why TDM is used for digital satellite link? Why intermodulation products are not present in TDM?
- h) Discuss TDMA frame efficiency in satellite communication.
- i) What is VSAT? Write its application.
- j) Four gain blocks are connected in cascade. It is given that their gain and noise figures are  $G_1 = 100, F_1 = 2, G_2 = 10, F_2 = 10, G_3 = 10, F_3 = 15, G_4 = 10, F_4 = 20$ . Determine the noise figure of the cascaded arrangement.

**2x10**

### **PART-A**

**Q.2** a) What are the various advantages and disadvantages of satellite communication? Give the reasons that although optical fibres have high bandwidth but still satellite communication has an edge over it.

**10**

- b) What are the reasons for choosing C-Band for satellite communication?

**5**

- c) What are the elements of satellite communication? How does satellite differ from a communication relay?

**5**

**Q.3** a) State Kepler's third law of planetary motion. A satellite is moving in a highly eccentric orbit, having farthest and closest points as 35,000 km and 500 km respectively from surface of earth. Determine orbital time period and velocity at apogee and perigee points.

**10**

b) What is meant by look angles? Explain them with reference to a geostationary satellite and earth stations.

**5**

c) Discuss is station keeping of a satellite? Briefly explain E-W and N-S measures.

**5**

Q.4 a) What is system noise temperature? How does it affect G/T and C/N ratios?

**12**

b) A geostationary satellite is located at a distance of 3000 km, with an operating frequency 14.25 GHz. The gains of transmitting and receiving antennas are 15 and 20 respectively. If the transmitter power is 200 KW, calculate the power received by the receiving antenna.

**8**

### **PART-B**

Q.5 a) A TV signal has a baseband bandwidth of 4.2 MHz and is transmitted over the satellite link in an RF bandwidth of 30 MHz using frequency modulation and standard pre-emphasis and de-emphasis. At the receiving earth station the C/N ratio in clear air conditons is 15 dB. Calculate the baseband S/N ratio for the video signal. Assume a de-emphasis improvement of 9 dB and a subjective improvement factor of 8 dB in the baseband S/N ratio.

**10**

b) Describe the concept of threshold in FM demodulator.

**4**

c) What are the elements of a digital satellite link? Downlink transmission rate in a satellite circuit is 61 Mbps and required E<sub>b</sub>/No at ground station receiver is 9.5 dB. Calculate the required C/No.

**6**

Q.6 a) Differentiate between multiplexing and multiple access. Explain TDMA in detail. What is TDMA superframe? Explain its structure.

**8**

b) What is meant by burst time plan? What is its structure?

**6**

c) Explain CDMA in detail. How is it superior to TDMA.

**6**

Q.7 Write short notes on:

a) SPRSAT.

**6**

b) INMARSAT.

**6**

c) Laser Satellite Communication.

**8**



**End Semester Examination, Dec. 2018**  
B. Tech. — Eighth Semester  
**ELECTRONIC COMPONENTS AND MATERIALS (EC-839)**

Time: 3 hrs. Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **ANY TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1** Answer the following questions: **2×10**
- a) What is superconductivity?
  - b) What are the basic properties of magnetic material?
  - c) Differentiate between active and passive components.
  - d) Give classification of inductors.
  - e) What are the different shapes and sizes of connectors?
  - f) Explain is electric contact phenomenon in relay?
  - g) What is an electric switch? How it works?
  - h) What are different types of PCB's?
  - i) Discuss PCB fabrication process.
  - j) Give two advantages of SMD's.

**PART-A**

- Q.2** a) How the materials are classified on the basis of energy bands? **10**  
b) What is hysteresis loop? Explain soft and hard magnetic materials. **10**
- Q.3** a) With the help of neat diagram explain the working of metal film resistors. **10**  
b) What is a MOSFET? Discuss the MOSFET fabrication process with suitable diagram. **10**
- Q.4** a) Discuss the connector terminations in detail. **10**  
b) Explain RF connectors in detail. Discuss the advantages and limitations of using RF connectors. **10**

**PART-B**

- Q.5** a) Explain the types, construction and applications of following switches:  
i) Toggle switch.  
ii) Push button switch. **5×2**
- b) What is the principle of relay? Discuss the construction of electromagnetic relay with the help of suitable diagram. **10**
- Q.6** a) What are the advantages and disadvantages of using PCB? Explain in detail. **10**  
b) Discuss the manufacturing process of double sided PCB. **10**
- Q.7** a) What is surface mount technology? Explain the limitations of SMD's. **10**  
b) Write short notes on 'SMD sizes' and 'dimensions'. **10**

**End Semester Examination, Dec. 2018**  
B. Tech. — Eighth Semester  
**ADHOC AND SENSOR NETWORK (EC-840)**

Time: 3 hrs. Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 Answer the following questions:
- a) What are the various applications of adhoc wireless network?
  - b) Differentiate between cellular network and adhoc wireless network.
  - c) What are on demand routing protocols?
  - d) What is split TCP? List the advantages of split TCP.
  - e) Write a short note on network security attacks.
  - f) Suggest a few metrics that can be associated with battery aware routing techniques.
  - g) Why there is a need for energy management in adhoc wireless network?
  - h) Explain wireless sensor network?
  - i) Describe data dissemination?
  - j) What are the issues and challenges in security provisioning?
- 2×10**

**PART-A**

- Q.2 a) Describe design goals of a MAC protocol for adhoc wireless networks in detail. **10**
- b) Explain the classification of MAC protocols in detail. **10**
- Q.3 a) Is a table driven routing protocol suitable for high mobility environment? **10**
- b) Explain dynamic source routing protocol in detail. **10**
- Q.4 a) Explain split-TCP approach in detail. **10**
- b) Discuss the requirements of security protocols for adhoc wireless networks. List various issues and challenges in security provisioning. **10**

**PART-B**

- Q.5 a) Explain DBASE protocol in detail. **10**
- b) List various issues and challenges in providing QOS in adhoc wireless networks. **10**
- Q.6 a) How does the coverage and expose parameters describe the quality of a sensor network? **10**
- b) Describe data link layer solutions for energy management in adhoc wireless networks. **10**
- Q.7 Write short notes on the following:  
a) Battery management schemes.  
b) Wireless sensor network architecture. **10×2**

**End Semester Examination, Dec., 2018**  
**B. Tech. – First Semester**  
**INTERNET OF THINGS-I (EC-1001)**

Time: 3 Hours

Max Marks: **100**

*No. of pages:* 1

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any **TWO** questions from **PART-B**. Each question carries equal marks.



2x10

## **PART-A**

- Q.2 a) Sketch the schematics of IoT with the help of blocks and describe each block in brief. **10**

b) Explain in detail the various characteristics of Internet of things. **10**

Q.3 a) With the help of a block diagram explain the system components of machine to machine communication. **10**

b) List down the various points of difference between machine to machine communication and internet of things. **10**

Q.4 a) Describe in detail the various advantages of internet of things. **10**

b) Demonstrate with the help of a block diagram a simplified global value chain. **10**

## **PART-B**

- Q.5 a) Express in detail the various layers of TCP-IP protocol suits. **12**  
b) Elucidate the usage and working of dynamic host configuration protocol. **8**
- Q.6 a) Apply the knowledge of internet and analyze in detail the static and dynamic IP address assignment. **10**  
b) Discuss the utilization of internet of things in manufacturing sector. **10**
- Q.7 Write short notes on:  
a) DNS.  
b) SMTP.  
c) Intelligent home.  
d) Wearable.  
e) IoT in health care.

**4x5**

# **End Semester Examination, Dec. 2018**

B. Tech. – Second Semester

## **INTERNET OF THINGS - II (EC-2001)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 a) Name atleast two examples of devices which act as both a sensor and a transducer. **2×10**  
b) How input-output characterization of sensor and transducer is different?  
c) LVDT is primary transducer or secondary. Give justification.  
d) Explain the term sensitivity and selectivity by sensor.  
e) A sensor measured output value is 5.3 V, while the actual value of voltage is 4.9 V. Calculate the accuracy of sensor.  
f) What are the commonly used liquids for vapour pressure thermometers?  
g) What are the different types of thermal sensors?  
h) Differentiate between tree and hybrid topology.  
i) If bandwidth of a channel is 2000 Hz and number of levels required is 4, calculate bit rate.  
j) Which sensor is used for temperature measurement in medical diagnosis? **2×10**

### **PART-A**

- Q.2 a) Why do IOT system have to be self-adapting and self-configuring? **10**  
b) "Each sensor have a different working principle". Support the statement with suitable explanation. **10**
- Q.3 a) Explain primary and secondary transducer with the help of example. **10**  
b) How is a 'bathtub' curve associated with failures of transducers? **10**
- Q.4 a) How is the output voltage of resistive potentiometer affected due to movement of jockey? **10**  
b) Differentiate between bonded and unbonded resistive strain gauge. **10**

### **PART-B**

- Q.5 a) For gas thermometric sensors, prove that  $T = T_r \left( \frac{P}{P_r} \right)^{\frac{1}{n}}$ . **10**  
b) On what factors and parameters of the sensor does the hall voltage output depend for a given field condition? Describe in detail. **10**
- Q.6 a) Compare and contrast the various guided transmission media. **10**  
b) What are the different communication modes between two nodes? Explain with example. **5**  
c) How serial and parallel communication take place between two nodes? **5**

- Q.7 a) Draw a block diagram to show, how sensors interact with the automated manufacturing process. **10**
- b) Describe on what principles do the microsensors work in bio-medical system? Explain the role of radiation and electromagnetic variables in detail. **10**

# End Semester Examination, Dec. 2018

B. Tech. – First / Second Semester

## ELEMENTS OF ELECTRICAL ENGINEERING (EE-101B)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

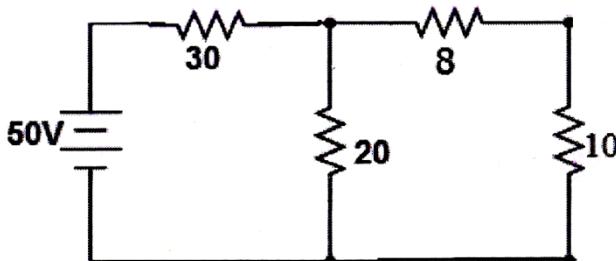
Q.1 Answer the following:

- Find the impedance of a coil with resistance  $9\Omega$  and reactance  $16\Omega$ .
- State Kirchoff's voltage Law.
- What is true power? Write its unit also.
- An ideal voltage source should possess \_\_\_\_\_ source resistance.
- Write an expression for synchronous speed in terms of frequency and number of poles.
- PMMC instrument has \_\_\_\_\_ scale.
- List two differences between shell type and core type transformer?
- What is an auto transformer?
- For a delta connected system line current is \_\_\_\_\_ times phase current.
- What are different types of excitation of a dc machine?

**2×10**

### **PART-A**

Q.2 a) Explain Superposition theorem. **10**  
b) Find the current in  $10\text{ ohm}$  resistor of network in fig. by Thevenin's theorem. All the resistances are in ohms.



**10**

Q.3 a) A voltage  $e = 250 \sin 314t$  is applied to a coil having  $R = 100\text{ohm}$  and  $L = 100\text{mH}$ . Find the expression for the current and also determine the power taken by the coil. **10**  
b) Derive the expression for resonant frequency for a series RLC circuit. **4**  
c) Differentiate star and delta connected three phase system **6**

Q.4 a) Explain construction of moving iron voltmeter. **12**  
b) What are the advantages of moving coil meters? **8**

### **PART-B**

Q.5 a) Explain the working principle of a transformer. **10**  
b) Define efficiency of a transformer. Derive the condition for maximum efficiency of a transformer. **10**

- |     |                                                                       |    |
|-----|-----------------------------------------------------------------------|----|
| Q.6 | a) Derive the emf equation of a dc machine.                           | 10 |
|     | b) Differentiate between dc shunt motor and dc series motor.          | 5  |
|     | c) Write short notes on brushless dc motor.                           | 5  |
| Q.7 | a) Will the induction motor runs at synchronous speed? State reasons. | 5  |
|     | b) Explain the working principle of three phase induction motor.      | 10 |
|     | c) Explain any one type single phase induction motor.                 | 5  |

# **End Semester Examination, Dec. 2018**

B. Tech. – First / Second Semester

## **ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING (EE-102A)**

Time: 3 hrs.

Max Marks: **100**

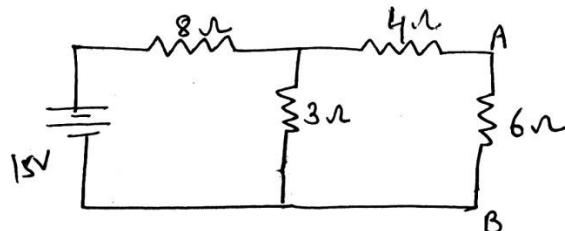
No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1 a) State maximum power transfer theorem.  
 b) What do you mean by power factor?  
 c) What are star and delta connections? Where do we use them?  
 d) Define knee voltage in P-N junction diode.  
 e) What is current amplification factor? Define relation between  $\alpha, \beta$  and  $\gamma$ .  
 f) How ideal diode behaves like switch?  
 g) What are filter circuits? What is their requirement?  
 h) In a purely resistive circuit, power factor is \_\_\_\_\_.  
 i) Differentiate between latch and flip-flop.  
 j) Why NAND and NOR gates are called as universal logic gates? **2x10**

### **PART-A**

- Q.2 a) State and explain superposition theorem. **10**  
 b) Determine current through  $6\Omega$  resistance across A-B terminals in the electric circuit of figure using Thevenin's theorem. **10**



- Q.3 a) A 0.014H choke coil with negligible resistance is connected to a 220V, 50 Hz supply. Find the  
 i) Inductive reactance of the coil.  
 ii) Current flowing through the coil.  
 iii) Power consumed by the coil. **10**  
 b) Explain how three-phase e.m.f is generated? **10**

- Q.4 a) Differentiate between core and shell type transformers. **10**  
 b) Explain construction and working principle of a synchronous motor. **10**

### **PART-B**

- Q.5 a) What are clamping circuit? Explain its working with its classification.  
 b) Write short notes on the following:  
 i) Varactor diode. **10**

ii) Schottky diode. **5×2**

**Q.6** a) Explain the working of a PNP function transistor. **10**  
b) Draw and explain with construction and working of n-channel depletion MOSFET. **10**

**Q.7** a) Draw and explain with truth table working of a J-K flip-flop. **10**  
b) Convert the following binary number to hexadecimal and then to decimal.  
i) 1000      100101      1101011  
ii) 10100      1011111      0010001 **10**

# End Semester Examination, Dec. 2018

B. Tech. – Third Semester

## NETWORK ANALYSIS AND SYNTHESIS (EE-301B)

Time: 3 hrs.

Max Marks: **100**

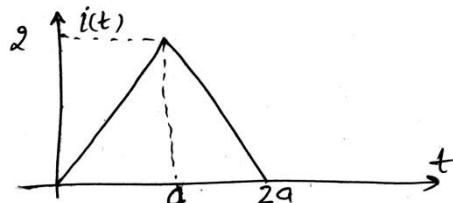
No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1**
- Find the Laplace transform of  $x(t) = u(t) + \delta(t)$ .
  - Define time constant and write an expression for the same for a series RL circuit.
  - What is the significance of poles and zeros in network functions?
  - A network function is stable when the \_\_\_\_\_ parts of the poles and zeros are in \_\_\_\_\_.
  - State the reciprocity and symmetry condition for y-parameters.
  - Draw the equivalent circuit representation for z-parameters.
  - Check whether the polynomial  $T(s) = s^5 + s^4 + 6s^3 + 4s^2 + 8s + 3$  is Hurwitz or not
  - Write any two properties of PR function.
  - Give the applications of filters.
  - How number of links (l), branches (b) and number of nodes (n) are interrelated? **2x10**

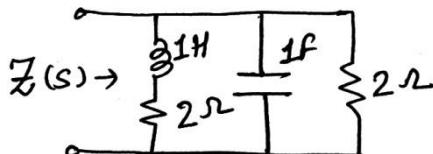
### PART-A

- Q.2**
- Derive an expression for transient current  $i(t)$  of series RC circuit with sinusoidal (ac) input. **12**
  - Using the concept of waveform synthesis, obtain the waveform components of given waveform.



**8**

- Q.3**
- Find the driving point impedance function for the network shown below:



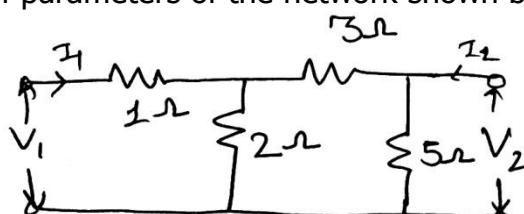
**10**

- For the given network function, draw pole zero plot and obtain the time domain response.

$$I(s) = \frac{2s}{(s+1)(s^2 + 2s + 4)}$$

**10**

- Q.4**
- Determine the h-parameters of the network shown below figure:



**10**

- b) Explain the interconnection of two port networks for cascaded connection.

**10**

### **PART-B**

- Q.5 a) Enlist the properties of RL and RC network immittance functions.  
b) The driving point impedance of a network is given by

$$z(s) = \frac{8(s^2 + 4)(s^2 + 25)}{s(s^2 + 16)}$$

Obtain the Foster-I form of equivalent network.

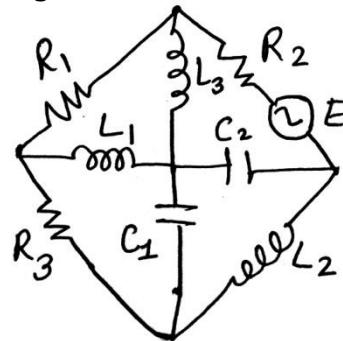
**10**

- Q.6 a) Design a constant K-low pass filter having cut-off frequency of 2.5 kHz and design impedance of  $700\Omega$ .  
b) Describe the analysis process of a high pass filter to find its cut-off frequency and propagation and attenuation constants.

**8**

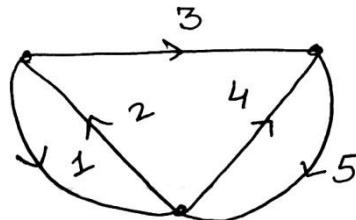
**12**

- Q.7 a) A network is shown in the figure. Draw the directed graph, free and show the loops.



**8**

- b) Obtain the tie-set and cut set matrix by selecting a tree for the given graph of figure.



**12**

# **End Semester Examination, Dec. 2018**

B. Tech. — Third Semester

## **ELECTRICAL MACHINE-I (EE-302B / EE-302C)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) Why all day efficiency is lower than commercial efficiency?
- b) What is the basic principle of tertiary winding?
- c) Draw the following 3- transformer connection:
  - i) Y-YO
  - ii) dy11
- d) List the condition for parallel operation of transformers.
- e) Why short circuit test is conducted on HV side.
- f) What are the requirements of excitation system?
- g) Differentiate between lap winding and wave winding of DC machine.
- h) Define back pitch and front pitch.
- i) What are the application of DC shunt motor?
- j) DC series motor is never run at no load. Give reason.

**2×10**

### **PART-A**

**Q.2** a) Explain the principle of operation of a transformer. Draw the vector diagram to represent load at Unity Power Factor (UPF), lagging and leading power factor. **10**  
b) Obtain the equivalent circuit of 200/400, 50 Hz. single phase transformer from following test data:  
OC Test: 200V, 0.7Amp, 70W on LV side  
SC Test: 15V, 10 Amp, 85W on HV side **10**

**Q.3** a) Draw and explain Scott connection. Prove that if secondary load is balance them primary side is also balanced. **10**  
b) Write short notes on the following:

- i) Welding transformer.
- ii) Tertiary winding transformer.

**5×2**

**Q.4** a) Explain the concept of single excited machines and derive the expression for electromagnetic torque. **16**  
b) Differentiate between singly excited and doubly excited machines. **4**

### **PART-B**

**Q.5** a) Explain the armature reaction and commutation in detail. **10**  
b) Discuss parallel operation of DC series and shunt generator. **10**

**Q.6** a) Explain in detail method of speed control in DC motor. **10**  
b) Derive the expression for electromagnetic torque developed in a DC motor. **4**

- c) Why is starter necessary for a motor? Give the diagram and explain 3-point starter for a shunt motor. **6**
- Q.7 a) With the help of neat circuit diagram explain conduction of Swinburne's test. **10**  
b) List the features of electrical braking. Explain plugging in detail. **10**

# **End Semester Examination, Dec. 2018**

B. Tech. — Third / Fourth Semester  
**POWER SYSTEM-I (EE-304A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

**Q.1** Answer the following questions:

- a) Compare copper and aluminum as conductors.
- b) Distinguish between radial and ring main distribution.
- c) Why grading of cable is done?
- d) What is the importance of equipment earthing?
- e) Differentiate between stranded and bundled conductors.
- f) Why skin effect is absent in DC system?
- g) What should be the main characteristics of trarif?
- h) Discuss the important point to be taken into consideration while selecting the size and number of units.
- i) Why pulverized coal is preferred in thermal power plant?
- j) What is the function of superheater?

**2x10**

## **PART-A**

**Q.2** a) Draw the schematic diagram of a thermal power plant and explain in detail its operation.

**15**

- b) What factor must be considered while selecting the site for nuclear power plant?

**5**

**Q.3** a) A power station has daily load cycle:

|            |     |      |       |       |       |      |
|------------|-----|------|-------|-------|-------|------|
| Time (hrs) | 6-8 | 8-12 | 12-16 | 16-20 | 20-24 | 24-6 |
| Load MW    | 20  | 40   | 60    | 20    | 50    | 20   |

Plot the load curve and load duration curve. Also, calculate the energy generated per day.

**10**

- b) A generating station has a maximum demand of 50,000 kW. Calculate the generation from the following data:

Capital cost=Rs.  $95 \times 10^6$ ;

Annual load factor=40%;

Annual cost of fuel=Rs.  $9 \times 10^6$

Taxes and wages=Rs.  $7.5 \times 10^6$ ;

Depreciation=12%

**10**

Q.4 a) Show that in a string of suspension insulator the disc nearest to the conductor has the highest voltage across it.

**10**

b) What is sag in overhead line? Discuss the disadvantages of providing too small or too large sag on a line?

**5**

c) Describe various methods for reducing corona effect in an overhead transmission line.

**5**

**PART-B**

Q.5 a) Derive an expression for inductance of a 3-phase overhead line.

**10**

b) Evaluate the generalized circuit constants for short transmission line.

**10**

Q.6 a) Explain the complete AC system for distribution of electrical energy with a neat diagram.

**10**

b) Derive an expression for the voltage drop for a uniformly loaded distributor fed at one end.

**10**

Q.7 What is neutral grounding? Explain its different methods in detail.

**20**

**End Semester Examination, Dec. 2018**  
B. Tech. — Third Semester  
**POWER SYSTEM-I (EE-304A)**

Time: 3 hrs.

**Max Marks:** **100**

*No. of pages:* 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1** Answer the following questions:

  - a) State the characteristics of a good ash handling plant.
  - b) Enumerate essential elements of a hydro-electric power plant.
  - c) List the factors which should be considered while designing a power plant.
  - d) What is the significance of load curves?
  - e) How are the transmission line insulator classified?
  - f) What do you mean by string efficiency and how it can be improved?
  - g) What do you understand by transposition of conductors?
  - h) Draw the cross-section of an insulated core cable and explain its various layers.
  - i) How does AC distribution differ from DC distribution?
  - j) What are the functions in power system for earthing?

## **PART-A**

- Q.2 a) Explain the construction and working of a nuclear power plant with help of neat diagram. **12**  
 b) Give comparison between steam, hydro-electric, diesel and nuclear power plants. **8**

Q.3 a) The yearly duration curves of a certain plant can be considered as a straight line from 300 MW to 80 MW. Power is supplied with one generating unit of 200 MW capacity and two units of 100 MW capacity each. Determine:  
 i) Load factor.                    ii) Plant factor.                    iii) Installed capacity.  
 iv) Maximum demand.            iv) Utilization factor. **10**

b) Explain briefly the following tariff:  
 i) Straight water rate.            ii) Block meter rate.            iii) Three part tariff. **10**

Q.4 a) How is sag calculated in the following cases?  
 i) When supports are at equal levels.  
 ii) When supports are at unequal levels. **5x2**  
 b) Explain the phenomenon of corona. How can be corona loss be minimized in transmission lines? **10**

## **PART-B**

- Q.5 a) Show that the inductance per loop meter of two-wire transmission line using solid round conductor is given by  $L = 4 \cdot 10^{-7} l_n \left( \frac{V}{r_1} \right) H$ , where V is the distance between the conductors and  $r_1$  is GMR of the conductors. **10**

b) Explain the "skin effect" in a transmission line. On what factors does it depend? What is its effect on the resistance of the line? **10**

Q.6 Write short notes on the following:

- a) Single phase 2 wire AC distribution system.
- b) Three phase 4 wire AC distribution systems.
- c) 3-wire DC system.

**20**

- Q.7 a) State the advantages of neutral grounding of an electrical system. **5**
- b) Derive an expression for the reactance of the Peterson coil in term of capacitance of a protected line. **15**

# **End Semester Examination, Dec. 2018**

B. Tech. – Third Semester

## **MEASUREMENT AND INSTRUMENTATION (EE-306)**

Time: 3 hrs

Max Marks: **100**

*No. of pages: 1*

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

Q.1 Answer the following questions:

- a) What is the difference between transducer and inverse transducer?
- b) What are the types of electrodes used in EEG?
- c) What do you mean by graticule?
- d) Give the expression to calculate Inter modulation Distortion (IMD).
- e) What is the range of frequencies when using ac signal conditioning system for capacitive transducers?
- f) List the various blocks of digital frequency meter?
- g) State the purpose of "function switch" used in universal counter.
- h) Recall the need of excitation system and amplification system.
- i) What is the purpose of delay line in CRO?
- j) What is the resolution of a 3½ digit display?

**2x10**

### **PART-A**

Q.2 a) Classify different types of transducers? List the difference between primary and secondary transducers.

**8**

- b) Derive the expression for gauge factor of a strain gauge.

**7**

- c) A platinum thermometer has a resistance of  $100 \Omega$  at  $25^\circ\text{C}$ . Calculate its resistance at  $65^\circ\text{C}$  if the platinum has resistance temperature coefficient of  $0.00392^\circ\text{C}$ .

**5**

Q.3 a) Illustrate the block diagram of ECG measurement.

**10**

- b) Discuss the types of amplifiers used in Biomedical applications

**10**

Q.4 a) Discuss the working and construction of various parts of cathode ray tube with the help of neat sketch.

**10**

b) Interpret the technique for the measurement of phase angle and frequency using CRO.

**10**

**PART-B**

Q.5 a) Describe the following:

**10**

- i) A signal generator using envelope feedback for amplitude modulation.
- ii) A heterodyne oscillator.
- b) Explain the different types of distortion caused by amplifiers. Also discuss total harmonic distortion.

**10**

Q.6 a) Identify the various blocks of DC signal condition system and explain the function of each block.

**10**

- b) What do you mean by Phase locked loop? What IC is used for PLL? Explain its pin configuration.

**10**

Q.7 a) What are the different types of Digital Voltmeters? Explain in detail.

**10**

- b) Discuss the method of measurement of frequency and time period with the neat circuit diagram.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fourth Semester  
**ELECTRICAL MACHINE-II (EE-401A)**

Time: 3 hrs

Max Marks: **100**

*No. of pages: 1*

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

**Q.1** Answer the following questions:

- a) Induction motor never run at synchronous speed. Why?
- b) Why winding slots are skewed in  $3-\phi$  induction motor.
- c) List the advantages of rotating field as compared to stationary magnetic field.
- d) Define:
  - i) Distribution factor.
  - ii) Winding factor.
- e) Why are alternators rated in KVA and not in kW?
- f) Define synchronous impedance.
- g) How can the direction of a capacitor run motor be reversed?
- h) What is the effect of change in supply voltage on starting torque of induction motor?
- i) State the application of shaded pole motor.
- j) What is meant by hunting?

**2x10**

## **PART-A**

**Q.2** a) Develop the approximate equivalent circuit of a 3-phase induction motor.

**10**

b) Explain in detail the construction of circle diagram of an induction motor.

**10**

**Q.3** a) A 40 kW,  $3-\phi$  slip ring induction motor of negligible stator impedance runs at a speed of 0.96 times synchronous speed at rated torque. The slip at maximum torque is four times the full load value. If rotor resistance of motor is increased by 5 times, determine:

- i) The speed, power output and rotor copper loss at rated torque.
- ii) The speed corresponding to maximum torque.

**10**

b) Explain in detail the speed control methods of induction motor.

**10**

**Q.4** a) Explain the operation of single phase induction motor using double field revolving theory.

**10**

b) Discuss with neat diagram the operation of shaded pole induction motor.

**10**

**PART-B**

Q.5 a) List the methods used to predetermine the voltage regulation of synchronous machine and explain MMF method.

**10**

b) Explain the concept of armature reaction and mention the methods to reduce this effect.

**10**

Q.6 a) Draw and explain the phasor diagram of synchronous motor operating at lagging and leading power factor.

**10**

b) Explain V and inverted V curves applied to synchronous motor.

**10**

Q.7 Write short notes on **(any two)**:

- a) Hysteresis motor.
- b) Reluctance motor.
- c) PMLBLDC motor.

**10x2**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fourth Semester

## **ELECTRONIC INSTRUMENTATION (EE-402B)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Answer the following questions:

- a) What are primary and secondary transducers?
- b) What is RTD and where it is used?
- c) A platinum thermometer has a resistance of  $300\Omega$  at  $20^\circ\text{C}$ . Find its resistance at  $60^\circ\text{C}$  if platinum has resistance temperature coefficient of  $0.00392/\text{ }^\circ\text{C}$ .
- d) What are the different types of leads used in EEG?
- e) What is piezoelectric effect?
- f) List the names of amplifiers used in biomedical instrumentation.
- g) What is the need of time base generator in CRO?
- h) Define resolution and quantization errors.
- i) What is PLL?
- j) What is the operation of current source in a pulse generator?

**2x10**

### **PART-A**

**Q.2** a) Describe the working principle, construction of wire wound strain gauge, derive an expression for the gauge factor.

**10**

b) Explain the working, construction of the transducer used to measure temperature.

**10**

**Q.3** a) Draw and explain block diagram of ECG measurement.

**10**

b) Describe in brief the three leading systems used in ECG.

**10**

**Q.4** Draw the block diagram of CRO and explain following:

- a) Synchronization.
- b) Position controls.
- c) Vertical deflection system.
- d) Types of sweep.

**5x4**

### **PART-B**

**Q.5** a) Explain wave analyzer with its block diagram.

**10**

b) Explain the working of a pulse generator. What are the specific requirements of pulse output?

**10**

Q.6 a) Explain DC signal conditioning with the help of a suitable block diagram.

**10**

b) Explain voltage controlled oscillator with its block diagram. Also, give its applications.

**10**

Q.7 Write short notes on **(any two)** of the following:

- a) Universal counter.
- b) Digital voltmeter.
- c) Frequency measurement.

**10x2**

# **End Semester Examination, Dec. 2018**

B. Tech. — Fourth / Fifth Semester

## **SWITCH GEAR AND PROTECTION (EE-403A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.

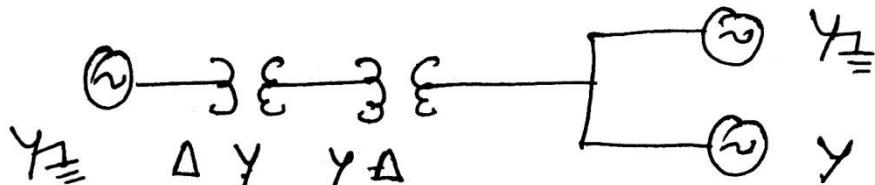
**Q.1** Answer the following questions:

- Why do we prefer to analyze unsymmetrical faults by symmetrical components method?
- Draw the sequence network for one conductor open fault on power system.
- What is the purpose of resistance switching?
- Why current interruption easier in an AC circuit than in DC circuit?
- List the reasons for generation of overvoltages.
- What is surge absorber?
- Sketch typical time / P.S.M. curve.
- What is meant by time grading of relays?
- How ground wire provide protection against direct stroke?
- Name some important fault occurring on alternators.

**2x10**

### **PART-A**

**Q.2** a) Draw the negative and zero sequence network for the given network:



**10**

- b) Derive an expression for three phase power in terms of symmetrical components. **10**

**Q.3** a) Derive an expression for fault current for single line to ground fault by symmetrical component method.

**10**

- b) Three impedances of  $5-j10$ ,  $6+j5$  and  $3+j15\Omega$  are connected in star to red, yellow and blue lines of  $3300V$ ,  $3-\phi$ , 3 wire supply. The phase sequence is RYB. Calculate the line current  $I_R$ .

**10**

**Q.4** a) Explain the construction and working of SF<sub>6</sub> circuit breaker.

**10**

- b) A circuit breaker is rated as 2500A, 1500MVA, 33KV, 3 sec, 3-phase oil circuit breaker. Determine:
- rated normal current.
  - breaking current.
  - making current.
  - short-time rating-I.

**10**

**PART-B**

- Q.5 a) Explain the following terms as applied to protective relaying:
- |                              |                              |
|------------------------------|------------------------------|
| i) Pick up value             | ii) Current setting.         |
| iii) Plug-setting multiplier | iv) Time setting multiplier. |
- 10**
- b) Explain the construction and the principle of operation of distance relays.
- 10**
- Q.6 a) Explain with diagram the application of Merz-price circulating current principle for protection of alternator.
- 10**
- b) Describe the construction and working of a Buchholz relay.
- 10**
- Q.7 a) What is the difference between direct and indirect stroke and also discuss streamers?
- 10**
- b) Explain the construction and working of:
- Rod gap lightning arrestor.
  - Horn arc lightning arrestor.
- 10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fourth Semester

## **PRINCIPLES OF COMMUNICATION (EE-404)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

**Q.1** Answer the following questions:

- a) Define signal. What is the difference between deterministic and random signals?
- b) What is aliasing error? How can it be avoided?
- c) What is the percentage of the power saving in SSB modulation?
- d) Define selectivity and sensitivity of a receiver.
- e) What is the bandwidth required for an FM signal whose modulating frequency is 3 kHz and the maximum deviation is 18 kHz?
- f) How do you get FM from PM and vice versa?
- g) How do you generate PPM from PWM?
- h) State sampling theorem. A bandpass signal has a spectral range that extends from 200 Hz to 64 kHz. Determine the acceptable range of sampling frequency.
- i) Explain PSK modulation scheme.
- j) Four stages of amplifiers are connected in cascade. Each stage has the same S/N ratio? If S/N ratio is 55 db, calculate the output S/N ratio of the entire system. **2x10**

### **PART-A**

**Q.2** a) What are the advantages of digital communication over analog communication?

**5**

b) Explain the need for modulation.

**8**

c) Write a short note on impulse function  $\delta(t)$  and its properties.

**7**

**Q.3** a) How is SSB signal generated by the phase shift method? Explain in detail with a block diagram and necessary equation. Give the advantages and disadvantages of this method.

**7**

b) With a block diagram, explain the functioning of a synchronous detector. Derive an expression for the output voltage. Hence show that any shift in phase or frequency of the locally generated carrier from that of the transmitter carrier results in phase distortion or delay.

**7**

c) Explain vestigial sideband transmission.

**6**

**Q.4** a) An angle modulated wave with a carrier frequency  $W_c = \pi \times 10^5$  is

$$f(t) = 5\cos(W_c t + 3\sin 2000t)$$

Find:

- i) Frequency deviation  $\Delta f$
- ii) Modulation index,  $\beta$
- iii) Phase deviation  $\Delta\phi$  and
- iv) The bandwidth.

**8**

- b) Explain the direct method for FM generation.

**6**

- c) What is the advantage of ratio detector over the slope detector and foster seelay detector? Explain it in detail.

**6**

### **PART-B**

- Q.5 a) Explain the process of conversion of an analog signal to digital. What is quantization error? How can it be reduced?

**7**

- b) A PCM system has the following parameters. Minimum dynamic range of 35 dB, minimum analog frequency of 5 kHz, and a maximum decoded voltage of 3V at the output. Find out the following:

- i) Minimum sampling rate.
- ii) Minimum number of bits used.
- iii) Resolution.
- iv) Quantization error.

**8**

- c) Explain Adaptive delta modulation technique. What are its advantages over PCM?

**5**

- Q.6 a) Explain with block diagram, BFSK type of modulator and demodulator.

**8**

- b) What is M-ary phase shift keying? Derive a mathematical expression for it.

**5**

- c) Explain spread spectrum technique.

**7**

- Q.7 a) What is noise? Explain different types of internal noise.

**12**

- b) Define noise figure. What is its value for a noiseless system? An amplifier has a noise figure of 12 dB. Calculate the equivalent amplifier input noise for a bandwidth of 5 MHz.

**8**

### **End Semester Examination, Dec. 2018**

B. Tech. – Fourth Semester

## **PRINCIPLES OF COMMUNICATION (EE-404)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

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- c) What is the percentage of the power saving in SSB modulation?
- d) Define selectivity and sensitivity of a receiver.
- e) What is the bandwidth required for an FM signal whose modulating frequency is 3 kHz and the maximum deviation is 18 kHz?
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- g) How do you generate PPM from PWM?
- h) State sampling theorem. A bandpass signal has a spectral range that extends from 200 Hz to 64 kHz. Determine the acceptable range of sampling frequency.
- i) Explain PSK modulation scheme.
- j) Four stages of amplifiers are connected in cascade. Each stage has the same S/N ratio? If S/N ratio is 55 db, calculate the output S/N ratio of the entire system. **2x10**

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**8**

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- ii) Modulation index,  $\beta$
- iii) Phase deviation  $\Delta\phi$  and
- iv) The bandwidth.

**8**

- b) Explain the direct method for FM generation.

**6**

- c) What is the advantage of ratio detector over the slope detector and foster seelay detector? Explain it in detail.

**6**

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- Q.5 a) Explain the process of conversion of an analog signal to digital. What is quantization error? How can it be reduced?

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- b) A PCM system has the following parameters. Minimum dynamic range of 35 dB, minimum analog frequency of 5 kHz, and a maximum decoded voltage of 3V at the output. Find out the following:

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- iii) Resolution.
- iv) Quantization error.

**8**

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**7**

- Q.7 a) What is noise? Explain different types of internal noise.

**12**

- b) Define noise figure. What is its value for a noiseless system? An amplifier has a noise figure of 12 dB. Calculate the equivalent amplifier input noise for a bandwidth of 5 MHz.

**8**

### **End Semester Examination, Dec. 2018**

B. Tech. — Fourth Semester

**POWER SYSTEM ENGINEERING (EE-406)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer the following questions:

- What factors are taken into account while selecting the site for a steam power plant?
- What is the function of economisers in thermal power plant?
- What is the importance of load factor?
- A generating station has a connected load of 43 MW and a maximum demand of 20 MW. The units generated being  $61.5 \times 10^6$  per annum. Calculate: i) the demand factor ii) Load factor.
- What should be the main characteristics of tariff?
- Discuss why string efficiency in an DC system is low?
- What are the advantages of 3-curve distribution over 2-wire distribution?
- Why skin effect is absent in DC system?
- What is meant by transposition of line conductor?
- Differentiate between grounding and earthing.

**2x10**

### **PART-A**

Q.2 a) Draw a neat schematic diagram of hydroelectric plant and explain function of various components.

**15**

- Discuss the various parts of nuclear reactor.

**5**

Q.3 a) The maximum demand of a consumer is 20A at 220V and his total energy consumption is 8760 kWh. If the energy is charged at rate of 20 paise per unit for 500 hours use of the maximum demand per annum plus 10 paise per unit for additional unit calculate i) annual bill ii) equivalent flat rate.

**10**

- A power supply is having the following loads:

| Types of load | Base demand | Diversity of group | Demand factor |
|---------------|-------------|--------------------|---------------|
| Domestic      | 1500        | 1.2                | 0.8           |
| Commercial    | 2000        | 1.1                | 0.9           |
| Industrial    | 10,000      | 1.25               | 1             |

If the overall system diversity factor is 1.35 determine i) the maximum demand ii) connected load of each type.

**10**

Q.4 a) Why are insulators used with overhead lines? Discuss the desirable properties of insulators

**10**

- Explain the following:

- Critical disruptive voltage
- Visual critical voltage

- iii) String efficiency.
- iv) Power loss due to corona.

**10**

**PART-B**

Q.5 a) What do you understand by constants of an overhead transmission line? Derive an expression for inductance per phase for a three phase overhead transmission line when conductors are symmetrically placed.

**10**

b) Deduce an expression for voltage regulation of short transmission line. Also, draw its vector diagram.

**10**

Q.6 a) Derive an expression for the voltage drop for a uniformly loaded distributor fed at one end.

**10**

b) Write short notes on:

- i) System of ac distribution.
- ii) Ring main distribution.

**5x2**

Q.7 What is neutral grounding? Explain in details different methods of neutral grounding.

**20**

# End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

## CONTROL SYSTEM ENGINEERING (EE-501A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

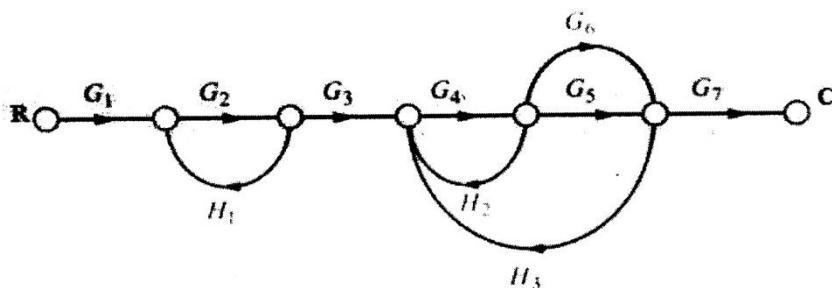
Q.1 Answer the following questions:

- Differentiate between linear and non linear system.
- What is a characteristic equation?
- Name four types of standard test signals.
- Define the BIBO stability of a system.
- How will you obtain break away point in root locus analysis?
- What do you mean by type two system?
- Draw an electrical network for lag compensation.
- Define 'gain margin'.
- Draw the polar plot of transfer function  $K / (1+sT_1)(1+sT_2)$ .
- Define 'state of a system'.

**2x10**

### **PART-A**

Q.2 a) Obtain the overall transfer function  $\frac{C(s)}{R(s)}$  of the signal flow graph shown below in the figure using Mason's gain formula.



b) Find the transfer function of an armature controlled dc motor. **10**

Q.3 a) Derive an expression for  $c(t)$  of a second order system subjected to unit step input. **10**  
b) Determine the position, velocity and acceleration error constants of a unity feedback control system with forward path gain given as  $G(s) = \frac{k(s+3)}{s(s+2)(s+1)}$ . Also find the steady state error due to an input  $r(t) = a_0 + a_1 t + \frac{a_2}{2} t^2$ . **10**

- Q.4 a) Using Routh Hurwitz criterion, determine the stability of a closed loop control system whose characteristic equation is  $s^6 + 5s^5 + 11s^4 + 25s^3 + 36s^2 + 30s + 36 = 0$ . **10**  
 b) Draw the root locus of a system with  $G(s)H(s) = \frac{K}{(s+1)(s+2)(s+3)}$  when  $K$  is varied from 0 to  $\alpha$ . **10**

**PART-B**

- Q.5 a) A unity feedback control system has  $G(s) = \frac{10}{(s+5)(s+2)}$ . Draw the Bode plot. **10**  
 b) Using Nyquist stability criterion, find the stability of closed loop system with  $G(s)H(s) = \frac{10}{s(s+1)}$ . **10**

- Q.6 Write short notes on (**any two**) of the following:  
 a) Stepper motor and its applications.  
 b) AC servomotor.  
 c) Synchros.

**10x2**

- Q.7 a) Discuss lead compensator using an electrical network. Derive its transfer function. Also draw its Bode plot. **10**  
 b) Obtain the state space representation for a system characterized by the differential equation  $\frac{d^3y}{dt^3} + 3\frac{d^2y}{dt^2} + 8\frac{dy}{dt} + 17y = 20u(t)$  where  $y$  is the output and  $u$  is the input to the system. **10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fifth Semester

## **POWER ELECTRONICS (EE-502A / EE-502B / EE-502C)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) What is holding current?  
b) What are the application of power electronics?  
c) What do you mean by reverse recovery current?  
d) What is the need of freewheeling diode?  
e) What is strung efficiency?  
f) List the application of cycloconverter.  
g) Discuss the need of snubber circuit.  
h) What is extinction angle?  
i) Broadly classify the various types of inverters.  
j) What are the applications of choppers? **2×10**

### **PART-A**

- Q.2 a) Explain the construction detail and working of IGBT. Also enumerate its application. **10**  
b) Discuss the various types of power diodes/ **10**
- Q.3 a) Discuss the main features of firing circuit. Explain the R and R-C firing scheme in detail. **10**  
b) What do you mean by forced commutation? Explain any one forced commutation technique in detail. **10**
- Q.4 a) Explain the working of single phase full wave converter with RLE load. Draw the waveform of load voltage and load current. **10**

- b) A single half wave converter with R load and firing angle  $\frac{\pi}{2}$ , calculate:  
i) rectification efficiency  
ii) form factor  
iii) ripple factor  
iv) peak inverse voltage of thyristor. **10**

### **PART-B**

- Q.5 a) Discuss the principle of working of a three phase bridge inverter with appropriate circuit diagram. Draw phase voltage waveform assuming that each thyristor conductor for  $120^\circ$  and resistive load is star connected. **15**  
b) Compare voltage source inverter with current source inverters. **5**
- Q.6 a) Describe the working of type E-chopper with relevant circuit diagram. **10**

- b) Explain the buck converter with appropriate circuit diagram and waveform. **10**
- Q.7 a) What are cycloconverters? Explain its working with suitable waveform. **10**
- b) Discuss single phase voltage controller with R-L load. Analyze its waveform of load voltage and load current. **10**

# End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester  
**ELECTRICAL MACHINE DESIGN (EE-503)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Explain the real and apparent flux densities. **2×10**  
b) List any two guiding factors for the choice of number of poles.  
c) What are the cooling methods used for electrical machines?  
d) Define window space factor.  
e) Write the advantages of computer aided design of electrical machines.  
f) Why circular coils are preferred over rectangular coils for windings of a transformer?  
g) What are the functions of conservator and breather in a transformer?  
h) What methods should be used to avoid synchronous curps?  
i) What are the advantages of using stepped core in transformer?  
j) What is the function of damper winding?

## **PART-A**

- Q.2 a) Briefly explain the various methods of cooling of electric machine. **10**  
b) What are the various duty types of electric machine? **10**
- Q.3 a) Develop output equation of single and three phase transformer. **10**  
b) Calculate the core and window areas required for 1000 KVA, 6600/400V, 50 Hz single phase core type transformer.  
Assume  $B_{max} = 1.25 \text{ wb/m}^2$  and current density of  $2.5 \text{ A/mm}^2$ . Voltage per turn 30V, window space factor = 0.32. **10**
- Q.4 a) Derive an expression for overall design of electromagnet. **10**  
b) Derive an expression for mmf of air gap of magnetic circuit. **10**

## **PART-B**

- Q.5 a) Develop the expression for output equation of a DC machine. **10**  
b) Calculate the length and diameter of armature core of 70 kW, 240V, 600 rpm, 4 pole dc shunt generator. The average air gap flux density is.  $70 \text{ wb/m}^2$  and ac (electric loading) is 34000. Core length to pole pitch ratio is 0.80. Full load armature voltage drop is 0.96 V and field current is 3A. **10**
- Q.6 a) Derive an expression for output equation of synchronous machine. **10**  
b) Write short notes on:  
i) Damper winding.  
ii) Design of salient pole machine. **5×2**
- Q.7 a) Design the stator winding of an induction motor. **10**

b) Explain how the squirrel cage rotor of an induction motor is designed.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fifth Semester

## **POWER GENERATION OPERATION AND CONTROL (EE-504)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Answer the following questions:

- a) What do you understand by Penalty factor?
- b) Draw Automatic Generation Control model of single area system.
- c) Define 'economic dispatch'.
- d) How the frequency can be controlled by steam valve in response to load variation?
- e) Cite the assumptions to be made to ease the transient stability analysis.
- f) Brief out the concept of Equal area criterion for stability.
- g) What is Generation Shift Factor?
- h) Enlist the components of a hydro plant.
- i) When the condition of system blackout arises? Explain.
- j) Describe cascading outage in short.

**2x10**

### **PART-A**

**Q.2** a) The fuel inputs per hour of plants 1 and 2 are given below as:

$$F_1 = 0.2Pg_1^2 + 40Pg_1 + 120Rs / hr$$

$$F_2 = 0.25Pg_2^2 + 30Pg_2 + 150Rs / hr$$

Determine the economic operating schedule and the corresponding cost of generator. The maximum and minimum loading on each unit is  $100\text{ MW}$  and  $25\text{ MW}$ . Assume that the transmission losses are ignored and the maximum demand  $P_D = 180\text{ MW}$ .

**10**

- b) Derive an expression for transmission loss coefficient (*i.e Bij*).

**10**

**Q.3** a) Demonstrate the function of speed governor system and explain how mathematical model of speed governor system is developed for AGC.

**14**

- b) Distinguish between the LFC and AVR loops.

**6**

**Q.4** a) Illustrate the factors that can affect the transient stability of a interconnected system.

**10**

- b) Discuss the dynamics of a synchronous machine and hence formulate the swing equation.

**10**

## **PART-B**

Q.5 a) How should the two operation offices of interconnected system coordinate their operation to obtain best economic operation of both systems? Explain by an example.

**10**

- b) Write short notes on following:
- i) Capacity interchange.
  - ii) Diversity interchange.
  - iii) Emergency interchange.
  - iv) Energy banking.

**10**

Q.6 a) Explain major functions of system security. Also enumerate the factors affecting the power system security.

**10**

- b) With the help of a flow chart explain the contingency analysis using AC Power flow.

**10**

Q.7 a) Obtain the condition for best or maximum efficiency of steam plant while carrying out energy scheduling in hydrothermal system.

**10**

- b) A hydro plant and a steam plant are to supply a constant load of 90 MW for one week (168 hr). The unit characteristics are:

$$\text{Hydro Plant } q = 300 + 15P_H \text{ acre- ft/h}$$

$$0 \leq P_H \leq 100 \text{ MW}$$

$$\text{Stream Plant } H_S = 53.25 + 11.27P_S + 0.0213P_S^2$$

$$12.5 \leq P_S \leq 50 \text{ MW}$$

Solve for run time ( $T_S$ ) of the steam unit for following cases:

- i) When Hydro Plant is limited to 10,000 MWh of energy.
- ii) When maximum draw down ( $q$ ) of Hydroplant is 2,50, 000 acre-feet.

**5x2**

# End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester  
**POWER ELECTRONICS-I (EE-505)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) What is power electronics?  
b) Define latching current and holding current.  
c) Write down the application of IGBT.  
d) Define forward break over and reverse break over voltage.  
e) Differentiate between power diode and Schottky diode.  
f) Explain reverse recovery time.  
g) What is commutation?  
h) Draw the characteristic of MOSFET.  
i) Draw RC firing circuit of thyristor gate.  
j) Describe the importance of freewheeling diode. **2×10**

## **PART-A**

- Q.2 a) What are the differences in the gating characteristics of thyristors and transistors? **10**  
b) What are the advantages and disadvantages of GTO? **10**
- Q.3 a) What is SCR? Name their family number. **10**  
b) Explain on-state and off-state condition of thyristors. **10**
- Q.4 a) Differentiate between natural commutation and forced commutation of thyristor. **10**  
b) What are the types of MOSFET? Explain the difference between them. **10**

## **PART-B**

- Q.5 a) What is the purpose of  $dv/dt$  protection? Explain common method of  $dv/dt$  protection. **10**  
b) Name the different firing circuit. Explain one of them. **10**
- Q.6 a) What is a heat sink and its function? Discuss the different guidelines for the selection of heat sink. **10**  
b) Explain the working principle of phase controlled converter. **10**
- Q.7 Write short notes on the following:  
a) Dual converter.  
b) AC-DC converter.  
c) UJT.  
d) Power electronics application. **5×4**

# **End Semester Examination, Dec. 2018**

B. Tech. — Fourth / Fifth Semester

## **POWER SYSTEM PROTECTION (EE-521)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer the following:

- a) What do you understand by switchgear?
- b) What is the difference between a fuse and circuit breaker?
- c) A 1000 kVA transformer with 5% reactance will have a reactance of \_\_\_\_\_ at 2000 kVA base.
- d) What are symmetrical components?
- e) Why do we prefer to analyse unsymmetrical faults by symmetrical components method?
- f) Why is  $3-\phi$  symmetrical fault more severe than a  $3-\phi$  unsymmetrical fault?
- g) Is arc production in a circuit breaker unfortunate manifestation?
- h) Why do plain break oil circuit breakers have a low speed of circuit interruption?
- i) Define: i) Pickup value      ii) Current setting
- j) Why are surge diverters located very close to the equipment to be protected? **2x10**

### **PART-A**

Q.2 a) Explain the 'Fortesges's theorem and symmetrical components for a set of unbalanced voltage phases.

**10**

- b) A 3-phase, 20 MVA, 10 kV alternator has internal reactance of 5% and negligible resistance. Find the external reactance per phase to be connected in series with the alternator so that steady current on short-circuit does not exceed 8 times the full load current.

**10**

Q.3 a) Derive an expression for fault current for single line to ground fault by symmetrical components method.

**10**

- b) A 3-phase, 11 kV, 25 MVA generator with  $X_0=0.05$ ,  $X_1=0.2$  p.u and  $X_2=0.2$  p.u. is grounded through a reactance of  $0.3\Omega$ . Calculate the fault current for single line to ground fault.

**10**

Q.4 Explain briefly the following types of air circuit breakers:

- a) Axial-blast type.
- b) Cross-blast type

**10x2**

### **PART-B**

Q.5 a) Describe the construction and principle of operation of an induction type directional overcurrent relay.

**10**

b) Derive the equation for torque developed in an inductor relay.

**10**

Q.6 a) Describe the Merz-price circulating current system for the protection of transformers.

**10**

b) Describe the construction and working of a Buchdz relay.

**10**

Q.7 Write short notes on following arrestor:

a) Rod gap.      b) Horn gap.      c) Expulsion type.  
d) Multigap type.      **5x4**

# End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

## POWER SYSTEM PROTECTION (EE-521)

Time: 3 hrs.

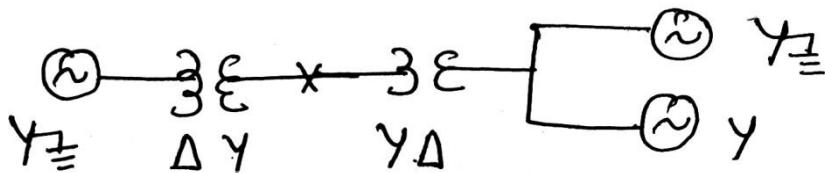
Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Answer the following questions:

- Why do we prefer to analyze unsymmetrical faults by symmetrical component methods?
- Obtain the interconnection of sequence network for one conductor open fault on power system.
- Enumerate various types of rating of a circuit breaker.
- Outline the essential requirements of a relay.
- What are the cause of over voltage on a power system?
- Prove that  $1 + \alpha + \alpha^2 = 0$ ;  $\alpha$  = symmetrical component operator.
- Draw the zero sequence network for the following single line diagram.



- Distinguish between direct and Indirect stroke.
- Discuss the phenomena of Lightning streamer.
- A relay is connected to 400/5 current transformer with a current setting of 125%. Calculate plug-setting multiplier of the coil when fault current is 1200A. **2x10**

### **PART-A**

**Q.2** a) Discuss transient phenomena on a transmission line also find the expression for maximum current.

**15**

- Draw and explain the waveform of a short circuit current on a transmission line.

**5**

**Q.3** a) A 50 MVA, 11 KV, 3- $\phi$  alternator was subjected to different types of faults. The fault currents are as under:  
3- $\phi$  fault = 2000A, Line to Line fault=2600A , Line to ground fault=4200A. The generator neutral is solidly grounded. Find the values of three sequence reactance of alternator ignoring resistances.

**10**

- Drive an expression for fault current for line to ground fault by symmetrical component method.

**10**

Q.4 a) Discuss the working and operating principle of sulphur hexafluoride circuit breaker.  
What are its advantages over other types of circuit breaker

**10**

b) Comprehend different arc control strategies of oil circuit breaker

**10**

**PART-B**

Q.5 a) Explain the significance of current setting multiplier and Time/ P.S.M curve for finding the actual time of operation of relay

**7**

b) Draw and explain typical Time/P.S.M curve

**3**

c) Discuss different types of Electromagnetic attraction relay

**10**

Q.6 a) Discuss how Buchholz relay is used for protection of transformer and also discuss its advantages and disadvantages

**10**

b) Analyze the mho relay by using universal torque equation and also draw its characteristics.

**10**

Q.7 a) Explain the mechanism of lightning discharge

**10**

b) What is lightning arrester? Explain its basic principle of operation.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech – Sixth Semester

## **ELECTRICS DRIVES (EE-602B/EE-602A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer the following questions:

- a) What are the advantages of electric drive?
- b) What is duty cycle?
- c) What are the types of the electric braking?
- d) Define pole pitch of stepper motor.
- e) What are the similarities between BLDC motor and DC motor drives?
- f) What is dual converter?
- g) Name the methods of speed control of DC motor.
- h) What are the applications of AC drives?
- i) What are the different types of load?
- j) What do you mean by AC voltage controller?

**2x10**

### **PART-A**

Q.2 a) Explain the multiquadrant operation and speed convection of electric drive? Explain with example?

**10**

b) Draw and explain the block diagram of electric drive in detail.

**10**

Q.3 a) Explain the working of single phase fully controlled rectifier control of dc separately excited motor.

**10**

b) A 200 V, 875 rpm, 150 A separately excited dc motor has an armature resistance of  $0.06\Omega$ . If is fed from single phase fully controlled rectifier with an ac source of 220V, 50Hz. Assuming continuous conduction, calculate:

- i) Firing angle for rated motor torque and (-500) rpm.
- ii) Motor speed for  $\alpha=160^\circ$  and rated torque.

**10**

Q.4 a) Explain the chopper controlled dc motor drive for both motoring and braking operation.

**10**

b) A 230V, 960 rpm and 200A separately excited dc motor has an armature resistance of  $0.02\Omega$ . The motor is fed from chopper which provides motoring and braking operation. The source has an voltage of 230V. Assuming continuous conduction.

- i) Calculate duty ratio for chopper for motoring operation at rated torque and 350 rpm.
- ii) If the maximum duty ratio of chopper is limited to 0.95 and maximum permissible motor current is twice the rated, calculate maximum permissible

motor speed obtainable without field weakening and power fed to the source.  
**10**

**PART-B**

- Q.5 a) Explain how speed of the induction motor drive can be controlled by variable frequency control from voltage source?  
**10**
- b) What is static rotor resistance control? Also, explain closed loop speed control with static rotor resistance?  
**10**
- Q.6 a) Discuss variable frequency control of synchronous motor drive.  
**10**
- b) Explain self-controlled synchronous motor drive employing load commutated thyristor inverter.  
**10**
- Q.7 a) Write the features and application of variable reluctance stepper motor drive. Also, discuss the working of the stepper motor drive.  
**10**
- b) What is the difference between BLDC and DC motor? Explain the working of BLDC motor.  
**10**

# End Semester Examination, Dec. 2018

## B. Tech – Sixth Semester POWER SYSTEM-II (EE-603A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

**Q.1** Answer the following questions:

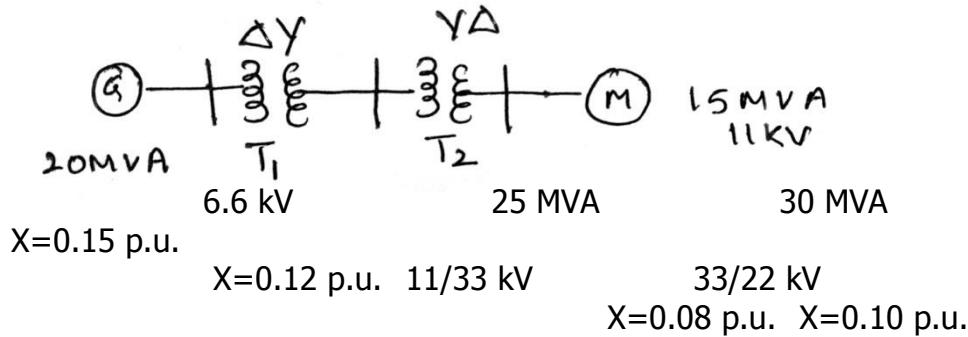
- Define load bus and give its importance.
- State drawbacks of newton raphson method.
- List the factors that affect transient stability.
- State importance of automatic voltage regulator.
- Give applications and limitations of equal area criteria.
- Write the components of power system network.
- Write the assumptions commonly made in stability studies.
- What are quantities on which load flow problem formulation depends?
- Define cograph and branches.
- Write the relationship between branch impedance and branch admittance matrix. **2x10**

### **PART-A**

**Q.2** a) Represent three phase power system network applying primitive network approach in terms of impedance and admittance of the line.

**10**

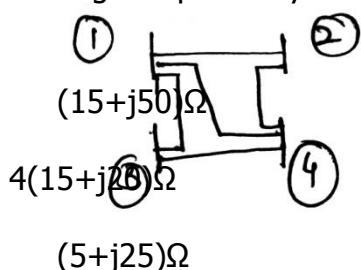
b) Draw the reactance diagram of the following network:



**Q.3** a) Explain clearly with a flowchart the computational procedure for load flow solution using newton raphson method when the system contain all types of buses.

**10**

b) For a given power system network, build  $Y_{bus}$  matrix:



|      |     |                  |
|------|-----|------------------|
| Live | 1-2 | $(10+j40)\Omega$ |
|      | 1-3 |                  |
|      | 1-  |                  |
|      | 2-4 |                  |

3-4

$$(10+j30)\Omega$$

**10**

- Q.4 a) Justify the relation given below, using graph theoretical approach:

$$Z_{BR} = Y_{BR}^{-1} = [C[Y]C^T]^{-1}$$

**10**

- b) Draw the  $Z_{bus}$  building flowchart with explanation of suitable mathematical equations.

**10**

**PART-B**

- Q.5 a) Explain equal area criterion to determine stability of the system for sudden change in mechanical input.

**10**

- b) Explain the assumptions made for transient stability.

**10**

- Q.6 Explain in detail the block diagram of Automatic Generation Control. Also, explain the function of AVR.

**20**

- Q.7 Explain in detail following facts controllers:

- a) Series controllers. b) Shunt controllers.

**10x2**

# **End Semester Examination, Dec. 2018**

B. Tech – Sixth Semester

## **DESIGN OF ELECTRICAL MACHINES (EE-604)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer the following questions:

- a) What are the various design considerations of an electric machine?
- b) How can temperature rise be measured?
- c) What is the selection criteria for type of core of transformer?
- d) What are the various types of windings of a transformer?
- e) What is space factor?
- f) What is total magnetic loading?
- g) What is specific electric loading?
- h) What are the types of armature windings of a synchronous machine?
- i) What are the considerations for designing of end rings in an induction motor?
- j) What are the main dimensions of an induction motor?

**2x10**

### **PART-A**

Q.2 a) Derive an expression for temperature rise with time in electric machine.

**10**

b) Explain various methods of cooling of electric machines.

**10**

Q.3 a) Develop output equation of single and three phase transformer.

**10**

b) Explain the concept of designing of transformer windings.

**10**

Q.4 a) Derive an expression for maximum temperature rise permissible for an electromagnetic coil.

**10**

b) Name and explain various methods employed for calculation of mmf for a tapered teeth.

**10**

### **PART-B**

Q.5 a) Derive an expression for output equation of DC machine.

**10**

b) Explain the concept of designing of lap and wave winding.

**10**

Q.6 a) Derive an expression for output equation of synchronous machines.

**10**

b) Find the main dimensions of a 100 MVA, 11 KV, 50 Hz, 150 rpm, 3 phase water wheel generator. The average gap density = $0.65 \text{ wb/m}^2$  and ampere conductor / m are 40,000. The peripheral speed should not exceed 65 m/s.

**10**

Q.7 a) Derive the output equation of an Induction motor.

**10**

b) How will you design of wound rotor motor?

**10**

# End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester  
**CONTROL ENGINEERING (EE-606)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

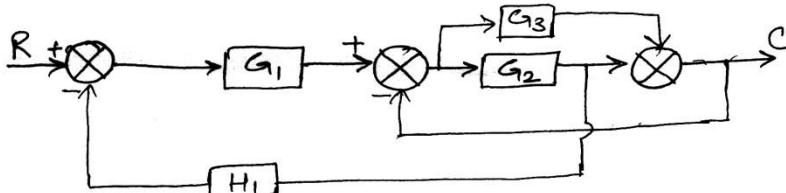
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1**
- What are the components of feedback control system?
  - Define type and order of a system.
  - List the time domain specifications.
  - What is the need of controller in control system?
  - Define phase margin.
  - Explain relative stability.
  - What is the necessary condition of stability?
  - When is lag lead compensator required?
  - What is frequency response?
  - Define settling time.

**2×10**

## **PART-A**

- Q.2** a) Determine the transfer function  $\frac{C}{R}$  from the block diagram shown in figure.



**12**  
**8**

- b) Compare open loop and closed loop control system.

- Q.3** a) Derive an expression for the time response of a first order system when subjected to ramp input function. Point out the salient features of the time response curve. **8**  
 b) The forward path transfer function of a unity feedback system is characterized by the expression  $G(S) = \frac{K}{s(s+12)}$ .

What should be the value of gain factor K, if the damping ratio is limited at 0.6? For this value of K, determine the values for the parameters: Settling time, peak overshoot and the time to peak overshoot. If the system is subjected to unit step input. **12**

- Q.4** a) A unity negative feedback control system has the open loop transfer given by:

$$G(S) = \frac{K}{(s+2)(s+4)(s^2 + 6s + 25)} \quad \text{Using Rout criterion, determine:}$$

- i) How much variation in the value of K can be permitted so that the system remains stable?
  - ii) The value of K which will cause sustained oscillations in the closed loop and the corresponding oscillation frequencies.
  - b) How will you obtain the breakaway point in root locus analysis?
- 13  
7

### **PART-B**

Q.5 a) Sketch the polar plot for open loop transfer function given as

$$G(S) = \frac{10}{S(S+1)}$$

10

b) State and explain the Nyquist stability criterion.

10

Q.6 Write short notes on (any two)

- a) AC servo motors.
- b) Synchros.
- c) Stepper motor and its applications.

10×2

Q.7 a) Discuss phase lag compensation with the help of circuit diagram and also find the transfer function.

10

b) Explain the PI control action. Discuss the effect of using PI controller in a second

order control system on the steady state error due to unit ramp input.

**10**

**End Semester Examination, Dec. 2018**  
B. Tech. – Sixth Semester  
**HIGH VOLTAGE ENGINEERING (EE-621A)**

Time: 3 hrs.

Max Marks: 100

*No. of pages:* 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1

  - a) What are different forms of high voltage?
  - b) What is a voltage doubler?
  - c) Define 'basic impulse level'.
  - d) What is an impulse generator?
  - e) What is the significance of over voltage?
  - f) What is switching over voltages?
  - g) What is meant by insulation coordination?
  - h) What is insulation breakdown?
  - i) What are the environmental aspects in EHV and UHV line design?
  - j) What are the principles of common live line maintenance?

2x10

## **PART-A**

- Q.2** a) Explain the working of Van de Graff generator with diagram. **10**  
b) Write a short note on 'voltage multiplier circuits'. **10**

**Q.3** a) Briefly explain any multistage impulse generator. **10**  
b) Write a short note on 'generation of switching surges'. **10**

**Q.4** a) Discuss the phenomenon of lightning discharge in detail. **10**  
b) Briefly explain surge diverter. **10**

## **PART-B**

- Q.5 a) Briefly explain the methods of reducing switching over voltages. **10**  
b) Explain the principle of insulation coordination. **10**

Q.6 a) Briefly explain the concept of insulation breakdown. **10**  
b) Briefly explain conduction and breakdown in gases. **10**

Q.7 Explain principle of line maintenance and also write about the tools used in line maintenance. **20**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **COMPUTER APPLICATION AND POWER SYSTEM (EE-622)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) Define 'short circuit capacity of a bus'.
- b) Give criterion for selection of a circuit breaker.
- c) Differentiate between 'voltages controlled bus' and 'swing bus'.
- d) The inertia constant 'H' of a 200 MVA machine is  $2pu$ . Find its value for 400 MVA.
- e) Define 'power quality'.
- f) List advantages of per unit system.
- g) State importance of AVR.
- h) On what factors does maximum power transfer depend?
- i) What do you understand by dynamic stability?
- j) Define 'primitive network'.

**2x10**

### **PART-A**

Q.2 a) Explain the speed governing system used for automatic load frequency control and hence derive the transfer function for the same.

**10**

b) Discuss automatic generation control in detail.

**10**

Q.3 a) Explain symmetrical component transformation as used in analysis of power system. **6**

b) Discuss representation of:

i) Synchronous machine.

**7**

ii) Over-head transmission lines.

**7**

Q.4 a) Prove that in bus admittance matrix, each diagonal element is equal to the sum of all admittance connected at node 'i' and off diagonal element is equal to negative of admittance connected between node 'i' and 'j'.

**10**

b) Formulate bus impedance matrix for elements without mutual coupling.

**10**

### **PART-B**

Q.5 a) Derive expression for *LLG* fault.

**10**

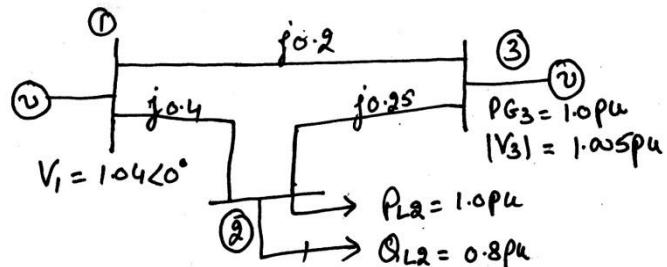
- b) A 6.9KV, 10 MVA alternator has  $x'' = x_2 = .15 \text{ pu}$  and  $x_0 = .05 \text{ pu}$ . Its neutral is grounded through a reactor of  $0.397 \text{ ohm}$ . The alternator is operating at rated voltage without load and is disconnected from the system when a single line to ground fault occur at its terminals. Find the sub-transient current in the faculty phase.

**10**

- Q.6 a) Write down the flow chart for fast decoupled load flow method.

**10**

- b) For the power system shown below; compute the bus voltage using GS method. Bus1 is slack bus and Bus 2 and Bus 3 are load and voltage control bus respectively.



**10**

- Q.7 a) Derive transmission loss formula for transmission line without loss.

**10**

- b) The operating characteristics of three plants with total capacity of 700 MW are given as:

$$F_1 = 0.8P_1^2 + 30P_1 + 100; \quad 50 \leq P_1 \leq 250$$

$$F_2 = 0.10P_2^2 + 32P_2 + 125; \quad 50 \leq P_2 \leq 250$$

$$F_3 = 0.12P_3^2 + 35P_3 + 150; \quad 50 \leq P_3 \leq 200$$

Determine economic dispatch if plants are scheduled for a load of 500 MW.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Sixth Semester

## **NEW AND RENEWABLE ENERGY SOURCES (EE-625A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 a) List various non-conventional energy sources.  
b) What is the scenario of the total power generation in India?  
c) Define solar azimuth angle.  
d) What is photovoltaic effect?  
e) Explain the term wind energy pattern factor?  
f) What is pitch angle?  
g) What are the limitations of using biomass?  
h) What are the advantages of Tidal power?  
i) What is the efficiency of OTEC?  
j) What is nuclear fusion? **2×10**

### **PART-A**

- Q.2 a) Discuss briefly the “Angstrom equation” used for estimation of average solar radiation. **10**  
b) How do you design and fabricate a flat plate collector? **10**
- Q.3 a) Explain the working of photovoltaic cell. What are the different ways of using PV cells to provide power? **10**  
b) Explain the working of the devices used for measuring of solar radiations. **10**
- Q.4 a) What is the classification of windmills? Describe them in detail. **10**  
b) What are the parameters to be considered while selecting a windmill? Also write the design considerations of wind turbine. **10**

### **PART-B**

- Q.5 a) Classify and explain the tidal power plants on the basis of basins. **10**  
b) Derive the relation for yearly power generation from a tidal project. **10**
- Q.6 a) What is the selection criteria for the site of hydro-electric plant? **10**  
b) Explain the construction and working of different types of turbines used in small hydro plants. **10**
- Q.7 a) List the various component of fuel cell and explain it in detail. **10**  
b) Write short notes on:  
i) Power from nuclear fusion.  
ii) Geothermal energy. **5×2**



# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **ENERGY CONSERVATION AND MANAGEMENT (EE-626)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) What is total quality management?
- b) What is energy efficiency?
- c) Discuss the significance of energy audit.
- d) What is need of energy conservation?
- e) What is meant by decamping?
- f) What is meant by electrical load analysis?
- g) What is payback in case of energy management?
- h) List the method used for calculating rate of return.
- i) What is meant by financial evaluation of energy project?
- j) What is meant by power planning?

**2x10**

### **PART-A**

Q.2 a) Explain the concept of efficient energy use.

**5**

b) Explain GDP coupling with energy intensity.

**5**

c) Write short notes on:

- i) Establishing energy database.
- ii) Energy intensity.

**5x2**

Q.3 a) What is energy audit? Discuss the concept of establishing energy database.

**10**

b) Discuss the various ways and instruments used for energy auditing.

**10**

Q.4 a) Explain the laws of thermodynamics in energy conservation.

**10**

b) Explain the energy saving opportunities in an air condition system. How would you calculate the net load for a room to be air conditioned?

**10**

### **PART-B**

Q.5 a) Discuss the general principle of electrical energy management.

**10**

b) Explain the process of electrical load analysis in detail.

**10**

Q.6 a) How 'total life cycle' cost can be determined? Also write its uses.

**10**

b) Differentiate between:

i) Average rate of return method and internal rate of return method.

**5**

ii) Payback method and present value method.

**5**

Q.7 Write short notes on the following:

a) DEFENDUS strategy.

**10**

b) Co-generation of electricity.

**10**

**End Semester Examination, Dec. 2018**  
**B. Tech. — Fifth Semester**  
**POWER GENERATION (EE-634)**

Time: 3 hrs.

**Max Marks:** 100

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

- Q.1** Answer the following questions:

  - a) What are the types of turbine used in hydro power plant?
  - b) Why pulverized coal is preferred in thermal power plants?
  - c) Prove that load factor of a supply system is improved by an increase in diversity of load.
  - d) Mention the merits and demerits of a nuclear power plant.
  - e) What are the factors to be considered while selecting a site for diesel power plant.
  - f) Define “co-generation”.
  - g) Define “diversity factor”.
  - h) Define “load factor”.
  - i) How energy audit is beneficial for large industries?
  - j) What is meant by energy management?

**2×10**

## PART-A

- Q.2**

  - a) Discuss about the various energy sources [conventional and non-conventional] used for power generation and their availability. **10**
  - b) Explain construction and working of a thermal power plant in detail. **10**

**Q.3**

  - a) A generating station supplied the following:  
Loads: 150 MW, 120 MW, 85 MW, 60 MW, 5 MW.  
The station has a maximum demand of 220 MW. The annual load factor of station is 48%.  
Calculate:
    - i) Number of units supplied annually.
    - ii) Diversity factor.
    - iii) Demand factor. **12**
  - b) Differentiate between base load and peak load power plant. **4**
  - c) What are load curve and load duration curves? Discuss their utility in the economics of generation. **4**

**Q.4**

  - a) What is traffic? Discuss and compare various tariff used in practice. **10**
  - b) What is the need of power factor correction? **4**
  - c) A 1Q motor connected to 400 V, 50 Hz supply takes 31.7 amp at power factor of 0.7 lagging.  
Calculate the capacitance required in parallel with motor to raise power factor to 0.9 lagging. **6**

## **PART-B**

- Q.5**    a) Draw block diagram of a diesel power station and discuss its operation in detail. **10**  
         b) What are the factors of selection of sets for a hydro power plant? Why hydro power plants  
            are used as peak load power plant? **10**

**Q.6**    a) With the help of neat and schematic diagram. Explain solar power plant. **10**  
         b) Write short notes on (*any two*) of the following:

- i) Magneto hydro dynamic (MHD) system.
- ii) Tidal power plant.
- iii) Wind power plant.

**5×2**

- Q.7** a) What are energy efficient motors? Discuss their role in energy saving. **10**  
b) Discuss energy audit as a part of energy management system in detail. **10**

# **End Semester Examination, Dec. 2018**

B. Tech. — Seventh Semester

## **PROGRAMMABLE LOGIC CONTROLLER AND SCADA (EE-702)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) What is automation?
- b) Differentiate between PLC based system and microprocessor based system.
- c) What are the types of sensors?
- d) What are the basic components of PLC?
- e) List the manufacturers of PLC?
- f) Discuss the application of SCADA system.
- g) What is MTU?
- h) What are real time systems?
- i) State the operation state of a power system.
- j) What is DMS?

**2×10**

### **PART-A**

**Q.2** a) Draw the block diagram of PLC and label it. Also explain the function of its each block. **10**  
b) Describe the classification of input/output module of Mitsubishi PLC. **10**

**Q.3** a) Explain the wiring diagram of Mitsubishi PLC in sink and source mode for both input and output modules. **10**  
b) Discuss the addressing scheme of iQ-R Mitsubishi PLC. **10**

**Q.4** a) Discuss the timer and counter operation of PLC. Support your answer with the help of examples. **10**  
b) Write a program for setting up lighting system for user to switch on/off the light whether they are at bottom or the top of stairs.

Take input device  $X_0$ ,  $X_1$ , and output  $Y_1$

| Device | Function                                              |           |
|--------|-------------------------------------------------------|-----------|
| $X_0$  | $X_0$ turns on when bottom switch is turned to right. |           |
| $X_1$  | $X_1$ turns on when top switch is turned to right.    |           |
| $Y_1$  | Stair light                                           | <b>10</b> |

### **PART-B**

**Q.5** a) List the benefits of automation in power system. **5**  
b) Explain the hardware architecture of SCADA system in detail. Also, discuss implementation of SCADA in AGC. **15**

**Q.6** a) Discuss the process of communication of PLC with SCADA system on ethernet. **10**  
b) Explain the block diagram of RTU in detail. **10**

Q.7 Write short notes on (***any four***) of the following:

- a) Substation layout.
- b) Energy audit.
- c) Automation in distribution.
- d) DMS.
- e) Load forecasting.

**5×4**







# End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester  
**RENEWABLE ENERGY SOURCES (EE-539)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) What is total installed capacity of power generation in India?  
b) What is meant by 'Green House effect'?  
c) Which materials are used for manufacturing of solar cell?  
d) Give expression for current and voltage relationship in a solar cell.  
e) What are the advantages of wind energy conversion systems?  
f) How is OTEC related to solar energy?  
g) How are tides generated?  
h) What is meant by energy farming?  
i) What is meant by nuclear fusion energy?  
j) What is refuse derived fuel? **2×10**

## **PART-A**

- Q.2 a) Explain solar energy storage in detail. **10**  
b) Write short notes on:  
i) Solar distillation.  
ii) Solar collectors. **5×2**
- Q.3 a) Explain construction and working of a solar cell. **10**  
b) Explain solar radiation measurement by Pyrheliometer. **10**
- Q.4 a) Explain wind energy conversion system with block diagram. **10**  
b) Write a note on horizontal axis wind machines. **10**

## **PART-B**

- Q.5 a) Give expression for energy obtained from ocean waves. **7**  
b) Briefly explain tidal power generation. **8**  
c) Give advantages and disadvantages of wave energy. **5**
- Q.6 a) Explain the turbines used in small scale hydro power plant. **10**  
b) How energy can be extracted from biofuels through the process of gasification? **10**
- Q.7 Write short notes on (**any two**):  
a) Fuel cell.  
b) Alcohol energy.  
c) Power from satellite stations. **10×2**

# End Semester Examination, Dec. 2018

B. Tech – Sixth Semester

## **ELECTRICS DRIVES (EE-602B/EE-602A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer the following questions:

- a) What are the advantages of electric drive?
- b) What is duty cycle?
- c) What are the types of the electric braking?
- d) Define pole pitch of stepper motor.
- e) What are the similarities between BLDC motor and DC motor drives?
- f) What is dual converter?
- g) Name the methods of speed control of DC motor.
- h) What are the applications of AC drives?
- i) What are the different types of load?
- j) What do you mean by AC voltage controller?

**2x10**

### **PART-A**

Q.2 a) Explain the multiquadrant operation and speed convection of electric drive? Explain with example? **10**

- b) Draw and explain the block diagram of electric drive in detail. **10**

Q.3 a) Explain the working of single phase fully controlled rectifier control of dc separately excited motor. **10**

- b) A 200 V, 875 rpm, 150 A separately excited dc motor has an armature resistance of  $0.06\Omega$ . If is fed from single phase fully controlled rectifier with an ac source of 220V, 50Hz. Assuming continuous conduction, calculate:
  - i) Firing angle for rated motor torque and (-500) rpm.
  - ii) Motor speed for  $\alpha=160^\circ$  and rated torque.

**10**

Q.4 a) Explain the chopper controlled dc motor drive for both motoring and braking operation. **10**

- b) A 230V, 960 rpm and 200A separately excited dc motor has an armature resistance of  $0.02\Omega$ . The motor is fed from chopper which provides motoring and braking operation. The source has an voltage of 230V. Assuming continuous conduction.
  - i) Calculate duty ratio for chopper for motoring operation at rated torque and 350 rpm.
  - ii) If the maximum duty ratio of chopper is limited to 0.95 and maximum permissible motor current is twice the rated, calculate maximum permissible motor speed obtainable without field weakening and power fed to the source.

**10**

## **PART-B**

- Q.5 a) Explain how speed of the induction motor drive can be controlled by variable frequency control from voltage source? **10**
- b) What is static rotor resistance control? Also, explain closed loop speed control with static rotor resistance? **10**
- Q.6 a) Discuss variable frequency control of synchronous motor drive. **10**
- b) Explain self-controlled synchronous motor drive employing load commutated thyristor inverter. **10**
- Q.7 a) Write the features and application of variable reluctance stepper motor drive. Also, discuss the working of the stepper motor drive. **10**
- b) What is the difference between BLDC and DC motor? Explain the working of BLDC motor. **10**

# End Semester Examination, Dec. 2018

## B. Tech – Sixth Semester POWER SYSTEM-II (EE-603A)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

**Q.1** Answer the following questions:

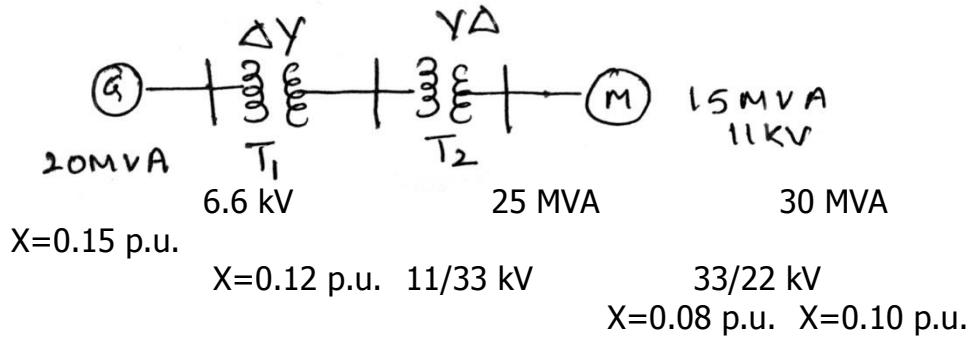
- Define load bus and give its importance.
- State drawbacks of newton raphson method.
- List the factors that affect transient stability.
- State importance of automatic voltage regulator.
- Give applications and limitations of equal area criteria.
- Write the components of power system network.
- Write the assumptions commonly made in stability studies.
- What are quantities on which load flow problem formulation depends?
- Define cograph and branches.
- Write the relationship between branch impedance and branch admittance matrix. **2x10**

### **PART-A**

**Q.2** a) Represent three phase power system network applying primitive network approach in terms of impedance and admittance of the line.

**10**

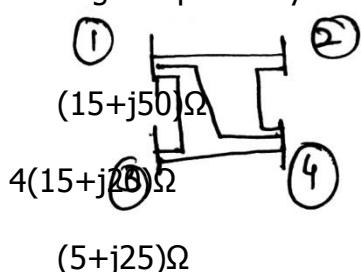
b) Draw the reactance diagram of the following network:



**Q.3** a) Explain clearly with a flowchart the computational procedure for load flow solution using newton raphson method when the system contain all types of buses.

**10**

b) For a given power system network, build  $Y_{bus}$  matrix:



|      |     |                  |
|------|-----|------------------|
| Live | 1-2 | $(10+j40)\Omega$ |
|      | 1-3 |                  |
|      | 1-  |                  |
|      | 2-4 |                  |

3-4

$$(10+j30)\Omega$$

**10**

- Q.4 a) Justify the relation given below, using graph theoretical approach:

$$Z_{BR} = Y_{BR}^{-1} = [C[Y]C^T]^{-1}$$

**10**

- b) Draw the  $Z_{bus}$  building flowchart with explanation of suitable mathematical equations.

**10**

**PART-B**

- Q.5 a) Explain equal area criterion to determine stability of the system for sudden change in mechanical input.

**10**

- b) Explain the assumptions made for transient stability.

**10**

- Q.6 Explain in detail the block diagram of Automatic Generation Control. Also, explain the function of AVR.

**20**

- Q.7 Explain in detail following facts controllers:

- a) Series controllers. b) Shunt controllers.

**10x2**

# **End Semester Examination, Dec. 2018**

B. Tech – Sixth Semester

## **DESIGN OF ELECTRICAL MACHINES (EE-604)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

**Q.1** Answer the following questions:

- a) What are the various design considerations of an electric machine?
- b) How can temperature rise be measured?
- c) What is the selection criteria for type of core of transformer?
- d) What are the various types of windings of a transformer?
- e) What is space factor?
- f) What is total magnetic loading?
- g) What is specific electric loading?
- h) What are the types of armature windings of a synchronous machine?
- i) What are the considerations for designing of end rings in an induction motor?
- j) What are the main dimensions of an induction motor?

**2x10**

### **PART-A**

**Q.2** a) Derive an expression for temperature rise with time in electric machine.

**10**

b) Explain various methods of cooling of electric machines.

**10**

**Q.3** a) Develop output equation of single and three phase transformer.

**10**

b) Explain the concept of designing of transformer windings.

**10**

**Q.4** a) Derive an expression for maximum temperature rise permissible for an electromagnetic coil.

**10**

b) Name and explain various methods employed for calculation of mmf for a tapered teeth.

**10**

### **PART-B**

**Q.5** a) Derive an expression for output equation of DC machine.

**10**

b) Explain the concept of designing of lap and wave winding.

**10**

Q.6 a) Derive an expression for output equation of synchronous machines.

**10**

b) Find the main dimensions of a 100 MVA, 11 KV, 50 Hz, 150 rpm, 3 phase water wheel generator. The average gap density = $0.65 \text{ wb/m}^2$  and ampere conductor / m are 40,000. The peripheral speed should not exceed 65 m/s.

**10**

Q.7 a) Derive the output equation of an Induction motor.

**10**

b) How will you design of wound rotor motor?

**10**

# End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester  
**CONTROL ENGINEERING (EE-606)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

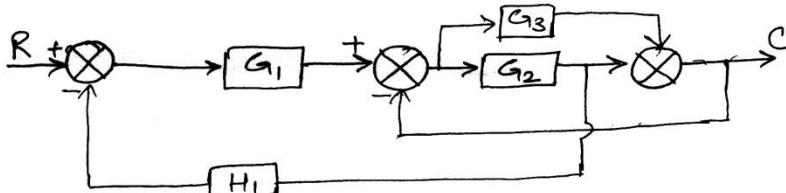
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1**
- What are the components of feedback control system?
  - Define type and order of a system.
  - List the time domain specifications.
  - What is the need of controller in control system?
  - Define phase margin.
  - Explain relative stability.
  - What is the necessary condition of stability?
  - When is lag lead compensator required?
  - What is frequency response?
  - Define settling time.

**2×10**

## **PART-A**

- Q.2** a) Determine the transfer function  $\frac{C}{R}$  from the block diagram shown in figure.



**12**  
**8**

- b) Compare open loop and closed loop control system.

- Q.3** a) Derive an expression for the time response of a first order system when subjected to ramp input function. Point out the salient features of the time response curve. **8**  
 b) The forward path transfer function of a unity feedback system is characterized by the expression  $G(S) = \frac{K}{s(s+12)}$ .

What should be the value of gain factor K, if the damping ratio is limited at 0.6? For this value of K, determine the values for the parameters: Settling time, peak overshoot and the time to peak overshoot. If the system is subjected to unit step input.

**12**

- Q.4** a) A unity negative feedback control system has the open loop transfer given by:

$$G(S) = \frac{K}{(s+2)(s+4)(s^2 + 6s + 25)} \quad \text{Using Rout criterion, determine:}$$

- i) How much variation in the value of K can be permitted so that the system remains stable?
  - ii) The value of K which will cause sustained oscillations in the closed loop and the corresponding oscillation frequencies.
  - b) How will you obtain the breakaway point in root locus analysis?
- 13  
7

### **PART-B**

- Q.5 a) Sketch the polar plot for open loop transfer function given as

$$G(S) = \frac{10}{S(S+1)}$$

10

- b) State and explain the Nyquist stability criterion.

10

- Q.6 Write short notes on (any two)

- a) AC servo motors.
- b) Synchros.
- c) Stepper motor and its applications.

10×2

- Q.7 a) Discuss phase lag compensation with the help of circuit diagram and also find the transfer function.

10

- b) Explain the PI control action. Discuss the effect of using PI controller in a second order control system on the steady state error due to unit ramp input.

10

**End Semester Examination, Dec. 2018**  
B. Tech. – Sixth Semester  
**HIGH VOLTAGE ENGINEERING (EE-621A)**

Time: 3 hrs.

Max Marks: 100

*No. of pages:* 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1

  - a) What are different forms of high voltage?
  - b) What is a voltage doubler?
  - c) Define 'basic impulse level'.
  - d) What is an impulse generator?
  - e) What is the significance of over voltage?
  - f) What is switching over voltages?
  - g) What is meant by insulation coordination?
  - h) What is insulation breakdown?
  - i) What are the environmental aspects in EHV and UHV line design?
  - j) What are the principles of common live line maintenance?

2x10

## **PART-A**

- Q.2** a) Explain the working of Van de Graff generator with diagram. **10**  
b) Write a short note on 'voltage multiplier circuits'. **10**

**Q.3** a) Briefly explain any multistage impulse generator. **10**  
b) Write a short note on 'generation of switching surges'. **10**

**Q.4** a) Discuss the phenomenon of lightning discharge in detail. **10**  
b) Briefly explain surge diverter. **10**

## **PART-B**

- Q.5 a) Briefly explain the methods of reducing switching over voltages. **10**  
b) Explain the principle of insulation coordination. **10**

Q.6 a) Briefly explain the concept of insulation breakdown. **10**  
b) Briefly explain conduction and breakdown in gases. **10**

Q.7 Explain principle of line maintenance and also write about the tools used in line maintenance. **20**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **COMPUTER APPLICATION AND POWER SYSTEM (EE-622)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) Define 'short circuit capacity of a bus'.
- b) Give criterion for selection of a circuit breaker.
- c) Differentiate between 'voltages controlled bus' and 'swing bus'.
- d) The inertia constant 'H' of a 200 MVA machine is  $2pu$ . Find its value for 400 MVA.
- e) Define 'power quality'.
- f) List advantages of per unit system.
- g) State importance of AVR.
- h) On what factors does maximum power transfer depend?
- i) What do you understand by dynamic stability?
- j) Define 'primitive network'.

**2x10**

### **PART-A**

Q.2 a) Explain the speed governing system used for automatic load frequency control and hence derive the transfer function for the same.

**10**

b) Discuss automatic generation control in detail.

**10**

Q.3 a) Explain symmetrical component transformation as used in analysis of power system. **6**

b) Discuss representation of:

i) Synchronous machine.

**7**

ii) Over-head transmission lines.

**7**

Q.4 a) Prove that in bus admittance matrix, each diagonal element is equal to the sum of all admittance connected at node 'i' and off diagonal element is equal to negative of admittance connected between node 'i' and 'j'.

**10**

b) Formulate bus impedance matrix for elements without mutual coupling.

**10**

### **PART-B**

Q.5 a) Derive expression for *LLG* fault.

**10**

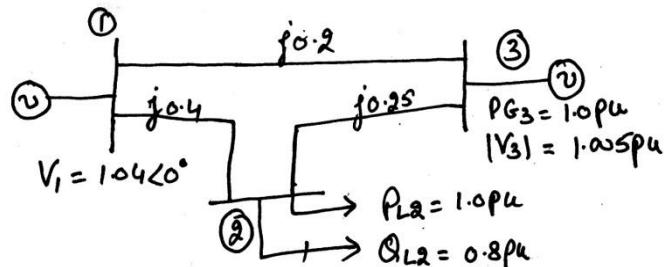
- b) A 6.9KV, 10 MVA alternator has  $x'' = x_2 = .15 \text{ pu}$  and  $x_0 = .05 \text{ pu}$ . Its neutral is grounded through a reactor of  $0.397 \text{ ohm}$ . The alternator is operating at rated voltage without load and is disconnected from the system when a single line to ground fault occur at its terminals. Find the sub-transient current in the faculty phase.

**10**

- Q.6 a) Write down the flow chart for fast decoupled load flow method.

**10**

- b) For the power system shown below; compute the bus voltage using GS method. Bus1 is slack bus and Bus 2 and Bus 3 are load and voltage control bus respectively.



**10**

- Q.7 a) Derive transmission loss formula for transmission line without loss.

**10**

- b) The operating characteristics of three plants with total capacity of 700 MW are given as:

$$F_1 = 0.8P_1^2 + 30P_1 + 100; \quad 50 \leq P_1 \leq 250$$

$$F_2 = 0.10P_2^2 + 32P_2 + 125; \quad 50 \leq P_2 \leq 250$$

$$F_3 = 0.12P_3^2 + 35P_3 + 150; \quad 50 \leq P_3 \leq 200$$

Determine economic dispatch if plants are scheduled for a load of 500 MW.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Sixth Semester

## **NEW AND RENEWABLE ENERGY SOURCES (EE-625A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 a) List various non-conventional energy sources.  
b) What is the scenario of the total power generation in India?  
c) Define solar azimuth angle.  
d) What is photovoltaic effect?  
e) Explain the term wind energy pattern factor?  
f) What is pitch angle?  
g) What are the limitations of using biomass?  
h) What are the advantages of Tidal power?  
i) What is the efficiency of OTEC?  
j) What is nuclear fusion? **2×10**

### **PART-A**

- Q.2 a) Discuss briefly the “Angstrom equation” used for estimation of average solar radiation. **10**  
b) How do you design and fabricate a flat plate collector? **10**
- Q.3 a) Explain the working of photovoltaic cell. What are the different ways of using PV cells to provide power? **10**  
b) Explain the working of the devices used for measuring of solar radiations. **10**
- Q.4 a) What is the classification of windmills? Describe them in detail. **10**  
b) What are the parameters to be considered while selecting a windmill? Also write the design considerations of wind turbine. **10**

### **PART-B**

- Q.5 a) Classify and explain the tidal power plants on the basis of basins. **10**  
b) Derive the relation for yearly power generation from a tidal project. **10**
- Q.6 a) What is the selection criteria for the site of hydro-electric plant? **10**  
b) Explain the construction and working of different types of turbines used in small hydro plants. **10**
- Q.7 a) List the various component of fuel cell and explain it in detail. **10**  
b) Write short notes on:  
i) Power from nuclear fusion.  
ii) Geothermal energy. **5×2**



# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **ENERGY CONSERVATION AND MANAGEMENT (EE-626)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) What is total quality management?
- b) What is energy efficiency?
- c) Discuss the significance of energy audit.
- d) What is need of energy conservation?
- e) What is meant by decamping?
- f) What is meant by electrical load analysis?
- g) What is payback in case of energy management?
- h) List the method used for calculating rate of return.
- i) What is meant by financial evaluation of energy project?
- j) What is meant by power planning?

**2x10**

### **PART-A**

Q.2 a) Explain the concept of efficient energy use.

**5**

b) Explain GDP coupling with energy intensity.

**5**

c) Write short notes on:

- i) Establishing energy database.
- ii) Energy intensity.

**5x2**

Q.3 a) What is energy audit? Discuss the concept of establishing energy database.

**10**

b) Discuss the various ways and instruments used for energy auditing.

**10**

Q.4 a) Explain the laws of thermodynamics in energy conservation.

**10**

b) Explain the energy saving opportunities in an air condition system. How would you calculate the net load for a room to be air conditioned?

**10**

### **PART-B**

Q.5 a) Discuss the general principle of electrical energy management.

**10**

b) Explain the process of electrical load analysis in detail.

**10**

Q.6 a) How 'total life cycle' cost can be determined? Also write its uses.

**10**

b) Differentiate between:

i) Average rate of return method and internal rate of return method.

**5**

ii) Payback method and present value method.

**5**

Q.7 Write short notes on the following:

a) DEFENDUS strategy.

**10**

b) Co-generation of electricity.

**10**

**End Semester Examination, Dec. 2018**  
**B. Tech. — Fifth Semester**  
**POWER GENERATION (EE-634)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.

- Q.1** Answer the following questions:

  - a) What are the types of turbine used in hydro power plant?
  - b) Why pulverized coal is preferred in thermal power plants?
  - c) Prove that load factor of a supply system is improved by an increase in diversity of load.
  - d) Mention the merits and demerits of a nuclear power plant.
  - e) What are the factors to be considered while selecting a site for diesel power plant.
  - f) Define “co-generation”.
  - g) Define “diversity factor”.
  - h) Define “load factor”.
  - i) How energy audit is beneficial for large industries?
  - j) What is meant by energy management?

## **PART-A**

- Q.2**

  - a) Discuss about the various energy sources [conventional and non-conventional] used for power generation and their availability. 10
  - b) Explain construction and working of a thermal power plant in detail. 10

**Q.3**

  - a) A generating station supplied the following:  
Loads: 150 MW, 120 MW, 85 MW, 60 MW, 5 MW.  
The station has a maximum demand of 220 MW. The annual load factor of station is 48%.  
Calculate:
    - i) Number of units supplied annually.
    - ii) Diversity factor.
    - iii) Demand factor. 12
  - b) Differentiate between base load and peak load power plant. 4
  - c) What are load curve and load duration curves? Discuss their utility in the economics of generation. 4

**Q.4**

  - a) What is traffic? Discuss and compare various tariff used in practice. 10
  - b) What is the need of power factor correction? 4
  - c) A 1Q motor connected to 400 V, 50 Hz supply takes 31.7 amp at power factor of 0.7 lagging. Calculate the capacitance required in parallel with motor to raise power factor to 0.9 lagging. 6

PART-B

- Q.5**    a) Draw block diagram of a diesel power station and discuss its operation in detail. **10**  
         b) What are the factors of selection of sets for a hydro power plant? Why hydro power plants  
            are used as peak load power plant? **10**

**Q.6**    a) With the help of neat and schematic diagram. Explain solar power plant. **10**  
         b) Write short notes on (*any two*) of the following:

- i) Magneto hydro dynamic (MHD) system.
- ii) Tidal power plant.
- iii) Wind power plant.

**5×2**

- Q.7** a) What are energy efficient motors? Discuss their role in energy saving. **10**  
b) Discuss energy audit as a part of energy management system in detail. **10**

# **End Semester Examination, Dec. 2018**

B. Tech. — Seventh Semester

## **PROGRAMMABLE LOGIC CONTROLLER AND SCADA (EE-702)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) What is automation?
- b) Differentiate between PLC based system and microprocessor based system.
- c) What are the types of sensors?
- d) What are the basic components of PLC?
- e) List the manufacturers of PLC?
- f) Discuss the application of SCADA system.
- g) What is MTU?
- h) What are real time systems?
- i) State the operation state of a power system.
- j) What is DMS?

**2×10**

### **PART-A**

**Q.2** a) Draw the block diagram of PLC and label it. Also explain the function of its each block. **10**  
b) Describe the classification of input/output module of Mitsubishi PLC. **10**

**Q.3** a) Explain the wiring diagram of Mitsubishi PLC in sink and source mode for both input and output modules. **10**  
b) Discuss the addressing scheme of iQ-R Mitsubishi PLC. **10**

**Q.4** a) Discuss the timer and counter operation of PLC. Support your answer with the help of examples. **10**  
b) Write a program for setting up lighting system for user to switch on/off the light whether they are at bottom or the top of stairs.

Take input device  $X_0$ ,  $X_1$ , and output  $Y_1$

| Device | Function                                              |           |
|--------|-------------------------------------------------------|-----------|
| $X_0$  | $X_0$ turns on when bottom switch is turned to right. |           |
| $X_1$  | $X_1$ turns on when top switch is turned to right.    |           |
| $Y_1$  | Stair light                                           | <b>10</b> |

### **PART-B**

**Q.5** a) List the benefits of automation in power system. **5**  
b) Explain the hardware architecture of SCADA system in detail. Also, discuss implementation of SCADA in AGC. **15**

**Q.6** a) Discuss the process of communication of PLC with SCADA system on ethernet. **10**  
b) Explain the block diagram of RTU in detail. **10**

Q.7 Write short notes on (***any four***) of the following:

- a) Substation layout.
- b) Energy audit.
- c) Automation in distribution.
- d) DMS.
- e) Load forecasting.

**5×4**

# End Semester Examination, Dec. 2018

B. Tech. – Seventh Semester  
**ADVANCED CONTROL THEORY (EE-703)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following:

- a) Define state space formulation.
- b) Define state space.
- c) Write the advantage of state space analysis.
- d) Write the property of state transition matrix.
- e) Define observability.
- f) Explain sampling.
- g) Describe zero order hold.
- h) Define z-transform and region of convergence.
- i) Write two property of linear system.
- j) Write the two non-linearity.

**2×10**

## **PART-A**

**Q.2** a) Determine the state model of armature controlled d.c. motor. **10**  
 b) Define state transition matrix and drive if using Laplace transformation method. **10**

**Q.3** a) Construct state model of a system whose transfer function is given by

$$\frac{Y(S)}{U(S)} = \frac{10(s + \alpha)}{s(s+1)(s+3)}$$

**10**

b) A LTI system is characterized by state equation:

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

Find the solution of state equation, assuming the initial state vector

$$\alpha_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

**10**

**Q.4** a) The transfer function of a discrete-time system is

$$\frac{Y(z)}{U(z)} = \frac{4z^3 - 12z^2 + 13z - 7}{(z-1)^2(z-2)}$$

Determine the state model of the system. **10**

b) Determine the state model of the system represented by the block diagram.

**Fig.**

**10**

## **PART-B**

- Q.5 a) Check the stability of the sampled data system described by the characteristic equation.  
 $9z^2 - 5z + 8 = 0$  **10**  
b) Determine the describing function of saturation non-linearity. **10**
- Q.6 a) Response of a system is  
 $y = ax^2 + e^{bx}$   
Test whether the system is linear or non-linear. **10**  
b) Explain, how non-linearity are introduced in the systems? Write duff non-linearity. **10**
- Q.7 Write short notes on **(any two):**  
a) Jury's stability test.  
b) Sampling.  
c) Lyapunov stability. **10×2**

# End Semester Examination, Dec. 2018

B. Tech. — Seventh Semester

## ADVANCED CONTROL THEORY (EE-703)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) Define "State model".
- b) Define "Output space".
- c) Write the advantages of state space analysis.
- d) Define "State transition matrix".
- e) Define "Controllability".
- f) Describe the process of sampling.
- g) Describe "First order hold".
- h) Differentiate between linear time invariant and non-linear time varying system.
- i) Write the transfer function of a lag compensator and draw its pole zero plot.
- j) Describe "Phase plane".

**2×10**

### **PART-A**

**Q.2** a) Determine the state model of field controlled DC motor. **10**

- b) A is the system matrix given by  $A = \begin{pmatrix} 0 & 1 \\ 2 & -3 \end{pmatrix}$ . Compute  $e^{At}$  by Laplace transform method. Also write the property of  $e^{At}$ . **10**

**Q.3** a) Construct State model of a system whose transfer function is given by:

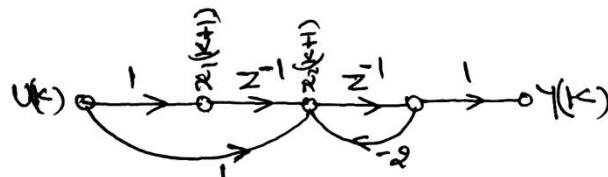
$$\frac{Y(S)}{U(S)} = \frac{10S(S+4)}{S(S+3)(S+5)} \quad \text{10}$$

- b) A LTI system is described by  $\begin{pmatrix} \dot{x}_1 \\ \dot{x}_2 \end{pmatrix} = \begin{pmatrix} 0 & 1 \\ 2 & -3 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$  and  $x_0 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$ . Find the solution of State equation. **10**

**Q.4** a) The transfer function of a discrete time system is  $\frac{Y(z)}{U(z)} = \frac{4z^3 - 12z^2 + 13z - 7}{(Z-1)^2(Z-2)}$ .

Determine the State model of discrete time system. **10**

- b) Determine the State model of discrete time system represented by signal flow graph.



**10**

### **PART-B**

**Q.5** a) Check the stability of sampled data system described by the characteristic equation:  $Z^3 - 0.2z^2 - 0.25z + 0.05 = 0$  **10**

- b) Determine the describing function of relay. **10**
- Q.6 a) Response of a system is  $y = ax^2 + e^{bx}$ . Test whether the system is linear or non-linear? **10**  
b) Explain why a system is non-linear? Also write the various non-linearity. **10**
- Q.7 Describe **(any two)** of the following:  
a) Lyapunov stability.  
b) Kalman's test for controllability.  
c) Jury's stability test. **10×2**

# **End Semester Examination, Dec. 2018**

B. Tech. – Sixth Semester

## **ELECTRIC POWER APPLICATIONS AND TRACTION (EE-721A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

- Q.1 a) Derive relationship between luminance, illumination and luminance intensity.  
b) Why AC is more suitable for resistance welding?  
c) Why AC single phase series motors are not suitable for urban and suburban services.  
d) What are the factors which affect the schedule and speed of train?  
e) Why thermostat is used in domestic refrigerator?  
f) Why is tungsten selected as the filament material?  
g) State the difference between plastic and fusion welding?  
h) What are the causes of failure of heating elements?  
i) What are the applications of high frequency eddy current heating?  
j) What is practical unit of refrigeration? Define it. **2×10**

### **PART-A**

- Q.2 a) A class room of size  $30\text{ m} \times 30\text{ m}$  is to be illuminated with 75 lux. The lamps are required to be hung 5 m above the work bench. Assume a space-height ratio of 0.9-1, utilization factor = 0.5, Lamp efficiency = 15 lumen/watt, candle power depreciation of 20%. Estimate the number rating and disposition of lamps. **10**  
b) Describe the working of filament lamp and compare it with fluorescent lamp. **10**
- Q.3 a) Give classification of various electric heating methods along with brief account of their working principles.. **15**  
b) What do you mean by 'Salt-bath heating'? **5**
- Q.4 a) Give comparison between resistance and arc welding. **10**  
b) Explain the principle of electric spot welding. **5**  
c) What are the qualities of good weld? **5**

### **PART-B**

- Q.5 a) If 18.258 gm of nickel is deposited by 100A flowing for 10 minutes, how much copper would be deposited by 50A for 6 minutes? Atomic weight of nickel = 58.6 and that of copper is 63.18. Valency of both = 2. **10**  
b) What is electroplating and what for is it done? Describe various operations involved in electroplating. **10**

- Q.6**   a) An electric train has an average speed of 42 kmph on a level track between stops 1400 m apart. It is accelerated at 1.7 kmphps and braked at 3.3 kmphps. Draw the speed time curve for the run and also indicate different time period. **10**  
      b) Discuss different types of current collectors used for over-head system. **10**
- Q.7**   a) Draw the electric circuit of refrigerator and explain its working in details. **15**  
      b) Differentiate between comfort air conditioning and industrial air conditioning. **5**

# End Semester Examination, Dec. 2018

B. Tech. – Seventh Semester  
**SOLAR ENERGY ENGINEERING (EE-725)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) What is air-mass ratio?  
b) Distinguish between diffused radiation and global radiation.  
c) What is a sunshine recorder?  
d) Define Reynolds number.  
e) What is meant by U-factor?  
f) What is a flat plate collector?  
g) What is altitude angle?  
h) Why is the storage of solar energy essential?  
i) On what factor does optimum capacity of energy storage depend on?  
j) What is meant by photovoltaic? **2×10**

## **PART-A**

- Q.2 a) Calculate declination angle (s) for march 31<sup>st</sup> in a leap year. **10**  
b) Explain structure of sun.  
c) What is spectrum? **5×2**
- Q.3 a) Explain the working of pyranometer with neat diagram. Also explain it's limitations. **10**  
b) Name and explain different type of solar collectors classified on the basis of orientation with sun. **10**
- Q.4 a) Derive the expression of  $\Delta T$  for air transfer system. **10**  
b) Describe in brief community heating and cooling system. **10**

## **PART-B**

- Q.5 a) Describe in detail any type of solar pond with help of neat sketch. **10**  
b) Mention the materials used along with their applications used for heat storage. **10**
- Q.6 Describe in detail the solar gas absorption refrigeration scheme with heat layout and also give it's applications. **20**
- Q.7 Write short notes on (**any two**):  
a) Community heating and cooling system.  
b) Solar cells.  
c) Solar water pumping. **10×2**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **CONSERVATION OF ENERGY AND MANAGEMENT (EE-726)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) What is energy intensity?  
b) What is total quality management?  
c) What is the need of energy conservation?  
d) Explain the concept of energy effectiveness.  
e) Define the term 'coefficient of performance'.  
f) What is meant by 'DEFENDUS strategy'?  
g) What is the difference between sources and resources?  
h) What do you understand by compensator in heating?  
i) What is meant by climate protection?  
j) Write the mathematical relation of the interval rate of return method. **2×10**

### **PART-A**

- Q.2 a) State and explain the principles of energy management. **15**  
b) Briefly explain the value of energy management. **5**
- Q.3 Explain "Energy management program" in detail. What is the role of energy audit in energy management program? **20**
- Q.4 a) What is meant by HVAC? **7**  
b) Explain in detail the management of refrigeration. **13**

### **PART-B**

- Q.5 a) Explain the process to improve lighting efficiency. **10**  
b) What the various lighting fundamentals? **10**
- Q.6 a) State and explain average rate of return. **10**  
b) Explain total life cycle cost with mathematical expression. **10**
- Q.7 Write short notes on:  
a) Cogeneration of energy.  
b) Use of computers in energy management. **10×2**

# **End Semester Examination, Dec. 2018**

B. Tech – Seventh Semester  
**POWER SYSTEM MANAGEMENT (EE-727)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 1*

Note: Attempt any **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following:

- a) What is the share of renewable sources in the total power generation in India?
- b) What is the total resource potential of electricity sector in India?
- c) State various generator cost curves.
- d) What is meant by incremental fuel cost curve?
- e) What is meant by scheduling of load?
- f) What is the need of load forecasting?
- g) Define the term peak demand.
- h) On what basis forecasting is classified?
- i) What is meant by distribution planning?
- j) Name the methods used for electrical load forecasting used in India.

**2x10**

## **PART-A**

**Q.2** a) Discuss various issues the India electricity sector is facing.

**10**

b) Write a short note on Grid Management.

**10**

**Q.3** a) List the main features of the electricity act, 2003.

**10**

b) Briefly explain the instrumentation and controls used in power plants.

**10**

**Q.4** a) Differentiate between explanatory and time series forecasting.

**10**

b) State and explain various peak demand forecasting technologies.

**10**

## **PART-B**

**Q.5** a) State and explain spacial load forecasting techniques.

**10**

b) Explain the importance of forecasting in electric power industries.

**10**

- Q.6 a) How does end use model estimate energy consumption?  
**6**
- b) In which fields time series method of load forecasting is used?  
**7**
- c) Briefly explain pattern based forecasting.  
**7**
- Q.7 a) What are the various steps taken in medium and long term planning studies?  
**10**
- b) Write a short note on transmission system planning.  
**10**

# End Semester Examination, Dec. 2018

B. Tech. — Eighth Semester  
**ADVANCED POWER SYSTEM (EE-728)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

**Q.1** Answer the following questions:

- Define load bus and give its importance.
- State importance of automatic voltage regulator.
- What is the effect of mutual coupling?
- What are the classification of unsymmetrical fault?
- What is contingency analysis?
- The Gauss-seidel method has \_\_\_\_\_ convergence characteristics.
- List advantage of N-R and G-S method.
- What are positive, negative and zero sequence components in power system.
- Define slack bus.
- What is sparsity?

**2x10**

## **PART-A**

**Q.2** a) What do you understand by load frequency control loop? Explain LFC for simple area in detail.

**10**

- b) Explain AVR in detail.

**10**

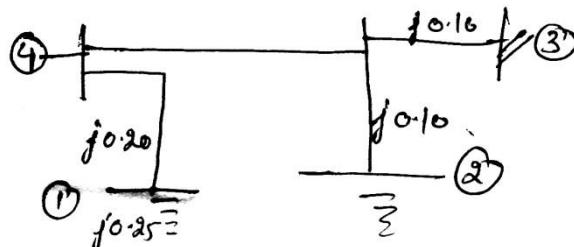
**Q.3** a) Explain the representation of synchronous motor and transmission lines in power systems.

**16**

- b) List advantages and disadvantages of per unit system.

**4**

**Q.4** a) For the network assemble  $Z_{bus}$  network:



**10**

- b) Explain Tinney's optional ordered coupling triangular formulation of bus impedance matrix.

**10**

**PART-B**

- Q.5 a) What are unsymmetrical faults? Find fault current for SLG fault on a power system.

**10**

- b) Explain the contingency analysis for power system and what are the approximation in contingency analysis.

**10**

- Q.6 a) Explain Newton-Raphson method and write its algorithm.

**10**

- b) Derive power flow equation for power system.

**10**

- Q.7 a) Explain economic dispatch for a thermal generation station neglecting the loss in power system.

**10**

- b) Explain loss coefficient calculation using  $Y_{bus}$ .

**10**

# End Semester Examination, Dec. 2018

B. Tech. — Eighth Semester  
**AUTOMATIC FLIGHT CONTROLS (EE-735)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

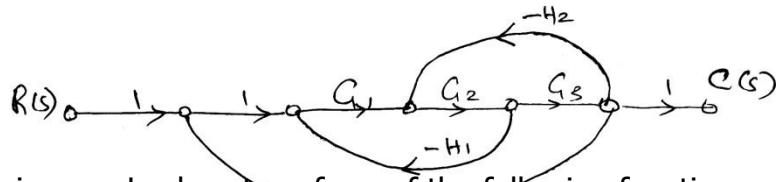
**Q.1** Answer the following questions:

- a) Define "Transfer function".
- b) What is settling time?
- c) Write the Mason's gain formula.
- d) Name the standard test signals using in control system.
- e) What is an autopilot?
- f) What is an accelerometer?
- g) What is sufficient condition for stability?
- h) What is a breakaway point in root locus?
- i) What is acceleration error constant?
- j) Find the Laplace transforms of the function  $\sin^2 t$ .

**2×10**

## **PART-A**

**Q.2** a) Consider the system shown in figure-1. Obtain transfer function using Mason's gain formula.



**10**

b) Find the inverse Laplace transform of the following functions:

$$\text{i) } \frac{2s^2 + 3s + 2}{(s+2)^2}.$$

$$\text{ii) } \frac{2s+8}{(s^2+3s+2)}.$$

**5×2**

**Q.3** a) Obtain the unit step response of a second order under damped system? **10**

b) For the unity feedback system with  $G(s) = \frac{10}{s(1+0.25s)(1+0.5s)}$ . Obtain the position, velocity and acceleration error constants. **10**

**Q.4** a) Sketch the root locus of  $G(s) = \frac{10}{s(s^2+8s+15)}$ . **10**

b) Check the stability of the characteristic equation  $2s^5 + 2s^4 + 5s^3 + 5s^2 + 3s + 5 = 0$ . **10**

## **PART-B**

**Q.5** a) Explain the components of longitudinal autopilot with a block diagram. **10**  
 b) Explain flight control systems. **10**

- Q.6 a) Draw the block diagram of lateral autopilot and explain its components. **10**  
b) Discuss the advantages and disadvantages of fly by wire system in aircraft control. **10**
- Q.7 Write short notes on **(any two)** of the following:  
a) Honeywell self-adaptive control system.  
b) Pitch orientational control system.  
c) Yaw orientational control system. **10×2**

# **End Semester Examination, Dec. 2018**

## **B. Tech. – Seventh / Eighth Semester ADVANCED CONTROL SYSTEM (EE-801)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

- Q.1 a) What are the advantages of control system in state space?

- b) Define state.
- c) State the condition for observability by Kalman's method.
- d) Define controllability.
- e) Write the property of transition of matrix.
- f) Explain the term region of convergence (ROC).
- g) Define 'limit cycle'.
- h) List common on Linnaeites present in the system.
- i) What is pulse transfer function?
- j) Find z-transform of:

$$x_1(n) = \begin{pmatrix} 4, 6, 0, 2, 5, 1 \\ \uparrow \end{pmatrix}$$

**2×10**

### **PART-A**

- Q.2 a) Obtain the state space representation for system characterized by the differential equation  $\frac{d^3y}{dt^3} + \frac{4d^2y}{dt^2} + \frac{9dy}{dt} + 8y = 6u(t)$  where  $y$  is the output and  $u$  is the input to the system. **12**

- b) Diagonalize matrix  $A = \begin{bmatrix} 1 & 4 \\ -2 & -5 \end{bmatrix}$  **8**

- Q.3 a) The state model of a linear time invariant system is given by:

$$\dot{X}(t) = A X(t) + B U(t)$$

$$Y(t) = C X(t) + D U(t)$$

Obtain the reppresenation for transfer function of the system. **10**

- b) State model of a system is given by:

$$\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \\ \dot{X}_3 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 1 \\ -2 & -3 & 0 \\ 0 & 2 & -3 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 2 \\ 0 \end{bmatrix} u; Y = \begin{bmatrix} 1 & 0 & 0 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix}$$

Check whether the system is controllable or not. **10**

- Q.4 a) Draw and explain ROC for infinite duration sequence. **8**

- b) Find  $z$  transform of  $x(n) = e^{-an}u(n)$ . **6**

- c) Find inverse  $z$  transform of  $\frac{4z^2 - 2z}{z^3 - 5z^2 + 8z - 4}$ . **6**

### **PART-B**

- Q.5 a) Check the stability of sampled data control system characterized by equation:  
$$z^3 - 0.2z^2 - 0.25z + 0.05 = 0$$
 **10**  
b) State and prove sampling theorem. **10**
- Q.6 a) Derive an expression for describing function for saturation nonlinearity. **10**  
b) Discuss dead zone and backlash nonlinearities present in system. **10**
- Q.7 a) Describe Lyapunov's stability criterion for stability of a non-linear system. **10**  
b) Differentiate between stability and instability. Also explain asymptotic stability. **10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **UTILIZATION OF ELECTRIC POWER AND TRACTION (EE-821)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following:

- a) Why is tungsten selected as the filament material?
- b) Compare the metal filament lamp with discharge lamps.
- c) List the properties of good heating element.
- d) Mention the advantages of dielectric heating.
- e) What are the limitations of resistance welding?
- f) Write the full form of TIG and MIG welding?
- g) The process of depositing a coating of one metal over another metal or non-metal electrically is called \_\_\_\_\_.
- h) What are the applications of electrolysis?
- i) Write the factors on which the quantity of electroplating depends.
- j) What are the requirements of an ideal traction system? **2×10**

### **PART-A**

**Q.2** a) Explain with a neat sketch, the construction and working of a sodium vapour lamp. **10**  
b) An office  $25\text{ m} \times 12\text{ m}$  is illuminated by 40W incandescent lamps of lumen output 2700 lumens. The average illumination required at a workplace is 200 lux. Calculate the number of lamps required to be fitted in the office. Assume utilization and depreciation factors as 0.65 and 1.25 respectively. **10**

**Q.3** Explain different methods of induction heating. Give some applications of induction heating. **20**

**Q.4** a) Compare AC and DC welding in detail. **8**  
b) Describe the following types of welding:  
i) TIG welding.  
ii) MIG welding. **6×2**

### **PART-B**

**Q.5** a) State law's of Faraday of electrolysis and explain it in detail. **10**  
b) Calculate the thickness of copper deposited on a plate area of  $2.2\text{ cm}^2$  during electrolysis if a current of 1A is passed for 90 minutes. ECE of copper =  $32.95 \times 10^{-8}$  and density of copper =  $8900\text{ kg/m}^3$ . **10**

**Q.6** a) Describe different systems of track electrification? **8**  
b) Explain speed-time curve of a train running on main line. **12**

- Q.7 a) Draw electric circuit of a refrigerator and explain its working. How can temperature inside the refrigerator be adjusted? **10**
- b) Explain the working of central air-conditioning system. How is air from microorganism, gaseous contaminant and odours purified? **10**

# **End Semester Examination, Dec. 2018**

B. Tech. — Eighth Semester

## **FACTS DEVICES AND ITS APPLICATIONS (EE-831)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Distinguish between load compensation and system compensation.
- b) Write the need for a reactor in basic single phase TSC diagram.
- c) List the advantages of slope in dynamic characteristics of SVC.
- d) What is PSDC?
- e) List the different modes of TCSC operation.
- f) Draw the VI capability characteristics of single module TCSC.
- g) Draw VI characteristics of STATCOM.
- h) Define SSSC and list the components in it.
- i) List the various possible combinations for the study of controller interactions.
- j) What are the frequencies ranges for the study of different control interactions? **2×10**

### **PART-A**

Q.2 Discuss the various active and passive compensation on power transmission capacity with necessary diagrams and expressions. **20**

Q.3 Explain the role of SVC in increasing the steady state power transfer capacity with necessary diagrams and expressions. **20**

Q.4 a) Explain the principle of operation and applications of STATCOM. **10**  
b) Explain the power exchange process between STATCOM and power system. **10**

### **PART-B**

Q.5 a) Discuss the advantages of TCSC in detail. **8**  
b) Describe the variable reactance model of TCSC with block diagram. **12**

Q.6 Explain the principle of operation of SSSC and series compensation using necessary diagrams. **20**

Q.7 Discuss the control coordination of multiple controllers using linear techniques for power flow control applications. **20**

# End Semester Examination, Dec. 2018

B. Tech. — Eighth Semester

## WIND ENERGY CONVERSION SYSTEMS (EE-833)

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) State the principle of wind energy extraction.
- b) What do you mean by aerodynamics?
- c) Define "Thrust-Efficiency".
- d) List different types of pitch control.
- e) Differentiate between synchronous and asynchronous wind turbine generator (WTG).
- f) Draw the basic circuit diagram of asynchronous induction generator.
- g) Explain principle of Magnus effects.
- h) What are the advantages of wind energy conversion system over other generating system?
- i) Compare mono blade, twin blade and three blade HAWT generators.
- j) What are the advantages of Savonius type (VAWT) generator? **2×10**

### **PART-A**

- Q.2** a) Explain the principle of wind energy extraction. **5**  
b) Derive the expression for power obtained from wind-single momentum theory. **15**
- Q.3** Describe different types of horizontal axis wind turbine (HAWT) generator. **20**
- Q.4** a) Explain constant speed constant frequency system with diagram. **10**  
b) Differentiate between steady state and transient state stability analysis used for the generator modeling. **10**

### **PART-B**

- Q.5** a) Describe different types of permanent magnet synchronous generator with diagrams. **10**  
b) List the essential factors for variable speed wind energy conversion system. **10**
- Q.6** a) Explain the concept of grid connected system. **15**  
b) What are the current practices and industrial trends used for grid connected system. **15**
- Q.7** Write short notes on the following:
  - a) Wind diesel hybrid system.
  - b) Wind thermal hybrid system. **10×2**

# End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester  
**SMART GRID TECHNOLOGY (EE-834)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) What is smart grid?
- b) What is the difference between smart grid and conventional grid?
- c) List the number of transmission system used in smart grid technology.
- d) What is the role of cloud computing in smart grid?
- e) What are the various issues arised in power quality grid connected renewable energy sources?
- f) What are the different methods used for fault detection in smart grid?
- g) Briefly explain outage management system.
- h) What are smart appliances?
- i) What is the role of smart sensor?
- j) State the applications of microgrid?

**2×10**

## **PART-A**

- Q.2** a) Draw the architecture of smart grid and explain it in detail. **10**  
b) Explain the concept of resilient and self-healing grid. **10**
- Q.3** a) Explain substation automation and feeder automation with its merits and demerits. **10**  
b) Write the short notes on:  
i) FACTS.  
ii) EMS. **5×2**
- Q.4** a) What are the different types of AMI protocols used in smart grid? Write the benefits of advanced metering infrastructure. **10**  
b) Explain home and building automation with its block diagram **10**

## **PART-B**

- Q.5** a) What do you mean by power quality conditioner? Explain different types of power quality conditioner used in smart grid. **12**  
b) Explain web based power quality monitoring. **8**
- Q.6** a) What are the different issues which occur during interconnection of microgrid? **10**  
b) How we can obtain protection and control in microgrid? **10**
- Q.7** a) Draw and explain the block diagram of local area network. **10**  
b) What are the advantages of WAN over NAN? **5**  
c) How can we make smart grid smarter? **5**



# **End Semester Examination, Dec. 2018**

B. Tech. — Eighth Semester  
**ENVIRONMENTAL ENGINEERING (EE-836)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) Define "Ecosystem".
- b) What is the need for development of an environment?
- c) From where do we obtain groundwater?
- d) How can we prevent water borne disease?
- e) What are the advantages of surface water over groundwater?
- f) Why testing of sewers are necessary?
- g) List the disadvantages of separate sewerage system.
- h) Explain the tertiary treatment method for sewage treatment.
- i) How sand filter purifies the water?
- j) What strategies should be adopted for exposure to radiation reduction at workplaces?

**2×10**

## **PART-A**

- Q.2** Which acts and regulatory laws has already been implemented in the direction of adopting pollution control strategies. Also explain the function of main bodies for enforcement of these laws. **20**
- Q.3** a) Explain in detail the process of desalination and fluoridation for water treatment. **10**  
b) What are the various forms of underground sources and describe which activities are leading to their over exploitation in detail. **10**
- Q.4** a) Discuss the types of sewerage systems with their advantages and disadvantages. **15**  
b) What components of sewerage systems are necessary for successfully conveying wastewater to the treatment plant? **5**

## **PART-B**

- Q.5** a) Describe the process of sewage treatment with a neat block diagram labeling all the processes. **15**  
b) Give the process description of trickling filters used to remove organic matter from wastewater with its advantages and disadvantages. **5**
- Q.6** a) Classify the health hazards which give rise to occupational diseases or adversely affect health through work. **15**  
b) What do you understand by personal protective equipment? Name them. **5**
- Q.7** a) State the quality management benefits with respect to the principles used by organizations management for improved performance approaches. **15**

b) Write a short note on occupational health and safety management system.

**5**

# **End Semester Examination, Dec. 2018**

M. Tech. – First Semester

## **PWM CONVERTER AND APPLICATIONS (EE-M-126)**

Time: 3 hrs.

Max Marks: **75**

No. of pages: **1**

Note: Attempt **ANY FIVE** questions in all. Marks are indicated against each question.

- Q.1 a) What are the main differences between voltage source and current source inverters? **8**  
b) What are the main advantages and disadvantages of variable dc link inverters? **7**
- Q.2 A single phase full-bridge inverter controls the power in a resistive load. The nominal value of input dc voltage is  $V_s = 220V$  and a uniform pulse width modulation with 5-pulses per half cycle is used. For the required control, the width of each pulse is  $30^\circ$ .  
a) Determine the rms voltage of the load.  
b) If the dc supply increases by 10% determine the pulse width to maintain the same power. If the maximum possible pulse width is  $35^\circ$ , determine the minimum allowable limit of the dc input source. **15**
- Q.3 In a stepup converter, the duty ratio is adjusted to regulate the output voltage  $V_o$  at 48V. The input voltage varies in a wide range from 12V to 36V. The maximum polar output,  $120\text{ m}$ . For stability Reasons, it is required that the converter always operate in a discontinuous current conduction mode. The switching frequency is 50 KHz. Assuming ideal components and  $c$  as very large, calculate maximum value of  $L$  that can be used. **15**
- Q.4 Derive an expression for ripple voltage,  $DV_o$  (prate peak) in a discontinuous conduction mode of a buck-boost converter, in terms of the circuit parameters. **15**
- Q.5 A three phase 11.2 kW, 1750 rpm, 460V, 60 Hz four pole wye-connected induction motor has the following parameters  $R_s = 0.66n$ ,  $R_r = 0.38n$ ,  $X_s = 1.14n$ ,  $X_r = 1.71n$  and  $X_m = 33.2n$ . The motor is controlled by varying both the voltage and frequency. The volts/hertz ratio which corresponds to the rated voltage and rated frequency is maintained constant. a) Calculate the maximum torque  $T_m$  and the corresponding speed  $\omega_m$  for 60 Hz and 30 Hz. **15**
- Q.6 Explain how is the selective harmonics eliminated by PWM technique in high power electric drivers. **15**
- Q.7 What are the techniques for harmonics reductions from inverter output? What are the effects of eliminating lawn order harmonics? **15**

Q.8 Classify, the inverter used to control the speed and torque of a induction motor. Explain, how is the speed and torque of induction motor controlled by PWM-USI? **15**

# **End Semester Examination, Dec. 2018**

M. Tech. – Third Semester

## **HVDC AND EHVAC TRANSMISSION SYSTEM (EE-M-301)**

Time: 3 hrs.

Max Marks: **75**

No. of pages: **1**

Note: Attempt **FIVE** questions in all. Marks are indicated against each question.

- |     |                                                                                                                                                      |                       |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Q.1 | Explain the cases in which EHVAC is better and in which HVDC is better for power transmission?                                                       | <b>15</b>             |
| Q.2 | Explain the theory of travelling and standing waves. Derive an expression for an open circuited transmission line travelling wave.                   | <b>15</b>             |
| Q.3 | a) What are the various advantages and disadvantages of reactive power?<br>b) Explain the working principle of static VAR controller.                | <b>5</b><br><b>10</b> |
| Q.4 | Explain how harmonics are controlled using AC and DC filters?                                                                                        | <b>15</b>             |
| Q.5 | Explain converter configurations and their characteristics which are used in HVDC transmission.                                                      | <b>15</b>             |
| Q.6 | a) Define: i) Critical disruptive voltage.<br>ii) Visual critical voltage.<br>b) Explain Corona and losses due to Corona in EHV transmission system. | <b>5</b><br><b>10</b> |
| Q.7 | Explain parallel operation of HVDC and EHVAC transmission systems.                                                                                   | <b>15</b>             |
| Q.8 | a) What is explaining DC link control?<br>b) Explain the various faults and protection in HVDC system.                                               | <b>5</b><br><b>10</b> |



# **End Semester Examination, Dec. 2018**

M. Tech. — Third Semester

## **LOAD AND ENERGY MANAGEMENT (EE-M-324)**

Time: 3 hrs.

Max Marks: **75**

No. of pages: **1**

Note: Attempt **FIVE** questions in all. Marks are indicated against each question.

- |     |                                                                                                                                                                                                                                                                |           |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Q.1 | a) State the different load modes used in load forecasting.                                                                                                                                                                                                    | <b>7</b>  |
|     | b) Explain the method to estimate the average of the load forecasting with periodic and seasonal variations.                                                                                                                                                   | <b>8</b>  |
| Q.2 | a) Narrate some of the important issues relating to implementation of DMS.                                                                                                                                                                                     | <b>5</b>  |
|     | b) Explain the term 'tariff' used in power system.                                                                                                                                                                                                             | <b>10</b> |
| Q.3 | a) Explain the Kalman filtering approach for estimation of stochastic load forecasting component.                                                                                                                                                              | <b>8</b>  |
|     | b) What are the recent trends in load forecasting in view of deregulated power system?                                                                                                                                                                         | <b>7</b>  |
| Q.4 | a) Differentiate between load duration curve and load curves.                                                                                                                                                                                                  | <b>5</b>  |
|     | b) The annual load duration curve of a small hydro plant shows $438 \times 10^4$ KWh of energy during the year. It is peak load plant with 20% annual load factor. Find station capacity. If plant capacity factor is 15%, find the reserve capacity of plant. | <b>10</b> |
| Q.5 | a) Why should part load operation of an induction motor lead to more losses of energy and lower efficiency?                                                                                                                                                    | <b>8</b>  |
|     | b) What are the main provisions of Energy Conservation Act?                                                                                                                                                                                                    | <b>7</b>  |
| Q.6 | a) "Measurement are essential part of energy audit" why?                                                                                                                                                                                                       | <b>8</b>  |
|     | b) Discuss the role of energy management team in detail.                                                                                                                                                                                                       | <b>7</b>  |
| Q.7 | a) Which industries generally go for the captive power plant and why?                                                                                                                                                                                          | <b>7</b>  |
|     | b) How are cost calculations done for a captive power plant? Explain in detail.                                                                                                                                                                                | <b>8</b>  |

# **End Semester Examination, Dec. 2018**

M. Tech. (P.S.E.D.) - Third Semester  
**LOAD AND ENERGY MANAGEMENT (EE-M-324)**

Time: 3 hrs

Max Marks: **75**

*No. of pages: 1*

Note: Attempt any **FIVE** questions in all. Each question carries equal marks.

Q.1 A steam station has two 110 MW units.

The cost of data is as under:

**Unit-I**

|                      |                          |
|----------------------|--------------------------|
| Unit capital cost =  | Rs. 18000/- per kW       |
| Fixed charge rate =  | 10%                      |
| Capacity factor =    | 0.55                     |
| Fuel consumption =   | 0.7 kg/kWh               |
| Fuel cost =          | Rs. 1500/- per 1000 kg.  |
| Cost of labour =     | 20% of annual fuel cost. |
| Utilization factor = | 1                        |

**Unit-II**

|                      |                          |
|----------------------|--------------------------|
| Unit capital cost =  | Rs. 3000/- per kW.       |
| Fixed charge rate =  | 10%                      |
| Capacity factor =    | 0.60                     |
| Fuel consumption =   | 0.65 kg/kWh              |
| Fuel cost =          | Rs. 1500/- per 1000 kg.  |
| Cost of labour =     | 15% of annual fuel cost. |
| Utilization factor = | 1                        |

- Calculate:
- a) Annual plant cost and generation cost of unit-I.
  - b) Annual plant cost and generation cost of unit-II.
  - c) Overall generation cost of the station.

**15**

Q.2 a) Describe various methods for short, medium and long range load forecasting in power system. What is the significance of these forecasting for various types of power system operation and control?

**10**

b) State different load modes used in load forecasting. What are the limitations?

**5**

Q.3 What is load forecasting? Discuss long term load forecasting and short term load forecasting in detail.

**15**

Q.4 a) Explain the details of energy growth scenario in India with some details of state of Haryana.

**10**

b) Explain future trends for energy management in India.

**5**

Q.5 a) Discuss the various roles of energy management team.

**5**

b) Discuss how the energy audit of heating, ventilation and air conditioning systems is done.

**10**

Q.6 a) Find the generation cost of a captive power plant installed in a sugar mill from the following data:

Size of plant 25 MW , total capital cost Rs. 800 million, interest rate 10%, life of plant 20 years. The plant will use bagasse as fuel which is free of cost. Annual operation and maintenance cost 5% of capital cost, load factor 60%, subsidy 30%.

**8**

b) Explain various government policies regarding captive power development.

**7**

Q.7 a) Explain the role of central electricity regulatory commission of implementation of deregulation in India.

**8**

b) Explain power system restructuring efforts made in foreign countries.

**7**

Q.8 a) Discuss the organization of power sector in India.

**9**

b) Give the main provisions of Grid code.

**6**

# **End Semester Examination, Dec. 2018**

B.A. (Hons.) English – Second Semester

## **CLASSICAL LITERATURE (ENG.-2.5)**

Time: 3 hrs.

Max Marks: **70**

No. of pages: 1

Note: *Question paper has three sections A, B, and C. All sections are compulsory. Marks are indicated against each question.*

### **SECTION-A**

Q.1 Explain the following passages with reference to the context (**any five**):

- a) "Today well lived makes every yesterday a memory of happiness and every tomorrow a vision of hope."
- b) I fear for the ruin of our line.  
When brother are split, a quarrel is sure:
- c) "... let the enemies be challenged! I shall take no risk, nor fight a battle in front of armies: I shall throw dice and, whole body and wise defeat the fools! Be sure, the dice are my bows and arrows, the heart of the dice my string, the dicing rug my chariot!"
- d) I accept with gratitude a Brahman's benediction...  
Is the chief of your Society now at home?
- e) Your kind words, noble Sir, fill me with confidence, and prompt me to inquire of what regal family our noble guest is the ornament? What country is now mourning his absence? And what induced a person so delicately nurtured to expose himself to the fatigue of visiting this grove of penance?
- f) "...If a guide, seduced by his enemy, gets confused about what path to take, how can followers follow his path?..."
- g) "There are three who own no property. A student, a slave, a dependent woman:"  
The wife of a slave, you are his now, my dear; A masterless slave wench, you are now slave wealth!"
- h) "We should not disturb the grove! Stop the chariot... one should not enter an ascetics grove in hunting gear. Take these!"

**3x5**

### **SECTION-B**

Q.2 Give short answer to the following questions (**any five**):

- a) What is the role of Madhvya in *Abhijan Shakuntalam*?
- b) What are some of the major themes in "The Recognition of Shakuntala"?
- c) What were the responses to draupadi's question in the game of dice? Explain with a suitable example.
- d) What was the dramatic function of ring in *abhijnana shakuntalam*?
- e) Critically comment on the role of Draupadi in Mahabharat.
- f) Explain the dramatic significance of the loss of Shakuntala's ring.
- g) What is the message to society by the silence of Dhrtarastra?
- h) Discuss the portrayal of men and women in Bharatamuni's *Natyashashtra*.

**5x5**

### **SECTION-C**

Q.3 Answer (**any two**) of the following (*Essay type*) questions:

- a) Define in brief the major themes of Abhijnanasakuntalam with a suitable example.
- b) Explain important difficulties when the game of dicing was arranged? Write its stake in this game.
- c) The game of dice was a gamble, and gamble is considered "adharma" or immoral/vice. Still he chose to play that game. Why did dharmaraja do this adharma?

**15x2**

# **End Semester Examination, Dec. 2018**

B.A. (Hons.) English – Second Semester

## **CLASSICAL LITERATURE (ENG.-2.5)**

Time: 3 hrs.

Max Marks: **70**

No. of pages: 1

Note: *Question paper has three sections A, B, and C. All sections are compulsory. Marks are indicated against each question.*

### **SECTION-A**

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# **End Semester Examination, Dec. 2018**

B.A. (Hons.) English – Second Semester  
**CLASSICAL LITERATURE (ENG.-2.5)**

Time: 3 hrs.

Max Marks: **70**

No. of pages: 1

Note: *Question paper has three sections A, B, and C. All sections are compulsory. Marks are indicated against each question.*

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When brother are split, a quarrel is sure:
  - c) "... let the enemies be challenged! I shall take no risk, nor fight a battle in front of armies: I shall throw dice and, whole body and wise defeat the fools! Be sure, the dice are my bows and arrows, the heart of the dice my string, the dicing rug my chariot!"
  - d) I accept with gratitude a Brahman's benediction...  
Is the chief of your Society now at home?
  - e) Your kind words, noble Sir, fill me with confidence, and prompt me to inquire of what regal family our noble guest is the ornament? What country is now mourning his absence? And what induced a person so delicately nurtured to expose himself to the fatigue of visiting this grove of penance?
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The wife of a slave, you are his now, my dear; A masterless slave wench, you are now slave wealth!"
  - h) "We should not disturb the grove! Stop the chariot... one should not enter an ascetics grove in hunting gear. Take these!"

**3x5**

## **SECTION-B**

- Q.2 Give short answer to the following questions (**any five**):

- a) What is the role of Madhvya in *Abhijan Shakuntalam*?
- b) What are some of the major themes in "The Recognition of Shakuntala"?
- c) What were the responses to draupadi's question in the game of dice? Explain with a suitable example.
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### **SECTION-C**

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- a) Define in brief the major themes of Abhijnanasakuntalam with a suitable example.
- b) Explain important difficulties when the game of dicing was arranged? Write its stake in this game.
- c) The game of dice was a gamble, and gamble is considered "adharma" or immoral/vice. Still he chose to play that game. Why did dharmaraja do this adharma?

**15x2**

# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – First Semester**

**ENGLISH PROSE (ENG-1.1)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: *Question paper has three sections A, B and C. All sections are compulsory. Marks are indicated against each question.*

## **SECTION-A**

Q.1 Write short answers to (**any five**):

- a) What is an Essay? Explain.
- b) "Reading maketh a full man; conference a ready man; and writing an exact man". Explain.
- c) "Travel in the younger sort, is part of education: in the elder a part of experience". Explain with reference to the context.
- d) "Studies serve for delight, for ornament, and for ability". Explain with reference to the context.
- e) "We are not of Alice, nor of thee, nor are we children at all. The children of Alice call Bartram father. We are nothing, less than nothing, and dreams". Explain with reference to the context.
- f) What is Bacon's view on travel in 'Of Travel'?
- g) What, according to Bacon, is the benefit of studies?
- h) Bring out the picture of Lamb's grandmother that we get from his essay 'Dream Children: A Reverie'.

**3x5**

## **SECTION-B**

Q.2 Write short answer to the following questions (**any five**):

- a) "Read not to contradict and confute, nor to believe and take for granted, nor to find talk and discourse, but to weigh and consider". Discuss.
- b) "...for quarrels, they are with care and discretion to be avoided: they are commonly for mistresses, healths, place, and words; and let a man beware how he keepeth company with choleric and quarrelsome persons; for they will engage him into their own quarrels". Explain.
- c) "Travel in the younger sort is a part of education: in the elder, a part of experience". Discuss.
- d) "Studies serve for delight, for ornament and for ability". Explain.
- e) "Crafty men condemn studies, simple men admire them, and wise men use them". Justify.
- f) "Bacon is not an idealist, he believed in worldly wisdom". Justify.
- g) What do you mean by the aphoristic style of Bacon? Discuss.

h) Write down the summary of 'Dream children: a Reverie'.

**5x5**

**SECTION-C**

Q.3 Answer (**any two**) of the following essay type questions:

- a) 'The essays of Bacon constitute a handbook of practical wisdom'. Discuss.
- b) Write a note on the development of English essays from Bacon to Lamb.
- c) To what extent does Lamb reveal himself in his essays? Give examples from the essay you have read.

**15x2**

# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – First Semester**

**ENGLISH PROSE (ENG-1.1)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: *Question paper has three sections A, B and C. All sections are compulsory. Marks are indicated against each question.*

## **SECTION-A**

Q.1 Write short answers to (**any five**):

- a) What is an Essay? Explain.
- b) "Reading maketh a full man; conference a ready man; and writing an exact man". Explain.
- c) "Travel in the younger sort, is part of education: in the elder a part of experience". Explain with reference to the context.
- d) "Studies serve for delight, for ornament, and for ability". Explain with reference to the context.
- e) "We are not of Alice, nor of thee, nor are we children at all. The children of Alice call Bartram father. We are nothing, less than nothing, and dreams". Explain with reference to the context.
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**3x5**

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**15x2**

# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – First Semester**

**ENGLISH PROSE (ENG-1.1)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: *Question paper has three sections A, B and C. All sections are compulsory. Marks are indicated against each question.*

## **SECTION-A**

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- a) What is an Essay? Explain.
- b) "Reading maketh a full man; conference a ready man; and writing an exact man". Explain.
- c) "Travel in the younger sort, is part of education: in the elder a part of experience". Explain with reference to the context.
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- h) Bring out the picture of Lamb's grandmother that we get from his essay 'Dream Children: A Reverie'.

**3x5**

## **SECTION-B**

Q.2 Write short answer to the following questions (**any five**):

- a) "Read not to contradict and confute, nor to believe and take for granted, nor to find talk and discourse, but to weigh and consider". Discuss.
- b) "...for quarrels, they are with care and discretion to be avoided: they are commonly for mistresses, healths, place, and words; and let a man beware how he keepeth company with choleric and quarrelsome persons; for they will engage him into their own quarrels". Explain.
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**5x5**

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- a) 'The essays of Bacon constitute a handbook of practical wisdom'. Discuss.
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- c) To what extent does Lamb reveal himself in his essays? Give examples from the essay you have read.

**15x2**

# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – First Semester**  
**ENGLISH DRAMA-I (ENG-1.2)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: Question paper has **three** sections **A**, **B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

- Q.1 Answer (**any five**) of the following short questions. Explaining the given lines with reference to the context:
- O, that this too too solid flesh would melt,  
Thaw and resolve itself into a dew!
  - What a piece of work is a man!  
How noble in reason, how infinite in faculties,  
In form and moving how express and admirable,  
In action how like an angel, in apprehension how like a God!
  - I hop'd thou shouldst have been my Hamlet's wife.  
I thought thy bride-bed to have deck'd, sweet maid,  
And not have strew'd thy grave.
  - Not a whit, we defy augury: there's a special  
Providence in the fall of a sparrow. If it be now,  
'Tis not to come; if it be not to come, it will be  
Now; if it be not now, yet it will come.  
The Readiness is all.
  - Men have died from time to time, and worms have eaten them, but not for love.
  - If she be a traitor,  
Why, so am I. We still have slept together,  
Rose at an instant, learned, played, eat together,  
And wheresoe'er we went, like Juno's swans,  
Still we went coupled and inseparable".
  - Sweet are the uses of adversity,  
Which, like the toad, ugly and venomous,  
Wears yet a precious jewel in his head;
  - All the world's a stage, and all the men and women merely players.

**3x5**

## **SECTION-B**

- Q.2 Answer (**any five**) of the following questions:
- Describe the events that lead to Gertrude's death.
  - Dilate the relationship between Hamlet and Gertrude.
  - Write down a note on Shakespearean tragedy.
  - What is the significance of the songs of Ophelia?

- e) Bring out the significance of the *Forest of Arden* in *As You Like It*.
- f) Throw light on the relationship between Rosalind and Celia.
- g) Critically analyse the song 'All the World is a Stage'.
- h) Why does Orlando decide to leave the castle of his elder brother Oliver?

**5x5**

### **SECTION-C**

Q.3 Answer (**any two**) of the following questions:

- a) Why is it not adequate to describe Hamlet as a tragedy of revenge? Explain.
- b) Discuss and illustrate the various types of love mentioned in *As You Like It*.
- c) Assess *As You Like It* as a lyrical comedy of romantic love.

**15x2**

# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – First Semester**  
**ENGLISH DRAMA-I (ENG-1.2)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: Question paper has **three** sections **A**, **B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

- Q.1 Answer (**any five**) of the following short questions. Explaining the given lines with reference to the context:
- O, that this too too solid flesh would melt,  
Thaw and resolve itself into a dew!
  - What a piece of work is a man!  
How noble in reason, how infinite in faculties,  
In form and moving how express and admirable,  
In action how like an angel, in apprehension how like a God!
  - I hop'd thou shouldst have been my Hamlet's wife.  
I thought thy bride-bed to have deck'd, sweet maid,  
And not have strew'd thy grave.
  - Not a whit, we defy augury: there's a special  
Providence in the fall of a sparrow. If it be now,  
'Tis not to come; if it be not to come, it will be  
Now; if it be not now, yet it will come.  
The Readiness is all.
  - Men have died from time to time, and worms have eaten them, but not for love.
  - If she be a traitor,  
Why, so am I. We still have slept together,  
Rose at an instant, learned, played, eat together,  
And wheresoe'er we went, like Juno's swans,  
Still we went coupled and inseparable".
  - Sweet are the uses of adversity,  
Which, like the toad, ugly and venomous,  
Wears yet a precious jewel in his head;
  - All the world's a stage, and all the men and women merely players.

**3x5**

## **SECTION-B**

- Q.2 Answer (**any five**) of the following questions:
- Describe the events that lead to Gertrude's death.
  - Dilate the relationship between Hamlet and Gertrude.
  - Write down a note on Shakespearean tragedy.
  - What is the significance of the songs of Ophelia?

- e) Bring out the significance of the *Forest of Arden* in *As You Like It*.
- f) Throw light on the relationship between Rosalind and Celia.
- g) Critically analyse the song 'All the World is a Stage'.
- h) Why does Orlando decide to leave the castle of his elder brother Oliver?

**5x5**

### **SECTION-C**

Q.3 Answer (**any two**) of the following questions:

- a) Why is it not adequate to describe Hamlet as a tragedy of revenge? Explain.
- b) Discuss and illustrate the various types of love mentioned in *As You Like It*.
- c) Assess *As You Like It* as a lyrical comedy of romantic love.

**15x2**

# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – First Semester**  
**ENGLISH DRAMA-I (ENG-1.2)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: Question paper has **three** sections **A**, **B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

- Q.1 Answer (**any five**) of the following short questions. Explaining the given lines with reference to the context:
- O, that this too too solid flesh would melt,  
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  - What a piece of work is a man!  
How noble in reason, how infinite in faculties,  
In form and moving how express and admirable,  
In action how like an angel, in apprehension how like a God!
  - I hop'd thou shouldst have been my Hamlet's wife.  
I thought thy bride-bed to have deck'd, sweet maid,  
And not have strew'd thy grave.
  - Not a whit, we defy augury: there's a special  
Providence in the fall of a sparrow. If it be now,  
'Tis not to come; if it be not to come, it will be  
Now; if it be not now, yet it will come.  
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  - Men have died from time to time, and worms have eaten them, but not for love.
  - If she be a traitor,  
Why, so am I. We still have slept together,  
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  - Sweet are the uses of adversity,  
Which, like the toad, ugly and venomous,  
Wears yet a precious jewel in his head;
  - All the world's a stage, and all the men and women merely players.

**3x5**

## **SECTION-B**

- Q.2 Answer (**any five**) of the following questions:
- Describe the events that lead to Gertrude's death.
  - Dilate the relationship between Hamlet and Gertrude.
  - Write down a note on Shakespearean tragedy.
  - What is the significance of the songs of Ophelia?

- e) Bring out the significance of the *Forest of Arden* in *As You Like It*.
- f) Throw light on the relationship between Rosalind and Celia.
- g) Critically analyse the song 'All the World is a Stage'.
- h) Why does Orlando decide to leave the castle of his elder brother Oliver?

**5x5**

### **SECTION-C**

Q.3 Answer (**any two**) of the following questions:

- a) Why is it not adequate to describe Hamlet as a tragedy of revenge? Explain.
- b) Discuss and illustrate the various types of love mentioned in *As You Like It*.
- c) Assess *As You Like It* as a lyrical comedy of romantic love.

**15x2**

# **End Semester Examination, Dec. 2018**

B.A. (Hons) English — Second Semester  
**ENGLISH NOVEL (VICTORIAN AGE)-I (ENG-2.1)**

Time: 3 hrs.

Max Marks: **70**

No. of pages: **1**

Note: *Question paper has THREE sections A, B and C. All sections are Compulsory. Marks are indicated against each question.*

## **SECTION-A**

Q.1 Answer the following short questions (**any five**):

- a) Whom does David meet in Yarmouth on his way to the boarding school in London?
- b) Who is Miss Betsey Trotwood? What does she do for David?
- c) What does David do at Mr. Quinion's wine bottling factory?
- d) Do you think George Eliot uses Psychological realism in her novel '*The Mill on the Floss*'? Explain with examples.
- e) "Nothing is more deceitful than the appearance of humility". Explain.
- f) Write a note on David as an ambitious boy in *David Copperfield*.
- g) Analyze the biography of *Maggie Tulliver*.
- h) Comment on the Bingley- Darcy relationship in *Pride and Prejudice*.

**3×5**

## **SECTION-B**

Q.2 Answer the following questions (**any five**):

- a) Do you agree with Dr. F.R. Leavis view that Dickens lacks the "total significance of profoundly serious kind"?
- b) How had Dickens dealt with the marriage question in the novel *David Copperfield*?
- c) Elucidate David's relationship with his mother.
- d) Do you think Fate plays a major role in the climax of the novel *The Mill on the Floss*? Discuss and justify your answer.
- e) Discuss *Mill on the Floss* as a picture of English family life.
- f) Comment on the use of irony in *Pride and Prejudice*.
- g) Discuss the address of class issues in *Pride and Prejudice*
- h) What is the importance of motherhood in the novel *David Copperfield*? Discuss.

**5×5**

## **SECTION-C**

Q.3 Answer **any two** of the following (essay type) questions:

- a) Elucidate the theme of growing-up in *David Copperfield*.
- b) Discuss the appropriateness of the title *Pride and Prejudice*.
- c) Discuss the character of Maggie Tulliver, the protagonist of the novel *The Mill on the Floss*. How is Maggie different from Lucy Dean?

**15×2**

# **End Semester Examination, Dec. 2018**

B.A. (Hons) English — Second Semester  
**ENGLISH NOVEL (VICTORIAN AGE)-I (ENG-2.1)**

Time: 3 hrs.

Max Marks: **70**

No. of pages: **1**

Note: *Question paper has THREE sections A, B and C. All sections are Compulsory. Marks are indicated against each question.*

## **SECTION-A**

Q.1 Answer the following short questions (**any five**):

- a) Whom does David meet in Yarmouth on his way to the boarding school in London?
- b) Who is Miss Betsey Trotwood? What does she do for David?
- c) What does David do at Mr. Quinion's wine bottling factory?
- d) Do you think George Eliot uses Psychological realism in her novel '*The Mill on the Floss*'? Explain with examples.
- e) "Nothing is more deceitful than the appearance of humility". Explain.
- f) Write a note on David as an ambitious boy in *David Copperfield*.
- g) Analyze the biography of *Maggie Tulliver*.
- h) Comment on the Bingley- Darcy relationship in *Pride and Prejudice*.

**3×5**

## **SECTION-B**

Q.2 Answer the following questions (**any five**):

- a) Do you agree with Dr. F.R. Leavis view that Dickens lacks the "total significance of profoundly serious kind"?
- b) How had Dickens dealt with the marriage question in the novel *David Copperfield*?
- c) Elucidate David's relationship with his mother.
- d) Do you think Fate plays a major role in the climax of the novel *The Mill on the Floss*? Discuss and justify your answer.
- e) Discuss *Mill on the Floss* as a picture of English family life.
- f) Comment on the use of irony in *Pride and Prejudice*.
- g) Discuss the address of class issues in *Pride and Prejudice*
- h) What is the importance of motherhood in the novel *David Copperfield*? Discuss.

**5×5**

## **SECTION-C**

Q.3 Answer **any two** of the following (essay type) questions:

- a) Elucidate the theme of growing-up in *David Copperfield*.
- b) Discuss the appropriateness of the title *Pride and Prejudice*.
- c) Discuss the character of Maggie Tulliver, the protagonist of the novel *The Mill on the Floss*. How is Maggie different from Lucy Dean?

**15×2**

# **End Semester Examination, Dec. 2018**

B.A. (Hons) English — Second Semester  
**ENGLISH NOVEL (VICTORIAN AGE)-I (ENG-2.1)**

Time: 3 hrs.

Max Marks: **70**

No. of pages: **1**

Note: *Question paper has THREE sections A, B and C. All sections are Compulsory. Marks are indicated against each question.*

## **SECTION-A**

Q.1 Answer the following short questions (**any five**):

- a) Whom does David meet in Yarmouth on his way to the boarding school in London?
- b) Who is Miss Betsey Trotwood? What does she do for David?
- c) What does David do at Mr. Quinion's wine bottling factory?
- d) Do you think George Eliot uses Psychological realism in her novel '*The Mill on the Floss*'? Explain with examples.
- e) "Nothing is more deceitful than the appearance of humility". Explain.
- f) Write a note on David as an ambitious boy in *David Copperfield*.
- g) Analyze the biography of *Maggie Tulliver*.
- h) Comment on the Bingley- Darcy relationship in *Pride and Prejudice*.

**3×5**

## **SECTION-B**

Q.2 Answer the following questions (**any five**):

- a) Do you agree with Dr. F.R. Leavis view that Dickens lacks the "total significance of profoundly serious kind"?
- b) How had Dickens dealt with the marriage question in the novel *David Copperfield*?
- c) Elucidate David's relationship with his mother.
- d) Do you think Fate plays a major role in the climax of the novel *The Mill on the Floss*? Discuss and justify your answer.
- e) Discuss *Mill on the Floss* as a picture of English family life.
- f) Comment on the use of irony in *Pride and Prejudice*.
- g) Discuss the address of class issues in *Pride and Prejudice*
- h) What is the importance of motherhood in the novel *David Copperfield*? Discuss.

**5×5**

## **SECTION-C**

Q.3 Answer **any two** of the following (essay type) questions:

- a) Elucidate the theme of growing-up in *David Copperfield*.
- b) Discuss the appropriateness of the title *Pride and Prejudice*.
- c) Discuss the character of Maggie Tulliver, the protagonist of the novel *The Mill on the Floss*. How is Maggie different from Lucy Dean?

**15×2**

# **End Semester Examination, Dec. 2018**

BA (Hons.) ENGLISH – Second Semester  
**ELIZABETHAN DRAMA (ENG-2.2)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: Question paper has **three** sections **A**, **B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

Q.1 Explain the following passages with reference to the context (**any five**):

- a) It is twice blessed:  
It blesseth him that gives and him that takes,  
'Tis mightiest in the mightiest.
- b) Cover her face; mine eyes dazze; she died young
- c) O, my conscience!  
I would pray now; but the devil takes away my heart
- d) ..... and let the sounds of music  
Creep in our ears, Soft stillness and the night  
Become the touches of sweet harmony.
- e) O, I am gone!  
We are only like dead walls or vaulted graves.
- f) It is enthronèd in the hearts of kings;  
It is an attribute to God himself,  
And earthly power doth then show likest God's,  
When mercy seasons justice.
- g) I hate him for he is a Christian,  
But more for that in low simplicity,  
He lends out money gratis and brings down,  
The rate of usance here with us in Venice.
- h) He is well paid that is well satisfied;  
And I, delivering you, am satisfied,  
And therein do account myself well paid: Pull and pull strongly, for your able.

**3x5**

## **SECTION-B**

Q.2 Give short answer to the following questions (**any five**):

- a) In scene thirteen, Faustus tells the scholars that he cannot call upon God or repent. Why?
- b) What seven figures does Lucifer use to distract Faustus from his prayers? What is the relevance of this scene in the play?
- c) What are the five conditions Faustus sets down in the contract?
- d) Comment on the elements of horror in *The Duchess of Malfi*.
- e) "To suffer death or shame for what is just:  
Mine is another voyage".

This dialogue is from the play *The Duchess of Malfi*. Who says it and what has happened to him? Explain this statement in light of the action happened.

- f) Write a note on the setting of *The Duchess of Malfi*.
- g) Why are the brothers of the Duchess against her marriage with Antonio?
- h) Write a short note on Jacobean Drama.

**5x5**  
**SECTION-C**

Q.3 Answer (**any two**) of the following (essay type) questions:

- a) Discuss *Dr. Faustus* as a Morality play.
- b) Evaluate *The Merchant of Venice* as a characteristic Shakespearean comedy. Is the play more tragic than comic?
- c) Critically comment on the influence of Machiavelli on Webster.

**15x2**

# **End Semester Examination, Dec. 2018**

BA (Hons.) ENGLISH – Second Semester  
**ELIZABETHAN DRAMA (ENG-2.2)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: Question paper has **three** sections **A, B and C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

Q.1 Explain the following passages with reference to the context (**any five**):

- a) It is twice blessed:  
It blesseth him that gives and him that takes,  
'Tis mightiest in the mightiest.
- b) Cover her face; mine eyes dazze; she died young
- c) O, my conscience!  
I would pray now; but the devil takes away my heart
- d) ..... and let the sounds of music  
Creep in our ears, Soft stillness and the night  
Become the touches of sweet harmony.
- e) O, I am gone!  
We are only like dead walls or vaulted graves.
- f) It is enthronèd in the hearts of kings;  
It is an attribute to God himself,  
And earthly power doth then show likest God's,  
When mercy seasons justice.
- g) I hate him for he is a Christian,  
But more for that in low simplicity,  
He lends out money gratis and brings down,  
The rate of usance here with us in Venice.
- h) He is well paid that is well satisfied;  
And I, delivering you, am satisfied,  
And therein do account myself well paid: Pull and pull strongly, for your able.

**3x5**

## **SECTION-B**

Q.2 Give short answer to the following questions (**any five**):

- a) In scene thirteen, Faustus tells the scholars that he cannot call upon God or repent. Why?
- b) What seven figures does Lucifer use to distract Faustus from his prayers? What is the relevance of this scene in the play?
- c) What are the five conditions Faustus sets down in the contract?
- d) Comment on the elements of horror in *The Duchess of Malfi*.
- e) "To suffer death or shame for what is just:  
Mine is another voyage".

This dialogue is from the play *The Duchess of Malfi*. Who says it and what has happened to him? Explain this statement in light of the action happened.

- f) Write a note on the setting of *The Duchess of Malfi*.
- g) Why are the brothers of the Duchess against her marriage with Antonio?
- h) Write a short note on Jacobean Drama.

**5x5**  
**SECTION-C**

Q.3 Answer (**any two**) of the following (essay type) questions:

- a) Discuss *Dr. Faustus* as a Morality play.
- b) Evaluate *The Merchant of Venice* as a characteristic Shakespearean comedy. Is the play more tragic than comic?
- c) Critically comment on the influence of Machiavelli on Webster.

**15x2**

# **End Semester Examination, Dec. 2018**

BA (Hons.) ENGLISH – Second Semester  
**ELIZABETHAN DRAMA (ENG-2.2)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: Question paper has **three** sections **A**, **B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

Q.1 Explain the following passages with reference to the context (**any five**):

- a) It is twice blessed:  
It blesseth him that gives and him that takes,  
'Tis mightiest in the mightiest.
- b) Cover her face; mine eyes dazze; she died young
- c) O, my conscience!  
I would pray now; but the devil takes away my heart
- d) ..... and let the sounds of music  
Creep in our ears, Soft stillness and the night  
Become the touches of sweet harmony.
- e) O, I am gone!  
We are only like dead walls or vaulted graves.
- f) It is enthronèd in the hearts of kings;  
It is an attribute to God himself,  
And earthly power doth then show likest God's,  
When mercy seasons justice.
- g) I hate him for he is a Christian,  
But more for that in low simplicity,  
He lends out money gratis and brings down,  
The rate of usance here with us in Venice.
- h) He is well paid that is well satisfied;  
And I, delivering you, am satisfied,  
And therein do account myself well paid: Pull and pull strongly, for your able.

**3x5**

## **SECTION-B**

Q.2 Give short answer to the following questions (**any five**):

- a) In scene thirteen, Faustus tells the scholars that he cannot call upon God or repent. Why?
- b) What seven figures does Lucifer use to distract Faustus from his prayers? What is the relevance of this scene in the play?
- c) What are the five conditions Faustus sets down in the contract?
- d) Comment on the elements of horror in *The Duchess of Malfi*.
- e) "To suffer death or shame for what is just:  
Mine is another voyage".

This dialogue is from the play *The Duchess of Malfi*. Who says it and what has happened to him? Explain this statement in light of the action happened.

- f) Write a note on the setting of *The Duchess of Malfi*.
- g) Why are the brothers of the Duchess against her marriage with Antonio?
- h) Write a short note on Jacobean Drama.

**5x5**  
**SECTION-C**

Q.3 Answer (**any two**) of the following (essay type) questions:

- a) Discuss *Dr. Faustus* as a Morality play.
- b) Evaluate *The Merchant of Venice* as a characteristic Shakespearean comedy. Is the play more tragic than comic?
- c) Critically comment on the influence of Machiavelli on Webster.

**15x2**

# **End Semester Examination, Dec. 2018**

BA (Hons.) ENGLISH – Second Semester  
**ELIZABETHAN DRAMA (ENG-2.2)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: Question paper has **three** sections **A**, **B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

Q.1 Explain the following passages with reference to the context (**any five**):

- a) It is twice blessed:  
It blesseth him that gives and him that takes,  
'Tis mightiest in the mightiest.
- b) Cover her face; mine eyes dazze; she died young
- c) O, my conscience!  
I would pray now; but the devil takes away my heart
- d) ..... and let the sounds of music  
Creep in our ears, Soft stillness and the night  
Become the touches of sweet harmony.
- e) O, I am gone!  
We are only like dead walls or vaulted graves.
- f) It is enthronèd in the hearts of kings;  
It is an attribute to God himself,  
And earthly power doth then show likest God's,  
When mercy seasons justice.
- g) I hate him for he is a Christian,  
But more for that in low simplicity,  
He lends out money gratis and brings down,  
The rate of usance here with us in Venice.
- h) He is well paid that is well satisfied;  
And I, delivering you, am satisfied,  
And therein do account myself well paid: Pull and pull strongly, for your able.

**3x5**

## **SECTION-B**

Q.2 Give short answer to the following questions (**any five**):

- a) In scene thirteen, Faustus tells the scholars that he cannot call upon God or repent. Why?
- b) What seven figures does Lucifer use to distract Faustus from his prayers? What is the relevance of this scene in the play?
- c) What are the five conditions Faustus sets down in the contract?
- d) Comment on the elements of horror in *The Duchess of Malfi*.
- e) "To suffer death or shame for what is just:  
Mine is another voyage".

This dialogue is from the play *The Duchess of Malfi*. Who says it and what has happened to him? Explain this statement in light of the action happened.

- f) Write a note on the setting of *The Duchess of Malfi*.
- g) Why are the brothers of the Duchess against her marriage with Antonio?
- h) Write a short note on Jacobean Drama.

**5x5**  
**SECTION-C**

Q.3 Answer (**any two**) of the following (essay type) questions:

- a) Discuss *Dr. Faustus* as a Morality play.
- b) Evaluate *The Merchant of Venice* as a characteristic Shakespearean comedy. Is the play more tragic than comic?
- c) Critically comment on the influence of Machiavelli on Webster.

**15x2**

## **End Semester Examination, Dec. 2018**

BA (Hons.) ENGLISH – Second Semester

### **WOMEN'S WRITING IN THE NINETEENTH AND TWENTIETH CENTURY (ENG-2.3)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 2*

Note: Question paper has **three** sections **A, B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

#### **SECTION-A**

Q.1 Explain the following passages with reference to the context (**any five**):

- a) You do not do, you do not do  
Any more, black shoe  
In which I have lived like a foot  
For thirty years, poor and white,  
Barely daring to breathe or Achoo
- b) Because I could not stop for Death-  
He kindly stopped for me-  
The Carriage held but just ourselves-  
And Immortality.
- c) I've known her —from an ample nation—  
Choose One—  
Then —close the Valves of her attention —  
Like Stone—
- d) And then I heard them lift a Box  
And creak across my Soul  
With those same Boots of Lead, again,  
Then Space – began to toll,
- e) If I've killed one man, I've killed two  
The vampire who said he was you  
And drank my blood for a year,  
Seven years, if you want to know.  
Daddy, you can lie back now.
- f) Now I am a lake. A woman bends over me,  
Searching my reaches for what she rally is.  
Then she turns to those liars, the candles or the moon.  
I see her back, and reflect it faithfully.
- g) Dying  
Is an art, like everything else.  
I do it exceptionally well.  
I do it so it feels like hell.  
I do it so it feels real.
- h) I

Know you appear,  
Vivid at my side,  
Denying you sprang out of my head,  
Claiming you feel,  
Love fiery enough to prove flesh real,  
Though it's quite clear,  
All your beauty, all your wit, is a gift, my dear,  
From me.

**3x5**

### **SECTION-B**

Q.2 Answer the following questions (**any five**):

- a) Highlight about the character of 'Draupadi' as portrayed by *Mahasweta Devi*.
- b) Write down the character sketch of Bertha from the story *Bliss*.
- c) Comment on the title of story '*Bliss*' by Katherine Mansfield.
- d) Comment upon Sylvia Plath's style of writing.
- e) Write down the critical Appreciation of '*Daddy*' by Sylvia Plath.
- f) Write down the critical Appreciation of '*Elysium is as far as to*' by Emily Dickinson.
- g) What is the poem '*Lady Lazarus*' by Sylvia Plath all about? Explain.
- h) Explain in your own words the poem '*Because I could not stop for death*' by Emily Dickinson.

**5x5**

### **SECTION-C**

Q.3 Answer (**any two**) (essay type) of the following:

- a) "Reading the poetry of Sylvia Plath can be a disturbing Experience." How far do you agree with this statement? Comment on the basis of the poems you've read.
- b) Elaborate Aurora's association of love with Metaphysical Motherhood in *Aurora Leigh Book V*
- c) "Emily Dickinson's style is distinguished by its conciseness, its simplicity, its control and its economy". Discuss.

**15x2**

# **End Semester Examination, Dec. 2018**

BA (Hons.) ENGLISH – Second Semester

## **WOMEN'S WRITING IN THE NINETEENTH AND TWENTIETH CENTURY (ENG-2.3)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 2*

Note: Question paper has **three** sections **A, B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

### **SECTION-A**

Q.1 Explain the following passages with reference to the context (**any five**):

- a) You do not do, you do not do  
Any more, black shoe  
In which I have lived like a foot  
For thirty years, poor and white,  
Barely daring to breathe or Achoo
- b) Because I could not stop for Death-  
He kindly stopped for me-  
The Carriage held but just ourselves-  
And Immortality.
- c) I've known her —from an ample nation—  
Choose One—  
Then —close the Valves of her attention —  
Like Stone—
- d) And then I heard them lift a Box  
And creak across my Soul  
With those same Boots of Lead, again,  
Then Space – began to toll,
- e) If I've killed one man, I've killed two  
The vampire who said he was you  
And drank my blood for a year,  
Seven years, if you want to know.  
Daddy, you can lie back now.
- f) Now I am a lake. A woman bends over me,  
Searching my reaches for what she rally is.  
Then she turns to those liars, the candles or the moon.  
I see her back, and reflect it faithfully.
- g) Dying  
Is an art, like everything else.  
I do it exceptionally well.  
I do it so it feels like hell.  
I do it so it feels real.
- h) I

Know you appear,  
Vivid at my side,  
Denying you sprang out of my head,  
Claiming you feel,  
Love fiery enough to prove flesh real,  
Though it's quite clear,  
All your beauty, all your wit, is a gift, my dear,  
From me.

**3x5**

### **SECTION-B**

Q.2 Answer the following questions (**any five**):

- a) Highlight about the character of 'Draupadi' as portrayed by *Mahasweta Devi*.
- b) Write down the character sketch of Bertha from the story *Bliss*.
- c) Comment on the title of story '*Bliss*' by Katherine Mansfield.
- d) Comment upon Sylvia Plath's style of writing.
- e) Write down the critical Appreciation of '*Daddy*' by Sylvia Plath.
- f) Write down the critical Appreciation of '*Elysium is as far as to*' by Emily Dickinson.
- g) What is the poem '*Lady Lazarus*' by Sylvia Plath all about? Explain.
- h) Explain in your own words the poem '*Because I could not stop for death*' by Emily Dickinson.

**5x5**

### **SECTION-C**

Q.3 Answer (**any two**) (essay type) of the following:

- a) "Reading the poetry of Sylvia Plath can be a disturbing Experience." How far do you agree with this statement? Comment on the basis of the poems you've read.
- b) Elaborate Aurora's association of love with Metaphysical Motherhood in *Aurora Leigh Book V*
- c) "Emily Dickinson's style is distinguished by its conciseness, its simplicity, its control and its economy". Discuss.

**15x2**

# **End Semester Examination, Dec. 2018**

BA (Hons.) ENGLISH – Second Semester

## **WOMEN'S WRITING IN THE NINETEENTH AND TWENTIETH CENTURY (ENG-2.3)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 2*

Note: Question paper has **three** sections **A, B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

### **SECTION-A**

Q.1 Explain the following passages with reference to the context (**any five**):

- a) You do not do, you do not do  
Any more, black shoe  
In which I have lived like a foot  
For thirty years, poor and white,  
Barely daring to breathe or Achoo
- b) Because I could not stop for Death-  
He kindly stopped for me-  
The Carriage held but just ourselves-  
And Immortality.
- c) I've known her —from an ample nation—  
Choose One—  
Then —close the Valves of her attention —  
Like Stone—
- d) And then I heard them lift a Box  
And creak across my Soul  
With those same Boots of Lead, again,  
Then Space – began to toll,
- e) If I've killed one man, I've killed two  
The vampire who said he was you  
And drank my blood for a year,  
Seven years, if you want to know.  
Daddy, you can lie back now.
- f) Now I am a lake. A woman bends over me,  
Searching my reaches for what she rally is.  
Then she turns to those liars, the candles or the moon.  
I see her back, and reflect it faithfully.
- g) Dying  
Is an art, like everything else.  
I do it exceptionally well.  
I do it so it feels like hell.  
I do it so it feels real.
- h) I

Know you appear,  
Vivid at my side,  
Denying you sprang out of my head,  
Claiming you feel,  
Love fiery enough to prove flesh real,  
Though it's quite clear,  
All your beauty, all your wit, is a gift, my dear,  
From me.

**3x5**

### **SECTION-B**

Q.2 Answer the following questions (**any five**):

- a) Highlight about the character of 'Draupadi' as portrayed by *Mahasweta Devi*.
- b) Write down the character sketch of Bertha from the story *Bliss*.
- c) Comment on the title of story '*Bliss*' by Katherine Mansfield.
- d) Comment upon Sylvia Plath's style of writing.
- e) Write down the critical Appreciation of '*Daddy*' by Sylvia Plath.
- f) Write down the critical Appreciation of '*Elysium is as far as to*' by Emily Dickinson.
- g) What is the poem '*Lady Lazarus*' by Sylvia Plath all about? Explain.
- h) Explain in your own words the poem '*Because I could not stop for death*' by Emily Dickinson.

**5x5**

### **SECTION-C**

Q.3 Answer (**any two**) (essay type) of the following:

- a) "Reading the poetry of Sylvia Plath can be a disturbing Experience." How far do you agree with this statement? Comment on the basis of the poems you've read.
- b) Elaborate Aurora's association of love with Metaphysical Motherhood in *Aurora Leigh Book V*
- c) "Emily Dickinson's style is distinguished by its conciseness, its simplicity, its control and its economy". Discuss.

**15x2**

# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – Third Semester**  
**ENGLISH DRAMA-II (ENG-3.2)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 2*

Note: Question paper has **three** sections **A, B and C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

- Q.1 Answer (**any five**) of the following short questions.  
(*Explain the given lines with reference to the context:*)
- a) I do beseech you, sir, you will vouch safe,  
To write me 'I' your family. All my hopes,  
Depend upon your worship.
  - b) Without a partner, sir, confirmed this morning;  
The wax is warm yet, and the ink scarcely dry,  
Upon the parchment.
  - c) The blazing star of Italy! A wench,  
Of the first year! A beauty ripe as harvest,  
Whose skin is whiter than a swan all over,  
Than silver, snow, or lilies!
  - d) I want to be quite perfect with Sergius—no meanness, no smallness, no deceit. My relation to him is the one really beautiful and noble part of my life.
  - e) When you get into that noble attitude and speak in that thrilling voice, I admire you; but I find it impossible to believe a single word you say.
  - f) Oh, war! War! The dream of patriots and heroes! A fraud, Bluntschli, a hollow sham, like love.
  - g) And, many a year elapsed, return to view,  
Where once the cottage stood, the hawthorn grew,
  - h) In barren splendour feebly waits the fall,  
Now lost to all; her friends, her virtue fled.

**3x5**

## **SECTION-B**

- Q.2 Answer (**any five**) of the following questions:
- a) "It proves that all our ideas were real after all". Explain with reference to the context in *Arms and the Man*.
  - b) Highlight the theme of Mortality in *Volpone*.
  - c) "Sweet Auburn! loveliest village of the plain;  
*Where health and plenty cheered the labouring swain,*  
*Where smiling spring its earliest visit paid,*  
*And parting summer's lingering blooms delayed*"  
The village was different before it was deserted. Explain with reference to *The Deserted Village*.

- d) What older work does the title *Arms and the Man* refer to? Why is this allusion made?
- e) Ben Jonson uses comedy as a tool for moral vision in *Volpone*. Comment in brief.
- f) What do you think was the reason for people leaving the village in *The Deserted Village*?
- g) "Avarice leads to human downfall". Elaborate with respect to *Volpone*.
- h) Provide the historical context of *The Arms and the World*.

**5x5**

### **SECTION-C**

Q.3 Answer (**any two**) of the following questions:

- a) Write an essay on Ben Jonson's Comedy of Humours with special reference to *Volpone*.
- b) Examine *Arms and the Man* as a characteristic Shavian play.
- c) Write down the critical appreciation of the poem *The Deserted Village*.

**15x2**

# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – Third Semester**  
**ENGLISH DRAMA-II (ENG-3.2)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 2*

Note: Question paper has **three** sections **A, B and C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

- Q.1 Answer (**any five**) of the following short questions.  
(*Explain the given lines with reference to the context:*)
- a) I do beseech you, sir, you will vouch safe,  
To write me 'I' your family. All my hopes,  
Depend upon your worship.
  - b) Without a partner, sir, confirmed this morning;  
The wax is warm yet, and the ink scarcely dry,  
Upon the parchment.
  - c) The blazing star of Italy! A wench,  
Of the first year! A beauty ripe as harvest,  
Whose skin is whiter than a swan all over,  
Than silver, snow, or lilies!
  - d) I want to be quite perfect with Sergius—no meanness, no smallness, no deceit. My relation to him is the one really beautiful and noble part of my life.
  - e) When you get into that noble attitude and speak in that thrilling voice, I admire you; but I find it impossible to believe a single word you say.
  - f) Oh, war! War! The dream of patriots and heroes! A fraud, Bluntschli, a hollow sham, like love.
  - g) And, many a year elapsed, return to view,  
Where once the cottage stood, the hawthorn grew,
  - h) In barren splendour feebly waits the fall,  
Now lost to all; her friends, her virtue fled.

**3x5**

## **SECTION-B**

- Q.2 Answer (**any five**) of the following questions:
- a) "It proves that all our ideas were real after all". Explain with reference to the context in *Arms and the Man*.
  - b) Highlight the theme of Mortality in *Volpone*.
  - c) "Sweet Auburn! loveliest village of the plain;  
*Where health and plenty cheered the labouring swain,*  
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**5x5**

### **SECTION-C**

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- a) Write an essay on Ben Jonson's Comedy of Humours with special reference to *Volpone*.
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**15x2**

# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – Third Semester**  
**ENGLISH DRAMA-II (ENG-3.2)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 2*

Note: Question paper has **three** sections **A, B and C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

- Q.1 Answer (**any five**) of the following short questions.  
(*Explain the given lines with reference to the context:*)
- a) I do beseech you, sir, you will vouch safe,  
To write me 'I' your family. All my hopes,  
Depend upon your worship.
  - b) Without a partner, sir, confirmed this morning;  
The wax is warm yet, and the ink scarcely dry,  
Upon the parchment.
  - c) The blazing star of Italy! A wench,  
Of the first year! A beauty ripe as harvest,  
Whose skin is whiter than a swan all over,  
Than silver, snow, or lilies!
  - d) I want to be quite perfect with Sergius—no meanness, no smallness, no deceit. My relation to him is the one really beautiful and noble part of my life.
  - e) When you get into that noble attitude and speak in that thrilling voice, I admire you; but I find it impossible to believe a single word you say.
  - f) Oh, war! War! The dream of patriots and heroes! A fraud, Bluntschli, a hollow sham, like love.
  - g) And, many a year elapsed, return to view,  
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  - h) In barren splendour feebly waits the fall,  
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**3x5**

## **SECTION-B**

- Q.2 Answer (**any five**) of the following questions:
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  - b) Highlight the theme of Mortality in *Volpone*.
  - c) "Sweet Auburn! loveliest village of the plain;  
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**5x5**

### **SECTION-C**

Q.3 Answer (**any two**) of the following questions:

- a) Write an essay on Ben Jonson's Comedy of Humours with special reference to *Volpone*.
- b) Examine *Arms and the Man* as a characteristic Shavian play.
- c) Write down the critical appreciation of the poem *The Deserted Village*.

**15x2**

# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – Fourth Semester**  
**ENGLISH NOVEL-II (ENG-4.1)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: Question paper has **three** sections **A**, **B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

Q.1 **Answer the following questions (any five):**

- a) Who is Sleary? What role does he play in the novel *Hard Times*?
- b) Write the major three themes of *Hard Times*.
- c) What does the expression " *Hard Times*" mean to you?
- d) Who is Bessie Lee? How does she soothe child Jane at Gateshead?
- e) What role Bertha Mason plays in the development of the novel?
- f) What happens when Mrs. Reed imprisons Jane in the Red-room?

**Explain the following lines with reference to the context:**

- g) Life, what is it but a dream?
- h) "When I use a word,' Humpty Dumpty said in rather a scornful tone, 'it means just what I choose it to mean — neither more nor less.'The question is,' said Alice, 'whether you can make words mean so many different things.'

**3x5**

## **SECTION-B**

Q.2 Answer **(any five)** of the following questions:

- a) Comment on Mr. Gradgrind's system of education and its effect on his children.
- b) Analyze the theme of class conflict in *Jane Eyre*.
- c) Write a short note on Nonsense Literature.
- d) What does the symbol 'fire vs. ice' signify in the novel in *Jane Eyre*?
- e) Contrast between the characters of Jane and Bertha Mason in *Jane Eyre*.
- f) Discuss Chess as a metaphor for Fate in the novel *Through the Looking Glass*.
- g) Comment on tragic story, of Stephen Blackpool in *Hard Times*. What kind of picture does it provide of the plight of factory workers in the 19th century England?
- h) Discuss *Through the Looking Glass* as depicting Life as a dream.

**5x5**

## **SECTION-C**

Q.3 Answer **(any two)** of the following (essay type) questions:

- a) Reproduce the picture of Victorian society which emerges from the reading of *Hard Times*.
- b) Write an essay on the plot construction of *Jane Eyre*.
- c) Analyze the character of Alice in *Through the Looking Glass*.

**15x2**



# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – Fourth Semester**  
**ENGLISH NOVEL-II (ENG-4.1)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: Question paper has **three** sections **A**, **B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

Q.1 **Answer the following questions (any five):**

- a) Who is Sleary? What role does he play in the novel *Hard Times*?
- b) Write the major three themes of *Hard Times*.
- c) What does the expression " *Hard Times*" mean to you?
- d) Who is Bessie Lee? How does she soothe child Jane at Gateshead?
- e) What role Bertha Mason plays in the development of the novel?
- f) What happens when Mrs. Reed imprisons Jane in the Red-room?

**Explain the following lines with reference to the context:**

- g) Life, what is it but a dream?
- h) "When I use a word,' Humpty Dumpty said in rather a scornful tone, 'it means just what I choose it to mean — neither more nor less.'The question is,' said Alice, 'whether you can make words mean so many different things.'

**3x5**

## **SECTION-B**

Q.2 Answer **(any five)** of the following questions:

- a) Comment on Mr. Gradgrind's system of education and its effect on his children.
- b) Analyze the theme of class conflict in *Jane Eyre*.
- c) Write a short note on Nonsense Literature.
- d) What does the symbol 'fire vs. ice' signify in the novel in *Jane Eyre*?
- e) Contrast between the characters of Jane and Bertha Mason in *Jane Eyre*.
- f) Discuss Chess as a metaphor for Fate in the novel *Through the Looking Glass*.
- g) Comment on tragic story, of Stephen Blackpool in *Hard Times*. What kind of picture does it provide of the plight of factory workers in the 19th century England?
- h) Discuss *Through the Looking Glass* as depicting Life as a dream.

**5x5**

## **SECTION-C**

Q.3 Answer **(any two)** of the following (essay type) questions:

- a) Reproduce the picture of Victorian society which emerges from the reading of *Hard Times*.
- b) Write an essay on the plot construction of *Jane Eyre*.
- c) Analyze the character of Alice in *Through the Looking Glass*.

**15x2**



# **End Semester Examination, Dec. 2018**

**BA (Hons.) ENGLISH – Fourth Semester**  
**ENGLISH NOVEL-II (ENG-4.1)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: Question paper has **three** sections **A**, **B** and **C**. All sections are **compulsory**. Marks are indicated against each question.

## **SECTION-A**

Q.1 **Answer the following questions (any five):**

- a) Who is Sleary? What role does he play in the novel *Hard Times*?
- b) Write the major three themes of *Hard Times*.
- c) What does the expression " *Hard Times*" mean to you?
- d) Who is Bessie Lee? How does she soothe child Jane at Gateshead?
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- g) Life, what is it but a dream?
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**3x5**

## **SECTION-B**

Q.2 Answer **(any five)** of the following questions:

- a) Comment on Mr. Gradgrind's system of education and its effect on his children.
- b) Analyze the theme of class conflict in *Jane Eyre*.
- c) Write a short note on Nonsense Literature.
- d) What does the symbol 'fire vs. ice' signify in the novel in *Jane Eyre*?
- e) Contrast between the characters of Jane and Bertha Mason in *Jane Eyre*.
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- h) Discuss *Through the Looking Glass* as depicting Life as a dream.

**5x5**

## **SECTION-C**

Q.3 Answer **(any two)** of the following (essay type) questions:

- a) Reproduce the picture of Victorian society which emerges from the reading of *Hard Times*.
- b) Write an essay on the plot construction of *Jane Eyre*.
- c) Analyze the character of Alice in *Through the Looking Glass*.

**15x2**



# **End Semester Examination, Dec. 2018**

BA (Hons.) ENGLISH – Fifth Semester  
**CLASSICAL LITERATURE-II (ENG-5.1)**

Time: 3 hrs

Max Marks: **70**

*No. of pages: 1*

Note: Question paper has **three** sections **A, B** and **C**. All sections are compulsory. Marks are indicated against each question.

## **SECTION-A**

Q.1 Attempt (**any five**) of the following questions:

**(Explain the following with reference to the context:)**

a) Anarchy---

Show me a greater crime in all the earth!  
She, she destroys cities, rip up houses,  
Break the rank of spearmen into the headlong rout.

b) You have no business with the dead

Nor do the gods above—this is violence  
You have forced upon the heavens.....

c) And there he lies, body enfolding body—

He has won his bride at last, poor boy,  
Nor here but in the houses of the dead.

d) When the soldier returns from the wars, even though he has white hair, he very soon finds a young wife? But a woman has only one summer; if she does not make hay while the sun shines, no one will afterwards have anything to say to her, and she spends her days consulting oracles that never send her a husband.

**Answer in brief:**

e) How do the women dismiss the Magistrate?

f) Who is Xanthos? What prophesy does it make to Achilles?

g) What is the connection between heroism and prospect of death? Are the heroes of *The Iliad* troubled by thoughts of death?

h) Who are Briseis and Chryseis? Why doesn't Achilles just hand over his captive to Agamemnon?

**3x5**

## **SECTION-B**

Q.2 Answer (**any five**) of the following questions:

a) Why does Antigone call her sister Ismene outside the palace of Thebes?

b) What according to Creon are the major attributes of an ideal king?

c) What role does the chorus play in *Antigone*?

d) Give significance of the title *Lysistrata*.

e) Write a note on Episode on False Pregnancy.

f) What are the human and cosmic dimensions of the combat with the river? What does this episode reveal about the importance of Achilles's participation in the war?

- g) Who are the members of the delegation sent to Achilles? How does each seek to persuade Achilles to return to combat?
- h) How does Achilles honor Patroclus and dishonor Hector?

**5x5**

### **SECTION-C**

Q.3 Answer **(any two)** of the following questions:

- a) Discuss critically the theme of the confrontation between the divine law and the civil law in *Antigone*.
- b) Critically comment on the various themes of *The Iliad*.
- c) Estimate *Lysistrata* as an anti-war comedy.

**15x2**



# **End Semester Examination, Dec 2018**

B. Tech. — Third Semester

## **MULTIMEDIA AND ANIMATION (IT-301)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer the following questions:

- a) Write different advantages of using multimedia technology.
- b) How animated movies are different from still movies? Explain in detail.
- c) Discuss various file formats used in multimedia technology.
- d) What is Maya? Explain in detail.
- e) Explain the term video on demand.

**4×5**

### **PART-A**

Q.2 a) What is the role of multimedia authoring tools in multimedia technology? Discuss in detail. **10**

- b) Write short notes on the following:
  - i) ATM.
  - ii) ADSL.

**5×2**

Q.3 a) Explain different process of making still images. **10**

- b) Write short notes on the following:
  - i) JPEG predictive lossless coding.
  - ii) 3D drawing.

**5×2**

Q.4 Write short notes on the following:

- a) Intelligent multimedia system.
- b) Visually couple system requirements.
- c) Desktop virtual reality.
- d) VR operating system.

**5×4**

### **PART-B**

Q.5 a) What is digital representation of sound? Explain transmission of digital sound. **10**  
b) Differentiate between stereophonic and quadraphonic sound. **5**  
c) How a musical instrument could be digitally interface? Explain in detail. **5**

Q.6 a) Explain various compression and decompression techniques in digital videos. **10**  
b) What is the importance of DVI technology in multimedia? Explain in detail. **10**

Q.7 Write short notes on the following:

- a) Principles of animation.
- b) Macromedia flash professional.
- c) Acrobat Photoshop.

d) Director X.

**5x4**

# **End Semester Examination, Dec. 2018**

B. Tech. – Third / Fourth Semester

## **DATA COMMUNICATION AND COMPUTER NETWORKS (IT-401A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

Q.1 Answer the following:

- a) Define digital and analog signals, giving an example of each.
- b) Enlist benefits of a distributed processing. What are the desired network criteria's?
- c) List out the features of "RS232" "physical layer interface".
- d) Define the "Shannon's Limit".
- e) Explain the concept of "Hamming codes" for error correction.
- f) How packet switching is different from circuit switching?
- g) Which layer in TCP/IP protocol suite, performs the job of IP addressing? Name IP address classes.
- h) Explain the concept of a "Token Ring"
- i) Differentiate among static and dynamic routing.
- j) How "Performance Management" is done in networks?

**2×10**

### **PART-A**

- Q.2 a) Differentiate simplex, half-duplex and full-duplex communication modes, giving real-life examples. **6**
- b) Define amplitude, frequency and phase of a signal. **6**
- c) Give relative features of various networks topologies. **8**
- Q.3 a) Give digital signal representation of the given bit stream- "11011101", using the following encoding schemes: Polar NRZ-I, Polar NRZ-L, Polar RZ and Manchester encoding. **8**
- b) Discuss and define the various transmission impairments: (Attenuation, distortion and Noise). **6**
- c) Compare wired and wireless media, with examples. **6**
- Q.4 a) Define cryptography. Discuss the process of secret-key and public-key cryptography. **10**
- b) Discuss Error detection using CRC (Cyclic Redundancy Check). **5**
- c) Define multiplexing. Differentiate between time-division and frequency-division multiplexing. **5**

### **PART-B**

- Q.5 a) What's the necessity of "OSI reference model" in network communication? Give layered architecture, discussing features or responsibility of each layer. **10**
- b) Discuss the functioning of ARP and RARP protocols. **6**
- c) Differentiate between TCP and UDP protocols. **4**

- Q.6** a) What's the purpose of ATM (Asynchronous Transfer Mode)? List out it's features. Give complete ATM layered architecture, specifying functionality of each layer. **10**  
b) Define DQDB (Distributed Queue Dual Bus) technology. **5**  
c) How to prevent congestion in a network? Name some congestion control techniques. **5**
- Q.7** a) Explain the process of security management with firewalls. Discuss the types of firewalls, specifying working process of each. **10**  
b) Enlist the benefits of a "VLAN" set up. **5**  
c) Explain the process of proxy servers. **5**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fourth Semester

## **DATA COMMUNICATION AND COMPUTER NETWORKS (IT-401A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Explain different communication modes.
- b) Differentiate between LAN, WAN and MAN.
- c) What is the role of physical layer interface RS232 in communication?
- d) Explain briefly different data encryption schemes.
- e) Explain "DNS".

**4×5**

### **PART-A**

Q.2 a) Discuss various types of network topologies in computer network. **10**  
b) Differentiate between digital and analog signals. **5**  
c) Discuss various components of data communications. **5**

Q.3 a) Explain different transmission media. **10**  
b) Explain Nyquist theorem and Shannon limit. **10**

Q.4 Write short notes on the following:

- a) Circuit switching.
- b) Frequency division multiplexing.
- c) Error detection.
- d) Run length encoding.

**5×4**

### **PART-B**

Q.5 a) Explain the working of TCP/IP reference model. **10**  
b) Differentiate between pure ALOHA and slotted ALOHA. **5**  
c) What are the IP addressing schemes? Discuss briefly. **5**

Q.6 a) What are the advantages and limitations of distance vector routing algorithm? **10**  
b) What do you understand by ATM? With the help of examples explain advantages of ATM network. **10**

Q.7 Write short notes on the following:

- a) Class of service v/s Quality of service.
- b) Security management.
- c) Remote monitoring techniques.

**20**

# **End Semester Examination, Dec. 2018**

**B. Tech. – Fourth Semester**  
**JAVA PROGRAMMING (IT-402)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

- Q.1 a) What do you mean by platform independence of Java?  
b) Which class is the super class of all classes?  
c) Why Java doesn't support multiple inheritances?  
d) What is the importance of main method in Java?  
e) What are access specifiers?  
f) What are finally and finalize in Java?  
g) What is static import?  
h) What is multi-catch block in Java?  
i) Can an interface implement or extend another interface?  
j) What are wrapper classes?

**2×10**

## **PART-A**

- Q.2 a) Write a program to create a package Math and import it to another class to perform Mathematical operations of add and subtract. **10**  
b) Explain the difference between abstract class and interfaces. Write a program to implement concept of inner classes and multiple inheritance. **10**
- Q.3 a) Write a program to create a calculator that shows an error message on dividing by zero. **10**  
b) Write a program to display life cycle of an applet. **10**
- Q.4 a) Discuss Event delegation model by handling keyboard events. **10**  
b) Discuss various layouts used in AWT with suitable example of BORDER layout. **10**

## **PART-B**

- Q.5 a) Explain Remote method invocation with the steps for setting up RMI. **10**  
b) Discuss CORBA and SOAP architectures with its applications. **10**
- Q.6 a) Write a program to copy bytes from one file to another. **5**  
b) Write a program to create three threads A, B and C. Set the priority of A as highest, B as one less than A and C as lowest. **10**  
c) Write a program to concatenate two files and display the output in new file. **5**
- Q.7 a) Discuss JDBL drivers and write a program to insert a row in the database using statement. **10**  
b) Explain the concept of scrollable and updatable resultset by giving an example. **5**

- c) Discuss rowsets and explain the steps for updating value in the database using cachedRowset. **5**

## **End Semester Examination, Dec. 2018**

B. Sc. (Information Technology) – Fourth Semester  
**PERSONALITY DEVELOPMENT-IV (IT-403)**

Time: 3 hrs.

Max Marks: **50**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

**Q.1 Choose the correct option:**

- a) According to time matrix, things which are urgent as well as important should be:
  - i) To be done Immediately by you
  - ii) Can be delegated
  - iii) Spent max. time on
  - iv) Can be eliminated
- b) If the name (Robin John) is provided, which is the correct salutation?
  - i) Dear Mr. John
  - ii) Dear Mr. Robin
  - iii) Dear Mr. Robin John
  - iv) None of the above
- c) Which of the following is not an enemy of time management?
  - i) Overreaching
  - ii) Reverse delegation
  - iii) Procrastination
  - iv) Planned meetings
- d) "If you are early, you are on time. If you are on time, you are late", it means:
  - i) Reach the venue exactly on time.
  - ii) Reach the venue 15 minutes before the start of GD.
  - iii) Reach the venue 5 minutes before the start of GD.
  - iv) It's ok to be late at times.
- e) The most important aspect of emotional intelligence is:
  - i) Self-regulation
  - ii) Self awareness
  - iii) Empathy
  - iv) Motivation

**1×5**

**State whether the following statements are TRUE or FALSE:**

- f) A resume should be short as the recruiters do not have time to go through a bulky one.
- g) Cover letter is a one page document meant for introducing yourself to the hiring manager.
- h) A good resume should be made using as many font styles and font sizes as possible.
- i) The question on "describe yourself" should include background details, educational qualifications, strengths etc.
- j) In a resume, the particulars are mentioned in a reverse chronological order.

**1×5**

### **PART-A**

- Q.2 Explain the time management matrix. How can we use it to our benefit? **10**
- Q.3 What are effective customer service skills? Explain the techniques of handling irate customers. **10**
- Q.4 Explain the concept of emotional intelligence. What are the components of emotional intelligence? **10**

### **PART-B**

- Q.5 What are the main elements of a good resume? What tips would you give to a fresh graduate with regards to the resume writing? **10**
- Q.6 What are cover letters? Explain their importance. You are S. Sharma. Write a cover letter to Ms. Rama Goyal, Head, HR, submitting your candidature for a post, about which you came to know from an acquaintance? **10**
- Q.7 How are Group discussions different from debates? What are the main points that should be kept in mind during a group discussion? **10**

# **End Semester Examination, Dec. 2018**

B. Tech. — Seventh / Eighth Semester

## **NETWORK PROGRAMMING AND ADMINISTRATION (IT-701)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) Identify class and find the network address of the following IP address:  
124.150.80.70
- b) Specify the purpose of "Tracert" and "Fingre" commands.
- c) List out various system calls used in TCP based client-server communication.
- d) Define the relationship between socket and TLI.
- e) Explain the role of a multiprotocol server.
- f) List out various issues in server software design.
- g) Define remote programs and procedures. How to accommodate multiple versions of a remote program?
- h) Enlist the roles of network and system administration.
- i) How network security is planned?
- j) Define "Subnetting and Supernetting".

**2×10**

### **PART-A**

**Q.2** a) A block of address is granted to a midsize organization. One of the address from a block is "180.190.120.64/28". Answer the following:

- i) Define the term "Default mask". Specify the default mask for the associated class in the given IP address.
- ii) Find the first address of a block.
- iii) Find the last address of a block.
- iv) Find the total number of addresses in the block.

**10**

b) What is the necessity of "ICMP" at network layer of TCP/IP protocol suite? Discuss the various ICMP message types, with their purpose in internetworking.

**7**

c) Explain the concept of a VLAN.

**3**

**Q.3** a) Specify the role of socket in network communication. Give the detailed architecture of client-server communication, based on TCP. Explain role and syntax of each socket call, involved with neat interaction diagram.

**10**

b) Specify the role of "Select ( ) and Poll ( )" functions in socket programming.

**5**

c) Explain ECHO service with respect to TCP and UDP.

**5**

**Q.4** a) Discuss in detail, the iterative connection oriented server algorithm, with neat process structure diagram. Also, compare it with iterative connection-less server implementation. What is the motivation behind concurrent server implementation? **15**

### **PART-B**

- Q.5 a) Discuss the complete RPC model with neat diagram as well as discuss its each component. Also compare RPC model with conventional procedure call between client and server. **10**
- b) Explain the concept of dynamic port mapping. Specify the role of RPC port mapper. Dicsuss the RPC port mapper algorithm, explaining each step. **10**
- Q.6 a) Specify the role of a "DNS" and List out the steps for configuring a DNS server.
- b) Discuss the following:
- i) Approaches towards network administration.
  - ii) Static and dynamic routing.
  - iii) Dial-up configuration using PPP. **4×3**
- Q.7 a) Differentiate between wrappers and firewalls. **8**
- b) List out measures to be considered for preventing password sniffing. **6**
- c) Give examples of techniques for implementing privacy, authentication and authorization with reference to network security. **6**

# **End Semester Examination, Dec. 2018**

B. Tech. — Third / Fifth Semester

## **SOFTWARE ENGINEERING (IT-702)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.

- Q.1 a) Name the SDLC models available. Which one is best?  
b) What is the role of a software engineer?  
c) What is modularization?  
d) Differentiate between testing and debugging.  
e) Mention some software analysis and design tools.  
f) Briefly define Top-Down and Bottom-up design model.  
g) Define 'risk'.  
h) Explain the role of data structure and database in system design.  
i) How a software is considered reliable?  
j) What is data modeling?

**2x10**

### **PART-A**

- Q.2 a) Define 'software engineering'. How it emerged as an important field of engineering?  
Explain.  
**10**  
b) Differentiate between software process and software product.  
**6**  
c) State the characteristics of a good computer software.  
**4**

- Q.3 a) What is requirement engineering? Explain prototyping methods and tools.  
**10**

- b) What is the purpose of data flow diagrams? Give an example.  
**10**

- Q.4 a) What do you mean by software project management? Why project planning is important in software development?  
**10**

- b) What are the methods used for project scheduling and tracking? Justify with an example.  
**10**

**15**

### **PART-B**

- Q.5 a) What is requirement of modular design? Explain functional independence and cohesion and coupling.  
**15**

b) What is data modeling? Give five examples of data modeling.

**5**

Q.6 a) List and Explain different types of testing done during testing phase.

**10**

b) Explain software testing fundamentals, objectives and principles.

**10**

Q.7 Write short notes on:

a) Software reliability and measurement.

**7**

b) CASE building blocks.

**7**

c) Quality control Vs quality assurance.

**6**

# **End Semester Examination, Dec. 2018**

B. Tech. — Third Semester  
**SOFTWARE ENGINEERING (IT-702)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.

- Q.1 a) Define software risk.  
b) What are the attributes of good software?  
c) Differentiate between cohesion and coupling.  
d) Define term 'abstraction' in software engineering.  
e) Classify software metrics.  
f) How can one measure software quality?  
g) Why is integration testing harder than unit testing?  
h) Define 'modularity'.  
i) List the drawbacks of waterfall model.  
j) What do you mean by reverse engineering?

**2x10**

## **PART-A**

- Q.2 a) Define 'software engineering'. Discuss the steps involved in development of a software.  
**10**  
b) List the characteristics of spiral model in detail.  
**10**

- Q.3 a) What is software requirement specification (SRS)? Discuss the steps involved in SRS documentation and review.  
**10**  
b) Define 'data dictionary'.  
**4**  
c) Create an ER-Diagram for Hospital Management System.  
**6**

- Q.4 a) Explain COCOMO heuristic estimation techniques.  
**10**  
b) Discuss project scheduling and tracking technique.  
**10**

## **PART-B**

- Q.5 a) Discuss system design concepts and principles.  
**10**  
b) What is structural partitioning? Explain with diagram.  
**5**

c) Define terms 'information hiding' and data structure used in system design.  
**5**

Q.6 a) Differentiate between black box and white box testing. Explain in detail about any one testing tool.

**10**

b) How recovery testing is done?

**5**

c) How a tester designs test cases? Explain with a suitable example.

**5**

Q.7 Write short notes on:

a) CASE.

**7**

b) Quality cost.

**8**

c) Formal technical reviews and reports.

**5**

# **End Semester Examination, Dec. 2018**

B. Tech. — Fifth Semester  
**SOFTWARE ENGINEERING (IT-702)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) Differentiate between verification and validation.
- b) In software development process, what is meaning of Testing?
- c) How to find the size of a Software Product?
- d) What is a Software Metric?
- e) Why is it important to perform design documentation?
- f) Define 'E-R Diagram'.
- g) What is Cohesion?
- h) What do you mean by level-0 Data Flow Diagram?
- i) What is Quality Assurance Vs Quality Control?
- j) Define term SRS.

**2x10**

## **PART-A**

Q.2 a) What do you mean by Software Engineering? Why Software Engineering is important for development of software?

**10**

b) What are the characteristics of a good software?

**10**

Q.3 a) What is Requirement Engineering? Explain system modeling and simulation.

**10**

b) Draw and explain ER Diagram of University Enrollment System.

**10**

Q.4 a) Explain COCOMO heuristic estimation techniques in detail.

**10**

b) What is the role of a software Project Management?

**10**

## **PART-B**

Q.5 a) Define System Design process and state design principles and design concepts.

**10**

b) Why low coupling and high cohesion is required for effective system design and how is it achieved?

**10**

Q.6 a) What do you mean by Testing? What are software testing fundamentals, objective and principles?

**12**

b) Differentiate between White Box and Black Box Testing.

**8**

Q.7 a) State differences between Quality Control and Quality Assurance.

**10**

b) What is the process of Formal Technical Reviews and Reporting? What is the significance of FTR and reporting?

**10**

# End Semester Examination, Dec. 2018

B. Tech. — Sixth Semester  
**SOFTWARE ENGINEERING (IT-702)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Comment on the statement "Software doesn't wear out".
- b) Write the disadvantages of classic life cycle model.
- c) Define "Data dictionary".
- d) Define "Measures, Metrics and Indicators".
- e) What is earned value analysis?
- f) What is the benefit of modular designs?
- g) What is vertical partitioning?
- h) What are the objectives of testing?
- i) Define process in context of software quality.
- j) Define repository in software quality.

**2×10**

## **PART-A**

- Q.2 a) Explain V model in detail along with its advantages and disadvantages. **10**
- b) How risks are associated with project handled in the spiral model of software development? **10**
- Q.3 a) List out requirement elicitation techniques. Which one is most popular and why? **10**
- b) Explain various levels of DFD with example. **10**
- Q.4 a) Explain how the scheduling of a project is done. **10**
- b) Explain about Software Cost Estimation techniques. **10**

## **PART-B**

- Q.5 a) Explain the design guidelines that can be used to produce a good quality system design. **10**
- b) What is module coupling and module cohesion? Explain their types also. **10**
- Q.6 a) Consider a program which computes the square root of an input integer between 0 and 5000. Determine equivalence class test cases. Determine the test cases using BVA also. **10**
- b) Explain the following:  
i) System testing.  
ii) Recovery testing. **5×2**
- Q.7 a) Discuss how the reliability changes over the life time of a software product and hardware product. **10**

b) What is CASE? How it supports software life cycle.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. — Sixth / Seventh Semester  
**SOFTWARE ENGINEERING (IT-702)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.

- Q.1 a) Name the SDLC models available. Which one is best?  
b) What is the role of a software engineer?  
c) What is modularization?  
d) Differentiate between testing and debugging.  
e) Mention some software analysis and design tools.  
f) Briefly define Top-Down and Bottom-up design model.  
g) Define 'risk'.  
h) Explain the role of data structure and database in system design.  
i) How a software is considered reliable?  
j) What is data modeling?

**2x10**

## **PART-A**

- Q.2 a) Define 'software engineering'. How it emerged as an important field of engineering?  
Explain.  
**10**  
b) Differentiate between software process and software product.  
**6**  
c) State the characteristics of a good computer software.  
**4**

- Q.3 a) What is requirement engineering? Explain prototyping methods and tools.  
**10**  
b) What is the purpose of data flow diagrams? Give an example.  
**10**

- Q.4 a) What do you mean by software project management? Why project planning is important in software development?  
**10**  
b) What are the methods used for project scheduling and tracking? Justify with an example.  
**10**

## **PART-B**

- Q.5 a) What is requirement of modular design? Explain functional independence and cohesion and coupling.  
**15**

b) What is data modeling? Give five examples of data modeling.

**5**

Q.6 a) List and Explain different types of testing done during testing phase.

**10**

b) Explain software testing fundamentals, objectives and principles.

**10**

Q.7 Write short notes on:

a) Software reliability and measurement.

**7**

b) CASE building blocks.

**7**

c) Quality control Vs quality assurance.

**6**

## **End Semester Examination, Dec. 2018**

B. Tech. — Sixth / Seventh Semester

# **MANAGEMENT INFORMATION SYSTEM (IT-721)**

Time: 3 hrs.

**Max Marks:** **100**

*No. of pages:* 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1** Answer the following questions:

  - Why the concept of information system is introduced in managing the system. Discuss in detail.
  - Discuss various pros and cons of using MIS.
  - In an organized system what is the importance of automated MIS? Discuss in detail.
  - List the various organizational sectors using MIS.

**5x4**

## **PART-A**

- Q.2**

  - a) Discuss the importance of MIS in an organization. Explain briefly different components of MIS. **10**
  - b) Data management system is having key role in maintenance of database. Justify your answer by comparing DBMS with data warehouses and data mining. **10**

**Q.3**

  - a) While designing an MIS system what information concepts are required? Justify your answer with the help of suitable examples. **10**
  - b) Write short notes on the following:
    - i) MIS software and MIS team.
    - ii) Information as quality product.**5×2**

PART-B

- Q.5 a) Explain the role of MIS in decision making. How could you transform different strategies into MIS activities? **10**  
b) Discuss various advantages and disadvantage of using DSS. **10**

Q.6 a) Compare and contrast between enterprise business system and supply chain management system. **10**  
b) Explain various activities of service sector into MIS. In support of your answer give suitable example of any service sector. **10**

Q7 Write short notes on the following:  
a) Ethical and societal challenges of IT.  
b) Security of management of information system. **10×2**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **MANAGEMENT INFORMATION SYSTEMS (IT-721)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Discuss the concept of information system. Also, explain MIS in brief.  
b) How customization of MIS software can be done for an organization?  
c) Explain the classification of information requirements at various levels in the organization.  
d) Define 'decision support system'.  
e) Describe security ethical and societal challenges of IT. **4×5**

### **PART-A**

- Q.2 a) Discuss service sector, production sector and business sector of MIS in detail. What are the organizing software supports for MIS? **10**  
b) Explain data warehouse and data mining in MIS in detail. **10**
- Q.3 Why information is called as quality product? Discuss it in detail. Explain the design of modules, layouts and inputs/outputs of MIS system design. **20**
- Q.4 Write short notes on:  
a) System controls and types of controls.  
b) Long range plane for MIS. **10×2**

### **PART-B**

- Q.5 a) What is the main role of MIS in decision-making? Why DSS is treated as deterministic system? **10**  
b) What are the various strategic planning tools and how strategies can be transformed into MIS activities? **10**
- Q.6 How the procedures, manuals and documents of MIS can be developed? Discuss enterprise business system and supply chain management system in detail. **20**
- Q.7 Write short notes on:  
a) Security considerations in MIS.  
b) Security of management of information systems. **10×2**

# **End Semester Examination, Dec. 2018**

B. Tech. – Sixth Semester

## **MANAGEMENT INFORMATION SYSTEMS (IT-721)**

Time: 3 hrs

Max Marks: **100**

*No. of pages: 1*

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) What is the need of MIS?
- b) Define 'information'.
- c) Define 'quality parameters'.
- d) Define 'DBMS in MIS'.
- e) Differentiate between MIS and DSS.
- f) Define 'strategic planning'.
- g) Mention few applications of MIS.
- h) List some security issues in MIS.
- i) What are the disciplines where MIS is implemented?
- j) What kind of information is required at different levels in an organization?

**2x10**

### **PART-A**

Q.2 a) Discuss evolution of MIS. What are its basic components? Explain functional model of service sector with respect to MIS.

**15**

- b) Explain datawarehouse and data mining in MIS in brief.

**5**

Q.3 a) What are the methods of data information and data collection? Discuss in detail. **10**  
b) What do you understand by MIS software and MIS team?

**5**

- c) Explain the information concept in brief.

**5**

Q.4 a) Discuss in detail the architecture of MIS.

**10**

- b) What is the role of staff training and its functional manuals?

**5**

- c) What do you understand by scheduling of activities?

**5**

### **PART-B**

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- Q.5 a) Discuss the concept of DSS in detail?  
**10**  
b) Explain strategic planning and tools of planning in detail.  
**10**
- Q.6 a) Explain supply chain management in detail?  
**10**  
b) What is an Electronic Business System? Explain with the help of examples.  
**10**
- Q.7 Write short notes on:  
a) Ethical and Societal challenges of IT.  
**8**  
b) PERT.  
**8**  
c) Implementation and Testing of MIS.  
**4**

# End Semester Examination, Dec 2018

B. Tech. — Sixth Semester  
**E-COMMERCE AND ERP (IT-722)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) Compare e-commerce and e-strategy.
- b) List advantages of e-commerce.
- c) Describe importance of social media in e-commerce.
- d) List risks associated with e-commerce.
- e) How is home shopping done?
- f) How is a smart card different from a debit card?
- g) Compare CIB and C2C.
- h) Explain production scheduling.
- i) SCM is important module of ERP. Comment on it.
- j) What is knowledge engineering?

**2×10**

## **PART-A**

- Q.2** a) Explain e-commerce organization model based on transaction party. **10**  
b) LIC's is the major concept of e-commerce. Explain each "C" with an example. **10**
- Q.3** a) What is digital payment system and explain cyber cash model. **10**  
b) Explain different techniques used in electronic payment system. **10**
- Q.4** a) Explain the concept behind electronic data interchange and explain its benefits and applications. **15**  
b) Define cryptography and mention its purpose. **5**

## **PART-B**

- Q.5** a) Explain in brief the different modules of ERP. **10**  
b) Explain origin of the term SCM. **5**  
c) What are the various advantages and disadvantages of ERP? **5**
- Q.6** a) Explain various functions and applications of resource management. **10**  
b) Compare the following terms: Production planning, production scheduling and production control. **10**
- Q.7** a) Write short notes on the following:
  - i) Customer relationship management.
  - ii) HRD module in ERD. **5×2**  
b) What are the different phases of ERP implementation life cycle? List out the activities to be performed in each case. **10**



# **End Semester Examination, Dec. 2017**

B. Tech. — Sixth Semester  
**E-COMMERCE AND ERP (IT-722)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

- Q.1 a) Mention the benefits of e-market over traditional markets.  
b) What are the risks with e-commerce?  
c) Enlist the advantages of ERP.  
d) Differentiate between e-cheque and e-cash.  
e) What are the disadvantages of e-commerce?  
f) Define knowledge engineering?  
g) Explain the operational process of digicash.  
h) Elaborate term OLAP.  
i) What are the characteristics of data in data warehouse?  
j) What is online commerce?

**2×10**

## **PART-A**

- Q.2 a) What are the 4C's of e-commerce, explain each with an example? **10**  
b) Explain e-commerce organization model based on transaction party. **10**
- Q.3 a) What are the different types of electronic payment systems? Explain. **10**  
b) Explain cyber cash model in detail. **10**
- Q.4 a) Explain the security standards that are implemented for e-commerce. **10**  
b) Write short notes on:  
i) Operational process of digicach.  
ii) EDI **5x2**

## **PART-B**

- Q.5 a) Explain briefly different modules of ERP. **10**  
b) List various advantages and disadvantages of ERP. **5**  
c) Explain origin of term SCM. **5**
- Q.6 a) Compare and contrast production planning, production scheduling and production control. **10**  
b) Explain various function and application of resource management. **5×2**
- Q.7 Write short notes on:  
a) Critical success factors of ERP implementation.  
b) Information system planning.

- c) HRD module in ERP.
- d) Product life cycle management.

**5x4**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fifth / Seventh / Eighth Semester

## **ADVANCE JAVA PROGRAMMING (IT-801)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) Explain encryption and decryption.
- b) What are property editors?
- c) Write the steps to configure LDAP server.
- d) Explain half close sockets.
- e) Write a program to create progress bar, using swings.

**4×5**

### **PART-A**

Q.2 a) Write a program to display a database file containing customer-id, name and address using JDBC. **10**  
b) Explain LDAP. **10**

Q.3 a) Write a Java program to retrieve the information from the server, using a URL connection. **10**  
b) Write a programme to implement client and server communication, using Java sockets. **10**

Q.4 a) What is the purpose of tabbed panes? Write a program to create tabbed pane. **10**  
b) Write a program demonstrating insertion and deletion of an element from LIST. **10**

### **PART-B**

Q.5 a) Explain the following:  
i) Transparency.  
ii) Composition clipboard. **10×2**

Q.6 a) Define Java Bean. Explain Java Bean properties. **10**  
b) List and explain the steps to create a new Java Bean with an example. **10**

Q.7 Explain the following:  
a) Byte code verification.  
b) Code signing. **10×2**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fifth / Sixth Semester

## **ADVANCED JAVA PROGRAMMING (IT-801)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) Name all the JDBC driver types.
- b) Define "Socket".
- c) What is the utility of component organizers?
- d) What do you mean by rendering hints?
- e) Explain code signing process.
- f) What are RowSets?
- g) What are the components of JRE?
- h) Explain any two methods of URL connection class.
- i) How can you make a result scrollable?
- j) Explain bootstrap class loader.

**2×10**

### **PART-A**

**Q.2** a) Write down the steps for JDBC configuration. Write a program for executing a simple database query in Java. **10**  
b) What do you mean by LDAP? How to configure LDAP server? How can we access LDAP directory information? **10**

**Q.3** a) What is network programming? How sockets are created and implemented for network communication in Java? Explain with the help of a program. **10**  
b) Explain the following:

- i) Advance socket programming concepts.
- ii) Half-Close.
- iii) Interruptible sockets.
- iv) Socket-Timeout.

**2½×4**

**Q.4** a) What are swings in Java? Write a program to create a scrollable list using List component in Java. **10**  
b) Create a table for storing name, roll no., address and phone number of students of your class. **10**

### **PART-B**

**Q.5** a) Explain rendering pipeline in detail. **10**  
b) How can you print multiple documents in Java? **4**  
c) Write a program to implement drag and drop faculties for an object in Java. **6**

**Q.6** a) What are beans? Write the process for bean writing with example. **10**

- b) Explain the naming patterns for bean. **10**
- Q.7 Write short notes on the following:  
a) Encryption and Decryption process. **7**  
b) Byte Code verification. **8**  
c) Security managers and permissions. **5**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fifth Semester

## **ADVANCED JAVA PROGRAMMING (IT-801)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 1*

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and any **TWO** questions from **Part-B.** Each question carries equal marks.

Q.1 Answer the following questions:

- a) Write a program to access the methods of URL connection class in Java.
- b) Explain scrollable and updatable result set and mention how it is different from row set?
- c) What is a J table? How do we add or remove rows from tables?
- d) Explain the concept of reusability in Java Beans.
- e) Explain encryption and decryption techniques.

**5x4**

### **PART-A**

Q.2 a) Write a program in Java to create a JDBC connection & run the following queries:

- i) To display employee record from table employee in reverse order.
- ii) To display all employee data whose name start with 'A'.

**10**

b) Differentiate between statement & prepared statement by citing a suitable example.

**5**

c) How do we access LDAP? Explain architecture of LDAP in detail.

**5**

Q.3 a) Write a program to implement client-server application. Explain in detail.

**10**

b) Write short notes on:

- i) Socket time out.
- ii) Half-days.

**10**

Q.4 a) Write a program to implement J List. How do we add and remove elements from J-List?

**10**

b) Write a program to make 'Java' as bold and 'coffee' as *italic* and set the background and foreground colour as red and yellow.

**10**

### **PART-B**

Q.5 a) Design a program to study basic geometric transformations.

**10**

b) Explain printing process in AWT with a program.

**10**

Q.6 a) Define Java beans. How do we set and get properties of a bean?

**10**

b) Explain bean writing process in detail with an example 'student-bean' and set and get its properties.

**10**

Q.7 a) How byte-codes can be verified in Java? Explain in detail.

**10**

b) Is Java a secure language? Explain code signing process in detail.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Sixth / Seventh Semester

## **SOFTWARE PROJECT MANAGEMENT (IT-821)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) What are the objectives of software project management?
- b) How the cost of a project is estimated?
- c) What is the purpose of risk management?
- d) Justify the role of review plan.
- e) Briefly explain critical change management.
- f) How the FTR (formal technical review) is processed?
- g) What are the utilities of software testing plant?
- h) What are the purpose of fish bone diagram?
- i) Define the role and milestone during the development process.
- j) Discuss the benefits of project closure report in brief.

**2×10**

### **PART-A**

Q.2 a) What is capability maturity model? How it can help in improving software project development or management. **10**  
b) Explain V shape model and its importance. **10**

Q.3 a) What are importance of design and testing phase in software development life cycle model? **10**  
b) Explain the concept of schedule estimation with suitable example. **10**

Q.4 a) Explain 'PERT' estimation technique with example. How the effort estimation is calculated. **10**  
b) Differentiate between PERT and CPM. **5**  
c) Draw and explain in brief iterative model. **5**

### **PART-B**

Q.5 a) Define 'quality management'. Define the term quality assurance and quality control. **10**  
b) What is risk and how it can be classified into different categories? **10**

Q.6 a) Discuss in detail: project crashing and fast tracking. **10**  
b) What is run chart and pie chart? What is flexibility matrix and its importance. **10**

Q.7 Write short notes on the following:

- a) Quality control tools
- b) Conduct review.
- c) Crash point and normal point.

d) Cost estimation in SPM.

**5x4**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh / Eighth Semester

## **DATA WAREHOUSE AND DATA MINING (IT-822)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 1*

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any two from **PART-B**. Marks are indicated against each question.

**Q.1** Answer the following:

- a) Briefly discuss multimedia databases along with an example.
- b) Face table and dimension table both have data, but still it differs. Explain.
- c) Define data aggregation and generalization.
- d) Why is outlier mining important?
- e) What are the characteristics of strategic information?
- f) Explain virtual data warehouse.
- g) How are the users of data warehouse classified?
- h) What are the requirements of cluster analysis?

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh / Eighth Semester

## **DATA WAREHOUSE AND DATA MINING (IT-822)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 1*

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any two from **PART-B**. Marks are indicated against each question.

Q.1 Answer the following:

- a) Briefly discuss multimedia databases along with an example.
- b) Fact table and dimension table both have data, but still it differs. Explain.
- c) Define data aggregation and generalization.
- d) Why is outlier mining important?
- e) What are the characteristics of strategic information?
- f) Explain virtual data warehouse.
- g) How are the users of data warehouse classified?
- h) What are the requirements of cluster analysis?
- i) Differentiate between operational and informational systems.
- j) Explain slice and Dice operations in context with data marts.

**2x10**

### **PART-A**

Q.2 a) What are the different components of a data warehouse?

**10**

b) What are the different models of OLAP? Explain each in detail.

**10**

Q.3 a) What are the techniques used for data extraction and data cleaning. Explain briefly.

**10**

b) Draw and explain with a neat diagram of 3-tier architecture of data warehouse.

**10**

Q.4 a) How are top-down and bottom-up approaches for building a data warehouse different? Discuss the merits of each.

**10**

b) Briefly explain the following concepts.

- i) Bit mapped indexing
- ii) Computation cubes.

**5x2**

### **PART-B**

- Q.5 a) Discuss the various objective measures of pattern interestingness in data mining.  
**10**  
b) Explain the syntax for the following data mining primitives:  
i) Task relevant data  
ii) Kind of knowledge to be mined.

**5x2**

- Q.6 a) Explain the BIRCH and CURE clustering methods in detail.  
**10**  
b) What is a decision tree? Where they can be used? How is tree pruning useful in decision tree induction?

**10**

- Q.7 a) What distance/similarity measure generally used to test documents? What is the measure generally used for multimedia documents?  
**10**  
b) Describe some applications of classification and clustering for multimedia documents.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – First / Second Semester

## **ELEMENTS OF MECHANICAL ENGINEERING (M-101C)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 a) Define the following terms:

- i) Strain
- ii) Stress
- iii) Thermodynamic system
- iv) Hardness
- v) Toughness
- vi) Chain drive
- vii) Velocity ratio

**2x7**

b) Write down the units of the following terms:

- i) Pressure
- ii) Force
- iii) Torque
- iv) Heat
- v) Strain
- vi) Modulus of rigidity

**1x6**

### **PART-A**

Q.2 a) What are the limitations of 1<sup>st</sup> Law of Thermodynamics Also state how are they overcome in 2<sup>nd</sup> Law of Thermodynamics.

**10**

b) A heat engine produces work equivalent to 120 kW with an efficiency of 60%. Determine the heat transfer rate to and from the working fluid.

**10**

Q.3 a) Draw the P-V and T-S diagram for the following cycles:

- i) Otto cycle
- ii) Diesel cycle

**2x5**

b) Write the difference between:

- i) Two stroke and four stroke engines
- ii) Petrol and Diesel engines.

**2x5**

Q.4 a) Derive an expression for the length of belt for cross-belt system.

**10**

b) Explain the gear terminology with the help of a suitable diagram.

**10**

**PART-B**

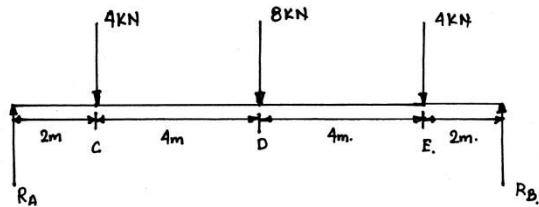
Q.5 a) Draw the stress strain diagram for mild steel and explain the salient points of it.

**10**

b) Derive an expression for the relation between K, E and C

**10**

Q.6 Draw the shear force and bending moment diagram for the following system:



**20**

Q.7 Explain the various types of resistance welding with neat sketches.

**20**

# End Semester Examination, Dec. 2018

B. Tech. – Second Semester  
**APPLIED MECHANICS (M-201 / M-201A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) Rigid body in mechanics.
- b) Force system.
- c) Moment of inertia.
- d) Derive  $I_{xx}$  of a rectangular plate with width  $b$  and height  $h$ .
- e) Free body diagram.
- f) Perfect truss.
- g) Maximum height and range of a projectile.
- h) Rectangular components of velocity.
- i) General plane motion.
- j) Principle of virtual work.

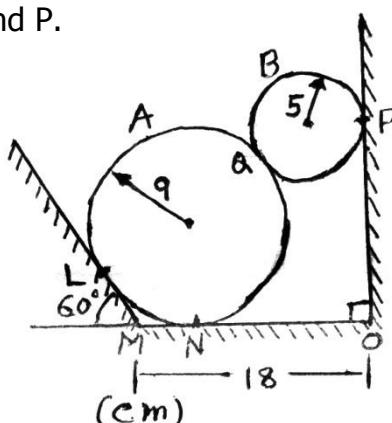
**2×10**

## **PART-A**

**Q.2** a) Briefly explain the laws of mechanics.

**8**

- b) Two cylinders A and B rest in a horizontal channel as shown in the figure. The cylinder A has a weight of 900N and radius of 9.0cm. The cylinder B has a weight of 400N and a radius of 5.0cm. The channel is 18.0cm wide at the bottom and one side vertical. The other side is inclined at an angle  $60^\circ$  with the horizontal. Find the reactions at point L, N and P.

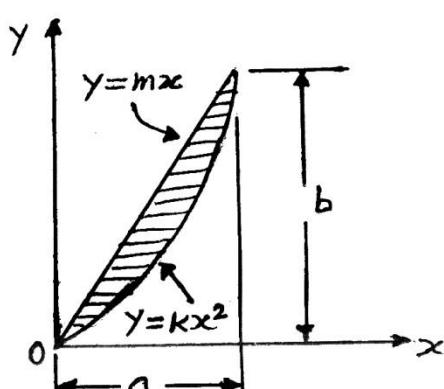


**12**

**Q.3** a) State and prove the perpendicular axis theorem.

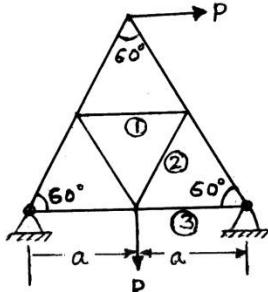
**6**

- b) Determine the coordinates of the centroid of the shaded area formed by the intersection of a straight line and the curve  $Y = Kx^2$  as shown in the figure.



14

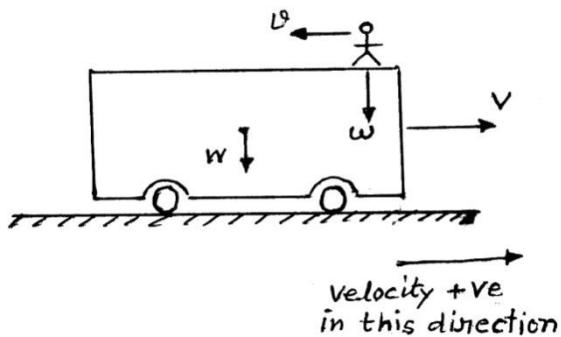
- Q.4 a) Differentiate between truss, frame and machine.  
 b) A truss is loaded and supported as shown in the figure. Find the axial forces in the members 1, 2, and 3.



14

### PART-B

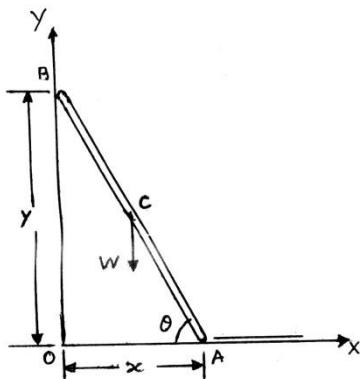
- Q.5 a) A stone is dropped from a building top from 60m height. At the same instant, another stone is thrown vertically upwards from foot of the tower to meet the first stone at a height of 18m. Determine:  
 i) The time when the two stones meet.  
 ii) The velocity with which the second stone was thrown up. 5x2  
 b) A helicopter flying horizontally at 80km/hr. and at a height of 500m intends to bomb a target on the ground. At what distance from the target should the bomb be released in order to hit the target? Also find the magnitude and direction of the velocity with which the bomb hits the target. 10
- Q.6 a) Define impulse of a force with the help of a force/time graph. 5  
 b) A trolley of weight  $W$  can move along a horizontal frictionless track. Initially the trolley together with a man of weight  $w$  standing on it is moving with a velocity  $V$  to the right as shown in the figure. Find the increase in velocity of the trolley if the man runs with a speed of  $v$  relative to the floor of the trolley and jumps off the left.



15

- Q.7 a) Explain with a help of suitable example the principle of virtual work.  
 b) Explain the principle of impulse and momentum. 5

- c) A ladder AB shown in the figure of length  $l$  and weight  $w$  stands in a vertical plane supported by smooth surfaces at A and B. Using the principle of virtual work, Find the magnitude of the horizontal force P to be applied at the end A if the ladder is to be in equilibrium.



10

# **End Semester Examination, Dec. 2018**

B. Tech. – Second Semester

## **ENGINEERING MATERIALS AND HEAT TREATMENT (M-202)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) State the effect of impurities on steel.
- b) What is duralumin? Give its composition and one application.
- c) State the application of "Optical fiber".
- d) State the significance of "Tensile test".
- e) Define hardness, toughness and fatigue.
- f) What are the  $M_s$  and  $M_f$  temperatures?
- g) State the mechanism of formation of austenite on heating for eutectoid steel.
- h) Why tempering is necessary after hardening?
- i) What is overheating and burning of steel?
- j) Define "Case depth" of surface hardening parts.

**2×10**

### **PART-A**

**Q.2** a) Distinguish between high carbon steel and alloy tool steel. **5**  
b) Write short notes on the following:  
    i) Maraging steel.              ii) Spring steel.              iii) Free cutting steel. **5×3**

**Q.3** a) State the mechanical properties of "Ceramics". **7**  
b) Write a short note on optical fiber. **5**  
c) What are agglomerated materials? Give examples and applications. **4**  
d) Write a short note on glasses types. **4**

**Q.4** a) Differentiate between toughness and stiffness. **5**  
b) Draw a typical creep curve of strain versus time at constant stresses and elevated temperatures clearly showing the three stages of creep and rupture. **8**  
c) Define "Vicker hardness test". **7**

### **PART-B**

**Q.5** a) Explain the construction of TTT diagram according to first principle. **10**  
b) Draw and explain Fe-Fe<sub>3</sub>C diagram and label the phase field. **10**

**Q.6** Differentiate between the following:  
a) Normalizing and Annealing.  
b) Hardening and Tempering. **10×2**

**Q.7** Write short notes on the following processes:  
a) Carburizing.              b) Case depth measurement.

c) Carbonitriding.

d) Flame hardening.

**5x4**

# **End Semester Examination, Dec. 2018**

B. Tech. – Second Semester

## **ENGINEERING MATERIALS AND HEAT TREATMENT (M-202)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt **ANY TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Why tungsten is added to steel?  
b) Differentiate between elasticity and plasticity.  
c) What is skin effect in induction hardening?  
d) What is yield point?  
e) What is dezincification?  
f) Define hardness and toughness.  
g) At what temperature and composition eutectic reaction happens in iron carbon diagram?  
h) Define ceramic material with example.  
i) Define uniform corrosion and crevice corrosion.  
j) Name the various types of quinclents. **2×10**

### **PART-A**

- Q.2 a) What is stainless steel? Discuss the various types of stainless steel in detail. **12**  
b) Write short notes on:  
i) Brass  
ii) Bronze **4×2**
- Q.3 a) What are composites? Give their types and briefly discuss the various types of composites. **10**  
b) What are abrasive materials? Discuss the type of abrasives in detail. **10**
- Q.4 a) Draw the stress strain curve and discuss the various properties of materials on basis of this curve. **12**  
b) What is fatigue? Why do we perform the fatigue test on various materials? **8**

### **PART-B**

- Q.5 a) Draw the iron-carbon diagram, showing all the transition phases, transition temperatures and reaction occurs at various temperatures and composition. **12**  
b) Write down the significance of TTT curve. **8**
- Q.6 Write short notes on the following:  
a) Tempering  
b) Hardening  
c) Quench cracks  
d) Hot spots **5×4**

- Q.7**   a) What is carburizing process? Explain the various types of carburizing process in detail. **12**  
      b) What is flame hardening? Discuss with diagram. **8**

# End Semester Examination, Dec. 2018

B. Tech. – Third Semester  
**ENGINEERING MECHANICS (M-301A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

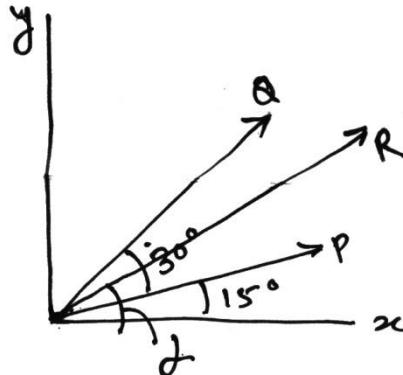
**Q.1** Explain (**any five**) terms in detail:

- Newton's law of Gravitation.
- Theorem of Varignon.
- Moment of a Couple.
- Equation of Dynamic Equilibrium.
- Equation of motion: rectangular component.
- Conservation of Momentum.

**4x5**

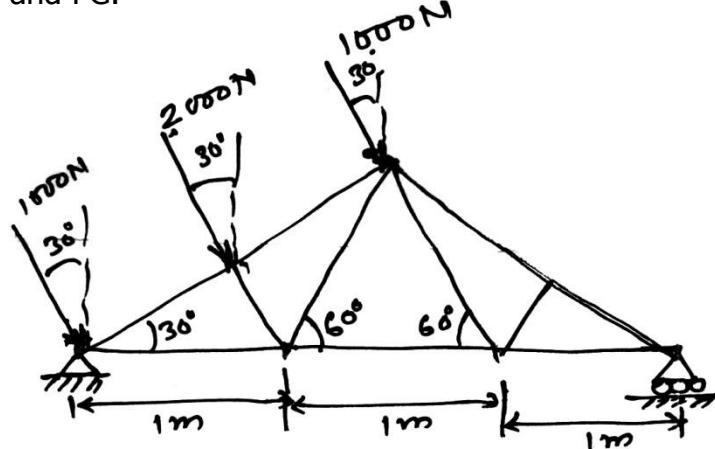
## **PART-A**

**Q.2** Two forces are acting at a point as shown in figure. Determine the magnitude and direction of resultant choosing the x and y axis as shown and resolving the forces P and Q along these axis?



**20**

**Q.3** A truss is loaded and supported as shown in figure. Determine the axial forces in the member CE, CG, and FG.

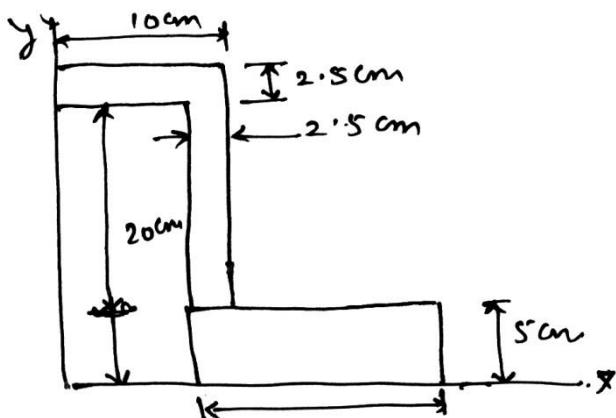


**20**

- Q.4 a) Explain:  
 i) Centre of Gravity.  
 ii) Centre of Mass.

**3x2**

- b) Find the centroid of cross-section area of Z section shown in figure.



**14**

### **PART-B**

- Q.5 Motion of a particle is given by the equation:  
 $x=t^3-3t^2-9t+12$

Determine the time, position and acceleration of the particle when its velocity become zero?

**20**

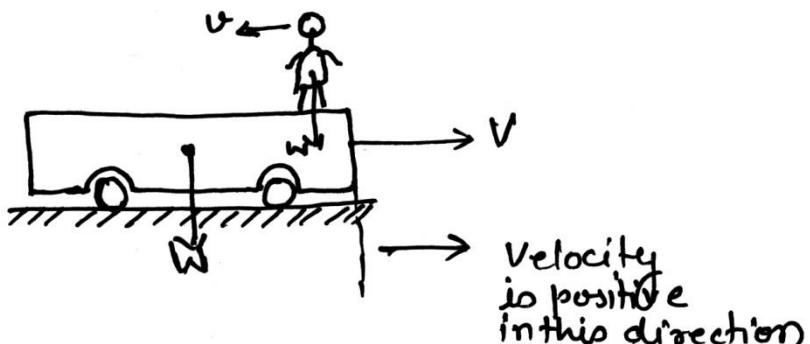
- Q.6 A car weighing 4000N is moving at a speed of 100m/s. The resistance to the car is largely due to air drag which is equal to  $0.004v^2$ . What distance will it travel before its speed is reduced to 5 m/s.?

**20**

- Q.7 a) A trolley of weight  $w$  can move along a horizontal friction less track. Initially the trolley together with a man of weight  $w$  standing on it, is moving with a velocity  $v$  to the right as shown in figure. Find the increase in velocity of the trolley if the man runs with a speed of  $v$  relative to the floor of the trolley and jump off to the left.

**14**

- b) Describe Principle of virtual work.





# End Semester Examination, Dec. 2018

B. Tech. – Third Semester  
**THERMALS ENGINEERING-I (M-302A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1**
- a) State the Zeroth law of thermodynamics.
  - b) What is meant by microscopic and macroscopic approach in thermodynamics?
  - c) What are the limitations of first law of thermodynamics?
  - d) Define enthalpy. How is it related to internal energy?
  - e) Draw cannot cycle on p-v and T-s diagram.
  - f) State the concept of clauses inequality.
  - g) Differentiate between critical point and triple point of water.
  - h) What is a pure substance?
  - i) How ideal gas is different from perfect gas?
  - j) Define the coefficient of volume expansion.
- 2×10**

## **PART-A**

- Q.2**
- a) Derive the equation for the work done in polytrophic process. **10**
  - b) A fluid at a pressure of a bar, and with specific volume of  $0.18\text{m}^3/\text{kg}$ , contained in a cylinder behind a piston expands reversibly to a pressure of 0.6 bar according to a law 
$$P = \frac{C}{V^2}$$
 where C is a constant. Calculate the work done by the fluid on the piston. **10**
- Q.3**
- a) Derive the expression for steady flow energy equation and simplify when applied for turbine. **10**
  - b) Air enters a compressor at  $10^5\text{ Pa}$  and  $25^\circ\text{C}$  having volume of  $1.8\text{m}^3/\text{kg}$  and is compressed to  $5\times 10^5\text{ Pa}$  isothermally. Determine:
    - i) Work done:
    - ii) Change in internal energy.
    - iii) Heat transferred.
10

- Q.4**
- a) State the Kelvin-Planck and clausius statements of the second law of thermodynamic and establish the equivalence between them. **10**
  - b) 1kg of ice at  $0^\circ\text{C}$  is mixed with 12kg of water at  $12^\circ\text{C}$ . Assuming the surrounding temperature as  $15^\circ\text{C}$ , calculate the net increase in entropy and unavailable energy when the system reaches common temperature. Given:  $C_{pw} = 4.18\text{ kJ/kg K}$ ,  $C_{pi} = 2.1\text{ kJ/kg K}$  and enthalpy of fusion of ice (latent heat) =  $333.5\text{ kJ/kg}$ . **10**

## **PART-B**

- Q.5 a) Steam enters an engine at a pressure 10 bar absolute and 400°C. It is exhausted at 0.2 bar. The steam at exhaust is 0.9 dry. Find:  
i) Drop in enthalpy.  
ii) Change in entropy. 10

- b) Describe with a neat sketch a separating-throttling calorimeter for measuring the dryness fraction of steam. 10

- Q.6 a) State Boyle's and Charle's laws and derive an equation of the state for a perfect gas. 10

- b) Write short notes on:  
i) Vander Waal's equation.  
ii) Compressibility chart. 5×2

- Q.7 a) Using the first Maxwell equation, derive the remaining three. 15
- b) Derive the following relations:

$$u = a - T \left( \frac{\partial a}{\partial T} \right)$$

Where  $a$  = Helmholtz function (per unit mass)

$g$  = Gibbs function (per unit mass) 5

# **End Semester Examination, Dec. 2018**

B. Tech. – Third Semester

## **MANUFACTURING TECHNOLOGY-I (M-303A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following:

- a) What are the desired properties of the moulding sand?
- b) What are the functions of chills and chaplets?
- c) State the limitations of centrifugal casting.
- d) List out the defects in casting process
- e) Differentiate between cold working and hot working.
- f) Compare progressive dies and compound dies.
- g) What is the purpose of electrode coating?
- h) Classify the types of welding processes based on factors affecting welding.
- i) What are the advantages of DC power supply over AC power supply in welding?
- j) Give the applications of shielded metal arc welding. **2×10**

### **PART-A**

**Q.2** a) How is a casting process carried and illustrate the functions of each component with a well labeled neat sketch. **14**  
b) What are the various pattern allowances provided and why? **6**

**Q.3** a) What are the different types of gates and risers? Explain the function of them. **10**  
b) How does investment casting work? And what are its advantages over other casting methods? **10**

**Q.4** a) Explain the principle of rolling and the types of rolling arrangement. **10**  
b) Elaborate the various operations possible in forging. **10**

### **PART-B**

**Q.5** a) Explain the various sheet metal operations possible with neat sketches. **10**  
b) Explain the significance of pilots, punches, strippers and die stops. **10**

**Q.6** a) State the principle of arc formation. Explain the working of electric arc welding with a neat sketch. **12**  
b) Explain the application of various flame settings in OXY-Acetylene gas welding. **8**

**Q.7** a) Explain the working of submerged arc welding. State its advantages over other welding methods. **12**  
b) Explain Brazing and soldering process. **8**

# **End Semester Examination, Dec. 2018**

B. Tech. – Third / Fourth Semester  
**FLUID MECHANICS (M-304A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

**Q.1** Answer briefly:

- a) Define the term 'continuum'.
- b) What is the effect of pressure and temperature on the bulk modulus of elasticity (k) of fluids?
- c) What do you understand by the terms circulation and vorticity?
- d) Name some practical applications of Bernoullis theorem.
- e) What is the difference between an ideal fluid and a real fluid?
- f) Write down the formula of shear stress in turbulent flow according to prandtl.
- g) Define the terms Laminar sub layer and boundary layer.
- h) What is Rayleigh's method?
- i) What is Hydraulic gradient line and total energy line?
- j) What is model analysis and Mach number? **2×10**

## **PART-A**

- Q.2**
- a) An isosceles triangle plate of base 3 m and 6 m is immersed vertically in water, with its axis of symmetry horizontal. If the head of water on its axis is 9 m, locate the centre of pressure. **10**
  - b) What is meant by stability of a floating body? Explain the stability of a floating body with reference to its metacentric height. **10**

- Q.3**
- a) Differentiate between the Eulerian and lagrangian method of representing fluid motion. **8**
  - b) The stream function is given by  $\psi = 3x^2y + (2+t)y^2$ . Find the velocity field and determine its values at a point defined by the position vector  $r = i + 2j - 3k$  when  $t = 2$ . **6**
  - c) A velocity potential function in 2-D flow is  $\phi = y + x^2 - y^2$ . Find the stream function for this flow. **6**

- Q.4**
- a) What is an orifice meter? Derive an expression for the discharge through an orifice meter. **10**
  - b) A horizontal venturimeter  $20\text{cm} \times 10\text{cm}$  is used to measure flow of oil of specific gravity 0.7 determine the deflection of the mercury guage, if the discharge of the oil 60 L/s. Assume coefficient of discharge=1.0. If the deflection of mercury guage is 0.2 cm, Find the coefficient of the venturimeter. **10**

## **PART-B**

Q.5 A oil of viscosity 10 poise and specific gravity 0.6 flow through a horizontal pipe of 30 mm diameter. If the pressure drop in 50 m length of the pipe is 3000 kN/m<sup>2</sup>, determine:

- i) the rate of flow of oil in  $m^3 / s$ .
- ii) the total frictional drag over 50 m length of pipe.
- iii) the centre line velocity.
- iv) Power required to maintain the flow.
- v) the velocity gradient at the pipe wall.

**4x5**

Q.6 a) Explain the concept of mixing length introduced by Prandtl and state the relationship that exist between the turbulent shearing stress and mixing length. **8**

- b) What is Von Karman momentum integral equation and derive it. **12**

Q.7 a) Find the expression for the thrust 'F' on the propeller of a ship or a motor boat. This thrust will be a function of 'f' and ' $\mu$ ' of the liquid and diameter 'd', speed of advance 'V' and rotational speed 'n' of the propeller. Use Buckingham's  $\pi$ -theorem. **10**

- b) What is a compound pipe? What will be the loss of head when the pipes are connected in a series? **10**

# End Semester Examination, Dec. 2018

B. Tech. – Third Semester  
**MATERIAL SCIENCE (M-305)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer (**any five**) questions:

- a) What are vacancies? How are they created in metal lattices?
- b) What information do we get from the study of phase diagrams?
- c) Discuss the processes of heat treatment of steel with examples.
- d) State the difference between elastic and plastic deformation.
- e) Discuss the effect of chromium content of the rate of corrosion in steel.
- f) Differentiate between matrix and dispersed phases in a composite material.      **4×5**

## **PART-A**

- Q.2** a) Show that BCC is more densely packed than SC.      **10**  
b) Describe and illustrate the edge and screw dislocation in solids.      **10**
- Q.3** a) What do you understand by solid solution? Explain with neat sketches the substitutional solid solution and interstitial solid solution. Give two examples of each in the alloy system.      **12**  
b) Explain the working of TTT diagrams and what information is supplied by them?      **8**
- Q.4** a) What is the need for hardening? Describe a method of hardening.      **10**  
b) Briefly explain the process of Nitriding and cyaniding in heat treatment.      **10**

## **PART-B**

- Q.5** a) Distinguish the term 'recovery' and the 'recrystallization' involved in the process of heating cold worked metals.      **10**  
b) Explain the mechanism for dislocation in plastic deformation with neat sketches.      **10**
- Q.6** a) Explain different methods used to protect steel against corrosion.      **10**  
b) How does temperature and stress affect the creep rate? Explain.      **10**
- Q.7** a) Differentiate between additional polymerization and condensation polymerization.      **10**  
b) Explain laminated composites giving their properties.      **10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Third Semester

## **MATERIALS AND HEAT TREATMENT (M-307)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) How cast iron differs from steel?  
b) Name some of the important applications of fiber re-inforced composites.  
c) What do you mean by percentage elongation? What does a high percentage elongation value signifies?  
d) Write the basic components of a heat treatment process.  
e) Briefly describe the objectives of annealing. **4×5**

### **PART-A**

- Q.2 a) What are high speed steels? What are the principal alloying elements in them? Describe their properties in brief. **10**  
b) What are the main characteristics of non-ferrous alloys due to which they are preferred over ferrous alloys inspite of their high costs? Describe the composition. Properties and used of a few important types of brasses. **10**
- Q.3 a) State the essential characteristics of ceramics that are used in industrial application. Briefly describe piezoelectric ceramics. **10**  
b) Define composite materials. What material properties are improved by the addition of reinforcing fibers? **10**
- Q.4 a) Explain the procedure used to measure the properties of ductile materials. Differentiate between brittle and ductile fracture. **12**  
b) What is corrosion? How can it be prevented or, accelerated? **8**

### **PART-B**

- Q.5 a) Explain why carbon, among all elements, is so effective in imparting strength to iron in the form of steel. **12**  
b) Discuss the phase transformation in steel on heating and cooling. **8**
- Q.6 a) Why is normalizing done? Explain the processes of normalizing. **10**  
b) What defects can occur in a heat treated component? What are the possible causes and remedies for them? **10**
- Q.7 a) What is the requirement of post heat treatment of carburized part? **5**  
b) What is surface hardening? Explain the methods of surface hardening. **15**

# End Semester Examination, Dec. 2018

B. Tech. – Third Semester  
**METROLOGY (M-308)**

Time: 3 hrs. Max Marks: **100**  
 No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Classify different types of fits.  
 b) State Taylor's principle of limit gauging.  
 c) Discuss about imperial standard yard and international prototype meter.  
 d) Interpret  $R_a$  and  $R_z$  values.  
 e) What do you mean by lay?  
 f) Define effective diameter of a screw thread.  
 g) List down methods of straightness measurement.  
 h) State the importance of geometric tolerance of manufacturing components.  
 i) What do you mean by pitch circle of a gear?  
 j) Discuss types of errors in spur gear. **2×10**

## **PART-A**

- Q.2 a) Differentiate between interchangeability and selective assembly. **5**  
 b) Calculate the dimensions, tolerance and allowances for a 22 mm shaft and hole pair designated H7d8. Fundamental deviation for 'd' shaft is  $-16D^{0.44}$ . Diameter range is 18–30 mm.  
 $IT\ 7 = 16^i$   
 $IT\ 8 = 25^i$  **15**
- Q.3 a) Write a short note on sine bar. **5**  
 b) Explain with neat sketch the working principle of optical comparator. **15**
- Q.4 a) Explain the terms:  
 i) CLA method. ii) Waviness  
 iii) Roughness iv) Stylus v) Skid **1×5**  
 b) Describe working principle of Taylor Hobson surface roughness instrument. **15**

## **PART-B**

- Q.5 a) What is best size wire? Calculate the diameter of best wire for an M20 × 25 screw. **5**  
 b) Describe two wire method of finding the effective diameter of screw threads. **15**
- Q.6 a) Explain following terms:  
 i) Straightness ii) Flatness  
 iii) Squareness iv) Roundness v) Concentricity **1×5**  
 b) Explain reference circle and its types with neat sketch. **5**  
 c) Describe at least two methods for measuring straightness. **10**

Q.7 a) Explain following spur gear terminologies:

- i) Pitch circle.
- ii) Chordal thickness.
- iii) Circular tooth thickness.
- iv) Tooth flank.
- v) Clearance.

**1×5**

b) Explain with diagram the construction, working and applications of Parkinson gear roller tester. **15**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fourth Semester

## **THERMAL ENGINEERING-II (M-401A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Answer the following questions:

- a) Differentiate between impulse turbine and reaction turbine.
- b) What are the methods of igniting fuel in Diesel engines?
- c) What is the sequence of operations in a Rankine cycle?
- d) Define the Condenser efficiency.
- e) What is classification of Condensers?
- f) What is the sequence of operations in a Dual cycle?
- g) Define 'carburetion'.
- h) What is cut off ratio?
- i) What is meant by abnormal combustion?
- j) Name the methods of increasing the thermal efficiency of a rankine cycle.

**2x10**

### **PART-A**

**Q.2** a) What is the classification of IC engines?

**7**

- b) What are the components exist in the fuel feed system of a Petrol engine?

**6**

- c) State the purpose of following parts of an IC engine: spark plug, piston rings, crank, Crank shaft, cam shaft & valve mechanism, fly wheel.

**7**

**Q.3** a) i) Define nozzle efficiency.

- ii) State the factors on which the nozzle efficiency depends.

- iii) Define tons of refrigeration.

- iv) What is meant by the throttle control governing?

- v) What is moist air and saturated air?

**10**

- b) Dry saturated steam at 10 bar is supplied to a steam engine working on Rankine cycle. It is exhausted at 0.5 bar. Calculate a) the condition of steam after adiabatic expansion, b) Rankine efficiency, c) efficiency ratio, and d) specific steam consumption. Take the indicated thermal efficiency as 20%.

**10**

**Q.4** a) What is the sequence of operations in a Diesel cycle? Derive an expression for the Efficiency of the Diesel Cycle. State the assumptions made before the derivation.

**10**

- b) An engine working on Otto cycle has a volume of  $0.5 \text{ m}^3$ , pressure 1 bar and temperature  $27^\circ\text{C}$  at the beginning of the compression stroke. The pressure at the end of compression is 10 bar. The heat added during the constant volume process is 200 kJ. Calculate (a) percentage clearance, (b) efficiency, and (c) mean effective pressure.

**10**

**PART-B**

- Q.5 a) Describe briefly with the sketch, the constructional and operational aspects of a Surface condenser. What are the causes of loss of vacuum in condenser? **10**
- b) What are the advantages obtained by incorporating a condenser in a steam power plant? What are the limitations of a surface condenser? **10**

- Q.6 a) Describe, with a neat schematic arrangement, the working of a simple vapour compression refrigeration cycle. Represent the cycle on p-v and T-s plots. **8**
- b) What is psychrometric chart? What information does it provide? Name any five psychrometric processes.

5

- c) Write short notes on:  
i) Factors affecting human comfort.  
ii) Refrigeration effect.

**7**

- Q.7 a) Define the following:  
i) Energy balance of human body.  
ii) Wet bulb temperature.  
iii) Dry bulb temperature. **2x3**
- b) Describe briefly with the sketch, the constructional and operational aspects of a Surface condenser. What are the causes of loss of vacuum in condenser? **14**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fourth / Fifth Semester

## **FLUID MACHINES AND TURBOMACHINERY (M-402A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Answer the following questions:

- a) Define the principle of impulse momentum.
- b) Define the effective head.
- c) What is the need of draft tube?
- d) Why the cavitation is not desirable?
- e) What is the specific speed?
- f) Mention the specific head required for the various turbines.
- g) Why the multistage pumps are needed?
- h) What is the slip?
- i) What is the principle of hydraulic press?
- j) Mention the uses of hydraulic ram.

**2x10**

### **PART-A**

**Q.2** a) Derive the relation for impact of jet on a fixed plate, when (a) the plate is held inclined to the jet flow direction; (b) plate is held normal to the jet flow direction. **10**  
b) Determine the normal force and its components , work done and efficiency of the jet impinged on a flat inclined ( $30^\circ$  to horizontal) plate moving with a velocity of 4.5 m/s. Take the flow of jet diameter as 2.8 cm and velocity 12 m/s. **10**

**Q.3** a) Classify the hydraulic turbines and mention their use with respect to the head available.

**10**

- b) Find the blade profile, work done, hydraulic efficiency of a Pelton wheel having the diameter of 2m and of speed 100 rpm. If the velocity of jet is 10 m/s having diameter of 1.5m, been deflected by  $120^\circ$  by the vane. Assume that surface is smooth. Also calculate the efficiency for rough surface having the friction of 0.8. **10**

**Q.4** Following data corresponds to an inward flow reaction turbine: Net head= 70 m, speed= 700rpm, width ratio= 0.15, flow ratio = 0.2, shaft power= 300 kW, ratio of inner dia to outer dia is 0.5, Hydraulic efficiency= 90% and overall efficiency= 85%. The velocity of flow remains constant and discharge at the outlet is radial. Determine: (a) Guide blade angle, (b) Runner blade angles, (c) Diameter of blade at inlet and outlet, (d) Specific speed of turbine.

**20**

### **PART-B**

**Q.5** a) Explain the working of centrifugal pump.

**5**

- b) Determine the work done, relative velocity at the outlet of impeller tip, manometric, mechanical efficiency and overall efficiency of a centrifugal pump having the outer diameter of the impeller as 720 mm, width as 100 mm, vane angle at the outlet of the impeller as  $50^\circ$ , and runs at a speed of

600 rpm and delivers a flow rate of  $0.6 \text{ m}^3/\text{s}$  with an effective head of 40 m. Assume water enters radially at inlet and a motor of 500kW is used to drive the pump.

**15**

- Q.6 Explain in detail the working, construction of reciprocating pump. Also mention its merits, demerits and its uses.

**20**

- Q.7 Explain in detail with neat sketches the following:  
a) Hydraulic crane.

**10**

- b) Hydraulic torque convertor

**10**

# **End Semester Examination, Dec. 2018**

B. Tech.-Third / Fourth Semester

## **STRENGTH OF MATERIAL (M-403A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1 Define (any ten) terms:**

- a) Thermal Stress.
- b) Poisson's Ratio.
- c) Principal Planes.
- d) Bending Stress.
- e) Polar modulors.
- f) Cantilever.
- g) Crippling load.
- h) Short Column.
- i) Impact load.
- j) Thick Cylinder.
- k) Circumferential Stress in cylinder.

**2x10**

### **PART-A**

**Q.2 Define the elongation caused by an axial force of 100 KN applied to a flat bar 20 mm thick, tapering from 120 mm to 40 mm in a length of 10m. Assume E = 200 KN/mm<sup>2</sup>.**

**20**

**Q.3 a) Prove the relation:**

$$\frac{M}{I} = \frac{6}{Y} = \frac{E}{R}$$

**10**

**b) Find the maximum stress induced in a 150mm wide, 12mm thick, steel flat, if it is bent into a circular arc of 12m radius. Assume E = 2x10<sup>5</sup> N/mm<sup>2</sup>.**

**10**

**Q.4 a) In torsion a follow circular shaft is preferred to a Solid Circular Shaft. Justify the statement.**

**12**

**b) Find the power transmitted by a shaft of 60mm diameter at 18.85 rad/sec; if the maximum permissible shear stress is 70 N/mm<sup>2</sup>.**

**8**

### **PART-B**

**Q.5 Determine the diameter of an aluminum shaft which is designed to store the same amount of strain energy per unit volume as a 50 mm diameter steel shaft of the same**

length. Both shafts are subjected to equal compressive axial load. What will be the ratio of the stresses setup in the two shafts?

**20**

- Q.6 a) Derive an expression for circumferential stress and the longitudinal stress for a thin shell subjected to an internal pressure.

**10**

- b) A cylindrical pipe of diameter 1.5m and thickness 15mm is subjected to an internal fluid pressure of  $1.2 \text{ N/mm}^2$ . Determine the longitudinal stress developed in the pipe, and the circumferential stress developed in the pipe.

**10**

- Q.7 a) Derive an expression for Buckling load of a column hinged at both end.

**10**

- b) A steel column is of length 8m and diameter 600mm with both end hinged. Determine the crippling load by the Euler's formula. Take  $E = 2.1 \times 10^5 \text{ N/mm}^2$ .

**10**

# **End Semester Examination, Dec. 2018**

B. Tech.(Mechanical) – Third Semester

## **STRENGTH OF MATERIAL (M-403A)**

Time: 3 hrs

Max Marks: **100**

*No. of pages: 2*

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B.** Each question carries equal marks.

- Q.1 Define any **FIVE** from below:
- a) Conventional or engineering stress
  - b) Natural Strain
  - c) Bulk modulus vs Yong's modulus
  - d) Principal stress and Principal strain
  - e) Strain energy due to bending
  - f) Torsion of thin hollow circular shaft

**4x5**

### **PART-A**

- Q.2 a) A stepped bar is loaded as shown in fig. 1. Calculate stress in each part and Total elongation.  $E = 200\text{GPa}$

**12**

### **FIGURE**

- b) A cast Iron block of  $5 \text{ cm}^2$  c/s carries and axial compressive load of 50 kw. Calculate the magnitude of Normal stress on a plane whose normal is inclined at  $30^\circ$  to the axis of the block?

**8**

- Q.3 a) Define and Derive Theory simple bending? State assumption also, taken for formulation of bending equation.

**12**

- b) Calculate the central deflection(s) for a simply supported beam of span 'l' and of uniform section carrying a uniformly distributed load 'w' per unit length.

**8**

- Q.4 a) Derive the torsion equation applied to circular shaft and also write its assumption. **12**

- b) What diameter of shaft will be required to transmit 80 kw at 80 rpm, " if the maximum torque is 30 percent greater than the mean torque and the limit of torsional stress is to be 56 MPa. If the modulus of rigidity is 84 GPa, What is the maximum angle of twist in 3m length?

**8**

## **PART-B**

- Q.5 a) A trolley of weight 100 KN is descending a slope with a uniform velocity of 2m/s at the end of a steel cable which is wound round a drum. When the length of the cable laid out is 600m, emergency brakes are suddenly applied and the wagon is brought to a halt. If the cross sectional area of the cable  $6 \text{ cm}^2$  and  $E = 200 \text{ GPa}$ , find the stress developed in the cable. What would be the stress if the length of the cable laid out is 240m

**10**

- b) State and Prove Castiglano's theorem.

**10**

- Q.6 a) A cylinder is 4m long, 0.95m in diameter and 13.5 mm thick at atmospheric pressure. Calculate the dimension when subjected to an internal pressure of 2 MPa  $E = 210 \text{ GPa}$ ,  $\nu = 0.25$  (*Poisson's ratio*)

**10**

- b) Define lame's theorem and derive expression for thick cylinder pressure vessel **10**

- Q.7 a) A close-coiled helical spring is to have a stiffness of 1 kN/m of compression under a maximum load of 4.5 kN and a maximum shearing stress of 45 MPa. The solid length of the spring is to be 4.5 cm. Find the diameter of the wire, the mean diameter of the coils required. Take  $G = 42 \text{ GPa}$

**10**

- b) Derive an expression for buckling load of a column hinged at both ends

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. — Fourth Semester

## **MANUFACTURING TECHNOLOGY-II (M-404A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Each question carries equal marks.

Q.1 Answer the following questions:

- a) What do you understand by orthogonal and oblique cutting? Explain with neat sketches.
- b) Explain various functions of cutting fluids.
- c) Explain the terms: Machinability and Machinability index.
- d) What are various types of machining operations that can be performed on lathe?
- e) What do you mean by machine tool? How will you specify a lathe?

**4x5**

### **PART-A**

Q.2 a) Derive the relationship between rake angle, shear angle and friction angle according to Merchant's theory. Give assumptions also.

**10**

- b) Discuss the sources of heat generation and its distribution among chip, tool and work piece.

**10**

Q.3 a) Explain the various factors which govern tool life.

**14**

- b) A carbide tool while machining a mild steel work piece was found to have a life 1 hour and 40 minutes when cutting at 50 m/min. Find the tool life if the tool is to operate at speed 30% higher than previous one. Also calculate the cutting speed if tool is required to have a life of 2 hours and 45 minutes. Assume Taylor's exponent,  $n=0.28$ .

**6**

Q.4 a) What do you mean by total cost of machining? Explain.

**5**

- b) Derive an expression for optimum cutting speed in turning of cylindrical work piece for minimum cutting cost.

**15**

### **PART-B**

Q.5 a) Make a neat sketch of a centre lathe and describe its main parts.

**12**

- b) Compare shaper and planer in terms of their operation and types of work piece.

**8**

**Q.6** a) Explain the various methods for turning taper on a lathe.

**14**

b) Discuss the effect of tool geometry on cutting.

**6**

**Q.7** a) What are the various standard milling operations? Explain with the help of suitable sketches.

**10**

b) Draw a neat sketch of a broach tool and explain its parts.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Third / Fourth Semester

## **KINEMATICS OF MACHINES (M-405A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Briefly explain the following:

- a) Inversions of a kinematic chain.
- b) Degrees of freedom in a mechanism.
- c) Law of gearing.
- d) Circular pitch of a gear.
- e) Epicyclic gear train.
- f) Compound gear train.
- g) Pitch curve of a cam.
- h) Offset follower with a cam.
- i) Chebychev spacing.
- j) Instantaneous centre.

**2x10**

### **PART-A**

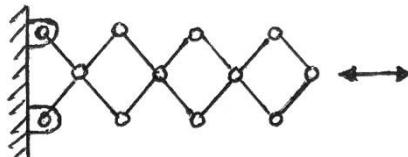
**Q.2** a) Describe with the help of a neat sketch, one inversion of a double slider chain.

**7**

b) Derive the fundamental equation for correct steering of a steering mechanism.

**7**

c) Find number of degrees of freedom for the mechanism given in the figure:



**6**

**Q.3** a) Derive an expression for minimum number of teeth on the wheel to avoid interference between two gears in mesh.

**10**

b) A pinion of  $20^\circ$  involute teeth rotating at 275 rpm meshes with a gear and provides a gear ratio of 1.8. Number of teeth on the pinion is 20 and the module is 8 mm. If the interference is just avoided, determine i) the addenda on the wheel and the pinion ii) the path of contact and iii) the maximum velocity of sliding on both sides of the pitch point.

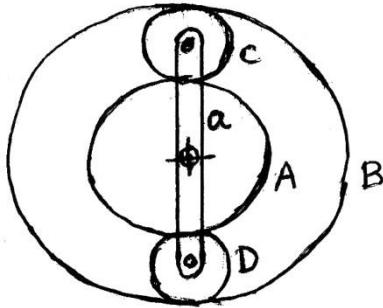
**10**

- Q.4 a) Explain with a neat sketch, functioning of reverted gear train. Provide expressions for its train value and relationship between radii of its gears.

**5**

- b) In the epicyclic gear train shown in the figure, number of teeth on A and B are 80 and 200. Determine the speed of the arm a  
 i) If A rotates 100 rpm clockwise and B at 50 rpm counter clockwise.  
 ii) If A rotates 100 rpm clockwise and B is stationary.

**15**



### **PART-B**

- Q.5 Draw the profile of a cam operating a roller reciprocating follower and with the following data:

Minimum radius of cam = 25 mm,

Lift 30 mm roller diameter = 15 mm.

The cam lifts the follower for  $120^\circ$  with SHM followed by a dwell period of  $30^\circ$ .

Then the follower lowers down during  $150^\circ$  of the cam rotation with uniform acceleration and declaration followed by a dwell period. If the cam rotates at a uniform speed of 150 rpm, calculate the maximum velocity and acceleration of the follower during the descent period.

**20**

- Q.6 a) Describe the graphical method of three position synthesis of a slider crank mechanism.

**6**

- b) Design a slider crank mechanism to coordinate three positions of the input and of the slider for the following angular and linear displacements of the input link and the slider.

$$\theta_{12} = 40^\circ \quad S_{12} = 180 \text{ mm}$$

$$\theta_{13} = 120^\circ \quad S_{13} = 300 \text{ mm}$$

$$\text{Eccentricity} = 20 \text{ mm}$$

The eccentricity of the slider is 20 mm.

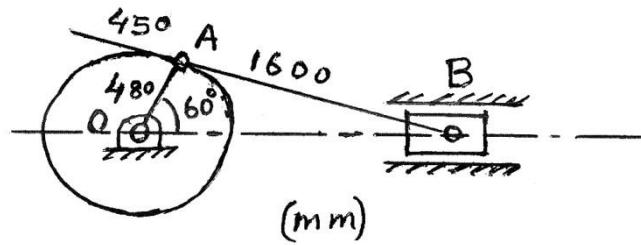
**14**

- Q.7 a) State and prove the Kemedy's theorem.

**5**

- b) For the configuration of a slider crank mechanism shown in figure, calculate the  
 i) acceleration of the slider at B

- ii) acceleration of the point E
  - iii) angular acceleration of the link AB
- OA rotates at 20 rad/s counter-clockwise.



15

# End Semester Examination, Dec. 2018

B. Tech. — Fourth Semester  
**APPLIED THERMODYNAMICS (M-419)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) Draw P-V and T-S diagram of Brayton cycle.
- b) Write the expression for air standard efficiency of dual cycle.
- c) What do you mean by higher heating value(HHV) and lower heating value (LHV) of the fuel?
- d) Draw T-S and h-S diagram of regenerative reheat Rankine cycle.
- e) Enumerate the effect of operating conditions on Rankine cycle.
- f) What is the difference between mounting and accessories of boilers?
- g) What are the limitations of chimney draught?
- h) Explain various types of steam Nozzle.
- i) What do you mean by stage efficiency and speed ratio?
- j) What are the organs of steam condensing plant?

**2x10**

## **PART-A**

**Q.2** a) Obtain an expression for efficiency of a diesel cycle.

**10**

- b) In an Otto cycle air at  $17^{\circ}\text{C}$  and 1 bar is compressed adiabatically until the pressure is 15 bar. Heat is added at constant volume until the pressure rises to 40 bar. Calculate the air standard efficiency, the compression ratio and mean effective pressure for the cycle. Assume  $C_v = 0.717 \text{ kJ/kg.k}$  and  $R = 8.314 \text{ kJ/k mol K}$ .

**10**

**Q.3** a) The percentage composition of sample of liquid fuel by weight is, C = 84.8 percent, and H<sub>2</sub> = 15.2 percent, Calculate the weight of air needed for the combustion of 1 Kg of the fuel.

**10**

- b) Describe the bomb calorimeter with the help of neat sketch.

**10**

**Q.4** a) Explain with the diagram the working of binary vapour cycle.

**10**

- b) A Rankine cycle operates between pressure of 80 bar and 0.1 bar. The maximum cycle temperature is  $600^{\circ}\text{C}$ . If the steam turbine and condensate pump efficiencies are 0.9 and 0.8 respectively, calculate the specific work and thermal efficiency.

**10**

## **PART-B**

Q.5 a) Give the comparison between fire tube and water tube boilers.

**10**

b) Explain with neat sketches the construction and working of any water tube boiler. **10**

Q.6 a) Define the term "degree of reaction" used in reaction turbine and prove that it is

$$\text{given by } R_d = \frac{C_f}{2C_{bl}} (\cot\phi - \cot\theta) \text{ when } C_{f_1} = C_{f_0} = C_f$$

Where  $C_{bl}$  — Linear velocity of moving blade.

$R_d$  — Degree of reaction.

$\theta$  — Entrance angle of moving blade.

$\phi$  — Exit angle of moving blade.

**10**

b) In a De Laval turbine steam issues from the nozzle with a velocity of 1200 m/s. The nozzle angle is  $20^\circ$ , the mean blade velocity is 400 m/s, and the inlet and outlet angles of blade are equal. The mass of steam flowing through the turbine per hour is 1000 Kg. Calculate:

- i) Blade angle.
- ii) Blade efficiency
- iii) Power developed.

Take blade velocity coefficient as 0.8.

**10**

Q.7 a) Explain the effect of air leakage in a condenser.

**10**

b) Explain with neat sketch any two of the following:

- i) Evaporative type condenser.
- ii) Ejector type condenser.
- iii) Regenerative type condenser.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester  
**INDUSTRIAL ENGINEERING (M-501B)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 2*

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any two from **PART-B**. Marks are indicated against each question.

**Q.1** Answer the following:

- a) Describe various methods of productivity measurement.
- b) Explain the significance of Inventory control.
- c) Distinguish between control charts for variable and control charts for attributes.
- d) Explain master production schedule as used in PPC.
- e) List down the functions of PPC.

**4x5**

## **PART-A**

**Q.2** a) What do you understand by method study. Explain the process of method study.  
**10**  
b) How the standard time is calculated for any process? Explain various types of allowances in detail.

**10**

**Q.3** a) What do you understand by term cost. How the various type of costs are classified.

**10**

- b) Desire break even quantity graphically and analytically. State the significance of breakeven point.

**10**

**Q.4** a) Calculate the economic order quantity for uniform demand rate and infinite production rate inventory model.

**10**

- b) A company produces 4800 parts per day and sells them at approximately half of the rate. The setup cost is Rs.1000 and carrying cost is Rs.5 per unit. The annual demand is 4,80,000 units. Find (i) optimal lot size (ii) number of production run that should be scheduled per year.

**10**

## **PART-B**

Q.5 a) Explain in detail the objectives of production planning and control. Describe the process of PPC.

**10**

b) Five jobs are to be processed on two Machines  $M_1$  &  $M_2$ . Processing time is given below in hours:

| Jobs  | A | B | C  | D | E  |
|-------|---|---|----|---|----|
| $M_1$ | 6 | 2 | 10 | 4 | 11 |
| $M_2$ | 3 | 7 | 8  | 9 | 5  |

Determine the sequence that minimizes the total elapsed time. Find out total elapsed time and idle time on  $M_2$ .

**10**

Q.6 a) The following data is available for a process. Plot x & R chart & comment on the result (for subgroup size  $n=5$ ,  $A_2 = 0.577$   $D_3 = 0.00$ ,  $D_4 = 2.114$ ).

| Subgroup | 8.00am | 8.30am | 9.00am | 9.30 am | 10.00am | 10.30am | 11.00am |
|----------|--------|--------|--------|---------|---------|---------|---------|
| 1        | 10.1   | 7.0    | 5.0    | 9.0     | 2.0     | 2.0     | 5.0     |
| 2        | 1.0    | 4.0    | 2.0    | 3.0     | 4.0     | 4.0     | 6.0     |
| 3        | 4.0    | 10.0   | 6.0    | 7.0     | 2.0     | 8.0     | 4.0     |
| 4        | 9.0    | 2.0    | 2.0    | 3.0     | 6.0     | 8.0     | 10.0    |
| 5        | 8.0    | 8.0    | 3.0    | 1.0     | 1.0     | 6.0     | 3.0     |

b) State the objectives of statistical process control.

Q.7 Write short notes on the following:

a) Benefits & limitations of job evaluation

**7**

b) Strategies for improving productivity.

**7**

c) Total quality management.

**6**

**End Semester Examination, Dec. 2018**  
B. Tech. – Fifth / Eighth Semester  
**INDUSTRIAL ENGINEERING (M-501A / M-501B)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 2*

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any two from **PART-B**. Marks are indicated against each question.

Q.1 Answer the following:

- a) Describe various methods of productivity measurement.
- b) Explain the significance of Inventory control.
- c) Distinguish between control charts for variable and control charts for attributes.
- d) Explain master production schedule as used in PPC.
- e) List down the functions of PPC.

**4x5**

**PART-A**

Q.2 a) What do you understand by method study. Explain the process of method study.

**10**

- b) How the standard time is calculated for any process? Explain various types of allowances in detail.

**10**

Q.3 a) What do you understand by term cost. How the various type of costs are classified.

**10**

- b) Desire break even quantity graphically and analytically. State the significance of breakeven point.

**10**

Q.4 a) Calculate the economic order quantity for uniform demand rate and infinite production rate inventory model.

**10**

- b) A company produces 4800 parts per day and sells them at approximately half of the rate. The setup cost is Rs.1000 and carrying cost is Rs.5 per unit. The annual demand is 4,80,000 units. Find (i) optimal lot size (ii) number of production run that should be scheduled per year.

**10**

**PART-B**

Q.5 a) Explain in detail the objectives of production planning and control. Describe the process of PPC.

**10**

b) Five jobs are to be processed on two Machines  $M_1$  &  $M_2$ . Processing time is given below in hours:

| Jobs  | A | B | C  | D | E  |
|-------|---|---|----|---|----|
| $M_1$ | 6 | 2 | 10 | 4 | 11 |
| $M_2$ | 3 | 7 | 8  | 9 | 5  |

Determine the sequence that minimizes the total elapsed time. Find out total elapsed time and idle time on  $M_2$ .

**10**

Q.6 a) The following data is available for a process. Plot x & R chart & comment on the result (for subgroup size n=5,  $A_2 = 0.577$   $D_3 = 0.00$ ,  $D_4 = 2.114$ ).

| Subgroup | 8.00am | 8.30am | 9.00am | 9.30 am | 10.00am | 10.30am | 11.00am |
|----------|--------|--------|--------|---------|---------|---------|---------|
| 1        | 10.1   | 7.0    | 5.0    | 9.0     | 2.0     | 2.0     | 5.0     |
| 2        | 1.0    | 4.0    | 2.0    | 3.0     | 4.0     | 4.0     | 6.0     |
| 3        | 4.0    | 10.0   | 6.0    | 7.0     | 2.0     | 8.0     | 4.0     |
| 4        | 9.0    | 2.0    | 2.0    | 3.0     | 6.0     | 8.0     | 10.0    |
| 5        | 8.0    | 8.0    | 3.0    | 1.0     | 1.0     | 6.0     | 3.0     |

b) State the objectives of statistical process control.

Q.7 Write short notes on the following:

a) Benefits & limitations of job evaluation

**7**

b) Strategies for improving productivity.

**7**

c) Total quality management.

**6**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fourth / Fifth Semester

## **DYNAMICS OF MACHINES (M-502A)**

Time: 3 hrs

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks..

**Q.1** Answer the following questions:

- a) State the necessary conditions to achieve static and dynamic balancing.
- b) What are in-line engines? How are they balanced?
- c) What is swaying couple? Write the expression.
- d) What is angular velocity of precession?
- e) Write the condition of stability of a four wheeler, moving in a curved path.
- f) What is the function of a governor? How does it differ from that of a flywheel?
- g) What is isochronous governor?
- h) What is stability of a governor?
- i) Write the principle of virtual work.
- j) State equilibrium conditions for a three forces and four forces member system. **2x10**

### **PART-A**

**Q.2** a) A shaft carries four masses A, B, C and D of magnitude 200 kg, 300 kg, 400 kg and 200kg respectively and revolving at radii of 80 mm, 70 mm, 60 mm and 80 mm in planes measured from A at 300 mm, 400 mm, and 700 mm. The angles between the cranks measured anticlockwise are A to B =  $45^\circ$ , B to C =  $70^\circ$  and C to D =  $120^\circ$ . The balancing masses are to be placed in planes X and Y. The distance between the planes A and X is 100 mm, between X and Y is 400mm and between Y and D is 200 mm. If the balancing masses revolve at a radius of 100mm, find their magnitudes and angular positions.

**10**

- b) Four masses A, B, C and D are attached to a shaft and revolve in the same plane. The masses are 12kg, 10kg, 18kg, and 15kg respectively and their radii of rotations are 40mm, 50mm, 60mm and 30mm. The angular position of the masses B, C, and D are  $60^\circ$ ,  $135^\circ$  and  $270^\circ$  from the mass A. Find the magnitude and position of the balancing mass at a radius of 100mm.

**10**

**Q.3** a) Derive an expression for balancing of V-Engines.

**12**

- b) An inside cylinder locomotive has its cylinder centre lines 0.7m apart and has a stroke of 0.6m. The rotating masses per cylinder are equivalent to 150kg at the crank pin, and the reciprocating masses per cylinder to 180 kg. The wheel centre lines are 1.5m apart. The cranks are at right angles.

The whole of the rotating and  $\left(\frac{2}{3}\right)^{\text{rd}}$  of the reciprocating masses are to be balanced

by masses placed at a radius of 0.6m is 105kg. Find the fluctuation in rail pressure under one wheel, variation of tractive effort and the magnitude of swaying couple at a crank speed of 300 rpm.

**8**

- Q.4 a) Derive an expression of angle of heel for stability of two wheeler.

**10**

- b) Describe the Gyroscopic effect on an aircraft.

**10**

### **PART-B**

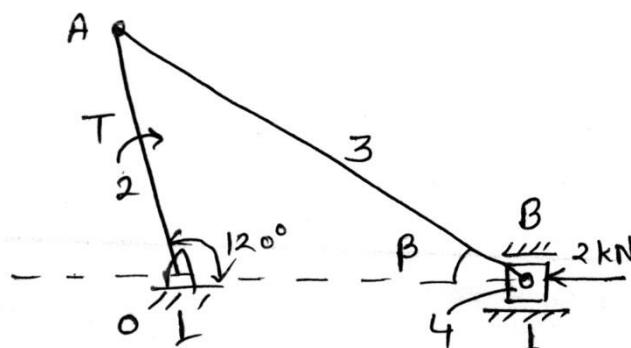
- Q.5 a) A governor has each arm 200 mm long. The pivots of upper and lower ends of arms are 40mm from the axis of rotation. Length of extension of lower arms to which each ball is attached is 100mm, mass of each ball is 6kg and mass of the central load is 150kg. If the radius of rotation of the balls is 180mm when the arms are inclined at an angle of  $40^{\circ}$  to the axis of rotation. Find the equilibrium speed. Neglect the frictional effect.

**12**

- b) What is controlling force of a governor? Draw the graph and condition for stability of a governor under force and governor radius.

**8**

- Q.6 a) A slider crank mechanism with the following dimensions is acted upon by a force  $F = 2\text{ kN}$ , at B as shown in Figure.  $OA = 100\text{ mm}$ ,  $AB = 450\text{ mm}$ .  
Find the input torque  $T$  on the link OA for the static equilibrium of the mechanism.



**15**

- b) Write the principle of superposition.

**5**

- Q.7 Describe the dynamic analysis of Single Slider Crank mechanism.

**20**

# End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester

## PRODUCTION ENGINEERING (M-504B)

Time: 3 hrs.

Max Marks: **100**

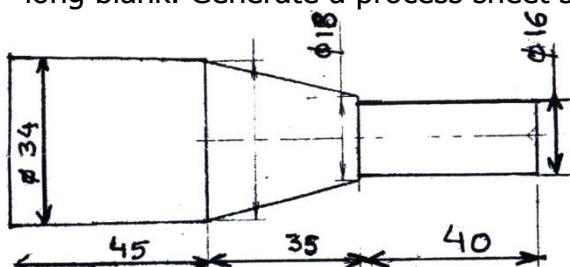
No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1**
- a) State the use of bush in drill Jig.
  - b) Explain the term loading and glazing as applied to grinding wheel.
  - c) Name the three set of taps used to cut the internal threads.
  - d) Enlist various methods to manufacture gears.
  - e) Define 'tolerance staking'.
  - f) Why balancing is done for a grinding wheel?
  - g) State the difference between blanking and punching.
  - h) Differentiate between single point and multipoint cutting tools.
  - i) Differentiate between roughness and waviness.
  - j) Differentiate between shot blasting and sand blasting.
- 2×10**

### PART-A

- Q.2** A batch of 1000 pieces of mild steel components is to be manufactured from a  $\phi 35 \text{ mm} \times 122 \text{ mm}$  long blank. Generate a process sheet shown in the figure.



**20**

- Q.3**
- a) Explain various types of locators used in jigs and fixtures with help of neat sketches. **10**
  - b) What is meant by error proofing in fixtures? Explain the process of error proofing with help of an example. **10**

- Q.4**
- a) Differentiate between blanking die and piercing die with help of neat sketches. Sketch the various methods of applying shear to the punch and die. **10**
  - b) Find the total force and dimensions of a die and punch to produce a washer of 5 cm outside diameter with 2.4 cm dia hole from a material 4 mm thick and having shear strength of 360 N/mm<sup>2</sup>. **10**

### PART-B

- Q.5**
- a) Explain each term in detail for following specification of grinding wheel:  
5 1 A 36 L5 V 23. **15**
  - b) Explain the meaning of 'wheel structure' and 'wheel grade' used in grinding. **5**

- Q.6 a) Explain the principle of gear hobbing. List the advantages and limitations of gear hobbing. Draw neat sketches. **10**  
b) Explain thread manufacturing processes with the help of neat sketches. **10**
- Q.7 a) Calculate the machining time to drill a hole of 15 mm and 70 mm deep in a plate of brass. Cutting speed is 75 meter/minute and feed = 0.175 mm/revolution. **15**  
b) Explain the purpose of cost estimation in brief. **5**

# **End Semester Examination, Dec. 2018**

B. Tech. — Fifth Semester

## **METROLOGY, MEASUREMENT AND CONTROL (M-505)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

Q.1 Answer the following questions:

- a) List various instruments studied in linear metrology and write its application areas.
- b) Explain the working of load cell to measure force.
- c) Explain the term transducer as a device with the help of any one example.
- d) What are sources of errors in metrology instruments?
- e) Describe the transfer of a control system.

**2×10**

### **PART-A**

- Q.2 a) Explain the working of sine bar to measure angle. **15**  
b) How straightness and flatness can be measured? **5**
- Q.3 a) Describe the bellows pressure gauge with the help of neat figures. **10**  
b) Discuss the working of torque-testing dynamometers. **10**
- Q.4 Discuss the classification of a transducers and explain LVDT with the help of neat sketch to measure the displacement. State advantages and limitations. **20**

### **PART-B**

- Q.5 a) Explain different types of response systems and derive expression for first order response system. **15**  
b) What is systematic and random error? **5**
- Q.6 a) Describe the open and closed loop in a control system with suitable example. **12**  
b) State and explain Mason's rule. **8**
- Q.7 Write short notes on (**any four**) of the following:  
a) Bridge circuit.  
b) ADC convertor.  
c) Data acquisition.  
d) Interfacing.  
e) Amplifier. **5×4**

# End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester  
**MACHINE DESIGN-I (M-508)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

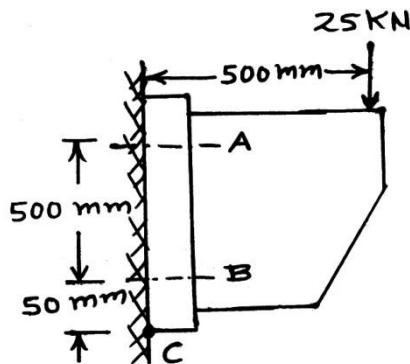
**Q.1** Answer the following questions:

- a) Define the following properties of a material:
  - i) Ductility
  - ii) Toughness
- b) What do you understand by cold working of metals?
- c) What is meant by 'hole basis system'?
- d) How will you designate ISO metric fine threads?
- e) What type of threads are used in a power screw and why?
- f) State advantages of welded joint over riveted joint.
- g) Why are clutches usually designed on the basis of uniform wear?
- h) Write desirable properties of good friction material.
- i) What are various factors responsible for temperature rise in brakes?
- j) What is self-energizing condition of a brake?

**2×10**

## **PART-A**

- Q.2** a) Explain different types of feasibility studies in design philosophy. **10**  
 b) Define 'interchangeability'. Explain the commonly used fits according to Indian standards. **10**
- Q.3** a) A wall bracket is attached to the wall by means of four identical bolts, two at 'A' and two at 'B' as shown in figure. Assuming that the bracket is held against the wall and prevented from tipping about 'C' by all four bolts. Using an allowable tensile stress in the bolt as  $35 \text{ N/mm}^2$ , determine the size of bolts on the basis of maximum principal stress theory.



**10**

- b) A screw jack is to lift a load of 80 kN through a height of 400 mm. The elastic strength of screw material in tension and compression is 200 MPa and in shear 120 MPa. The material of nut is phosphor-bronze for which the elastic limit may be taken

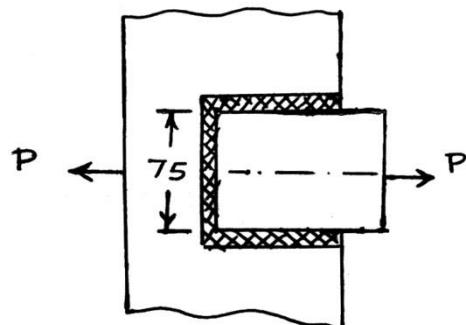
as 100 MPa in tension, 90 MPa in compression and 80 MPa in shear. The bearing pressure between the nut and the screw is not to exceed 18 N/mm<sup>2</sup>. Design the screw and nut of the screw jack. 10

- Q.4 a) A double riveted double cover butt joint in plates 20 mm thick is made with 25 mm diameter rivets at 100 mm pitch. The permissible stresses are:

$$\sigma_t = 120 \text{ MPa}; \tau = 100 \text{ MPa}; \sigma_c = 150 \text{ MPa}$$

Find the efficiency of joint, taking the strength of the rivet in double shear as twice than that of single shear. 10

- b) A plate, 75 mm wide and 10 mm thick, is joined with another steel plate by means of single transverse and double parallel fillet welds, as shown in the figure. The joint is subjected to a maximum tensile force of 55 kN. The permissible tensile and shear stresses in the weld material are 70 and 50 N/mm<sup>2</sup> respectively. Determine the required length of each parallel fillet weld.



10

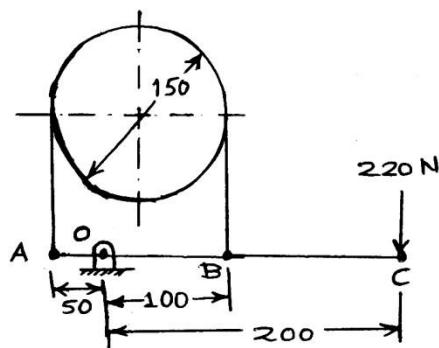
### **PART-B**

- Q.5 a) Derive an expression for length of open belt drive with a suitable diagram. 10  
 b) It is required to select a V-belt drive from 5 kW normal torque motor, which runs at 1440 rpm to a light duty compressor running at 970 rpm. The compressor runs for 24 hours per day. Space is available for a centre distance of about 500 mm. Assume that the pitch diameter of the driving pulley is 150 mm. 10

- Q.6 a) Derive the expression for torque transmitting capacity for a single plate friction clutch based on uniform pressure theory. 10  
 b) A cone clutch with asbestos friction lining transmits 30 kW power at 500 rpm. The coefficient of friction is 0.2 and the permissible intensity of pressure is 0.35 N/mm<sup>2</sup>. The semi-cone angle  $\alpha$  is 12.5°. The outer diameter is fixed as 30 mm from space limitations. Assume uniform wear theory, calculate:  
 i) The inner diameters;  
 ii) The face width of the friction lining; and  
 iii) The force required to engage the clutch. 10

- Q.7 a) List the important factors upon which capacity of a brake depends. 6

- b) A differential band brake has a force of 220 N applied at the end of a lever as shown in figure. The coefficient of friction between the band and the drum is 0.4. The angle of lap is  $180^\circ$ . Find:
- The maximum and minimum force in the band, when a clockwise torque of 450 N-m is applied to the drum; and
  - The maximum torque that the brake may sustain for counter clockwise rotation of the drum.



All dimensions in mm.

14

# End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester  
**OPERATIONS RESEARCH (M-601A)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 2*

Note: Attempt **FIVE** questions in all. **Q.1** is **Compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. All questions carry equal marks.

**Q.1** Answer the following:

- a) Explain the environments in which decisions are made.
- b) To which areas of the industry, OR can be applied.
- c) How do you identify the presence of degeneracy in a simplex problem?
- d) What are limitations of graphical method over the simplex method?
- e) What is the difference between an unbalanced and balanced transportation matrix?
- f) Write the expression to represent an assignment model.
- g) Define balked and reneged.
- h) Explain the various types of floats in a CPM problem.
- i) What are the advantages of simulation over other quantitative methods?
- j) State **True** or **False**:
  - i) A queue does not include the customer being serviced.
  - ii) Entry in Exam hall is FCFS discipline.

**2x10**

## **PART-A**

**Q.2** a) A Departmental store needs to decide an order for the number of cakes it should store. Following data was created on a span of 100 days of sale. Cost of a cake is Rs.2/- and selling price is Rs.2.5:

|               |     |     |     |     |
|---------------|-----|-----|-----|-----|
| Sales per day | 15  | 16  | 17  | 18  |
| No. of days   | 20  | 40  | 30  | 10  |
| Profitability | 0.2 | 0.4 | 0.3 | 0.1 |

Find the number of cakes the store should keep based on the opportunity losses.  
Also find the total profit if perfect information is given.

**15**

- b) Write the steps in decision making process.

**5**

**Q.3** a) Solve the following LPP:

$$\text{Maximize } z = x_1 + x_2 + 3x_3$$

$$\text{Subject to } 3x_1 + 2x_2 + x_3 \leq 3$$

$$2x_1 + x_2 + 2x_3 \leq 2$$

$$x_1, x_2, x_3 \geq 0$$

**15**

- b) What are the steps to solving LPP graphically?

**5**

- Q.4 a) Solve the following: transportation model:

|        |   |    |    |    |    | Supply |
|--------|---|----|----|----|----|--------|
|        |   |    |    |    |    | 70     |
|        |   |    |    |    |    | 75     |
| Demand | 6 | 11 | 10 | 85 | 35 | 50     |
|        | 1 | 5  | 12 |    |    | 45     |
|        | 9 | 2  | 14 |    |    | 7      |
|        | 3 | 8  | 7  |    |    |        |

**10**

- b) Solve the assignment model:

|       | A  | B  | C  | D  | E  |
|-------|----|----|----|----|----|
| $J_1$ | 4  | 3  | 6  | 2  | 7  |
| $J_2$ | 10 | 12 | 11 | 14 | 16 |
| $J_3$ | 4  | 3  | 2  | 1  | 5  |
| $J_4$ | 8  | 7  | 6  | 9  | 6  |

**10**

### **PART-B**

- Q.5 a) What are the elements of queuing system? What do they signify?  
 b) At a ONE-MAN barber shop, customer arrive at Poisson's distribution at an average of 5 customers per hour and hair cut time takes 10 minutes per customer at average.

**10**

Calculate:

- i) Avg. number of customers at shop.
- ii) Avg. number of customer wanting for hair cut.
- iii) Probability that a customer arriving won't wait.
- iv) Avg. time and customer waits in line for his turn.

**10**

- Q.6 b) Construct network diagram and identify critical path. Determine total, independent and free floats:

|                 |     |     |     |     |     |     |     |     |     |     |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Activity        | 1-2 | 1-3 | 2-3 | 2-5 | 3-4 | 3-6 | 4-5 | 4-6 | 5-6 | 6-7 |
| Duration (Days) | 15  | 15  | 3   | 5   | 8   | 12  | 1   | 14  | 3   | 14  |

**16**

- b) Differentiate between CPM and PERT.

**4**

- Q.7 a) What are the steps to Monte-Carlo simulation? Explain them in detail.

**10**

- b) A manufacturing company keeps stock of its product. Based on previous experiences a data was created as per the given table:

|              |      |      |      |      |      |      |
|--------------|------|------|------|------|------|------|
| Daily demand | 5    | 10   | 15   | 20   | 25   | 30   |
| Probability  | 0.01 | 0.20 | 0.15 | 0.50 | 0.12 | 0.02 |

Find the average demand for the product on the basis of the fall; random numbers, random number: 82, 96, 18, 96, 20, 84, 56, 11, 52, 03.

Simulate for the next 10 days.

**10**

## **End Semester Examination, Dec. 2018**

# B. Tech. — Fifth Semester

## **CAD/CAM (M-602)**

Time: 3 hrs.

**Max Marks: 100**

*No. of pages:* 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

- Q.1** Answer the following questions:

  - Explain translation and scaling with their matrix in 2D and 3D.
  - What are the different phases of product development cycle?
  - What do you understand by interpolation and approximation spline?
  - Explain the important properties of curve designing.
  - Explain solid modeling with example.
  - Explain under what conditions each of the following technology should be implemented:
    - NC
    - CNC
    - DNC
    - Adaptive control.
  - Discuss the open loop and closed loop system used in NC machines.
  - What is part programming? Discuss the procedure for developing manual parts program.
    - What is group technology?
    - Describe the purpose of process planning.

## **PART-A**

- Q.2** a) A sphere having centre (10, 10, 10) and radius 8 unit is translated by 4 unit in x-direction and 6 unit in z direction. Then it is rotated by  $45^\circ$  in anticlockwise direction about y axis. Find the new center of sphere. **10**  
 b) How CAD, CAM and CIM are interrelated to each other? **5**  
 c) Differentiate between isometric, orthographic and perspective projection. **5**

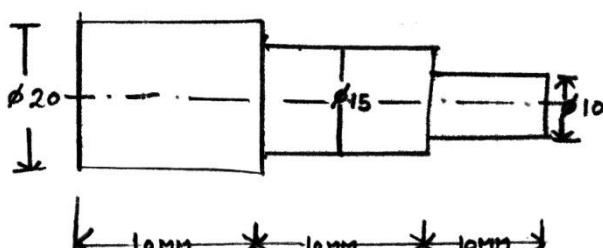
**Q.3** a) Draw the Bezier curve using the following control points (2, 0) (4, 3), (5, 2)(4, -2), (5, -3) and (6, -2). **15**  
 b) What are the important properties of curve designing? **5**

**Q.4** a) Make a comparative analysis of the wireframe, surface and solid modeling. **8**  
 b) Write short note on the following:  
     i) Surface of revolution.   ii) Tabulated cylinder.   iii) Bezier surface. **4x3**

## **PART-B**

- Q.5 a) Explain the coordinate system types and also explain the coordinate system used in NC with its G code. **10**  
b) What is automation? What are the levels of automation? **10**

Q.6 a) From a shaft of 25mm diameter, make a stepped shaft with dimensions as shown in the figure below. Take speed 3000rpm and feed = 30 mm/min.



**12**

- b) Briefly explain the concept of the following:
- i) Drive surface.
  - ii) Check surface.
  - iii) Part surface

**8**

Q.7 Write short note on the following:

- a) BOM
- b) MRPI and MRPII
- c) CAPP
- d) Part classification and coding
- e) MPS

**4×5**



# End Semester Examination, Dec. 2018

B. Tech. – Fourth / Sixth Semester  
**HEAT TRANSFER (M-604)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 2*

Note: Attempt **FIVE** questions in all. **Q.1** is **Compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. All questions carry equal marks.

**Q.1** Answer the following:

- a) What is thermal conductivity?
- b) What is overall heat transfer coefficient?
- c) Name any two fouling in heat exchanger.
- d) What do you mean by thermal contact resistance?
- e) What is Biot number?
- f) What is nusselt number?
- g) What do you mean by emissivity?
- h) What is Stefan's Boltzmann equation?
- i) What is effectiveness of a heat exchange?
- j) Define effectiveness of a fan.

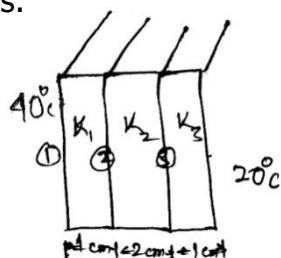
**2x10**

## **PART-A**

**Q.2** a) Derive heat conduction equation for Cartesian Co-ordinate system.

**10**

- b) For composite material shown  $K_1 - K_2 = K_3$  and  $2kN/m^2$  heat is flowing. Find intermediate temperatures.



**10**

**Q.3** a) Derive heat transfer for a finite length fin of insulated tip.

**10**

- b) A steel rod ( $k=32 \text{ w/m}^0\text{C}$ ), 12 mm in diameter and 60 mm long with an insulated end is to be used as spine. IT is exposed to surrounding of  $60^0\text{C}$  and heat transfer coefficient of  $55W/m^2\text{C}$ . The temperature at the base is  $95^0\text{ C}$ . Determine the followings:

- i) The efficiency of fin.
- ii) Temperature at the edge of spine.

iii) Heat dissipation.

**10**

Q.4 a) Discuss about lumped capacity method and its validity in details.

**10**

b) A steel ball 100 mm diameter was initially at  $500^{\circ}\text{C}$  and is placed in air at  $35^{\circ}\text{C}$ . Calculate time required to attain  $400^{\circ}\text{C}$  &  $300^{\circ}\text{C}$ . ( $K_{\text{steel}}=35 \text{ W/mx}$ ,  $\text{kJ / kgk}$ ,  $\rho=7800 \text{ Kg/m}^3$ ,  $h=10 \text{ w/m}^2\text{k}$ ).

**10**

### **PART-B**

Q.5 a) Explain Reynold's analogy in details.

**10**

b) A horizontal heated plate at  $200^{\circ}\text{C}$  and facing upward has been placed in still air at  $20^{\circ}\text{C}$ . If the plate measures  $1.2 \text{ m} \times 1\text{m}$ , make calculations for heat loss by natural convection where  $h= 0.32 Q^{0.25}$  where  $Q \uparrow$  is mean film temperature in degree Kelvin.

**10**

Q.6 a) Describe radiation heat transfer between two gray surfaces / non-black body.

**10**

b) A pipe with a surface temperature of  $480 \text{ K}$  is kept with a large enclosure whose walls are at  $380 \text{ K}$ . Presuming the pipe surface to be black, calculate the coefficient of radiant heat transfer. If the heat transfer coefficient including the effect of radiation and conversion is  $h=0.32Q^{0.25}$ , find corrective heat transfer coefficient.

**10**

Q.7 a) Derive e-NTU method for a parallel flow heat exchanger.

**10**

b) A parallel flow heat exchanger is used to cool  $4.2 \text{ kg/min.}$  of hot liquid of  $C_p = 3.5 \text{ kJ / kg}$  at  $130^{\circ}\text{C}$ . A cooling water of  $C_p = 4.18 \text{ kJ / kg}$  is used for cooling purpose at a temperature of  $15^{\circ}\text{C}$ . The mass flow rate of cooling water is  $17 \text{ Kg/min.}$  Calculate the followings if  $U=1100 \text{ W/m}^2\text{k}$ , Area,  $A=0.30 \text{ m}^2$ :

- i) Effectiveness of heat exchanger.
- ii) Outlet temperature of liquid.
- iii) Outlet temperature of water.

**10**

# End Semester Examination, Dec. 2018

B. Tech. – Sixth Semester  
**MACHINE DESIGN-II (M-607)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Answer the following questions:

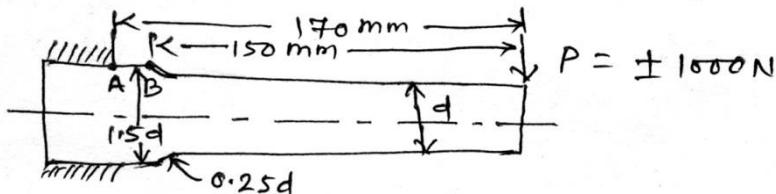
- Differentiate between failure due to static load and fatigue load.
- What is modifying factor to account for stress concentration in fluctuating loading?
- What is permissible shear stress for design of shaft as per ASME code?
- Write the functions and types of key used in shaft.
- Why is "Wahl Factor" used in design of spring?
- Write the applications of multi-leaf spring?
- Define static load carrying capacity of ball bearing.
- Why hydrostatic bearing is called "externally pressurized" bearing?
- What are the advantages of helical gears over spur gears?
- What do you mean by standard machine components? Write the uses of gaskets. **2x10**

## **PART-A**

**Q.2** a) State and write the Miner's equation for cumulative damage in fatigue.

**6**

- b) A cantilever beam made of cold drawn steel 20C<sub>8</sub> ( $S_{ut}=540 \text{ N/mm}^2$ ) is subjected to a completely reversed load of 1000 N as shown in the figure given below. The notch sensitivity factor at the fillet is 0.85 and expected reliability is 90%. Determine the diameter of the beam for a life of 10,000 cycles.



**14**

**Q.3** a) It is required to design a square key for fixing a pulley on the shaft which is 50mm in diameter. The pulley transmits 10 kW power at 200 rpm to the shaft. The key is made of steel 45C<sub>8</sub> ( $S_{yt} = S_{yc} = 380 \text{ N/mm}^2$ ) and the factor of safety is 3. Determine the dimensions of key. Assume ( $S_{sy} = 0.577 S_{yt}$ ).

**8**

- b) A rotating shaft 40mm in diameter, is made of steel FeE 580 ( $S_{yt} = 580 \text{ N/mm}^2$ ). It is subjected to a steady torsional moment of 250 N-m and bending moment of 1250 N-m. Calculate the factor of safety based on:
- Maximum Principle stress theory.

- ii) Maximum shear stress theory.

**12**

- Q.4 a) Derive expression for initial preload on centre clip to avoid 'nip' in multi-leaf spring.

**8**

- b) A safety valve, 40mm in diameter, is to blow off at a pressure of 1.2 MPa. It is held on its seat by means of a helical compression spring, with initial compression of 20mm. The maximum lift of the valve is 12mm. The spring index is 6. The spring is made of cold drawn steel wire with ultimate strength of  $1400 \text{ N/mm}^2$ . If  $G = 81370 \text{ N/mm}^2$ , calculate:
- Wire diameter.
  - Mean coil diameter.
  - Number of active coils.

**12**

### **PART-B**

- Q.5 a) A ball bearing operates on the following work cycle:

| Element No.      | Radial load (N) | Speed (rpm) |
|------------------|-----------------|-------------|
| Element time (%) |                 |             |
| 1                | 3000            |             |
| 720              | 30              |             |
| 2                | 7000            |             |
| 1440             | 50              |             |
| 3                | 5000            |             |
| 900              | 20              |             |

The dynamic load carrying capacity of the bearing is 16.6 KN. Calculate:

- Average speed of rotation
- The equivalent radial load.
- The bearing life.

**12**

- b) Using Raimondi and Boyd method, explain the dimensionless performance parameters for full journal bearing with side flow.

**8**

- Q.6 a) A steel pinion with  $20^\circ$  full length in volute teeth is transmitting 7.5 kW power at 1000 rpm from an electric motor. The starting torque of motor is twice the rated torque. The number of teeth on pinion is 25, while the module is 4mm. Face width is 45mm. Assuming that velocity factor accounts for the dynamic load, Calculate:
- Effective load on the gear tooth.
  - The bending stress on the gear tooth.

**15**

- b) Describe the parallel helical gear and crossed helical gear.

**5**

- Q.7 a) Describe in detail the ergonomic consideration in engineering design.

**10**

b) Explain the design considerations in casting process.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Fourth / Sixth Semester

## **IC ENGINE AND GAS TURBINES (M-621)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 2

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) What is Relative efficiency?
- b) What is the effect of Pre-ignition on detonation in S.I. Engine?
- c) What is 'Stoichiometric mixture'?
- d) What is 'Solid or airless injection'?
- e) What does high viscosity index indicate?
- f) Name the methods by which air consumption can be measured.
- g) What do you mean by term 'Gas Turbine'?
- h) How can the 'diesel knock' be controlled?
- i) Draw P-V and T-S diagram of Stirling Engine Cycle.
- j) What is 'Mean effective Pressure'?

**2x10**

### **PART-A**

**Q.2** In an ideal diesel cycle the pressure and temperature at the beginning of compression are 98.5 KN/m<sup>2</sup> and 60°C. respectively. The maximum pressure attained during the cycle is 4.5 MN/m<sup>2</sup> and heat received during the cycle is 580 kJ/kg of working fluid. Determine:

- i) The compression ratio.
- ii) The temperature at the end of compression.
- iii) The temperature at the end of combustion.

Assume  $\gamma = 1.4$ ,  $C_p = 1.003 \text{ kJ / kg K}$ .

**20**

**Q.3** a) Describe the MPFI system with a neat sketch. Explain port injection and throttle body injection system.

**10**

- b) By means of a suitable graph, explain the necessary Carburetor Performance to fulfill engine requirements.

**10**

**Q.4** a) Compare knocking in CI engine with the phenomenon of detonation in S.I. engine.

**10**

- b) Explain with figures the various types of combustion chambers used in CI engines.

**10**

## **PART-B**

Q.5 a) Explain the following:

- i) Thermosyphon Cooling System.
- ii) Forced Circulation Cooling System.

**5x2**

b) What are the various properties of lubricating oil?

**10**

Q.6 An indicator diagram taken from a single cylinder four stroke, compression ignition engine has a length of 100 mm and an area of 2045 mm<sup>2</sup>. The indicator pointer deflects a distance of 10 mm for a pressure increment of 2 bar in the cylinder. If the bore and stroke of the engine cylinder are both 100 mm and the engine speed is 900 rev/min, calculate the mean effective pressure and the indicated power. If the mechanical efficiency is 75%. What is the brake power developed.

**20**

Q.7 a) Air enters the compressor of a gas turbine plant operating on Brayton cycle at 101.325 kPa, 27°C. The pressure ratio in the cycle is 6. Calculate the maximum temperature in the cycle and the cycle efficiency.

Assume  $W_T = 2.5 W_C$ , where  $W_T$  and  $W_C$  are the turbine and compressor work respectively. Take  $\gamma = 1.4$

**10**

b) Describe with a neat sketch the working of a simple constant pressure open cycle gas turbine.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Sixth / Eighth Semester  
**POWER PLANT ENGINEERING (M-622)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

**Q.1** Briefly answer the following:

- a) Write down the advantages of damless PowerPoint.
- b) Write down the emerging sources of energy.
- c) Classified the different types of dam.
- d) Draw the air and flue gas circuit of steam power plant.
- e) Explain the function of primary and secondary air.
- f) Write down the advantages of combined cycle power plant.
- g) Write down the parameter affecting thermodynamic efficiency of combined cycle Power plant.
- h) Write down the reason for opting nuclear Power plant.
- i) Explain reverse factor in power plant.
- j) Explain diversity factor in power plant.

**2×10**

## **PART-A**

- Q.2** a) The efficiency of a power plant depends on the site location. Discuss the factors on which site selection is being influenced. **10**
- b) Explain with a neat sketch the working principle of "fuel cells". **10**
- Q.3** a) Explain in details the essential elements of a hydroelectric power plant. **10**
- b) Explain the following:
  - i) Function of surge tank in hydroelectric power plant.
  - ii) Function of draft tube.**5x2**

- Q.4** a) Draw the following circuit in the steam power plant:
  - i) Air and flue gas circuit.
  - ii) Feed water and steam circuit.**10**
- b) Explain in detail the setup and working principle of a modern thermal power plants. **10**

## **PART-B**

- Q.5** a) Water is a PFBC? Explain its operation. **6**
- b) Consider an air standard cycle in which the air enters the compressor at 1.0 bar and 20°C. The pressure of air leaving he compressor is 3.5 br and the temperature at turbine inlet is 600°C.

Determine per kg of air:

- i) Efficiency of the cycle.
- ii) Heat supplied to air.
- iii) Work available at the shaft for air  $\gamma = 1.4$  and  $C_p = 1.005 \text{ kJ/kgK}$

**14**

**Q.6** a) Explain the function of a cladding. What are the criteria of selecting a suitable cladding? **6**

b) Write down the different types of nuclear reactors. Explain with a neat sketch "BWR" nuclear reactor. **14**

**Q.7** a) What are the different kinds of method used for calculating the depreciation amount? Explain the straight line method. **6**

b) A power plant has the following annual factors:

Load factor = 0.75,

Capacity factor = 0.60,

Use factor = 0.65. Maximum demand is 60 MW. Estimate:

- i) The annual energy production.
- ii) The reverse capacity over and above peak load.
- iii) The hours during which the plant is not in service per year.

**14**

# **End Semester Examination, Dec. 2018**

B. Tech. – Sixth Semester  
**AUTOMOBILE ENGINEERING (M-624)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

**Q.1** Answer the following questions:

- a) What are the salient features of saloon car?
- b) Name the various types of clutch used in automobiles.
- c) What is the necessity of a transmission in a vehicle?
- d) What are the three active members of an epicyclic gearbox?
- e) Enlist various components of drive line.
- f) What is the function of shock absorber?
- g) Explain the need of a suspension system.
- h) What is negative camber?
- i) What are the different types of wheels?
- j) What is a catalytic converter?

**2x10**

## **PART-A**

**Q.2** a) How do you classify automobiles? Explain in details.

**12**

- b) What are the safety consideration kept in mind while designing an automobile?

**8**

**Q.3** a) Discuss in detail the construction and working of a single plate clutch with the help of neat sketch.

**12**

- b) Write short note on:

- i) Electromagnetic clutch.
- ii) Clutch linkage.

**4x2**

**Q.4** a) Draw a neat sketch of synchromesh gear box and then explain its working.

**12**

- b) Write short notes on:

- i) Over drive.
- ii) Differential.

**4x2**

## **PART-B**

Q.5 a) What are the main components of steering system? Describe them briefly.

**10**

b) Write short note on following with neat sketches:

- i) Leaf spring.
- ii) Macpherson strut type suspension.

**5x2**

Q.6 a) Describe the construction and working of disc brakes. Explain master cylinder and wheel cylinder with neat sketch.

**12**

b) Describe in detail the various factors affecting tyre life.

**8**

Q.7 a) Explain the methods of controlling air pollution caused from various sources in an automobile.

**10**

b) "Battery is the heart of electrical system in automobile". Explain.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Sixth Semester  
**ENERGY MANAGEMENT (M-625)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) Differentiate between renewable energy and non-renewable energy.
- b) Define the natural resources and minerals.
- c) Define the Power Factor.
- d) Define energy audit.
- e) Define Co-generation.
- f) What is the fossil energy?
- g) What is compressor's automation by pressure settings?
- h) What do you mean by Superheated steam?
- i) Distinguish contact demand and billing demand.
- j) Define the "instrument" and "Lux level" used in lighting audit.

**2x10**

## **PART-A**

**Q.2** a) Define the preliminary energy audit and detailed energy audit with example.

**7**

- b) What are the similarities and dissimilarities of heat and work?

**6**

- c) Define the water tube boiler, fire tube boiler and evaporation rate.

**7**

**Q.3** a) i) What is the gross calorific value and net calorific value?

- ii) Define the potable instrument and online instrument.

- iii) Define specific heat and heat capacity.

- iv) What is meant by flash steam utilization?

- v) Define the saturation temperature.

**2x5**

b) What are the functions of steam traps? Describe three types of steam traps used in the steam distribution systems in industry.

**10**

**Q.4** a) What are the technical steps involved in available two methods for assessing the boiler efficiency?

**10**

b) What are the classifications of energy conservation measures in industry? Explain technically.

**10**

## **PART-B**

Q.5 a) Define the ways for power factor improvement and its benefit. What are the tariff structure components?

**10**

b) Explain all the categories of energy savings opportunities in compressed air system. What is the "Receiver"?

**10**

Q.6 a) Describe the energy saving opportunities in the lighting system.

**10**

b) Describe the factors that affect the energy saving in motors.

**10**

Q.7 a) Define the basic terms used in Lighting System and Features.

**8**

b) What is Enthalpy? Define the "steam quality" and "pressure reduction valve". Define the cogeneration and bottoming cycle.

**7**

c) Describe the methodology of Lighting System energy audit study.

**5**

# End Semester Examination, Dec. 2018

B. Tech. – Seventh / Eighth Semester

## **SOLAR ENERGY AND ITS APPLICATIONS (M-626)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

- Q.1 a) Define 'zenith angle'.  
b) Define 'radiation and global radiation'.  
c) What do you understand by 'scattered radiation'?  
d) Name different modes of heat transfer.  
e) What are the limitations of solar thermal energy?  
f) Define the 'focusing' types of 'solar collectors'.  
g) Describe Reynold's number and its usefulness.  
h) Why is the storage of solar energy essential?  
i) Define 'energy efficiency'.  
j) Name a few applications of solar energy. **2×10**

### **PART-A**

- Q.2 a) Describe the spectrum distribution of solar radiation with neat leveled graph. **10**  
b) Calculate declination angle ( $\delta$ ) for January 22. **10**
- Q.3 a) What factors does optimum capacity of energy storage system depend on? Define them briefly. **14**  
b) Differentiate between 'peak flux' and 'average flux'. **6**
- Q.4 a) Which instrument used to measure the direct radiations? Explain the constructional details with a neat sketch. **8**  
b) Explain difference between flat plate solar collectors using water as heat transfer medium and air as heat transfer medium. **12**

### **PART-B**

- Q.5 a) Differentiate between natural pond and solar pond. **10**  
b) Describe in detail the non-convective salt gradient solar pond with the help of a neat sketch. **10**
- Q.6 a) Classify different types of solar energy storage. **10**  
b) Explain difference between connective and non-connective solar ponds. Also give applications of solar ponds. **10**
- Q.7 a) Explain thermal energy storage and why it is required. **10**  
b) Explain solar gas absorption refrigeration. **10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Sixth Semester

## **INTRODUCTION TO ROBOTICS (M-631)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: 1

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following questions:

- a) What is meant by work envelope?
- b) Which type of drive system is more suitable for heavy load robot application?
- c) What are the properties of stepper motor?
- d) What is the difference between internal and external gripper?
- e) What is image analysis?
- f) What is smoothing in vision system?
- g) Differentiate between sensors and transducers.
- h) How touch and slip sensor are used in robots?
- i) Write down the basic types of Robot Programming.
- j) What are limitation of online Robot Programming?

**2x10**

### **PART-A**

Q.2 a) Classify the robots according to arm configuration with a neat sketch and example, also explain the features of each type.

**8**

- b) Describe the industrial application of robot.

**4**

- c) Explain the various drive system used with an industrial robot and compare their features merits and demerits.

**8**

Q.3 a) Discuss about vacuum grippers along with their advantages and disadvantages.

**10**

- b) Discuss in detail the design consideration of robot.

**10**

Q.4 a) With a suitable sketch and application, explain the principle and working of the following sensors:

- i) Inductive Proximity Sensor.
- ii) Slip Sensor.
- iii) Rotary Encoder.
- iv) Touch Sensor.

**12**

- b) Explain the segmentation method used in image processing system with suitable example.

**8**

**PART-B**

- Q.5 a) Write a critical note on the steps that a company should follow during implementing robotics.

**10**

- b) Explain the application with one case study of robot cell in industry.

**10**

- Q.6 a) Explain in detail various type of programming techniques used to program a robot. Also, discuss advantages and disadvantages of each technique.

**15**

- b) What is Robotic Work cell? Explain with example.

**5**

- Q.7 Explain the use of robot in:

- a) Assembly Operation.
- b) Spray Painting Operation.
- c) Machine Loading and Unloading.
- d) Material Transfer.

**5x4**

# **End Semester Examination, Dec. 2018**

B. Tech. – Eighth Semester

## **PRODUCTION AND OPERATION MANAGEMENT (M-633)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.

**Q.1** Answer the following:

- a) Distinguish between production and productivity.
- b) Briefly explain the term value engineering.
- c) Explain the significance of forecasting in production planning.
- d) What do you understand by ‘bill of material’?
- e) Briefly explain the significance of control phase in production planning.
- f) What are strategic decisions in business environment?
- g) Explain briefly the types of cost involved in inventory control.
- h) Briefly explain the importance of lead time.
- i) Why cache charts are used for quality control.
- j) What are major maintenance systems?

**2×10**

### **PART-A**

- Q.2**
- a) Illustrate the process design with example. **8**
  - b) Explain different tools of concurrent engineering. **6**
  - c) Explain the term value engineering and its techniques. **6**
- Q.3**
- a) Explain the term aggregate planning. **8**
  - b) The demand of washing machines is shown below. The forecasted sale for the month of March is 100 machines with smoothing constant  $\alpha=0.15$ . Find the forecast for August. Also calculate MAD, MSE, MAPE and Bias.

| S. No. | Month | Demand |
|--------|-------|--------|
| 1      | March | 100    |
| 2      | April | 200    |
| 3      | May   | 100    |
| 4      | June  | 50     |
| 5      | July  | 150    |

**12**

- Q.4**
- a) Explain the process (different phases) of production planning and control. **10**
  - b) Discuss the techniques of production control in job shop production, batch production and mass production. **10**

### **PART-B**

- Q.5**
- a) A company makes 450 motors a month. It buys spindle at the cost of Rs. 20/- per piece. The inventory carrying cost is 15% of cost and ordering cost is Rs. 50/- per order. Calculate:
    - i) EOQ

- ii) No. of orders per year.
  - iii) Average annual ordering cost.
  - iv) Average inventory.
  - v) Average annual carrying cost
  - vi) Total cost. 12
- b) Explain the importance of inventory control. 8
- Q.6 a) Explain the significance of control charts in quality control. Also explain various types of control charts and their usage. 10
- b) Elaborate the three primary technical tools used for quality control and its improvements. 10
- Q.7 a) Explain the various planned maintenance strategies in debits. 10
- b) Describe various elements of total productive maintenance and its key features. 10

# **End Semester Examination, Dec. 2018**

B. Tech. – Sixth Semester  
**MECHATRONICS (M-634)**

Time: 3 hrs

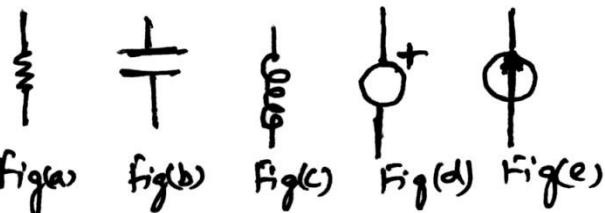
Max Marks: **100**

*No. of pages: 2*

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

**Q.1** Answer the following questions:

- a) Identify a mechatronic system and its primary elements.
- b) Name the basic electrical elements given in fig (a to e).



- c) Define a digital signal.
- d) Draw the symbol of "AND" and "OR" gate along with truth table.
- e) State the principle mechanism of bimetallic strip and its applications.
- f) Draw and label diagram of ADC convertor.
- g) Differentiate between "Microprocessor" and "Microcontroller".
- h) State the application of MEMS technology.
- i) Define sampling, quantization and coding.
- j) What are shape memory alloys?

**2x10**

## **PART-A**

**Q.2** a) State the characteristics of "Integrated circuits".

**4**

b) Explain the working of SR flip-flop.

**4**

c) Explain what logic gates are used to control the following:

- i) A boiler shut-down switch when the temperature reaches, say,  $80^{\circ}\text{C}$  and circulating pump is off.
- ii) The issue of tickets at an automatic ticket machine at railway station.
- iii) A safety lock system for a machine tool operation.

**4x3**

**Q.3** a) Explain the principle, construction and working of the following:

- i) Tactile sensor

ii) Encoder

**5x2**

b) Differentiate between pneumatic and hydraulic activator. Explain electrical activator.

**10**

Q.4 Write short notes on the following applications:

a) Microcontroller in domestic working machine.

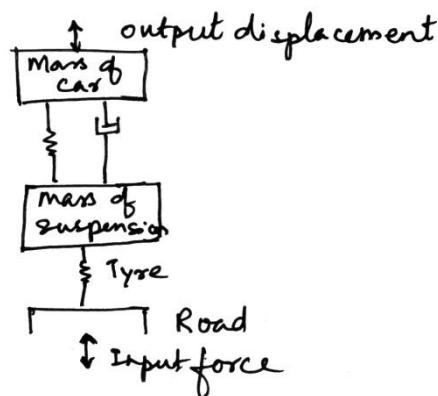
**10**

b) Microprocessor in temperature control.

**10**

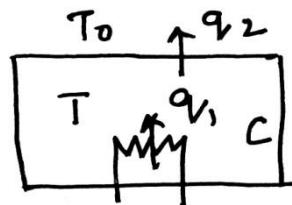
### **PART-B**

Q.5 a) Explain the governing equations of the following mechanical systems used in vehicle suspensions shown in the figure.



**10**

b) Figure shows a thermal system consisting of an electric fire in a room. The fire emits heat at the rate " $q_1$ ", and rooms looses heat at rate " $q_2$ ". Assuming that the air in the room is at a uniform temperature "T" and that there is no heat storage in the wall of the room. Derive an equation how the room temperature will change with time.



**10**

Q.6 a) A thermocouple giving an output of  $0.5 \text{ mV}/{}^\circ\text{C}$ . What will be the word length required when its output passes through an ADC if temperature from  $0^\circ\text{C}$  to  $200^\circ\text{C}$

are to be measured with a resolution of  $0.5^{\circ}\text{C}$ ?

**6**

- b) Explain the various elements that can be used for the presentation of data.
- 4**
- c) Explain the 7-segment displaying LED display in a multiple display of numbers/digits. Draw a table showing how a 4-bit binary code input be used to generate input to switch on the various segments.

**10**

Q.7 Write short notes on the following:

- a) Wind screen wiper motion.
- b) Automatic camera.
- c) Bar code recorder.
- d) Radiator water level indicator.

**5x4**

# End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester  
**MECHATRONICS (M-634)**

Time: 3 hrs

Max Marks: **100**

*No. of pages: 2*

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

**Q.1** Answer the following questions:

- What are the basic building blocks of a hydraulic and pneumatic system?
- Analyze the output of the following circuit:



- Convert the decimal 268.75 into binary, octal and hexadecimal.
- How does the microprocessor differentiate between data and instruction?
- Design an optical amplifier circuit that can be used to produce an output that ranges from 0 to -5V when the input goes from 0 to 100V.
- An inverting amplifier has an input resistance of 2KΩ. Determine the feedback resistance needed to give a voltage gain of 100.
- Draw the analogue between the mechanical and electrical building blocks.
- Explain how the zener diode help in protecting a circuit.
- Illustrate the circuit diagram of summing amplifier using operational amplifier.
- Categorize the sensors on the basis of principle of operation.

**2x10**

## **PART-A**

**Q.2** a) Draw the Karnaugh map for the given expressions and make the groupings:

- $A'B'C' + ABC' + AB'C' + A'B'C + A'BC + ABC$
- $A'BC'D' + A'BC'D + ABC'D + AB'C'D + A'B'CD + A'BCD + ABCD + ABCD'$

10

- b) Design and implement a 4 bit BCD to Excess-3 code converter using PLA.

**10**

**Q.3** a) "Different sensors have different working principle." Give justification to support the statement.

**10**

- b) A thermocouple element when taken from a liquid at 50°C and plunged into a liquid at 100°C at time  $t=0$  gave the following e.m.f. values. Determine the 95% response time:

| Time(s)    | 0   | 20  | 40  | 60  | 80  | 100 | 120 |
|------------|-----|-----|-----|-----|-----|-----|-----|
| e.m.f.(mV) | 2.5 | 3.8 | 4.5 | 4.8 | 4.9 | 5.0 | 5.0 |

**10**

- Q.4 a) Design an assembly language program based on 8051 microcontroller instruction set to perform four arithmetic operations on 2, 8 bit data.

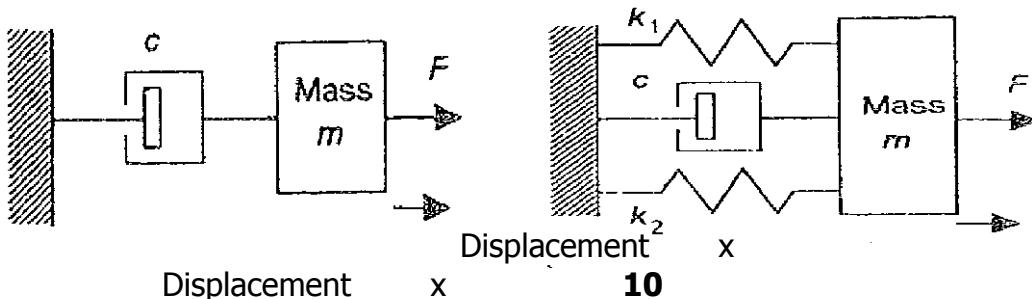
**10**

- b) Differentiate between microprocessor and microcontroller and briefly explain the architecture of 8085 microprocessor.

**10**

### **PART-B**

- Q.5 a) Design an equation relating the input, force  $F$ , with the output, displacement  $x$ , for the systems described by figure:



**10**

- b) A hot object, capacitance  $C$  and temperature  $T$ , cools in a large room at temperature  $T_r$ . If the thermal system has a resistance  $R$ , derive an equation describing how the temperature of the object changes with time and give an electrical analogue of the system.

**10**

- Q.6 a) Digital signals from a sensor are polluted by noise and interference and typically of the order of 100V or more. Explain how protection can be afforded for a microprocessor to which these signals are to be inputted.

**10**

- b) Illustrate the module that might be needed to interface the output of a microprocessor with an actuator.

**10**

- Q.7 Write short notes on (*any two*):

- Digital Speedometer and Odometer.
- A Pick and Place Robot.
- Traditional and Mechantronics Design approach.
- Mechatronics Application in Bionics and Avionics

**5x4**

# End Semester Examination, Dec. 2018

B. Tech. – Fifth Semester  
**MECHATRONICS (M-634)**

Time: 3 hrs

Max Marks: **100**

*No. of pages: 2*

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B.** Each question carries equal marks.

**Q.1** Answer the following questions:

- a) What are the basic building blocks of a hydraulic and pneumatic system?  
b) Analyze the output of the following circuit:



- c) Convert the decimal 268.75 into binary, octal and hexadecimal.  
d) How does the microprocessor differentiate between data and instruction?  
e) Design an optical amplifier circuit that can be used to produce an output that ranges from 0 to -5V when the input goes from 0 to 100V.  
f) An inverting amplifier has an input resistance of 2KΩ. Determine the feedback resistance needed to give a voltage gain of 100.  
g) Draw the analogue between the mechanical and electrical building blocks.  
h) Explain how the zener diode help in protecting a circuit.  
i) Illustrate the circuit diagram of summing amplifier using operational amplifier.  
j) Categorize the sensors on the basis of principle of operation.

**2x10**

## **PART-A**

**Q.2** a) Draw the Karnaugh map for the given expressions and make the groupings:

- i)  $A'BC' + ABC' + AB'C' + A'B'C + A'BC + ABC$   
ii)  $A'BC'D' + A'BC'D + ABC'D + AB'C'D + A'B'CD + A'BCD + ABCD + ABCD'$

10

- b) Design and implement a 4 bit BCD to Excess-3 code converter using PLA.

**10**

**Q.3** a) "Different sensors have different working principle." Give justification to support the statement.

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- b) A thermocouple element when taken from a liquid at 50°C and plunged into a liquid at 100°C at time  $t=0$  gave the following e.m.f. values. Determine the 95% response time:

|            |     |     |     |     |     |     |     |
|------------|-----|-----|-----|-----|-----|-----|-----|
| Time(s)    | 0   | 20  | 40  | 60  | 80  | 100 | 120 |
| e.m.f.(mV) | 2.5 | 3.8 | 4.5 | 4.8 | 4.9 | 5.0 | 5.0 |

**10**

- Q.4 a) Design an assembly language program based on 8051 microcontroller instruction set to perform four arithmetic operations on 2, 8 bit data.

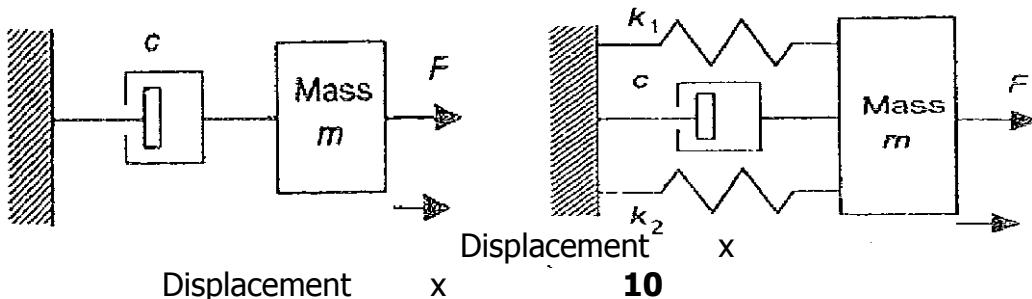
**10**

- b) Differentiate between microprocessor and microcontroller and briefly explain the architecture of 8085 microprocessor.

**10**

### **PART-B**

- Q.5 a) Design an equation relating the input, force  $F$ , with the output, displacement  $x$ , for the systems described by figure:



**10**

- b) A hot object, capacitance  $C$  and temperature  $T$ , cools in a large room at temperature  $T_r$ . If the thermal system has a resistance  $R$ , derive an equation describing how the temperature of the object changes with time and give an electrical analogue of the system.

**10**

- Q.6 a) Digital signals from a sensor are polluted by noise and interference and typically of the order of 100V or more. Explain how protection can be afforded for a microprocessor to which these signals are to be inputted.

**10**

- b) Illustrate the module that might be needed to interface the output of a microprocessor with an actuator.

**10**

- Q.7 Write short notes on (*any two*):

- Digital Speedometer and Odometer.
- A Pick and Place Robot.
- Traditional and Mechatronics Design approach.
- Mechatronics Application in Bionics and Avionics

**5x4**



# **End Semester Examination, Dec. 2018**

B. Tech. – Sixth Semester  
**TOOL ENGINEERING (M-635)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Answer the following questions:

- a) Which are the four tool materials mainly used for cutting?
- b) What are different types of tool failures?
- c) Why large positive rake angles cannot be used on cutting tools?
- d) What is the function of flutes in cutting tools?
- e) Write the name of materials for drills.
- f) Draw neat sketch of a circular form tool.
- g) Differentiate between peripheral milling and face milling.
- h) List the milling cutter principle elements with a sketch.
- i) State broaching tool.
- j) How is the pitch of teeth of a broach selected?

**2x10**

## **PART-A**

**Q.2** a) Discuss the general problems of cutting tool design.

**10**

b) State the composition of the following HSS tools:

T-1, T-4, M-2, M-4, M-6

**10**

**Q.3** Design a single point cutting tool based on checking for tool strength and tool rigidity.

**20**

**Q.4** Estimate the moment, thrust force and power required for 12.7 mm drill having a feed of 0.254 mm/rev, turning at 100 rpm, cutting a steel of Brinell hardness 200. Take the material factor as 1.07.

**20**

## **PART-B**

**Q.5** Derive the expression for depth of cut in an angular group turning tool (V-notch). Also determine the angle to be ground on the tool face.

**20**

**Q.6** The feed of an 8 tooth face mill is 0.33 cm per tooth at 200 rev/min. The material cut is 300 BHN steel. Depth of cut is 0.32 cm and the width is 10 cm. Calculate the:

- a) Horse-Power at the cutter.

b) Horsepower at the motor if the efficiency of the machine is 60%. The machinability factor is  $8.2 \text{ cm}^3/\text{min}/\text{hp}_c$ .

**20**

Q.7 Discuss the following design features of a broach:

- a) Rake and relief angles.
- b) Depth of cut per tooth.
- c) Width of Land.
- d) Depth of cutting tooth.
- e) Chip breakers.
- f) Cutting speed.

**20**

# End Semester Examination, Dec. 2018

B. Tech. – Seventh Semester  
**MECHANICAL VIBRATIONS (M-721)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Answer the following questions:

- a) Define three elementary parts of a vibrating system?
- b) Give two examples each of the bad and good effects of vibration.
- c) Define 'damped vibrations'.
- d) What is meant by logarithmic decrement?
- e) Define 'forced vibrations'.
- f) Define 'transmissibility'.
- g) What is an accelerometer?
- h) What are various methods available for vibration control?
- i) Why is it important to find the natural frequency of a vibrating system?
- j) What is the difference between a vibration absorber and a vibration isolator? **2x10**

## **PART-A**

**Q.2** a) A body is subjected to two harmonic motions:

$$x_1 = 15 \sin(wt + \frac{\pi}{6})$$

$$x_2 = 8 \cos(wt + \frac{\pi}{6})$$

What harmonic motion should be given to the body to bring it to equilibrium?

**10**

- b) A force  $p_0 = \sin wt$  acts on a displacement  $x_0 \sin(wt - \frac{\pi}{6})$  where  $p_0 = 25N$ ,  $x_0 = 0.05m$  and  $w = 20\pi \text{ rad/sec}$ .

What is the work done during:

- i) The first second?
- ii) The first 1/40 second?

**10**

**Q.3** a) A body of 5 kg is supported on a spring of stiffness 200 N/m and has dashpot connected to it, which produces a resistance of 0.002 N at a velocity of 1 cm/sec. In what ratio will the amplitude of vibration be reduced after 5 cycles?

**10**

- b) A circular disc of 5 kg mass, 100 mm radius is held by a spring of constant 200 N/m at a distance of 50 mm from the centre and rolls on a smooth horizontal plane. Find the natural frequency of the system from the given figure.

**10**

### **Figure**

Q.4 a) Explain with neat a sketch of the following:

**10**

- i) Vibrometer
- ii) Accelerometer
- b) A vibrating system having mass 1 kg is suspended by a spring of stiffness 1000 N/m and it is put to harmonic excitation of 10 N . Assuming viscous damping, determine:
  - i) The resonant frequency
  - ii) The phase angle at resonance
  - iii) The amplitude at resonance:
  - iv) The frequency corresponding to the peak amplitude
  - v) Damped frequency

Take  $C=40 \text{ N-sec/m}$

**10**

### **PART-B**

Q.5 a) Solve the problem shown in figure,  $m_1 = 10\text{kg}$  ,  $m_2 = 15\text{kg}$  and  $k = 320\text{N/m}$

**10**

### **Figure**

- b) Write notes on:
- i) Generalized and principal co-ordinates.
  - ii) Normal mode of vibration.

**10**

Q.6 a) Write notes on:

- i) Dunkerley's equation
- ii) Orthogonality principle.

**10**

- b) Using matrix method, determine the natural frequencies of the system shown in figure.

### **Figure**

**10**

Q.7 a) Derive equation for critical speed of a light shaft with a single disc, considering damping effect.

**10**

- b) A light shaft carries pulley at the centre with its centre of gravity on the centre line. The shaft is supported in self aligning bearings at the ends. The shaft deflects 0.5 mm under the static weight of the shaft. Determine the lowest critical speed.

**10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **MECHANICAL VIBRATIONS (M-721)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Answer the following questions:

- Define 'damping'. Can damping be disregarded in vibration analysis?
- In vibration, what happens to the energy dissipated by damping?
- If a vehicle vibrates badly while moving on a uniformly bumpy road, will a change in the speed improve the condition?
- How would you determine the number of degrees of freedom of a lumped mass system?
- What is difference between generalized coordinates and Cartesian coordinates? **4x5**

### **PART-A**

**Q.2** a) Define the degree of freedom of a vibratory system. Explain with suitable examples, the good and bad effects of vibration

**10**

- How do you add two harmonic motions having different frequencies? Also find the resultant motion of vibration.

**10**

**Q.3** a) Why does the magnitude of the free vibration gradually diminish in practical system? What effect does a decrease in mass have on the frequency of a system?

**10**

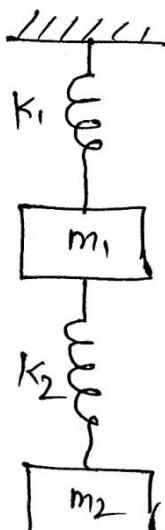
- A spring mass system has a natural frequency of 10Hz. When the spring constant is reduced by 800N/m, the frequency is altered by 45%. Find the mass and spring constant of the original system.

**10**

**Q.4** a) Define the term magnification factor. How is the magnification factor related to the frequency ratio?

**8**

b)



Find the natural frequencies and mode shapes of the system shown in figure,  
If  $m_1 = m_2 = 1\text{kg}$ ,  $k_1 = 2000\text{N/m}$  and  $k_2 = 6000 \text{ N/m}$

**12**

**PART-B**

Q.5 a) Derive the equations of motion of a multi-degree of freedom system in matrix form using the flexibility matrix.

**14**

b) What is a degenerate system? What is the use of Routh-Hurwitz criterion?

**6**

Q.6 a) What are the sources of industrial vibration? Explain the methods available for vibration control.

**6**

b) A rotor of mass 10 kg is mounted in the middle of 20mm diameter shaft supported at the ends by two bearings. The bearing span is 500 mm. Because of certain manufacturing inaccuracies, the CG of the disc is 0.03mm away from the geometric centre of rotor. If the system rotates at 2500 rpm. Find the amplitude of steady state vibrations and dynamic force transmitted to the bearings. Neglect damping. Take  $E=2 \times 10^5 \text{ N/mm}^2$

**14**

Q.7 Write short notes on **(any four)**:

- a) Transducer.
- b) Vibrometer.
- c) Whirling of shaft.
- d) Dynamic balancing.
- e) Single plane balancing.

**5x4**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **REFRIGERATION AND AIR-CONDITIONING (M-821 / M-821A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.

**Q.1 Answer the following:**

a) Write down refrigerant number for following chemical formula:



b) Write with reason in which case electricity bill will be higher:

i) Air cooled condenser.

ii) Water cooled condenser.

c) Draw a neat pressure-enthalpy diagram showing superheating and sub-cooling.

d) What is the implication of sensible heat factor?

e) What is the necessity of cooling load calculation?

**4×5**

### **PART-A**

**Q.2** a) A boot-strap cooling system of 10 TR capacity is used in an aeroplane. The ambient air temperature and pressure are 20°C and 85 bar respectively. The pressure of air increases from 0.85 bar to 1 bar due to ramming action of air. The pressure of air discharged from the main compressor is 3 bar. The discharge pressure of air from auxiliary compressor is 4 bar. The isentropic efficiency of each of the compressor is 80%, while that of turbine is 85%. 50% of the enthalpy of air discharged from main compressor is removed in the first heat exchanger and 30% of the enthalpy of air discharged from auxiliary compressor is removed in the second heat exchanger using rammed air. Assuming ramming action to be isentropic, the required cabin pressure of 0.9 bar and temperature of the air leaving the cabin not more than 20°C. Find:  
i) The power required to operate the system.  
ii) The COP of the system.

Draw the temperature-entropy diagram of the system. Take  $r = 1.4$  and  $c_p = 1 \text{ kJ/kg K}$

**20**

**Q.3** a) Draw a neat diagram of vapour absorption refrigeration system and explain its working principle. **10**  
b) Draw a neat diagram of cascade refrigeration system and explain with details the working of cascade cycles. **10**

**Q.4** a) In a single stage vapour compression system, show in temperature-entropy diagram, how the varying evaporator conditions affect the C.O.P. **10**  
b) Describe necessity of multistage refrigeration compression system in case of dairy and food processing plant? What is advantage of inter-cooling in multistage compression? **10**

### **PART-B**

- Q.5 a) Draw a handmade sketch of psychometric chart showing all the 8 processes and with a brief note on each process. **10**
- b) Derive the relation  $\phi = \frac{\mu}{1 - (1 - \mu) \frac{P_{vs}}{P_t}}$  where  $\phi$  = relative humidity,  $\mu$  = Degree of saturation,  $P_v$  = Partial pressure of vapour,  $P_t$  = Total pressure of moist air,  $P_{vs}$  = saturation pressure of vapour in moist, air. **10**
- Q.6 Explain briefly:  
 a) Centrifugal compressor  
 b) Shell and tube condenser.  
 c) Cooling towers.  
 d) Difference between comfort and industrial air conditioning. **5x4**
- Q.7 A Hall is to be maintained at 24°C dry bulb temperature and 60% relative humidity under the following conditions:  
 Outdoor conditions = 38°C DBT and 28°C WBT  
 Sensible Load heat in the room = 46.4 kW  
 Latent heat load = 11.6 kW  
 Total infiltration air = 1200 m<sup>2</sup>/h  
 Apparatus dew point temperature = 10°  
 Quantity of recirculated air from the hall = 60%.  
 If the quantity of recirculated air is mixed with the conditioned air after the cooling coil, find the following:  
 a) The condition of air leaving the conditioner coil and before mixing with the recirculated air.  
 b) The condition of air before entering the hall.  
 c) The mass of air entering the cooler.  
 d) The bypass factor of the cooling coil.  
 e) The refrigeration load in the cooling coil in tones of refrigeration. **4x5**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **REFRIGERATION AND AIR-CONDITIONING (M-821A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **2**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following:

- a) Write down the refrigerant number for following chemical formula:  
 $CCl_2F_2$ ,  $CF_3CHCl_2$ .
- b) Draw pressure-enthalpy diagram and show superheating and sub-cooling clearly.
- c) What do you mean by bypass factor in a cooling coil?
- d) What is difference between sensible heat and latent heat?
- e) Draw a neat diagram of electric refrigerator.

**4×5**

### **PART-A**

**Q.2** A simple evaporative air refrigeration system is used for an aeroplane to take 20 tonnes of refrigeration load. The ambient air conditions are  $20^{\circ}C$  and 0.9 bar. The ambient air is rammed isentropically to a pressure of 1 bar. The air leaving the main compressor at pressure 3.5 bar is first cooled in the heat exchanger having effectiveness of 0.6 and then in the evaporator where its temperature is reduced by  $5^{\circ}C$ . The air from the evaporator is passed through the cooling turbine and then it is supplied to the cabin which is to be maintained at a temperature of  $25^{\circ}C$  and a pressure of 1.05 bar. The internal efficiency of the compressor is 80% and that of cooling turbine is 75%. Determine:

- a) Mass of air fled off the main compressor.
- b) Power required for the refrigerating system.
- c) C.O.P. of the refrigerating system.

**20**

**Q.3** a) Derive  $(C.O.P.)_{max}$  of an ideal vapour absorption refrigeration system. **10**  
b) Write down the merits and demerits of aqua ammonia refrigeration system. **10**

**Q.4** a) What is the difficulty faced during wet compression in case of reciprocating compressor? Indicate wet and dry compression in pressure-enthalpy diagram. **10**  
b) Draw a simple vapour compression cycle indicating all equipments and show in pressure-enthalpy and temperature-entropy diagram. Describe the process in detail. **10**

### **PART-B**

**Q.5** a) The atmospheric air at  $30^{\circ}C$  dry bulb temperature and 75% relative humidity enters a cooling coil at the rate of  $200 \text{ m}^3/\text{min}$ . The coil dew point temperature is  $14^{\circ}C$  and the bypass factor of the coil is 0.1.

Determine:

- i) The temperature of air leaving the cooling coil.

- ii) The capacity of the cooling coil in tones of refrigeration.
  - iii) The amount of water vapour removed per minute.
  - iv) The sensible heat factor for the process. 12
- b) 200 m<sup>3</sup> of air per minute is passed through the adiabatic humidifier. The condition of air at inlet is 40°C dry bulb temperature and 15% relative humidity and the outlet condition is 25°C dry bulb temperature and 20°C wet bulb temperature. Find the dew point temperature and the amount of water vapour added to the air per minute. 8

- Q.6 Explain briefly:
- a) Difference between compressors and pumps.
  - b) Flowchart of compressor classification.
  - c) Tube within a tube condenser.
  - d) Difference between D-X type and flooded evaporating. 5x4
- Q.7 a) What are the factors affecting comfort air conditioning? Describe each factor with example.  
b) What are the classifications of air-conditioning system?  
c) Draw the schematic diagram of summer air conditioning system showing supply air, return air, filtration etc.  
d) Show with a neat sketch, the cooling load components with brief description. 5x4

# **End Semester Examination, Dec. 2018**

B. Tech. – Fifth / Sixth Semester

## **REFRIGERATION AND AIR CONDITIONING (M-821 / M-821A)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

**Q.1** Answer the following questions:

- a) If the refrigerant is designated as R-11 and R-729, find the chemical formula?
- b) What is difference between a refrigerator and a heat pump?
- c) Explain the term "sub-cooling and superheating".
- d) Why a single-stage vapor compression refrigeration system cannot be used to produce ultralow temperature?
- e) Why Hydrogen is essential in an Electrolux refrigeration system?
- f) Which refrigeration system can directly utilize the solar energy?
- g) Define 'sensible cooling'.
- h) Itemize the major refrigeration components of a vapor compression system.
- i) The most common type of absorption system in used in industrial applications is based on which refrigerant-absorbent combination?
- j) What is necessity of cooling in an airplane?

**2x10**

### **PART-A**

**Q.2** a) If the condenser and evaporator temperature are 312 K and 273 K respectively, calculate the reverse Carnot COP.

**10**

- b) Explain briefly an air-refrigeration working on a reverse Carnot cycle. Derive an expression for its COP.

**10**

**Q.3** a) Prove that the coefficient of performance of a heat pump is greater than that for the refrigerating machine operating between the same temperature limits.

**10**

- b) A refrigerating machine working on reversed Carnot cycle takes out 2 kW of heat from the system at 200K while working between temperatures limits of 300K and 200K. What is the C.O.P. and power consumed by the cycle?

**10**

**Q.4** a) What are properties of a refrigerant-absorbent mixture?

**10**

- b) In vapor absorption refrigeration system heating in generator is done at 177 °C, refrigeration in evaporator at -3 °C and cooling in condenser at 27 °C. What will be the maximum COP of the system?

**10**

### **PART-B**

- Q.5 a) Derive expressions for 'degree of Saturation' and 'enthalpy of moist air'.  
**10**
- b) One kg of air at 35 °C has a relative humidity of 60% is mixed with 2 kg of air at 20°C DBT and 13°C DPT. Calculate the specific humidity of the mixture.  
**10**
- Q.6 An air-conditioned space is maintained at 26 °C DBT and 50% RH when the outdoor conditions are 35 °C DBT and 28 °C WBT. The space has a sensible heat gain of 17.6 kW and the air space is supplied at a condition of 8 °C saturated. Determine:
- Mass and volume flow rates of the air supplied.
  - Latent heat load in the room.
  - The cooling load of the refrigerator plant if 15% of total mass of air supplied to the space is fresh air and the remaining air is re-circulated
- 20**
- Q.7 Classify the cooling tower and describe the function of each cooling tower. What are the location wise advantages and disadvantages of a cooling tower?  
**20**

# **End Semester Examination, Dec. 2018**

B. Tech. — Seventh Semester

## **ALTERNATIVE FUELS AND ADVANCES IN IC ENGINES (M-824)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) What is high energy and power density batteries?
- b) Define "Thermal efficiency of SI engine".
- c) How is a LHR engine different from conventional engine?
- d) Define the compression ratio level of a CI Engine.
- e) Describe the effect of decreasing air fuel ratio on the emission characteristics.
- f) What are the disadvantages associated with using alcohol as a fuel?
- g) What are the advantages offered by using bio diesel as an alternative fuel?
- h) What are hybrid operations in terms of engine fuels?
- i) What do you mean by turbulence in reference to combustion chamber designing?
- j) What are the safety aspects involved in the storage and handling of hydrogen? **2×10**

### **PART-A**

**Q.2** Explain the following:

- a) Lean burn engine.
- b) Operation of air standard cycle along with the assumptions involved in it. **10×2**

**Q.3** Explain the following:

- a) Simulation of engine performance.
- b) Closed Loop control of engine parameters and hybrid operations. **10×2**

**Q.4** a) What do you mean by CI Engine modeling? Draw a neat sketch to show the various processes involved in combustion modeling. **10**  
b) Compare the of fuel air cycle and the actual cycle along with the assumptions involved in each. **10**

### **PART-B**

**Q.5** a) Define "Trans Esterification". **6**  
b) Describe briefly about the properties of CNG, LPG and biogas along with their chemical formulas. **14**

**Q.6** a) Explain clearly the important qualities of engine fuel with respect to SI engine fuels. **10**  
b) Write the important properties of a CI Engines fuels. **10**

**Q.7** a) Discuss clearly the layout of an electric vehicle, its advantages and limitations. **10**  
b) What are the modifications required to use CNG in engines? **10**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester  
**RAPID PROTOTYPING (M-834)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.

Q.1 Answer the following (**any four**):

- a) State the principle of generative manufacturing process.
- b) What do you mean by direct numeric control?
- c) How mask is used in solid ground curing process.
- d) Define 'Voxel in RP'.
- e) What is Concept Modeling?

**4x5**

## **PART-A**

Q.2 Explain the need and application of Rapid Prototyping in batch production.

**20**

Q.3 a) Differentiate SLA and SLS in Rapid prototyping.

**8**

b) What are the merits and elements of laminated Object Manufacturing?

**12**

Q.4 With a neat sketch explain Arc spray Metal tooling.

**20**

## **PART-B**

Q.5 With a neat sketch, explain the Sander's Model Maker's working and operations.

**20**

Q.6 Describe in details the date preparation error part building errors and error in finishing in RP.

**20**

Q.7 a) Discuss about different factors those are accuracy of RP.

**8**

b) Explain shape deposition manufacturing.

**12**

# **End Semester Examination, Dec. 2018**

B. Tech. – Seventh Semester

## **MODERN MACHINING METHODS (M-835A)**

Time: 3 Hours

Max Marks: **100**

*No. of pages: 1*

Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any two from **PART-B**. Marks are indicated against each question.

**Q.1** Answer the following:

- a) What are the factors to be considered in selection of Modern Machining Method?
- b) Why is abrasive jet machining not recommended to machine ductile materials?
- c) State the function of tool concentrator.
- d) Contrast ECM and CHM.
- e) Distinguish between cut and peel resists and photographic resists.
- f) Define duty factor.
- g) What are thermal and non-thermal types of EBM?
- h) Name the different types of LASER used in machining.
- i) How does spark occur in electro-chemical sparks machining?
- j) State the application of ECG.

**2x10**

### **PART-A**

**Q.2** Compare and contrast the various modern machining methods on the bases of the type of energy employed, material removal rate, transfer media and economical aspects.

**20**

**Q.3** a) Explain the main factors that affect the AJM removal rate sketch the machining arrangement in WJM.

**10**

b) State the working principle of USM with a neat sketch. Derive an equation of MRR in USM.

**10**

**Q.4** a) Derive a theoretical relationship for the determination of the metal removal rate in ECM. Explain the advantages and limitations of ECM.

**10**

b) Explain the main steps of the chemical machining process. Explain the chemical blanking in brief.

**10**

### **PART-B**

Q.5 a) Derive an expression for the material removal rate of R-C relaxation circuit used for the EDM power supply.

**12**

b) Briefly explain the flushing techniques used in EDM giving their relative merits and applications.

**8**

Q.6 a) State the important parameters that influence the material removal rate in LBM.

**8**

b) Explain various effects of the process parameter of PAM process:

- i) Plasma are current intensity
- ii) Plasma are voltage
- iii) Cutting speed
- iv) Nature of Plasmogen gas

**3x4**

Q.7 Write short notes on:

- a) Electro chemical honing
- b) Electro stream drilling.

**10x2**

# **End Semester Examination, Dec. 2018**

B. Tech. — Seventh Semester

## **COMPUTATIONAL FLUID DYNAMICS (M-843)**

Time: 3 hrs.

Max Marks: **100**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.

**Q.1** Answer the following questions:

- a) What is meant by curl and divergence of velocity vector?
- b) What is structured meshing?
- c) State the concept of continuum and no slip condition.
- d) What is multiphase modeling?
- e) Define "Geometric transformations".
- f) What do you understand by discretisation?
- g) What is Dirichlet boundary condition?
- h) What is the condition for a partial differential equation to be hyperbolic?
- i) What is conservation form?
- h) What is upwind and downwind scheme?

**2×10**

### **PART-A**

- Q.2** a) Derive the energy equation for fluid flow in 3D. **10**  
b) What is Reynolds's transport theorem? State and prove it. **10**
- Q.3** a) Show that the second order wave equation  $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$  is a hyperbolic equation. **10**  
b) Convert the partial differential equation  $\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} = 0$  to a finite difference equation. **10**
- Q.4** a) Explain implicit and explicit methods. **10**  
b) What is Eulerian-Lagrangian approach in multiphase modeling? **10**

### **PART-B**

- Q.5** a) Explain trajectory model theory in detail. **10**  
a) Discuss the applications of multi-phase flow model. **10**
- Q.6** Explain about Reynolds stress model in detail. **20**
- Q.7** a) Discuss any two geometric transformation of a point in detail. **10**  
b) Discuss parametric representation of curves and surfaces. **10**

