

End Semester Examination, May 2016

B. Tech. – Second Semester

BASICS OF AERONAUTICAL ENGINEERING (AE-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.** Each question carries equal marks.

Q.1 Attempt **any five** questions:

- a) What are slat and slot? How do they help in increasing lift?
- b) What is a hot air balloon and how does it differ from an airship?
- c) Define aspect ratio. What is theoretical aspect ratio of an infinite airfoil?
- d) Write the thrust equation of a jet engine.
- e) List various basic structural elements of aircraft structure. What type of load is borne by each of these structural elements?
- f) What basic flight instruments are present in most of the aircraft? What information is indicated on these instruments?
- g) Name the types of hydraulic oils which have been in use in aircraft hydraulic systems.

4x5

PART-A

Q.2 a) Define STOL criteria. Describe briefly the systems that can be provided in an aircraft to achieve short take-off and landing. Give an example of an aircraft which has the STOL capability. **8**

b) What are flaprongs, elevons, stabilators and ruddervators? Explain with suitable sketches how they are operated to serve their intended purpose. **12**

Q.3 a) What basic flying controls are used in an aircraft and how such controls are exercised? **8**

b) Explain the difference between static stability and dynamic stability. Clarify whether a statically stable aircraft will also be dynamically stable, and whether a dynamically stable aircraft will also be statically stable. **6**

c) Define stalling velocity. How can we reduce stalling velocity and maintain adequate lift to ensure straight and level flight? **6**

Q.4 a) Describe the operation of jet engine components starting from the entry of air till the exhaust of the combustion gases from the jet nozzle and explain the generation of thrust. **10**

b) What methods are used to ensure positive feed of liquid propellants to the combustion chamber? Explain with the help of schematic diagrams showing the principle of operation of each type of feed system. **10**

PART-B

Q.5 a) What do you understand by tension, compression, shear and torsion loads? Discuss which parts of an aircraft take up these types of loads when the aircraft is either flying or is on ground. **10**

b) Define load factor. Discuss the V-n diagram of an aircraft. Why do we call it as flight envelope? **10**

- Q.6 a) Explain, with the help of a block diagram, how the pitot-static system provides ram pressure and static pressure for the operation of the basic flight instruments. **10**
b) Explain, with the help of a suitable diagrammatical representation of ILS, how its different components function to accomplish safe landing of aircraft. **10**
- Q.7 a) Explain, with the help of suitable sketches, the working of the following components of hydraulic system:
i) Pressure relief valve.
ii) Selector valve. **5x2**
b) Draw a pneumatic system showing use of compressor air for different purposes. **10**

End Semester Examination, May 2016

B. Tech. – Third Semester

ELEMENTS OF AERONAUTICAL ENGINEERING (AE-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 **any five** of the following:

- a) Define aerospace vehicle and list out various types of aerospace vehicles.
- b) As the elevators are used for pitching control of an airplane, how such a control is achieved in case of a tailless airplane. Draw suitable sketch to explain.
- c) Plot typical pressure distribution on an airfoil in a subsonic flow at low angle of attack. Show the changes that can take place when the angle of attack is increased.
- d) What do you understand by a hybrid propellant rocket engine?
- e) Define load factor. What are the implications of load factor?
- f) What do you understand by magnetic bearing of a station as seen from a flying aircraft?
- g) What is the purpose of a relief valve in a hydraulic system and how does it function? Explain with the help of a diagram.

4x5

PART-A

- Q.2** a) Describe the salient features of a space vehicle and a V/STOL aircraft. How is the V/STOL capability achieved? **12**
- b) List out the differentiating features of a transport aircraft, a fighter aircraft, a helicopter, and a spacecraft. **8**
- Q.3** a) What are the main sources of drag? What is induced drag? How do finite wings generate induced drag? **10**
- b) What are the conditions of static longitudinal, lateral and directional stability? Draw typical pitching moment curves in case of any one type of stability. How are stability and maneuverability related? **10**
- Q.4** a) Describe the function of a propeller. What is pitch of a propeller? What are fixed pitch and variable pitch propellers? **10**
- b) Describe the features and functions of ramjet engine, pulse jet engine and rocket engines of solid propellant and liquid propellant type. **10**

PART-B

- Q.5** a) Describe the type of loads that different parts of an aircraft are subjected to. **6**
- b) What are the major structural parts of an aircraft? Describe briefly the function of each part. **6**
- c) What are the different types of landing gears? What are the commonly used undercarriage arrangements? Explain with suitable illustration of each type and indicate example of the aircraft where such arrangements are used. **8**
- Q.6** a) Describe ADF navigation system with the help of a block diagram. How does ADF differ from VOR? **10**
- b) Describe instrument landing system with the help of a schematic diagram. **10**
- Q.7** a) What is a hydraulic system? Explain a basic hydraulic system of an aircraft highlighting the concept of open centre and closed centre hydraulic systems. **10**

b) Name some essential services which are operated during the landing of the aircraft.

5

c) What is a hydraulic actuator? What are the different types of hydraulic actuators?

5

End Semester Examination, May 2016

B. Tech. – Fourth Semester
AERODYNAMICS-I (AE-401)

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 **any five** of the following:

- a) Explain the characteristics of an Airfoil and methods of nomenclature.
- b) Write a short note on Kutta condition.
- c) Explain the flow around sphere and the concept of relieving effect.
- d) Write a short note on vortex panel numerical methods.
- e) Explain the reason and concept of boundary layer separation.
- f) Write a short note on different types of flaps and its effect.

4x5

PART-A

Q.2 Derive and explain the concept of dynamic similarity with the help of dimensional analysis.Explain the details of dynamic similarity. **20**

Q.3 a) Write a short note on Velocity Potential and Stream Function. **6**
b) Explain the detailed concept of Kelvin circulation theorem and starting vortex. Explain with the help of a diagram. **14**

Q.4 a) Explain the phenomena of downwash.
b) What is vortex filament and how it helps to simplify the concepts of aerodynamics?
c) Derive an expression for induced velocity by a vortex filament using the Biot-savart law. Also mention the assumptions used.
d) Explain the concept and conclusion of Helmholtz theorem. **5x4**

PART-B

Q.5 Explain in details the method of numerical non-linear lifting-line. Explain the method and steps to calculate circulation over an airfoil using it. **20**

Q.6 a) Explain the concept and physical significance of displacement thickness and momentum thickness. **8**
b) Derive the boundary layer equation. Explain its concept and assumptions in detail. **12**

Q.7 a) Explain the methods of preventions of boundary layer separation over a wing and its limitations with the help of diagrams. **10**
b) Explain the methods of reduction of skin friction drag, form drag and induced drag in detail. **10**

End Semester Examination, May 2016

B. Tech. – Fourth Semester

AIRCRAFT STRUCTURES-I (AE-402A)

Time: 3 hrs

Max Marks: **100**

No. of pages: **2**

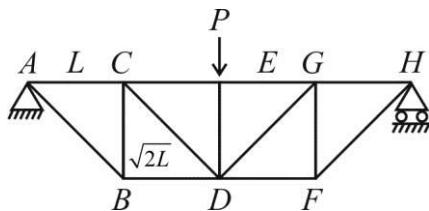
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B.** Each question carries equal marks.

- Q.1 a) What are frames and bulkheads in aircraft structures?
b) Define determinate structures.
c) Explain the role of longerons and stressed skin structure in fuselage design.
d) State the principle of St. Venant.
e) Define factor of safety.
f) Define strain energy.
g) Draw stress Vs strain curve for true stress and engineering stress.
h) What do you mean by shear flow?
i) Explain briefly, the stress-strain relationship.
j) Explain Rayleigh Ritz technique. **2x10**

PART-A

- Q.2 a) Find the deflection curve for end point loaded cantilever beam. **12**
b) Derive the relation between force/length(q), moment(M) shear force(V) for a static structure. **8**
- Q.3 a) At a particular point in a structural member a two-dimensional stress system exists where $\sigma_x=60 \text{ N/mm}^2$, $\sigma_y=-40 \text{ N/mm}^2$ and $\tau_{xy}=50 \text{ N/mm}^2$. If young's modulus $E=200\,000 \text{ N/mm}^2$ and Poisson's ratio $\nu=0.3$ calculate the direct strain in the x and y directions and the shear strain at the point. **10**
b) A rectangular element in a linearly elastic isotropic material is subjected to tensile stresses of 83 and 65 N/mm^2 on mutually perpendicular planes. Determine the strain in the direction of each stress and in the direction perpendicular to both stresses. Find also the principal strains, the maximum shear stress, the maximum shear strain and their directions at the point. Take $E=200\,000 \text{ N/mm}^2$ and $\nu=0.3$. **10**

- Q.4 For the truss shown below, calculate the forces in all bars using method of joints. All horizontal and vertical length being L . Take modules of elasticity as E and cross-section areas as A .

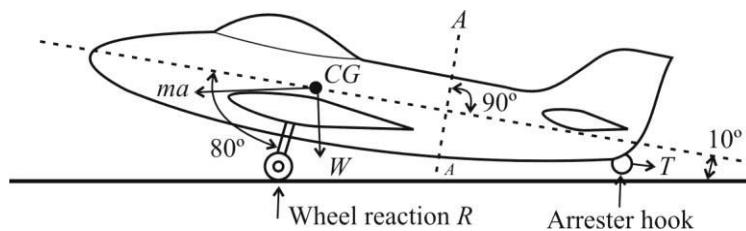


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PART-B

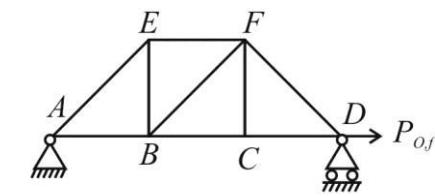
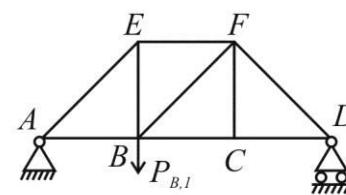
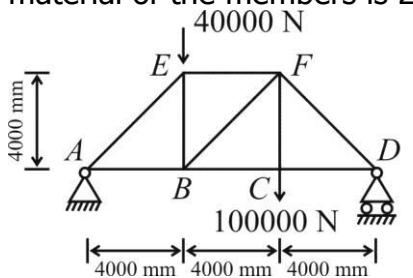
- Q.5 An aircraft having a total weight of 45 kN lands on the deck of an aircraft carrier and is brought to rest by means of a cable engaged by an arrester hook, as shown in the figure. If the deceleration induced by the cable is $3g$ determine the tension, T , in the

cable, the load on an undercarriage strut and the shear and axial loads in the fuselage at the section AA; the weight of the aircraft aft of AA is 4.5 kN. Calculate also the length of deck covered by the aircraft before it is brought to rest if the touch-down speed is 25 m/s.



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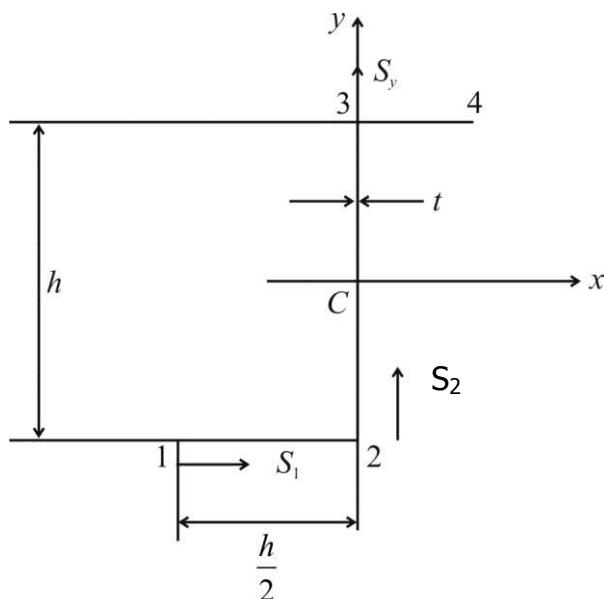
- Q.6 Calculate the vertical deflection of the point B and the horizontal movement of D in the pin-jointed framework shown below by using complementary energy method; All members are linearly elastic and have cross-sectional areas of 1800mm^2 . E for the material of the members is $200,000\text{N/mm}^2$.



20

- Q.7 a) What is shear centre? Where would the shear centres of channel section, T-section and L-section beam lie?
b) Determine the shear flow distribution in the thin walled Z-section shown in the figure below due to shear load S_y applied through the shear centre of the section.
Given:

$$q_s = \left(\frac{S_x I_{xx} - S_y I_{xy}}{I_{xx} I_{yy} - I_{xy}^2} \right) \int_0^s t x ds - \left(\frac{S_y I_{yy} - S_x I_{xy}}{I_{xx} I_{yy} - I_{xy}^2} \right) \int_0^s t y ds$$



12

End Semester Examination, May 2016

B. Tech. – Fourth Semester

AIRCRAFT PROPULSION-I (AE-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**. Each question carries equal marks.

- Q.1 a) Draw a sketch of mixed-exhaust turbofan engine.
 b) Define bypass ratio.
 c) What do you mean by propulsive efficiency?
 d) What happens to power developed by an engine as altitude increases?
 e) What is compressible flow?
 f) What does isentropic flow mean?
 g) How does shock occur?
 h) Define stagnation pressure.
 i) Briefly explain the concept of blade element theory.
 j) What are scramjet engines? **2x10**

PART-A

- Q.2 a) Explain 4-stroke engine cycle in detail with a P-V diagram. **10**
 b) Derive the expression for efficiency of diesel cycle. **10**
- Q.3 a) Write a note on turbojet engine with descriptive diagram highlight the flight velocity for which such an engine can be effectively used and mention, its application in aerospace industry. **10**
 b) Inlet flow conditions for an engine are $T_1 = 25^\circ C$, $u_1 = 150 m/sec$, $Cp_1 = 1004 J / Kg.K$, $\gamma_1 = 1.4$. Find total temperature at the given conditions. Again if 42 MW of heat is added to the system then find total temperature of exit flow. **10**
- Q.4 a) Air is compressed isentropically from $P_1 = 100 KPa$, $T_1 = 150^\circ C$, to $P_2 = 1 MPa$, Calculate T_2 and ρ_2 . Take $\gamma = 1.4$, $R = 287 J / Kg.K$, and gas is calorically perfect. **10**
 b) Write area Mach Number relation. Explain its application for subsonic diffuser and nozzle. **5**
 c) Draw P_2/P_1 curve for normal shock. **5**

PART-B

- Q.5 a) Write expression for $F_n|_{\text{uninstalled}}$ for turbofan engine. Explain each term. **6**
 b) What are thermal efficiency and approximate take off thrust? **4**
 c) Consider turbojet engine in take off condition with following parameters:-
 $m_o = 100 kg/s$, $v_0 = 0 m/sec$, $m_t = 2 kg/s$, $Q_R = 42000 Kj/kg$, $v_g = 900 m/s$. Find thermal efficiency and thrust at take off. **10**
- Q.6 a) What is a gas generator? Write a note on inlet of a gas turbine engine. **10**
 b) An aircraft is flying at an altitude where ambient static pressure is $P_0 = 10 kPa$ and the flight Mach no. is $M_0 = 0.85$. Total pressure at the engine face is measured to be $P_{t2} = 15.88 kPa$. Assuming adiabatic inlet and $\gamma = 1.4$. Find:
 i) Total pressure recovery π_d i.e P_{t2} / P_{t0}
 ii) Inlet adiabatic efficiency, η_d . **10**

- Q.7** a) Explain ideal momentum theory for turboprop engine and airscrew coefficient. **10**
 b) Write a note on Ramjet engine and ideal ramjet cycle. **10**

End Semester Examination, May 2016

B. Tech. – Third / Fourth Semester

AIRCRAFT MATERIALS (AE-404)

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 Passivating and Carburizing.
- b) Draw stress-strain diagram for steel and show elastic and plastic regions.
- c) What are the cost determining factors for aircraft industries?
- d) Draw binary-phase diagram for aluminium-copper.
- e) What are the allotropes of iron?
- f) Classify and explain wrought aluminium alloys.
- g) What is the specific gravity of magnesium alloy compared to aluminium and steel?
- h) What is inconel?
- i) What is anisotropic elasticity?
- j) What are different types of welding methods? **2×10**

PART-A

- Q.2** a) Explain reasons for temperature variation experienced by aircraft over its body during flight. **10**
- b) Explain general degradation mechanism (physical event or chain of event) for aircraft materials. **10**
- Q.3** a) Explain Iron-carbon binary diagram with phase change occurring at different temperatures. **10**
- b) Explain different types of fatigue loading with real life examples. **10**
- Q.4** a) i) What are spot welding and electric arc welding? **5**
ii) What will be S.A.E steel numbering system for manganese steel? **5**
- b) i) Define galvanic corrosion and pitting corrosion. **5**
ii) How does corrosion of dissimilar metals occur? **5**

PART-B

- Q.5** a) How does corrosion of aluminium occur? **6**
- b) Write a note on magnesium alloys and their application. **6**
- c) How are extrusion processes of aluminium alloys for shapes like Z, T sections etc. carried out? Explain briefly. **8**
- Q.6** a) Write a note on monel and its metallurgical processes. **8**
- b) What is muntz metal and how its strength can be increased? **8**
- c) What do you understand by refractory materials? **4**
- Q.7** a) How do composite materials differ from metal alloys? **6**
- b) What is anisotropic lamina? **6**
- c) What are the functions of a reinforcing agent? **8**

End Semester Examination, May 2016

B. Tech. - Fifth Semester
AERODYNAMICS-II (AE-501)

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 **any five** of the following questions:

- a) Plot schematics of spanwise pressure coefficient distribution across a delta wing (i) when it is without the leading-edge vortex flaps, and (ii) when it is modified by the leading edge vortex flaps.
- b) How does flying a delta wing aircraft at high angle of attack and at low speed help to maintain the desired lift instead of stalling?
- c) Explain briefly the phenomenon of intersection of two left-running shock waves.
- d) What do you understand by strength of an oblique shock wave? What is the strength of a Mach wave?
- e) Explain briefly Whitcomb's area rule.
- f) With the help of C_p distributions, explain the usefulness of a supercritical airfoil over any other airfoil.

4x5

PART A

Q.2 a) What is Zhukovsky transformation? Show that when the transformation $\xi = z^2$ is applied to a field of uniform flow parallel to the OY axis, the transformed streamlines are parabolas about the $O\xi$ axis. Plot any transformed streamline. **12**

b) Define conformal transformation. For the transformation $\xi = z + b^2 / z$, where b is a constant, find out the length ratio. **8**

Q.3 a) Sketch various versions of delta wing planforms. Draw a schematic of the real subsonic flow field over the top of a slender delta wing at certain angle of attack.
10

b) Explain the essential features of Pohlhamus leading edge suction analogy. **10**

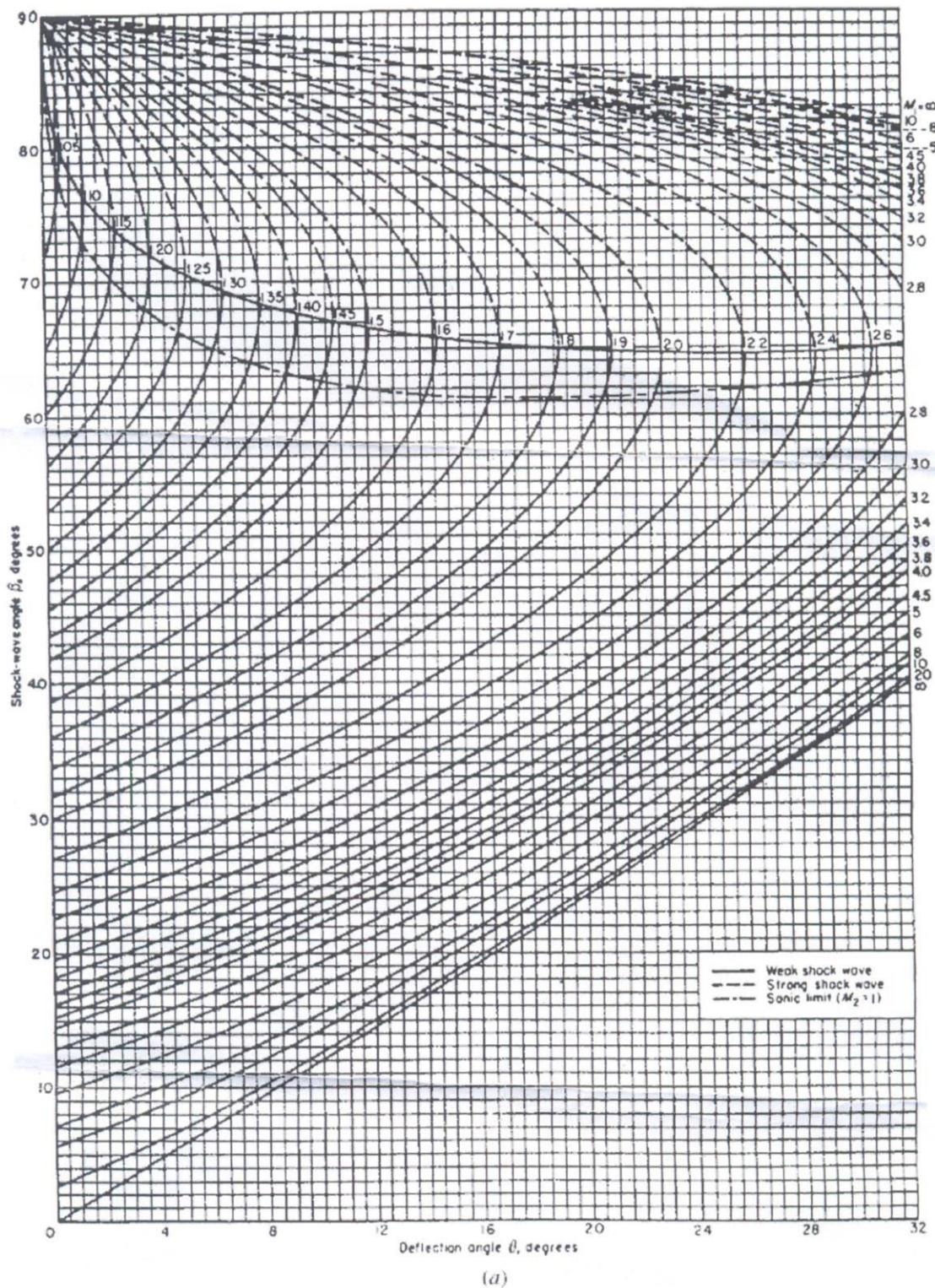
Q.4 a) Derive Rankine-Hugoniot relation for pressure ratio in terms of density ratio across a normal shock. Compare this with the relationship between pressure ratio with density ratio for an isentropic flow. **12**

b) A gas ($\gamma = 1.4$, $R = 0.287 \text{ kJ/kg K}$) at a Mach number of 1.8, $p=0.8 \text{ atm}$ and $T=373 \text{ K}$ passes through a normal shock. Determine its density after the shock. Compare this value in an isentropic compression through the same pressure ratio.

8

PART B

Q.5 Consider an oblique shock generated at a compression corner with a deflection angle $\theta = 18.2^\circ$. A straight horizontal wall is present above the corner. If the upstream flow has the properties $M_1 = 3.2$, $P_1 = 1 \text{ atm}$, and $T_1 = 288 \text{ K}$, calculate M_3 , P_3 , and T_3 behind the reflected shock from the upper wall. Also obtain the angle ϕ , which the reflected shock makes with the upper wall. Use $\theta - \beta - M$ graph.



(a)

20

- Q.6 a) Derive the linearized velocity potential equation for a two-dimensional, irrotational, isentropic flow over a body immersed in a uniform flow and work out the perturbation velocity potential equation for small perturbations at subsonic and supersonic Mach numbers. **15**
- b) Under low-speed incompressible flow conditions, the pressure coefficient at a given point on an airfoil is -0.54. Calculate C_p at this point when the freestream Mach number is 0.7, using the Prandtl-Glauert rule. **5**
- Q.7 a) Differentiate between the internal and external points referred while using the method of characteristics. **5**
- b) Considering the compatibility relations along C- and C+ characteristics and starting from points where flow properties are known, discuss the steps of the method of characteristics used to obtain

the flow properties at downstream points for a two-dimensional, inviscid, steady flow.

15

End Semester Examination, May 2016

B. Tech. – Fifth Semester

AIRCRAFT PROPULSION-II (AE-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.** Each question carries equal marks.

Q.1 Briefly explain the following:

- Define compressibility of a fluid using control volume approach.
- Determine the speed of sound in Neon gas (Ne) at 100°C. ($MW = 20.2\text{kg/kmol}$).
- What is the reason behind using axial flow compressors in aircrafts?
- What is slip factor of a centrifugal compressor?
- What is specific thrust?
- What is propulsive efficiency?
- What are momentum thrust and pressure thrust of a propulsive duct?
- Why is power input factor included and how is it denoted?
- Write the dependency of slip factor on number of vanes.
- What are the benefits of using axial flow compressor over centrifugal flow compressor?

2x10

PART-A

Q.2 The following data apply to a twin-spool turbofan engine, with the fan driven by the LP turbine and the compressor by the HP turbine. Separate cold and hot nozzles are used.

Overall pressure ratio= 25.0

Fan pressure ratio= 1.65

Bypass ratio $m_c/m_h=5.0$

Turbine inlet temperature=1550 K

Fan, compressor and turbine polytropic efficiency=0.90

Isentropic efficiency of each propelling nozzle=0.95

Mechanical efficiency of each spool=0.99

Combustion pressure loss=1.50 bar

Total air mass flow= 215 kg/s

It is required to find the thrust under sea level static conditions where the ambient pressure and temperature are 1.0 bar and 288 K.

20

Q.3 a) Describe the parts of centrifugal compressor and explain its working. Also draw a labelled diagram.

10

b) What are the two types of thrust augmentation methods? Explain with diagrams.

10

Q.4 a) What are the different types of combustion chambers used in gas turbine engines? Explain their features with the help of suitable diagram.

12

b) Write the summary points of qualitative results of series of calculations for optimization of turbofan engine.

8

PART-B

Q.5 The following data are suggested as a basis for the design of a single-sided centrifugal compressor:

Power input factor $\psi = 1.04$

Slip factor = 0.9

Rotational speed N = 290 rev/s

Overall diameter of impeller = 0.5 m

Eye tip diameter = 0.3 m
Eye root diameter = 0.15 m
Air mass flow $m = 9 \text{ kg/s}$

Inlet stagnation temperature $T_{01} = 295 \text{ K}$
Inlet stagnation pressure $p_{01} = 1.1 \text{ bar}$
Isentropic efficiency $\eta_c = 0.78$

Determine the pressure ratio of the compressor and the power required to drive it assuming that the velocity of the air at inlet is axial and calculate the inlet angle of the impeller vanes at the root and tip radii of the eye, assuming that the axial inlet velocity is constant across the eye annulus.

20

Q.6 a) Draw and explain the typical components of a turbojet engine.

10

b) Write the important factors affecting combustor design.

10

Q.7 a) What are the performance criteria for a propulsive duct?

10

b) Derive an expression for stagnation temperature rise in a stage of axial flow compressor.

10

End Semester Examination, May 2016

B. Tech. – Fifth / Sixth Semester

AIRCRAFT STRUCTURES-II (AE-503A)

Time: 3 hrs

Max Marks: **100**

No. of pages: **3**

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.

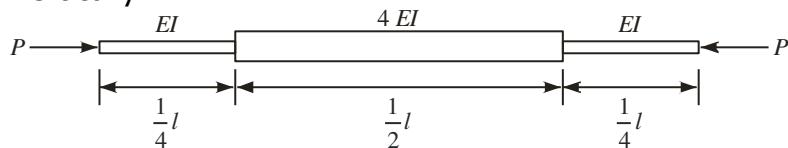
Q.1 Briefly answer:

- What types of columns are designed to prevent material elastic failure?
- Define slenderness ratio.
- State the principle of stationary value of the total complementary energy.
- Define aeroelasticity.
- Define Buckling.
- What are the basic functions of an aircraft's structure?
- Derive the stiffness matrix for an elastic spring.
- What are the implications of structural idealization?
- Define Margin of Safety.
- Why bolt holes are always slightly larger than the bolt diameter?

2×10

PART-A

Q.2 The system shown in fig.2.a consists of two bars *AB* and *BC*, each of bending stiffness EI elastically hinged together at *B* by a spring of stiffness K (i.e. bending moment applied by spring = $K \times$ change in slope across *B*). Regarding *A* and *C* as simple pin-joints, obtain an equation for the first buckling load of the system. What are the lowest buckling loads when a) $K \rightarrow \infty$, b) $EI \rightarrow \infty$. Note that *B* is free to move vertically.

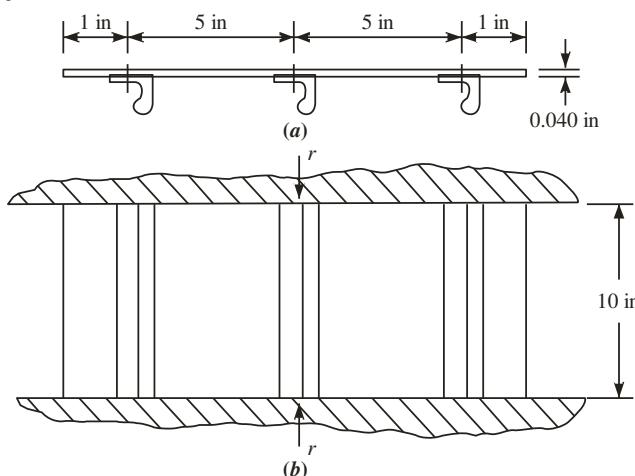


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Q.3 The sheet stringer panel shown in figure below is loaded in compression by means of rigid members. The sheet is assumed to be simply supported at the loaded ends and at the rivet lines and to be free at the sides. Each stringer has an area of 0.1m^2 . Assume $E=10,300,000\text{lb/in}^2$ for the sheet and stringers. Find the total compressive load P :

- When sheet buckles first.
- When the stringer stress σ_c is $15,000 \text{ lb/in}^2$
- When the stringer stress σ_c is $35,000 \text{ lb/in}^2$

$K = 3.62$ (given)



16/4

- Q.4 An initially untwisted rectangular wing of semi-span 's' and chord 'c' has its flexural axis normal to the plane symmetry, and is of constant cross-section with torsional rigidity GJ . The aerodynamic centre ec ahead of the flexural axis, the lift-coefficient slope is ' a ' and the pitching moment coefficient at zero lift is $C_{m,0}$. At speed V in the air density ρ , the wing root incidence from the zero lift line is α_0 .

Using simple strip theory i.e. ignoring downwash effects, show that the incidence at a section distant y from the plane of symmetry is given by –

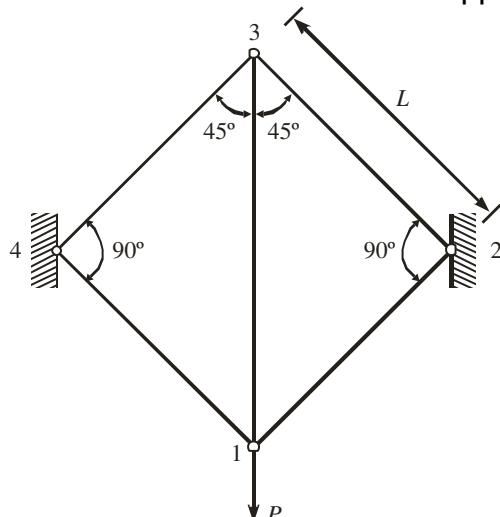
$$\alpha_0 + \theta \left(\frac{C_{m,0}}{ea} + \alpha_0 \right) \frac{\cos \lambda(s-y)}{\cos \lambda s} - \frac{C_{m,0}}{ea}$$

where $\lambda^2 = \frac{ea}{2} \frac{1}{GJ} \rho V^2 c^2$

Hence, assuming $C_{m,0}$ to be negative, find the condition giving the speed at which the lift would be reduced to zero 20

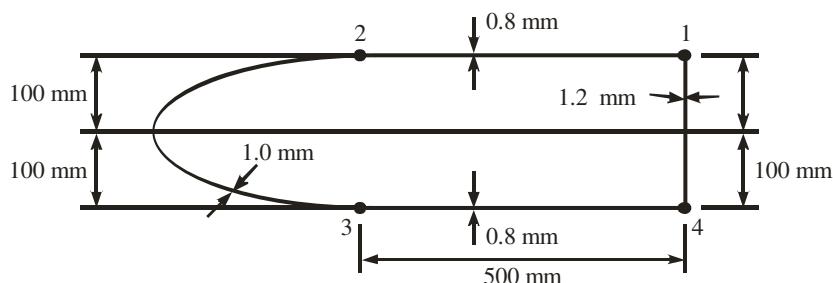
PART-B

- Q.5 Figure below shows a square symmetrical pin-jointed truss 1234, pinned to rigid supports at 2 and 4 and loaded with a vertical load at 1. The axial rigidity EA is same for all the members. Use the stiffness method to find the displacements at nodes 1 and 3 hence solve for all the internal member forces and support reactions.



- Q.6 Figure below shows the cross-section of a single cell, thin walled beam with a horizontal axis of symmetry. The direct stresses are carried by the booms B_1 to B_4 , while the walls are effective only for carrying shear stresses. Assuming that the basic theory of bending is applicable, calculate the position of shear centre S . The shear modulus G is same for all walls.

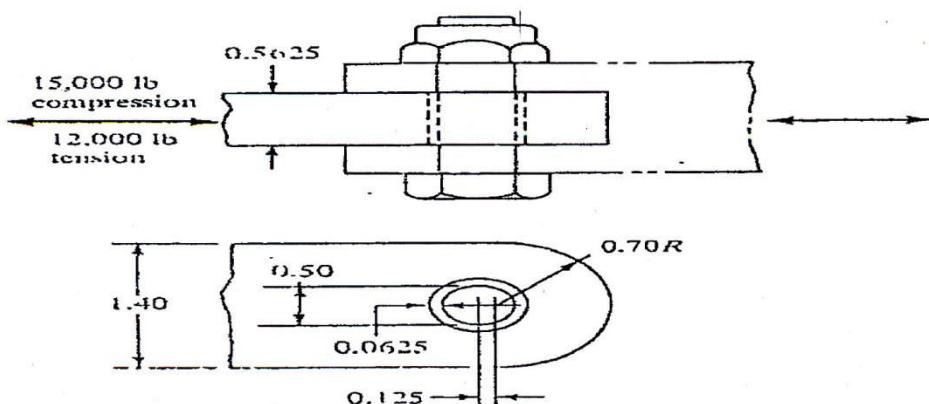
Cell area = 135000 mm^2 . Boom areas : $B_1 = B_4 = 45 \text{ mm}^2$, $B_2 = B_3 = 550 \text{ mm}^2$.



Wall	Length (mm)	Thickness (mm)
12, 34	500	0.8
23	580	1.0
41	200	1.2

20

- Q.7 The fitting shown in figure 7.a is made of a 2014 aluminium forging, for which $\sigma_{at} = 65000$, $\tau_a = 39000$ and $\sigma_{abr} = 98000 \text{ lb/in}^2$. The bolt and bushing are made of steel for which $\sigma_{at} = 125000$, $\tau_a = 75000$ and $\sigma_{abr} = 175000 \text{ lb/in}^2$. The fitting resists limit or applied loads of 15000-lb compression and 12000-lb tension. A fitting factor of 1.2 and a bearing factor of 2.0 are used. Find the margins of safety for the fitting for various types of failure.



20

End Semester Examination, May 2016

B. Tech. – Fifth Semester

FLIGHT MECHANICS-I (AE-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 **any ten** of the following questions:

- a) Explain the importance of hydrostatic equation in aerodynamics? How does it play an important role?
- b) What is the physical significance of geometric and geopotential altitudes?
- c) Write a short note on turn and bank indicator?
- d) Write a short note on altimeter?
- e) How do the laminar and turbulent flows affect the drag? Explain the effect for pressure and skin friction drag.
- f) Explain with the help of a graph why the flight path angle and maximum rate of climb cannot be achieved at the same time in a flight.
- g) What are absolute ceiling and service ceiling?
- h) Illustrate the devices used for reducing the induced drag.
- i) If the L/D_{max} for a glider is 13.6, find the minimum glide angle.
- j) What is the condition (in terms of C_L and C_D) for the maximum endurance and range for a propeller driven aircraft?

2×10

PART-A

Q.2 Calculate the standard atmosphere values of T , p and ρ at geopotential altitude of 7 km. Find the altitude for which the aircraft could achieve same Mach number with same velocity.

Note: p, ρ and T at sea level can be taken as $1.01 \times 10^5 \text{ N/m}^2$, $\rho = 1.23 \text{ kg/m}^3$ and $T = 216.66 \text{ K}$, $g = 9.81$, $R = 287$.

20

Q.3 a) What is the IAS and how it is measured? **6**
b) Define CAS, EAS, TAS. **6**
c) What is the headwind and crosswind component of the wind blowing at a speed of 300 km/hr at angle of 3° from the direction of flight of airplane? **8**

Q.4 a) Explain the difference between finite and infinite wing.
b) How does compressibility affect the Mach number and drag of an aircraft?
c) Explain the drag polar for an airfoil and how it is different from the drag polar of aircraft?
d) Explain airfoil terminology? How does it explain the drag of an aircraft?
e) Explain Load factor and V-n Diagram. **5×4**

PART-B

Q.5 a) Illustrate the various leading and trailing edge high lift devices. Explain how these affect the max lift coefficient. **12**
b) Explain the advantages of sweep back aircraft? **8**

- Q.6 A twin jet aircraft has a wing area of 47 m^2 , aspect ratio of 6.5 and Oswald efficiency factor of 0.87. It weighs 103047 N and its zero lift drag coefficient is 0.032. It is equipped with two jet engines with 40298 N static thrust each at sea-level. Calculate and plot the power required curve for S/L and find the approximate velocity for minimum power required.

Note: Read the question properly and solve wisely

20

- Q.7 Estimate the take-off distance for a jet aircraft weighing 62832N, at sea level. It has a wing area=27.64 sq m, parasite drag co-efficient=0.022, coefficient of rolling friction=0.02. Consider that there is no skidding of wheel over the ground to alter the friction. Height of the wing is 8m from the ground. Thrust is provided by the jet engine of 38492N when the wings are providing 48534N lift on average. The maximum lift coefficient with flaps fully deployed at runway, is 2.5.

20

End Semester Examination, May 2016

B. Tech. – Fifth / Sixth Semester

AIRCRAFT SYSTEMS (AE-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**. Each question carries equal marks.

- Q.1 a) Differentiate between the primary and secondary flight controls.
b) What is the difference between normal and powered hydraulic systems?
c) How anti-skid system works?
d) Describe the ionization type smoke detectors.
e) Explain briefly, how the humidity is controlled in an aircraft. **4x5**

PART-A

- Q.2 a) Explain the fly by wire and fly by light systems. **10**
b) Explain the mechanical control linkage used in an aircraft with suitable diagrams. **10**
- Q.3 a) What do you understand by skidding and explain how it can be avoided? **10**
b) Explain the steering system used in aircraft for both the nose wheel and main wheels. **10**
- Q.4 a) Explain the fuelling and defueling of aircraft and safety precautions to be observed during this procedure. **10**
b) Explain the types of fuels used and fuel system requirements and precautions to avoid contamination. **10**

PART-B

- Q.5 a) Describe the air-cycle cooling system and vapor cycle cooling system of an aircraft. **10**
b) Describe the water separator system and temperature control system used in the aircraft. **10**
- Q.6 a) Explain the aircraft oxygen system that is provided for supply of oxygen to the human passengers. Explain the function of each component of this system. **10**
b) Describe the engine oxygen system and conditions under which it is used. **10**
- Q.7 a) Explain the dangers of in-flight icing. **5**
b) Describe the pneumatic deicer system. **10**
c) How is windshield protected from icing? **5**

End Semester Examination, May 2016

B. Tech. – Sixth Semester

FLIGHT MECHANICS-II (AE-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.** Each question carries equal marks.

Q.1 Answer **any five** of the following:

- a) What is the effect of power and thrust over the longitudinal stability?
- b) Write a short note on Frise aileron.
- c) Explain the detailed concept of trim condition.
- d) Explain the effect and solution of adverse yaw and anti symmetric power.
- e) Explain how directional and lateral stability and maneuvering affect each other.
- f) Explain the difference between body axis and wind axis.

4×5

PART-A

- Q.2 a) Explain the two conditions for the aircraft's static longitudinal stability. **4**
- b) Derive and explain the tail contribution. Explain how elevator power and deflection control affect it. **16**
- Q.3 a) Explain the details of hinge moment parameters with the help of graphs and expressions. **8**
- b) Explain the concept of Floating and Restoring Tendencies. **6**
- c) Write a short note on aerodynamic balancing. **6**
- Q.4 a) Explain the limits of an aircraft's center of gravity for static longitudinal stability. Also show and explain the effect of ground, power and maneuvering over it. **5**
- b) Derive an expression for stick-free neutral point for a static longitudinal stability. Also explain how it differs from the stick fixed neutral point. **15**

PART-B

- Q.5 a) Explain the static directional stability with the help of C_n vs ψ graph. **4**
- b) Derive an expression for vertical tail contribution of stick free directional stability. Explain how pedal force gradient is related to stick free directional stability. Derive an expression for pedal force gradient. **16**
- Q.6 a) Explain the static lateral stability with the help of C_l vs ψ graph. **4**
- b) Derive and explain aileron control forces? Explain why it cannot be used for practical purpose? **16**
- Q.7 Derive the equation of longitudinal motion with the help of general equation of motion for an aircraft. **20**

End Semester Examination, May 2016

B. Tech. – Sixth Semester
AIRCRAFT DESIGN (AE-604)

Time: 3 hrs

Max Marks: **100**

No. of pages: **3**

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 is fuel fraction estimate and give its equation for a simple commercial passenger aircraft?
 b) What are the various types of high lift devices that can be used on an aircraft? Explain configuration of each type.
 c) What are the different types of engines used in aircraft? How are they housed in aircraft?
 d) Draw the diagram of Tail dragger configuration with necessary terms.
 e) Give the various stages in aircraft flight for a commercial aircraft and a combat aircraft.
 f) Describe the various terms in airfoil geometry with a diagram.
 g) What all forces act on a wing in flight? Draw the BM and SF diagrams for a straight wing.
 h) On which principle does the oleo shock absorber work and how?
 i) Give the Schrenk's approximation for span-wise load on an elliptical and rectangular wing?
 j) Determine the stroke length of an oleo shock absorber:
 Efficiency of tire = 0.52; efficiency of oleo = 0.7; $N_{gear} = 2.8$; vertical velocity = 10 ft/s; dia. of tire = 30 inches; rolling dia. of tire = 19 inches. **2x10**

PART-A

- Q.2 a) Draw the flight envelope for a supersonic aircraft and explain it properly. **5**
 b) What are the basic classifications used for an aircraft? Describe them in detail. **5**
 c) Explain in brief:
 i) Configurations of aircraft.
 ii) Break-even point in terms of economic operation of aircraft.
 iii) Airfield Requirements.
 iv) Operating Criteria for an aircraft. **2½x4**
- Q.3 a) Calculate the weight fractions for a passenger aircraft with following input parameters:

Input Parameter	Value (F.P.S unit)
Cruise Mach Number	2.1
Max. Mach Number	2.1
Cruise Altitude	55000 ft.
Operating Radius	2000 nautical miles
Engine TSFC (min)	0.9
Engine TSFC (max)	2.17
Thrust	108.540 lbs
Aspect ratio	2
Combat time	0 min.
Combat Altitude	30,000 ft.
Loiter time	10 min.

Loiter altitude	0 ft.
Structural Factor	0.5
Payload (non-expendable)	4000 lbs.
Payload (expendable)	0 lbs

Atmospheric conditions at 55000 ft: pressure = $243 \text{ lb} / \text{ft}^2$; Temperature= 389.95 Rankine Density = $0.011706 \text{ lb} / (\text{ft}^3)$; Speed of sound = $968.0757 \text{ ft} / \text{s}$; Viscosity = $9.5528 \times 10^{-6} \text{ lb} / (\text{ft} \cdot \text{s})$. 13

- b) Write note on:
- i) BM and SF diagram for an elliptic and rectangular wing. How will the diagram change if wing-tips are added to rectangular wing?
 - ii) Which are the different types of flaps? How does using flaps help in lift augmentation? Explain with a graphs and diagrams.
 - iii) Draw the design wheel and design flow-chart. 7

- Q.4 a) Draw the critical load diagram for L1011. Also give the load table mentioning all the loads acting on an aircraft. 6
- b) Explain Maneuver Loads and Gust Loads. Draw the individual V-n diagram and combined one and explain it. 10
- c) Define: 'load' and 'load factor'. How does load factor affect a/c design? 4

PART-B

- Q.5 a) Which are the factors that influence the volume considerations in fuselage design? Describe each in detail. Explain how cockpit designing is done. 10
- b) Describe how fineness ratio affects fuselage shape. Briefly describe about the various fuselage shapes. Derive equation to calculate the drag over fuselage for subsonic commercial aircraft. 10

- Q.6 a) Describe a simple type of oleo shock absorber arrangement. Explain why oleo performance is better than other shock absorber arrangements. Show how landing gear stroke length is independent of aircraft weight. 8
- b) Explain vertical tail, horizontal tail and canard sizing respectively. Discuss about how spin recovery is done using tail surfaces with p-effect. 6
- c) Discuss the various types of landing gear arrangements with diagrams. Compare bicycle and tail dragger arrangements in details. 6

- Q.7 a) Design a wing for a passenger aircraft with following inputs and determine various design parameters:
(Atmospheric data and remaining necessary parameters is given below:
Atmospheric conditions at 55000 ft: pressure = $243 \text{ lb} / \text{ft}^2$; Temperature= 389.95 Rankine Density = $0.011706 \text{ lb} / (\text{ft}^3)$; Speed of sound = $968.0757 \text{ ft} / \text{s}$; Viscosity = $9.5528 \times 10^{-6} \text{ lb} / (\text{ft} \cdot \text{s})$.)
- i) Wing Area = 200 ft^2 .
 - ii) Weight at start of Cruise = 15,300 lbs.
 - iii) Weight at end of Cruise = 11,500 lbs.
 - iv) Airfoil used= NACA 4412.
 - v) Aspect Ratio = 6.
 - vi) Taper Ratio = 0.
 - vii) $(t/c)_{\max} = 0.40$. 10

b) Design a fuselage for the passenger aircraft with following inputs and determine its various design parameters:

(Atmospheric data and remaining necessary parameters is given below:

Atmospheric conditions at 55000 ft: pressure = $243 \text{ lb} / \text{ft}^2$; Temperature= 389.95

Rankine Density = $0.011706 \text{ lb} / (\text{ft}^3)$; Speed of sound = $968.0757 \text{ ft} / \text{s}$; Viscosity = $9.5528 \times 10^{-6} \text{ lb} / (\text{ft} \cdot \text{s})$.)

- i) $D/L = 0.09$.
- ii) Diameter = 9 ft.
- iii) $Q = 1$; $F = 1.06$.
- iv) $\nu = 0.00020132 \text{ ft}^2/\text{s}$.

Use Von Kraman Ogive for fuselage design.

10

End Semester Examination, May 2016

B. Tech. – Sixth Semester

VIBRATIONS AND AEROELASTICITY (AE-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) Define forced vibration.
 b) A vibratory system has amplitude of $10X_0$, where X_0 is reference amplitude. Express above quantity in decibel (dB).
 c) What type of damping acts when a vibratory system slides on dry surface?
 d) Write dynamic equation of torsional pendulum? Find ω_n .
 e) What is the application of Rayleigh Energy Method?
 f) Find longitudinal stiffness of bar/rod.
 g) Give one real life example each of a critically damped system and an under damped system.
 h) What are principal coordinates?
 i) What is divergence?
 j) What is control reversal? **2x10**

PART-A

- Q.2 a) An unknown mass m kg attached to the end of an unknown spring k has natural frequency of 94 cpm (cycle per minute). When a 0.453 kg mass is added to m , the natural frequency is lowered to 76.7 cpm. Determine the unknown mass m and the spring constant k in N/m. **10**
 b) Give one example each of 1-DoF, 2-DoF, 3-DoF, clearly showing coordinates. **5**
 c) Find equivalent spring constant of two springs in parallel. **5**
- Q.3 a) Derive the response equation for critically damped system with spring-mass-damper. Show vector addition of all these forces. Draw the response curve. **15**
 b) For a spring-mass-damper system, $m=50\text{kg}$ and $k=5000\text{N/m}$. Find damped natural frequency when $C=C_c/2$. **5**
- Q.4 a) Write differential equation for 2-DoF system for free vibration in detail starting with free body diagram. **10**
 b) Find the free-vibration response of 2-DoF system with $k_1=30$, $k_2=5$, $k_3=0$, $m_1=10$, $m_2=1$, and $C_1=C_2=C_3=0$. **10**

PART-B

- Q.5 What is divergence speed? Derive expression for divergence speed. V_d for finite wing. **20**
- Q.6 a) How is flutter speed determined experimentally? **10**
 b) Find the X and Φ of a single-degree-of-freedom system with $m=10\text{kg}$, $c=20\text{N}\cdot\text{s}/\text{m}$, $k=4000\text{N/m}$ under an external force $F(t) = 100\text{N} \cos 10t$. **10**
- Q.7 a) How is buffeting different from flutter? What are different types of flutter phenomena? **10**
 b) What is quality factor and bandwidth? Write expression for Q . **5**
 c) A motor vehicle can vibrate in the vertical direction while traveling over a rough road. The vehicle has a mass of 1200kg. The suspension system has a spring

constant of 400 kN/m and a damping ratio of $\zeta = 0.5$. If the vehicle speed is 20km/hr, determine the displacement amplitude of the vehicle. The road surface varies sinusoidally with an amplitude of $Y = 0.05m$ and a wavelength of 6m. 5

End Semester Examination, May 2016

B. Tech. – Seventh/Eighth Semester

BOUNDARY LAYER THEORY (AE-802)

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 of the following:

- a) What do you understand by the concept of an effective body?
- b) Define the boundary layer thickness.
- c) Define laminar flow.
- d) What do you understand by energy thickness, explain briefly?
- e) What is the objective of theory of stability?
- f) Define parallel flow.
- g) Define turbulent flow.
- h) What determines the scale of turbulence?
- i) How can one design wind tunnels of low turbulence intensity?
- j) Define thermal boundary layer.

2×10

PART-A

Q.2 a) Derive the expression for momentum thickness with the help of appropriate diagrams. **10**
b) Write any three general properties of the boundary layer equation. **10**

Q.3 Using Approximate methods for steady equations explain the rotation near the ground with the help of an appropriate diagram. **20**

Q.4 Explain the Prandtl's mixing length theory for the calculation of turbulent flows. **20**

PART-B

Q.5 Derive Orr-Sommerfeld equation with the help of the method of small perturbation for the principle of the theory of stability of laminar flow. **20**

Q.6 a) Explain any three methods of control for boundary layer with the help of appropriate diagrams. **12**
b) When suction is applied to a wing, what two distinct problems may arise? **8**

Q.7 a) Deduce the relationship between the mean motion and Reynolds stresses caused by the fluctuations. **10**
b) Explain universal velocity distribution law using Von Karman Similarity hypothesis. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

ROCKET PROPULSION (AE-821)

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 answer:

- a) How does Jet Propulsion differ from Rocket Propulsion?
- b) Define specific impulse. What is its unit?
- c) What is Characteristic Velocity? Explain.
- d) Write a few lines about burning rate dependency on pressure.
- e) Define burn time and action time with the help of a diagram.
- f) What is thrust vector control?
- g) What are the reasons for using thrust vector control?
- h) What is inadvertent ignition?
- i) Why does rocket have stages?
- j) What are double based propellants? Write any two of its classifications.

2×10

PART-A

Q.2 a) Write a note on electro-thermal rocket propulsion. **5**
 b) Describe resistojets. **5**
 c) What desired propellant characteristics are kept in mind before selection of a propellant for rocket motor? **10**

Q.3 A rocket projectile has the following characteristics:

Initial Mass=200kg.

Mass after rocket operation=130kg.

Payload, non-propulsive structure, etc.=110kg.

Rocket operating duration=3sec

Average specific impulse of propellant=240sec

Determine the vehicle's mass ratio, propellant mass fraction, propellant flow rate, thrust, thrust-to-weight ratio, acceleration of vehicle, effective exhaust velocity, total impulse, and the impulse-to-weight ratio. **20**

Q.4 a) Write a note on nuclear propulsion. Classify, describe and draw the relevant diagrams of each classification. **10**
 b) Write the differences between solid rocket motor and liquid rocket engine. **10**

PART-B

Q.5 The following requirements are given for a solid propellant rocket motor:

Sea level thrust=2000 lbf average

Duration=10 sec

Chamber pressure=1200 psia

Operating temperature=Ambient temperature (approx. 70°F)

Propellant=Ammonium nitrate-hydrocarbon

Determine the specific impulse, the throat and exit areas, the flow rate, the total propellant weight, the total impulse, the burning area, and an estimated mass assuming moderately efficient design. Properties for this propellant are: $k=1.26$; $T_1 =$

29/4

$2700 \text{ } ^\circ\text{F} = 3160 \text{ } R$; $r=0.10 \text{ in/sec}$ at 1000 psia ; $c^*=4000 \text{ ft/sec}$; $P_b = 0.056 \text{ lb/in}^3$, molecular weight= 22 lbm/lb-mol ; gas constant= $1544/22=70.2 \text{ ft-lbf/lbm-R}$. **20**

- Q.6 a) Write down all the assumptions for ideal rocket unit. **10**
b) On what parameter does the evaluation of volume and shape of combustion chamber and nozzle depend upon? Explain. **10**
- Q.7 a) Write about different types of injectors and draw suitable diagrams. **10**
b) What are the factors affecting injection behavior. Explain each one of them. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

INTRODUCTION TO WIND ENERGY (AE-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.** Each question carries equal marks.

Q.1 Attempt **any five** parts.

- a) List out factors which favour the installation of wind turbines for commercial use.
- b) Explain the meaning of the lift-based and drag-based wind turbines.
- c) What are 'active stall power control' and 'passive stall power control' methods used for controlling the power?
- d) How do you summarize the features of suitable sites for installing wind machines?
- e) Plot typical variation of annual average energy density of winds with change in wind speed at a given site and explain the plot.
- f) List various types of economic incentives that are generally provided to the entrepreneurs who choose to set up the WECS.
- g) What are 'water saver' and 'fuel saver' modes of operation of a wind machine? **4×5**

PART-A

- Q.2** a) List various types of wind energy collectors. Explain the comparative advantages and disadvantages of each type. Which of these wind energy collector types has been most successfully used? **15**
- b) Explain how wind is generated during day and night. **5**
- Q.3** a) Explain that in case of a drag translator device (Savonius wind machine), the maximum value of coefficient of performance (C_{pmax}) achievable is C_D 4/27, where C_D is drag coefficient. **15**
- b) What are the characteristics of a Darrieus wind turbine that make it a suitable choice? **5**
- Q.4** a) What is Betz' limit? Derive the value of Betz limit by applying momentum theory treatment to the flow through a wind turbine rotor. **15**
- b) Discuss the actual aerodynamic efficiency of an optimum wind turbine as a function of tip speed ratio. **5**

PART-B

- Q.5** a) Explain, with the help of sketches/block diagrams, the pumping applications of wind energy. **10**
- b) What do you understand by direct heat applications of wind energy? Name and sketch such applications. **10**
- Q.6** a) How the installation of wind energy systems can affect birds, wild life and public attitude? Suggest measures to curtail these effects. **10**
- b) What electromagnetic influence is caused by the wind machines when in operation? Why is wind energy called a clean energy? **10**
- Q.7** a) What is the general objective of designing a WECS? What aspects are considered by a designer when taking up the process of designing a WECS? **10**

- b) List out relative advantages in favour of small, decentralized and large, centralized wind energy systems. **10**

End Semester Examination, May 2016

B. Tech. –Seventh Semester

PRINCIPLES OF HELICOPTER ENGINEERING (AE-826)

Time: 3 hrs

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 any **TWO** questions from **Part B.** Each question carry equal marks.

- Q.1 a) Briefly explain the basic parts of the helicopter.
b) How is lift generated by the rotor blades?
c) Explain the vortex ring state.
d) Explain the concept of Autorotation.
e) Write the differences between piston engine and gas turbine engine. **4×5**

PART-A

- Q.2 a) With the help of a hinge arrangement, show the flapping, lagging and feathering motion and briefly explain the importance of each motion. **10**
b) How is the power transferred from the engine to the rotors? Explain in detail. **10**

Q.3 a) In the actuator-disc analysis, why do we assume that the rotor has infinite number of blades? **10**
b) Explain the ground effect on the lifting rotor with the help of relevant diagrams. What is the advantage of this effect? **10**

Q.4 a) Derive the characteristic equation for longitudinal dynamic stability using all the assumptions?

Given:

$$\begin{aligned} \frac{du}{d\tau} - x_u u - x_w w - x_q \frac{d\theta}{d\tau} + w_c \theta \cos \tau_c &= x_{B1} B_1 + x_{\theta o} \theta_o \\ -z_u u + \frac{dw}{d\tau} - z_w w - (\hat{V} + q_q) \frac{d\theta}{d\tau} + w_c \theta \sin \tau_c &= z_{B1} B_1 + z_{\theta o} \theta_o \\ -m_u u - m_w w - m_w \frac{dw}{d\tau} + \frac{d^2\theta}{d\tau^2} - m_q \frac{d\theta}{d\tau} &= m_{B1} B_1 + m_{\theta o} \theta_o \end{aligned}$$

- b) The longitudinal derivatives for the hovering case (e.g. on shaft axis) are:

$$x_u = -0.032, x_w = 0, x_g = 0$$

$$z_u = 0, z_w = -0.52, z_q = 0$$

$$m'_\mu = 0.016, m'_w = 0, m_a = -0.099$$

Given: $\mu^* = 47.6$, $\hat{t} = 1.82 \text{ seconds}$, $w_C = 0.0856$ and $i_B = 0.11$
 $m_u = 6.8$, $m_w = 0$, $m_a = -0.90$

Calculate the time to halve amplitude and time to double amplitude. Also comment on the stability characteristics. **10**

PART-B

- Q.5 a) What is the advantage of an electromechanical device over the stabilizing bar? **10**
b) Explain in detail the Control Response with the help of B_1 derivative. **10**

- Q.6 a) Explain in detail the auto-stabilization. **10**
 b) What is the purpose of using a gyro-device in helicopter? **10**

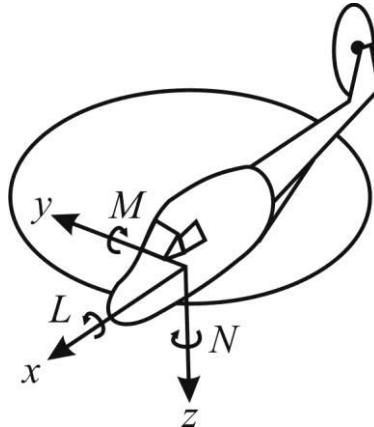
- Q.7 a) The exciting forces i.e. hub forces and moments from each blade can be resolved into force components X, Y, Z and moment components L, M, N relative to fixed axes in the helicopter. With the help of the information provided, show that:

$$X = -\frac{1}{2}b \sum_{m=1}^{\infty} [P_{mb-1} + T_{mb-1} + P_{mb+1} - T_{mb+1}] \cos mb\varphi$$

$$-\frac{1}{2}b \sum_{m=1}^{\infty} [Q_{mb-1} - S_{mb-1} + Q_{mb+1} + S_{mb-1}] \sin mb\varphi$$

Given: azimuth angle of k^{th} blade, $\varphi_k = \varphi + 2\pi k / b$

$$X_k = -R_{1k} \cos \varphi_k + R_{2k} \sin \varphi_k$$



- b) Why elimination or reduction of vibration is important in helicopter? **10**

10
10

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

BASICS OF COMPUTATIONAL FLUID DYNAMICS (AE-827)

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) Give the relations between surface integral, volume integral and line integral for a control surface around a control volume.
 b) For flow over a flat plate, speak on the behaviour of governing equations used for solving the flow under following cases:
 i) Subsonic flow ($M < 0.4$)
 ii) Supersonic flow ($M > 1.5$)
 c) What is time marching and space marching? Can a governing equation be both space and time marching? Give an example for the same.
 d) What is conservation and non-conservation forms of equations?
 e) Define explicit and implicit schemes.
 f) Define: i) Computational plane. ii) Physical plane.
 g) What is PISO model? To which type of flows can it be applied and why?
 h) What is the difference between RANS, LES and DNS?
 i) List out different RANS techniques for flow computation.
 j) Give the relations for:
 i) Length scale ratio.
 ii) Time scale ratio.
 iii) Velocity scale ratio.

2x10

PART-A

- Q.2 a) Derive the 3D Momentum equation for viscous flow. 8
 b) Derive the 3D Energy equation for viscous flow. 7
 c) Write note on the governing equation of CFD for a 3D flow. 5

- Q.3 a) Define FDM. Briefly write on the governing equation for discretization used in FDM. 4
 b) Differentiate explicit and implicit approach with a proper example. 6
 c) Give the error analysis and calculate the CFL for 1D heat conduction equation. 10

- Q.4 a) Write note on following:
 i) Hyperbolic equations.
 ii) Elliptic equations.
 iii) Parabolic Equations. 10
 b) Describe metrics and Jacobians? Give the governing equation of CFD in vector form and explain each term. 7
 c) Give the transformed 2D continuity equation for the following stretched grid:

$$x = \xi$$

$$y = e^\eta - 1$$

3

PART-B

- Q.5 a) Write note on pressure correction method and list out the step for SIMPLE algorithm. **10**
b) Write note on lax-wendroff scheme. **6**
c) Write note on over relaxation technique. **4**
- Q.6 a) Describe the methodology for 1D and 2D diffusion? **7**
b) Write note on convection-diffusion problem using Central differencing scheme. **6**
c) Draw the flow charts for:
i) SIMPLE Algorithm.
ii) SIMPLEC Algorithm. **7**
- Q.7 a) Write note on McCormack scheme. **7**
b) Explain:
i) Mixing length Model.
ii) Spalart-Allamaras Model. **5**
c) Explain and derive the Filtered Unsteady NSE. **8**

End Semester Examination, May 2016

B. Tech. – Sixth Semester

BASICS OF COMPUTATIONAL FLUID DYNAMICS (AE-827)

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) Define CFD with its applications.
 - b) Give the NSE for inviscid flow in 2D.
 - c) For flow over a flat plate, write about the behaviour of governing equations used for solving the flow under following cases:
 - i) Subsonic flow ($M < 0.4$)
 - ii) Supersonic flow ($M > 1.5$)
 - d) What are time marching and space marching? Can a governing equation be both space and time marching? Give an example for the same.
 - e) What are shock capturing and shock fitting techniques? Explain.
 - f) Define explicit and implicit schemes.
 - g) Give the classification of differential equations.
 - h) What is the difference between RANS, LES and DNS?
 - i) Define a well-posed problem.
 - j) Differentiate between numerical and analytical methods.

2x10

PART-A

- Q.2**
- a) Derive the continuity equation in non-conservative form. Using the obtained relation convert it into remaining forms? **8**
 - b) What is substantial derivative and derive it? Explain its role in governing CFD equations. Also give your explanation for divergence of velocity. **7**
 - c) Give the classification of PDEs with examples. Classify the following system of equation using eigen-value method:

$$a_1 \left(\frac{\partial u}{\partial x} \right) + b_1 \left(\frac{\partial u}{\partial y} \right) + c_1 \left(\frac{\partial v}{\partial x} \right) + d_1 \left(\frac{\partial v}{\partial y} \right) = f_1$$

$$a_2 \left(\frac{\partial u}{\partial x} \right) + b_2 \left(\frac{\partial u}{\partial y} \right) + c_2 \left(\frac{\partial v}{\partial x} \right) + d_2 \left(\frac{\partial v}{\partial y} \right) = f_2$$

5

- Q.3**
- a) Define FDM. Briefly write on the governing equation for discretization used in FDM. **4**

- b) Give the forward, backward and central difference for the following:

i) $\left(\frac{\partial u}{\partial x} \right)$

ii) $\left(\frac{\partial u}{\partial z} \right)$

iii) $\left(\frac{\partial^2 v}{\partial z^2} \right)$

iv) $\left(\frac{\partial^2 u}{\partial x \partial y} \right)$

12

- c) Differentiate explicit and implicit approaches with a proper example for each. **4**
- Q.4** a) Give the conservation form of governing equations for transformation from physical to computational plane. Give its implications. **7**
- b) Transform the following from physical to computational plane:
- $\left(\frac{\partial u}{\partial x} \right)$
 - $\left(\frac{\partial u}{\partial y} \right)$
 - $\left(\frac{\partial^2 u}{\partial x^2} \right)$
 - $\left(\frac{\partial^2 u}{\partial x \partial y} \right)$ **9**
- c) Transform the 3D Laplace Equation from physical to computational plane. **4**

PART-B

- Q.5** a) Write a note on pressure correction method and list out the steps for SIMPLE algorithm. **10**
- b) Write short notes on:
- MacCormack technique.
 - Lax-wendroff scheme. **5x2**
- Q.6** a) Describe the methodology for 1D and 2D diffusion. **7**
- b) Write a note on convection-diffusion problem using:
- Central difference scheme.
 - Upwind difference scheme. **6**
- c) Draw the flow charts for:
- PISO algorithm.
 - SIMPLEC algorithm. **7**
- Q.7** Write short notes on:
- Wilcox k- ω model
 - Mentor k- ω model.
 - Non-linear k- ω model.
 - Spalart Allmaras model. **20**

End Semester Examination, May 2016

B. Tech. – Fourth Semester

FUELS 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**. Each question carries equal marks.

Q.1 Answer briefly:

- a) Define Octane number and Cetane number.
- b) What is aniline point?
- c) What is chemical delay?
- d) Enlist advantages of hydrogen as an IC engine fuel.
- e) Describe the factors affecting ignition delay period.
- f) What do you mean by abnormal combustion?
- g) Define LPG, CNG and PNG.
- h) How lubricants are classified?
- i) What are the functions of lubrication?
- j) What is hydrostatic lubrications?

2x10

PART-A

Q.2 With the help of a neat sketch, explain refining process of petroleum and discuss about its by products in detail. **20**

Q.3 Write short notes on the following:

- a) HCV and LCV.
- b) Decomposition stability.
- c) Corrosion stability.
- d) Specification number.

5x4

Q.4 a) Discuss phenomena of engine knock in C.I. engines in detail. **10**
b) Explain stages of combustion in C.I. engines. **10**

PART-B

Q.5 Explain why alternate fuels are essential. Can LPG and CNG alone act as an alternative fuel successfully? Discuss. **20**

Q.6 a) What is the importance of lubrication? **5**
b) Explain lubricant emulsion. **5**
c) Discuss the desired properties of a lubricant. **10**

Q.7 a) What are the various components to be lubricated in an engine? Discuss in brief.
b) Explain boundary lubrication mechanism in brief. **10x2**

End Semester Examination, May 2016
B. Tech. – Fifth Semester
AUTO ELECTRICAL 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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) What is the function of rectifier?
- b) Define earthed and insulated return system.
- c) Define battery capacity and battery efficiency.
- d) Define engine resisting torque for a cranking motor.
- e) Explain the function of distributor and C B Points.
- f) Discuss the importance of modern "In-Vehicle- Infotainment" system.
- g) Define conductor, semiconductor and insulator.
- h) Explain Hot Spark Plug and Cold Spark Plugs.
- i) Define bulb wattage, optical headlight beam setter and fog lamps.
- j) Define H L Dazzling and anti dazzle device.

2×10

PART-A

- Q.2** a) Discuss the main electrical systems of an automobile vehicle. **10**
b) Explain with the help of a neat sketch construction and function of ignition coil. **10**
- Q.3** a) Explain effects of temperature on battery performance and electrolyte specific gravity. **10**
b) Describe with the help of a neat labeled sketch, construction and function of hydrometer and high discharge cell tester. **10**
- Q.4** a) With the help of a neat diagram describe the construction and working of D C generator. **15**
b) What is the function of alternator? Discuss its advantages over D C generator. **5**

PART-B

- Q.5** a) Explain with the help of a diagram construction and working of electronic ignition system. **12**
b) Enlist eight important sensors fitted on a modern vehicle. Discuss lambda (Oxygen) sensor in detail. **8**
- Q.6** a) Draw a neat labeled sketch of Battery Ignition System of 4-stroke, 4-cylinder SI engine and explain functions of its each component. **15**
b) What are the requisite of good spark plug? **5**
- Q.7** a) What is wiring harness? How does it affect electrical connections of an automobile? **12**
b) Discuss causes and prevention of H.L dazzle. **8**

End Semester Examination, May 2016
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 Briefly answer:

- a) Define endurance limit stresses.
- b) What is surging in spring?
- c) What is meant by stress concentration?
- d) Classify bearings depending upon nature of contact.
- e) What is meant by spring rate and spring index?
- f) Write the Lewis equation?
- g) State the function of piston rings.
- h) What are the different forces acting on connecting rod?
- i) What is module of gear and its significance?
- j) What is the significance of weight in flywheel?

2×10

PART-A

- Q.2** a) Derive the expression for Goodman criterion for combination of stresses under reversed axial loading for ductile materials. **10**
- b) Determine the thickness of a 120 mm wide uniform plate for safe continuous operation if the plate is to be subjected to a tensile load that has a maximum value of 250 kN and a minimum value of 100 kN. The properties of the plate material are as Endurance limit stress=225 MPa, and Yield point stress=300 MPa. The factor of safety based on yield point may be taken as 1.5. **10**
- Q.3** a) Explain the buckling of compression springs. **5**
- b) A solid circular shaft is subjected to a bending moment of 3000 Nm and a torque of 10000 Nm. The shaft is made of 45 C8 steel having ultimate tensile stress of 700 MPa and an ultimate shear stress of 500 MPa. Assuming a factor of safety as 6, determine the diameter of the shaft. **15**
- Q.4** The load on the journal bearing is 150 kN due to turbine shaft of 300 mm diameter running at 1800 r.p.m. Determine the following:
a) Length of the bearing if the allowable bearing pressure is 1.6 N/mm^2 , and
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 the bearing clearance is 0.25 mm. **20**

PART-B

- Q.5** A pair of straight teeth spur gear is to transmit 20 kW when pinion rotates at 300 rpm. The velocity ratio is 1:3. The allowable static stress for the pinion and gear materials are 120 MPa and 100 MPa. The pinion has 15 teeth and its face width is 14 times the module. Determine:
i) Module ii) Face width iii) Pitch Circle diameters of pinion and gear.
The tooth form factor and velocity factor are as:

$$(y) = 0.154 - \frac{0.912}{\text{No. of teeth}} C_v = \frac{3}{3+v} v \text{ in m/s.}$$

20

Q.6 a) What are different design considerations for a piston? **4**

b) A four-stroke diesel engine has the following specifications, brake power is 5KW, speed is 1200 r.p.m.; indicated mean effective pressure is 0.35 N/mm²; mechanical efficiency is 80%.

Determine:

- i) Bore and length of the cylinder.
- ii) Thickness of the cylinder head.

16

Q.7 Design the I- section shank, big end bearing, piston pin and small end bearing of the connecting rod of an I.C. engine running at 1800 r.p.m. and developing a maximum pressure of 3.15 N/mm². The diameter of the piston is 100 mm; mass of the reciprocating parts per cylinder 2.25 kg; length of connecting rod 380 mm; stroke of piston 190 mm and compression ratio 6:1. Take a factor of safety of 6 for the design. Take length to diameter ratio for big end bearing as 1.3 and small end bearing as 2 and the corresponding bearing pressures as 10 N/mm² and 15N/mm². The density of material of the rod may be taken as 8000 kg/m³ and the allowable stress in the bolts as 60 N/mm² and in cap as 80 N/mm². The rod is to be of I-section for which you can choose your own proportions. Use Rankine formula for which the numerator constant be taken as 320 N/mm² and the denominator constant 1/7500. **20**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

DESIGN OF AUTOMOBILE COMPONENTS (AU-601)

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 various factors affecting fatigue strength?
b) Explain stress concentration phenomenon.
c) What type of stresses are induced in shafts?
d) How shafts are formed?
e) Define the term: static equivalent load.
f) What is the usefulness of gears over the belt and chain drives?
g) What is meant by reliability of bearing?
h) What are the various causes of gear tooth failure?
i) What is splash lubrication system?
j) What is the function of connecting rod in an I.C. engine? **2x10**

PART-A

- Q.2 Explain the Goodman and Soderberg criterion for combined steady and variable stresses. **20**
- Q.3 a) Derive an expression for the shafts subjected to combined twisting moment and bending moment. **15**
b) A hollow shaft has greater strength and stiffness than solid shaft of equal weight. Explain. **5**
- Q.4 a) Enumerate advantages of rolling contact bearings over sliding contact bearings. **5**
b) The thrust of propeller shaft is absorbed by 6 collars. The rubbing surface of these collars have outer diameter 300 mm and inner diameter 200 mm. If the shaft runs at 120 rpm the bearing pressure amounts to 0.4 N/mm^2 . The coefficient of friction may be taken as 0.05. Assuming that the pressure is uniformly distributed, determine the power absorbed by collars. **15**

PART-B

- Q.5 A pair of straight teeth spur gear is to transmit 12 kW at 300 rpm of the pinion. The speed ratio is 3:1. The allowable static stresses for gear of cast iron and pinion of steel are 60 MPa and 105 MPa respectively. Assume the following number of teeth of pinion=16, face width=14 m, velocity factor (c_v)= $\frac{4.5}{4.5 + v}$ and tooth form factor $(y) = 0.154 - \frac{0.912}{\text{No. of teeth}}$.
- Determine: a) Module. b) Face width. c) Pitch dia of gears. **20**

Q.6 A four-stroke diesel engine has the following specifications; Brake power=5 kW; speed=1200 rpm; indicated mean effective pressure=0.35 N/mm²; mechanical efficiency=80%.

- Determine:
- a) Bore and length of the cylinder.
 - b) Thickness of the cylinder head.
 - c) Size of studs for the cylinder head.

20

Q.7 Write short notes on:

- a) Design consideration of a piston.
- b) Forces acting on a connecting rod.
- c) Various types of cylinder liners.
- d) Methods and materials used in manufacture of crankshaft.

5x4

End Semester Examination, May 2016

B. Tech. – 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.** Each question carries equal marks.

- Q.1**

 - a) Define breakdown preventive predictive and corrective maintenance.**
 - b) What is job card? Explain its importance.**
 - c) Explain importance of pneumatic tools.**
 - d) Describe operation of bearing puller.**
 - e) Differentiate between cylinder boring and cylinder honing.**
 - f) Enlist the components of engine valve mechanism.**
 - g) What do you mean by MPFI and CRDI fuel system?**
 - h) What is the function of Lambda sensor?**
 - i) Enlist the basic parts of Clutch system.**
 - j) Define brakes grabbing, brake noise and brake pulsation?**

PART-A

- Q.2** a) What do you mean by maintenance schedule? Explain with the help of standard performa and check list. 15
b) Discuss need of maintenance in brief. 5

Q.3 a) Discuss importance of tools and equipments used in an automobile workshop. Name four equipments those are commonly used in auto workshop. Explain function/working of any one equipment in brief. 15
b) How telescopic gauge is used to measure the cylinder diameter? 5

Q.4 a) Write down procedure for engine removal from the vehicle. 10
b) Discuss dismantling of cylinder head, valve removal and repair of valve seal. 10

PART-B

- Q.5** a) How fuel injector of petrol engine is cleaned and tested on fuel injector cleaner and testing machine? Write down the necessary precautions. 15
b) How will you test and set the pressure in injector of a diesel engine? 5

Q.6 a) Explain the procedure for clutch dismantling, inspection, repair and assembling in details. 12
b) What is the function of synchronizing assembly? Enlist components of 4 speed synchromesh gear box. 8

Q.7 a) What do you understand by wheel alignment? What parameters are checked and set during wheel alignment? What are the benefits of wheel alignment? 15
b) Discuss different types of brake systems. 5

End Semester Examination, May 2016

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) What are the constituents of the exhaust gases that cause pollution?
b) Name the possible sources of atmospheric pollution from an SI engine.
c) Name the different causes of HC emission from a SI engine.
d) What may cause 'black' smoky exhaust at slow speed of engine?
e) What is a catalytic converter?
f) What is E.G.R.? Why it is provided in vehicles?
g) What is known as 'Smog' in an automobile?
h) What are the different types of diesel smoke?
i) What is the function of resonator?
j) What are the methods to clean the exhaust gas? **2x10**

PART-A

- Q.2 a) Explain the contribution of vehicular emission to the global warming. **10**
b) What are the effects of engine emission on human health? **10**
- Q.3 a) Explain the mechanism of pollutants formation inside the cylinder of a conventional SI engine. **10**
b) What are the sources of evaporative emission in SI engines? How can it be controlled? **10**
- Q.4 a) Discuss the source of HC formation in petrol engines. **10**
b) Write a note on Aldehydes and Ketones in vehicle exhaust emission. **10**

PART-B

- Q.5 a) Give the names of different kind of smoke meters. Explain any two of them. **10**
b) Discuss the methods to control the smoke in CI engines. **10**
- Q.6 a) Explain the working of a catalytic converter with the help of a line diagram of it. **10**
b) Write the reasons for catalytic converter being so popular. **10**
- Q.7 a) Write a short note on non-dispersive infrared gas analyser. **10**
b) Write a short note on vehicle testing chassis dynamometer. **10**

End Semester Examination, May 2016

B. Tech. – 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.** Each question carries equal marks.

Q.1 Explain following terms in brief:

- a) Hysteresis and dead zone.
- b) Threshold and resolution.
- c) Active and passive transducer.
- d) Dissipation of energy associated with the use of hydraulic dynamometer.
- e) Absolute temperature scales.
- f) Significance of the term 'inferential' as applied to flow meters.
- g) What should be the shape of an ideal thermometer bulb?
- h) 'Camber' and 'Caster' and its importance.
- i) Transfer characteristics of a transducer.
- j) Linearity and sensitivity of an instrument.

2x10

PART-A

Q.2 A torsion dynamometer is used to find the power of an engine. The solid propeller shaft having 20 cm diameter twists 2° in a length of 6 m. If the modules of rigidity is 80 GN/m^2 and if the shaft runs at 500 rpm, calculate, torque transmitted by the shaft and horse power of the engine. **20**

Q.3 What are the standard inputs for studying the dynamic response of a system? Define and sketch them. **20**

Q.4 Describe with the help of neat diagrams, the mechanical devices used as primary detectors. Derive their output in terms of their physical dimensions. **20**

PART-B

Q.5 Explain different types of manometers with construction details and working principles. **20**

Q.6 How signal conditioning is achieved in the liquid-in-glass thermometers, and in the filled-in-system thermometers?

A bourdon tube temperature indicator has a range of 0°C to 250°C and produces a corresponding rotation 0 to 270° . Workout the sensitivity of the bourdon tube in radians per degree celsius if the mechanical levers and gears have an amplification of 30. **20**

Q.7 a) Discuss the importance of tools and equipments used in a workshop. Enlist various types of hand tools. **10**

b) Draw the neat labeled diagrams of four 'hand tools' and four 'measuring tools'. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

COMPUTER AIDED VEHICLE DESIGN (AU-802)

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 energy in context of fuels.
b) What are the important properties which SI engine fuel poses?
c) What are the special features limousine and estate cars have?
d) Draw the layout of a saloon car.
e) Define lift force.
f) Name some alternative methods to reduce the drag.
g) Define gradability.
h) What is the necessity to paint the vehicle body?
i) Define blind spot.
j) What are the different body trim items? **2x10**

PART-A

- Q.2 a) Why there is variation in torque of an IC engine w.r.t rpm? **10**
b) Describe various cylinder arrangement used in a vehicle. **10**
- Q.3 a) Explain how visibility and space can be improved in a car. **10**
b) Explain the classification of passenger car bodies with sketches. **10**
- Q.4 a) Explain how air flow visualization test can be conducted using a wind tunnel. **10**
b) What are the initial tests that are being carried out in a prototype model? Explain. **10**

PART-B

- Q.5 a) Explain various resistance acting on vehicle when it is running on road. **10**
b) Explain various loads which affect the vehicle motion. **10**
- Q.6 a) What is mean effective pressure? How it is important for IC engine. **10**
b) Explain PV diagrams used for SI and CI engines. **10**
- Q.7 a) What is meant by body mechanism? List few of them. **5**
b) What is a F.R.P.? Indicate its merits and demerits as body material. **7**
c) Mention briefly about priming in painting process. **8**

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh / Eighth Semester

EMERGING AUTOMOTIVE TECHNOLOGIES (AU-817)

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 environmental challenges are created because of vehicle emission?
b) List some alternative driving technologies helping in meeting the challenges of 21st century vehicles.
c) What are the main benefits of fuel cells?
d) How fuel cell is better than battery?
e) What is the difference between the turbo charging and supercharging?
f) How EGR affects the emission of diesel engine?
g) How regenerative brakes are useful?
h) What are ultra capacitors?
i) List benefits of brake by wire technology.
j) Give X-by wire technology's advantages over hydraulic system. **2x10**

PART-A

- Q.2 a) What are the crucial issues facing by automobile industries? **10**
b) What are the challenges for designing of 21st century vehicle? What are the steps automobile industries are taking to meet these challenges? **10**
- Q.3 a) How would the incorporation of fuel cell drive technology helps in reducing emission? **10**
b) Explain the working of fuel cell. Though it also produces electrical energy through chemical reaction, how its working is different from battery? **10**
- Q.4 How today's diesel engine is different from that used a decade before? Discuss in terms of:
a) Performance. **10**
b) Emission. **10**

PART-B

- Q.5 Discuss need and suitability of hybrid electric vehicle in terms of:
a) Energy.
b) Environment.
c) For urban transportation. **20**
- Q.6 a) What is start stop operation? How it is achieved in today's automobiles? **10**
b) Discuss the need of new energy storage media. **10**
- Q.7 a) Describe constantly variable transmission. List advantages of constantly variable transmission. **10**

b) Explain semi active and fully active suspension system.

10

End Semester Examination, May 2016
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 Write short notes on:

- a) Metamorphic rocks.
- b) Compressive strength of stones.
- c) Modular bricks.
- d) Storage of cement.
- e) Hydraulic lime.
- f) Seasoning of timber.
- g) Fly-ash.
- h) Wrought iron.
- i) Polymerization.
- j) Cold working on steel.

2×10

PART-A

Q.2 a) Explain properties of good building stone in detail. **10**
b) Explain process of manufacturing of bricks in detail. **10**

Q.3 a) Draw a labelled diagram of the cross section of a tree. **10**
b) What is fly ash? What is its use? Explain in detail. **10**

Q.4 a) Explain manufacturing of process of cement with a neat sketch. **10**
b) Explain physical tests conducted on cement. **10**

PART-B

Q.5 a) Explain bulking of sand and its significance in detail. **10**
b) Distinguish between paints, varnishes and distempers. **10**

Q.6 a) List the various types of cement concrete. **6**
b) Explain importance of curing of concrete. **6**
c) Explain steel and aluminium as building material. **8**

Q.7 a) Draw a line sketch to show the stages involved in the manufacture of glass. **10**
b) Explain the use of bitumen and tar as construction materials in Civil Engineering Works. **10**

End Semester Examination, May 2016

B. Tech. – Third Semester

STRUCTURAL ANALYSIS-I (C-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.

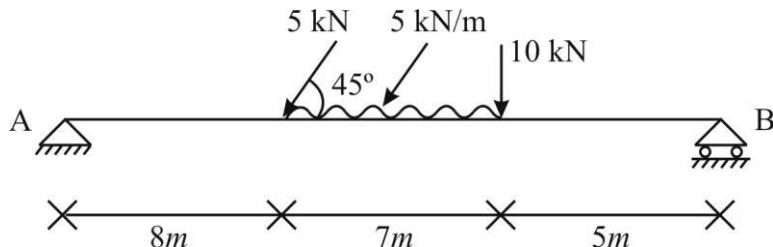
Q.1 Briefly answer:

- Write down the equations of static equilibrium and explain the terms.
- Define resultant.
- Draw the bending moment diagram for a simply supported beam with a point load 'W' at the center of the span.
- Check the determinacy of a Three Hinged Arch and Two Hinged Arch.
- Differentiate between simple, complex and compound trusses.
- Write the assumptions used in the analysis of a truss.
- Give the expression for Rankine formula.
- Write down the equivalent length for different end conditions.
- Write down the second moment area theorem.
- What is a conjugate beam?

2×10

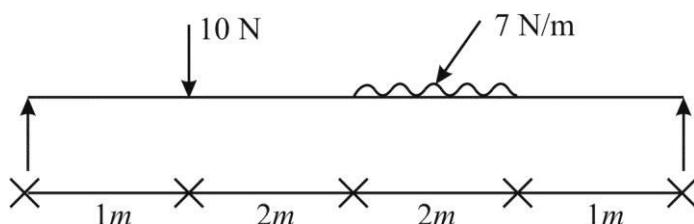
PART-A

Q.2 a) Draw a simple support and fixed support and the reactions developed. **5**
b)



Find the support reactions. **15**

Q.3 Draw SFD and BMD

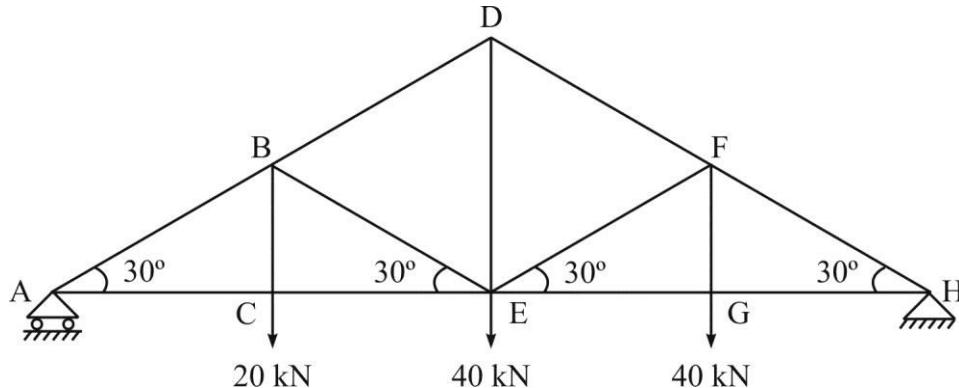


20

- 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 udl of 30 kN/m over the left half portion. Determine the vertical reactions and horizontal thrust at the supports. **20**

PART-B

- Q.5 Determine the nature and magnitude of forces in the members DF, EF and EG.



- Q.6 A rectangular column of size 100 mm \times 200 mm has its both ends hinged. Length of the column is 4 m. Find the crippling load. **20**

- Q.7 Find the deflection at the centre of a simply supported beam of length 20 m with a UDL 10 N/m on entire length using double integration method. **20**

End Semester Examination, May 2016

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**. Each question carries equal marks.

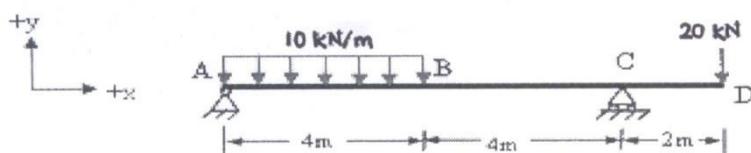
Q.1 Attempt all parts:

- a) What do you understand by Sagging Moment and Hogging Moment?
- b) How is bending moment and shear force related?
- c) Determine ILD for reactions at the supports of a S.S Beam.
- d) What are UDL(longer than span and shorter than span) head positions for maximum end shear(+ve and -ve)?
- e) Check determinacy of a Three Hinged Arch and Two Hinged Arch.
- f) A three hinged semi-circular arch of radius R carries a udl w/m run over the whole span. Find the Horizontal Thrust.
- g) Define determinate and indeterminate truss.
- h) Classify columns on basis of slenderness ratio.
- i) What are the limitations of Euler's formula?
- j) What is conjugate beam?

2x10

PART-A

Q.2 Draw Shear Force and Bending Moment diagrams for the following beam.



20

Q.3 Draw the Influence Line Diagram for bending moment at a point 10m distant from the left hand abutment on a bridge girder of span 25 m. Find the maximum bending moment at the point due to a series of wheel loads 100kN, 200kN, 200kN, 200kN, 200kN at centre to centre distance of 4m, 2.5m, 2.5m, 2.5m. The loads move from left to right with 100 kN load leading.

20

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

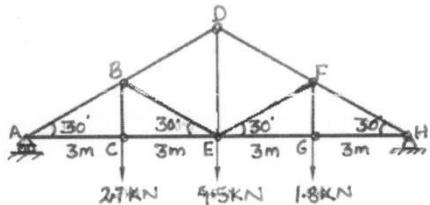
- a) The moment at a section 6m from the left support.

- b) Thrust and radial shear at a section 6m from the left support.

20

PART-B

- Q.5 Determine the nature and magnitude forces in the members DF, EF and EG of Howe roof truss shown in the figure.



20

- Q.6 a) What are the assumptions of Euler's theory for long columns? Derive Euler's formula for crippling load for one end fixed and other end free. **10**
 b) A mild steel tube 25mm internal diameter, 32 mm external diameter, length 3 m is used as a column one end fixed and other end hinged. Calculate the Euler's collapse load using $E = 2 \times 10^5 \text{ N/mm}^2$. **10**
- Q.7 a) What is the relationship between real beam and conjugate beam? **6**
 b) Find out the deflection at the free end of cantilever beam with UDL on entire length using double integration method. **14**

End Semester Examination, May 2016

B. Tech. – Third Semester

STRUCTURAL ANALYSIS-I (C-301B)

Time: 3 hrs

Max Marks: **100**

No. of pages: 2

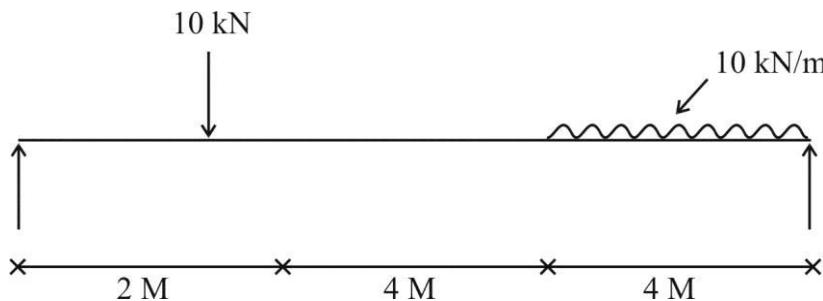
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B**. Each question carries equal marks.

- Q.1 Attempt all parts:
- What do you understand by bending moment and shear force?
 - Draw the bending moment diagram of a cantilever of length 'L' with a point load 'W' acting at the free end.
 - What is an influence line diagram?
 - Check the determinacy of a three hinged arch and a two hinged arch.
 - A three hinged semi-circular arch of radius 'R' carries a udl w/m run over the whole span. Find the horizontal thrust.
 - Write down the assumptions used in the analysis of trusses.
 - Differentiate between determinate and indeterminate truss.
 - Define the term 'slenderness ratio'.
 - Give the Rankine's formula and explain the terms.
 - State 'first moment area' theorem.

2x10

PART-A

- Q.2 Draw the shear force and bending moment diagrams for the following beam:



20

- Q.3 A uniformly distributed load of intensity 25 kN/m crosses a simply supported beam of span 70 m from left to right. The length of the udl is 10 m. Find the value of the maximum bending moment for a section 30m from left end. Find also the absolute maximum bending moment.

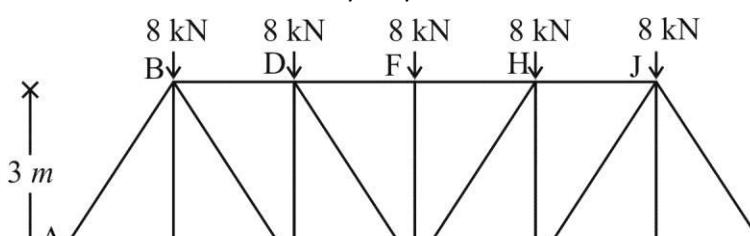
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- Q.3 A three hinged circular arch hinged at the crown and springing points has a span of 40 m and central rise of 8 m. It carries a udl of 20 kN/m over the left half of the span. Find the vertical reactions and horizontal thrust at the supports. Find the normal thrust at a section 10 m from left support.

20

PART-B

- Q.5 Find the force in the members HJ, CE, GH and DE for the truss shown in the figure:



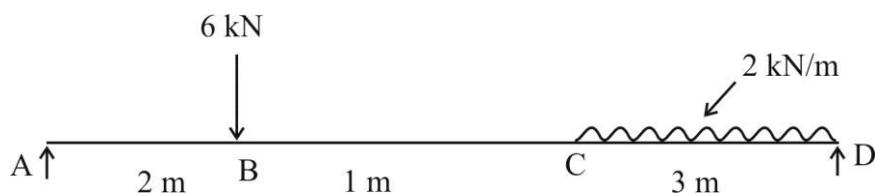
55/4

6 Panels, each of 4.5 m = 27 m.

20

- Q.6 a) Obtain the expression for Euler's load, when both ends hinged. **10**
b) A mild steel column of diameter 200mm and 3m has its both ends fixed. Calculate the crippling load, given $E = 2 \times 10^5 \text{ N/mm}^2$ **10**

- Q.7 Find the deflection of the given beam at C.



20

End Semester Examination, May 2016

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**. Each question carries equal marks.

Q.1 Briefly answer:

- a) What are dead load and live load?
- b) Give brief classification of foundation.
- c) Give any two causes of dampness.
- d) Draw a neat sketch of king post truss.
- e) Define: a) King closer b) Perpend
- f) What is difference between damp proofing and water proofing?
- g) Give any two differences between stone and brick masonry.
- h) Explain with diagram Dutch bond.
- i) Define: a) Eaves b) Ridge
- j) What are sources of flyash?

2×10

PART-A

- | | | |
|------------|--|--------------------------|
| Q.2 | a) Give detail classification of Ashlar masonry with neat sketches. | 10 |
| | b) i) Write a short note on dressing of stone. | 5 |
| | ii) List various types of buildings. Explain any one in detail. | 5 |
| Q.3 | a) Explain construction detail of cavity wall. | 8 |
| | b) Write short notes on (any three): | |
| | i) Brick partition. | 2 |
| | ii) Glass partition. | 2 |
| | iii) Metal lath partition. | 2 |
| | iv) Timber partition. | 2 |
| | c) What are various advantages of partition wall? | 4 |
| Q.4 | a) What are various methods for site exploration? Explain any two in detail. | 8 |
| | b) Write short notes on: | |
| | i) Spread footing. | ii) Raft foundation. |
| | iii) Pile foundation. | iv) Grillage foundation. |
| | | 3×4 |

PART-B

- | | | |
|------------|--|-----------|
| Q.5 | a) What are different sources of dampness? | 4 |
| | b) Explain: i) Guniting. | 3 |
| | ii) Membrane damp proofing. | 3 |
| | c) Describe treatment given to roofs. | 6 |
| | d) What are different materials which can be used for damp proofing? | 4 |
| Q.6 | a) What are different types of flooring? Explain any two in detail. | 10 |
| | b) Explain with sketches: i) King post truss | 2 |
| | ii) Queen post truss | 2 |
| | c) What are different types of roof? Explain any one in detail. | 6 |

- Q.7 Write short notes on:
- a) Cold weather concreting. 5
 - b) Polymer concrete. 5
 - c) Epoxy mortar. 5
 - d) Explain need of sustainability in construction materials. 5

End Semester Examination, May 2016

B. Tech. – Third Semester
FLUID MECHANICS-I (C-303)

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 Write notes on: **2x10**
- a) Mass density and specific weight.
 - b) Real and ideal fluid.
 - c) Laminar and turbulent flow.
 - d) Velocity potential and flownet.
 - e) Centre of pressure and forced vortex.
 - f) Aeration of nappe.
 - g) Smooth and rough boundary.
 - h) Model and prototype.
 - i) Distorted model.
 - j) Dimensional analysis.

PART-A

- Q.2 a) What do you mean by viscosity? Derive an expression for shear stress. **10**
b) A plate having an area of 1 m^2 is dragged down at 45° inclined plane with a velocity of 50 cm/sec . Find the weight of the plate if the viscosity of the fluid is one poise and thickness between plate and plane is 1 mm . **10**
- Q.3 a) Discuss in detail the graphical and experimental method of drawing flow net. **10**
b) What do you mean by manometer? Discuss in detail the various types of manometers and also derive an expression for difference of pressure in inclined tube manometer. **10**
- Q.4 a) What do you mean by centre of pressure and total pressure? Derive an expression for total pressure and centre of pressure on inclined surface submerged in water. **10**
b) A pipe line which is 4 m in diameter contains a gate valve. The pipe contains oil of specific gravity 0.87 . The pressure at the centre of pipe is $196,200 \text{ N/m}^2$. Find the force exerted by the oil upon the gate and its position of the centre of pressure. **10**

PART-B

- Q.5 a) Discuss the limitation and application of Bernoulli's equation. Derive an expression for discharge measurement by inclined venturimeter. **10**

- b) The flow of water through a pipe is measured with the help of an orificemeter. The pipe and orificemeter are 20 cm and 10 cm respectively. The pressure gauge fitted upstream and downstream read 195 kPa and 105 kPa respectively. Find out the discharge of the water. Take $C_d = 0.64$. **10**
- Q.6** a) What do you mean by boundary layer separation? How to control the boundary layer separation? **12**
 b) Explain the characteristics of laminar and turbulent layers in detail. **8**
- Q.7** a) Define and derive the expression for various dimensionless numbers. **10**
 b) A model is constructed for a river having the following data:
 River width = 2 km
 Depth of flow = 4 m
 Discharge = 4,000 m^3 / s
 Velocity = 1.6 m/s
 Manning's n = 0.02
 The model has a horizontal scale of 1 to 1000 and vertical scale to 1 to 50.
 Assuming the hydraulic radius equal to the mean depth of flow.
 Find: i) Manning's n for model.
 ii) Whether the flow of the model is laminar or turbulent.

End Semester Examination, May 2016

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 all questions:

- a) Define surveying. Explain the principle of 'whole to part' in surveying.
- b) Explain how the use of an incorrect chain results in faulty measurements. How is it corrected?
- c) What do you mean by whole circle bearing?
- d) Find the sum of all internal angles of a polygon of sides 10.
- e) What is reciprocal leveling?
- f) Write any two characteristics of contour.
- g) What is face left and face right observation in theodolite survey?
- h) Define Bowditch rule.
- i) What are multiplying constant and additive constant of a tachometer?
- j) Explain the method of radiation in plane table survey.

2x10

PART-A

- Q.2**
- a) What do you mean by ranging? What are two methods of ranging? **5**
 - b) What are various tape corrections in chain surveying? **5**
 - c) A steel tape was exactly 20 m long at 20°C when supported throughout its length under a pull of 5 kg. A line was measured with this tape under a pull of 16 kg and at a temperature 32°C was found to be 680 m long. Assuming the tape is supported at every 20 m. Find the true length of the line. Given cross-sectional area of tape = 0.03cm^2 , $E = 2.1 \times 10^6 \text{kg/cm}^2$, $\alpha = 11 \times 10^{-6}/^{\circ}\text{C}$ weight of the tape = 10gram/cc . **10**
- Q.3**
- a) Differentiate between prismatic compass and surveyor's compass in detail. **10**
 - b) Determine the bearings of the sides of regular pentagon of sides 5 m, if the bearing of the first line AB is 80° . **10**

- Q.4**
- a) Explain the curvature and refraction corrections and obtain the expression for both.
 - b) The following consecutive readings were taken with a dumpy level:
0.795, 1.655, 2.890, 3.015, 0.655, 0.625, 0.955, 0.255, 1.350, 0.860, 2.375.
The instrument was shifted after fourth and eighth reading. The first reading was taken on a B.M. whose R.L. was 500.0 m. Find the R.L. of all other points and apply arithmetic check. **10**

PART-B

- Q.5**
- a) Describe the process of repetition and reiteration method of horizontal angle measurement using a theodolite. **10**
 - b) The following length and bearings were recorded in running a closed traverse. Determine the omitted observations i.e. length and bearing of SP.

Line	Length (m)	Bearing
PQ	255	14°042
QR	656	35°00
RS	120	388°42
SP	?	?

10

- Q.6 a) Explain the various methods of plane table surveying with the help of a neat sketch. **10**
- b) Derive the distance and elevation formulae for an inclined line of sight and staff held vertical. **10**
- Q.7 a) Explain the term: degree of curve. **5**
- b) What purpose do the curve serve? Write different types of curves in detail. **5**
- c) What do you understand by transition curve? What is the necessity for providing transition curve? Explain the term 'super elevation' in brief. **10**

End Semester Examination, May 2016

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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) Name the two processes of cement manufacturing.
- b) Define the concrete and its ingredients.
- c) What does compressive strength means for concrete?
- d) Define workability.
- e) Which admixture, you will use in:
 - i) Cold weather concreting.
 - ii) Under water concreting.
- f) What do you understand by bulking of sand?
- g) Name any four types of cement.
- h) What is nominal mix? Define M₁₅ grade.
- i) Define setting time for cement.
- j) What type of cement you will use for:
 - i) Hot weather.
 - ii) Military operations.

2×10

PART-A

Q.2 a) Why concrete is superior than other building materials? Explain. **10**
b) Explain different types of cement. **10**

Q.3 a) Define soundness. How does it affect the concrete structures? **5**
b) Classify the aggregate according to particle size, shape and surface texture. **10**
c) How does the water absorption affect the W/Cs ratio in concrete, considering both for fine and coarse aggregates? **5**

Q.4 a) Write short notes on:

- i) Segregation.
- ii) Bleeding.

5
b) Define Duff Abram's water cement ratio law. **5**
c) Explain the properties of concrete in:

- i) Plastic state.
- ii) Hardened state.

10

PART-B

Q.5 a) Explain fly ash and silica fumes. How they affect the concrete? **10**
b) Define chemical admixtures. Explain their effect on concrete using various examples. **10**

Q.6 a) Explain concreting process in under water concreting. **10**

- b) Define self-compacting concrete and light weight concrete in detail. **10**
- Q.7 a) Discuss the objective of mix-design in concrete. **10**
- b) How normal concrete is different with controlled concrete? Explain. **10**

End Semester Examination, May 2016

B. Tech. – Third / Fifth Semester STRENGTH OF MATERIALS (C-306B / C-306C)

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.

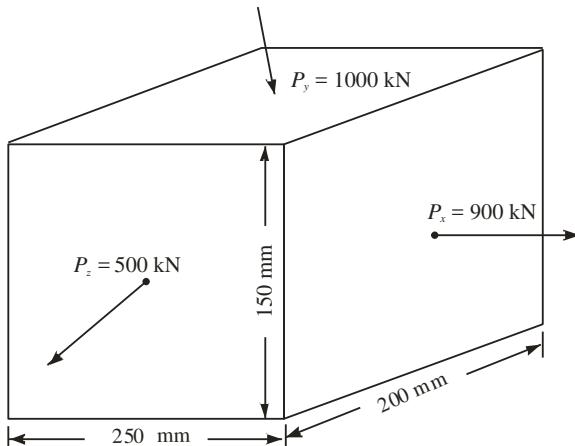
Q.1 Briefly answer:

- Define yield stress, ultimate stress and breaking stress of mild steel.
- What do you mean by principal stresses?
- Define neutral axis.
- Explain Mohr's circle.
- Draw stress – strain diagram for mild steel and mark the salient point.
- Write the formula to calculate shear stress in a given section.
- Define core of a section.
- What are the assumptions made in the analysis of shear stress?
- Differentiate between eccentric and concentric loading.
- Write down the formula for polar moment of inertia for a solid circular cross section.

2×10

PART-A

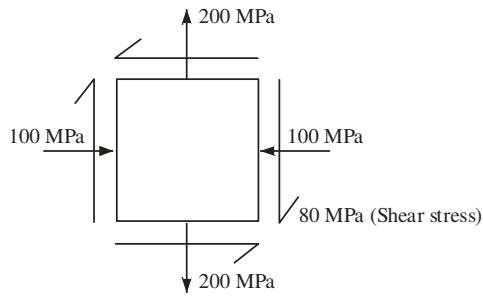
Q.2 a) Derive from the fundamental, the relation for the deformation of a uniform body, when it is subjected to its own weight. **10**
b) A rectangular block is subjected to axial load as shown in figure. Assuming Poisson's ratio as 0.25, and $E = 2 \times 10^5 \text{ N/mm}^2$, find the value of bulk modulus for the material and also calculate the change in the volume of the block due to application of the loading specified.



10

Q.3 Given the state of stress shown in the figure below. Find:

- Principal stresses and ii) maximum shearing stresses. Calculate the principal planes and maximum shear planes.



20

- Q.4 a) Write down the assumptions for theory of simple bending. **5**
 b) A $300 \text{ mm} \times 500 \text{ mm}$ rolled steel joist of I-section has flanges 12 mm thick and web 10 mm thick. Find out the uniformly distributed load that this section can carry over a span of 8 m if the permissible stress is limited to 150 N/mm^2 . **15**

PART-B

- Q.5 a) A rectangular beam $250 \text{ mm} \times 400 \text{ mm}$ supports udl of 50 kN/m over a simply supported span of 5 m. Determine maximum shear stress and average shear stress. **15**
 b) Show the variation of shear stress in i) I-section ii) T-section iii) Solid circular section iv) Hollow circular section. **5**
- Q.6 a) A short column of rectangular cross-section 400 mm wide and 600 mm deep carries a load of 1500 kN at an eccentricity of 50 mm. Compute the maximum and minimum stresses due to this load. **10**
 b) Find the core of a rectangular section of size $b \times d$. **10**
- Q.7 A shaft transmits 300 kW power at 120 r.p.m. Determine: a) necessary diameter of solid circular shaft b) the necessary diameter of hollow circular section, the inside diameter being $2/3$ of the external diameter. **20**

End Semester Examination, May 2016

B. Tech. – Fourth Semester

STRUCTURAL ANALYSIS-II (C-401A / C-401B)

Time: 3 hrs

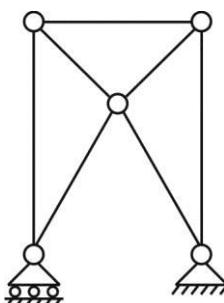
Max Marks: **100**

No. of pages: 3

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 indeterminate structures?
- b) Find the degree of internal, external and total indeterminacy of pin jointed frame.



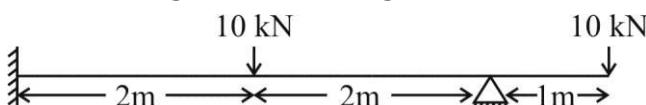
- c) Write down the general equation of Clapeyron's theorem of three moments.
- d) Write down the sign convention that we use in slope deflection method.
- e) What are the different conditions for which a portal frame sway?
- f) Define stiffness.
- g) Write down the expression for strain energy stored in a beam due to axial loading.
- h) What do you understand by first theorem of Castigliano?
- i) What is the second theorem of Castigliano?
- j) Write down the expression for horizontal thrust when a two hinged arch is subjected to an effect of temperature change.

2×10

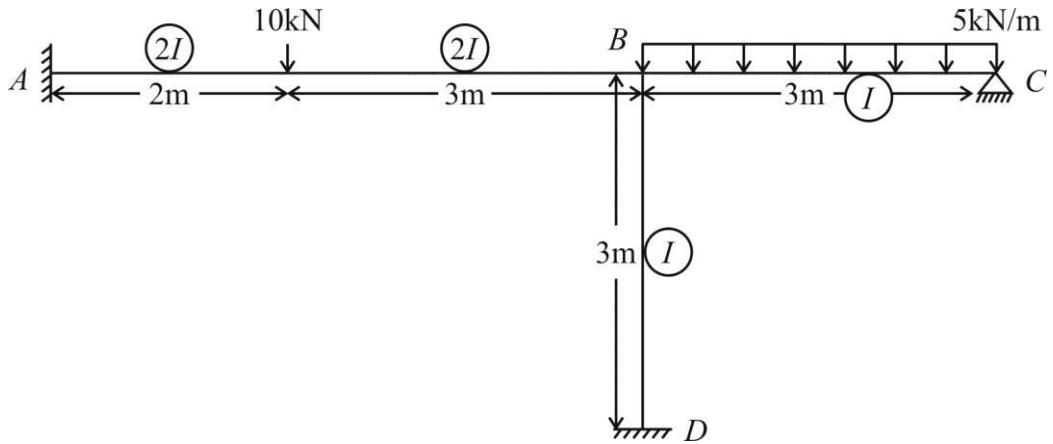
PART-A

Q.2 a) Find the reaction and fixing moment using Three Moment theorem.

8



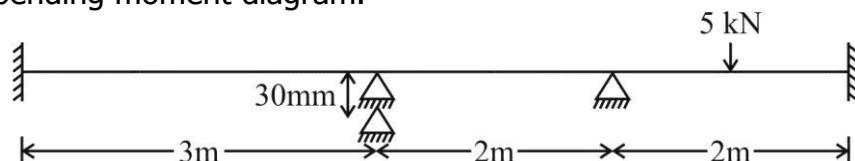
- b) A continuous beam ABC is supported on an elastic column BD and is loaded as shown in figure treating joint B as rigid, analyze the frame and plot bending moment diagram of the structure. Use slope deflection method.



12

Q.3 A continuous beam ABC is shown below:

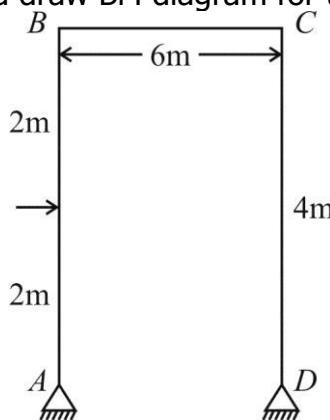
- Calculate the moment induced at the ends if the support B settle by 30 mm.
- Draw bending moment diagram.



Use moment distribution method.

10×2

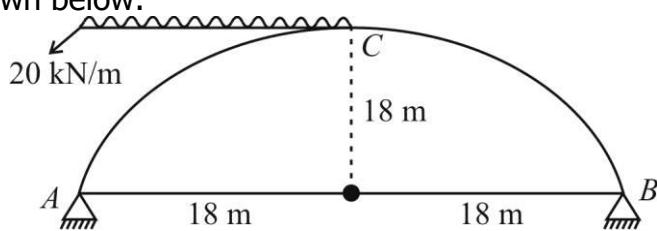
Q.4 A two hinged portal frame of uniform flexural rigidity consists of vertical column AB and CD of length 4m each and a horizontal beam BC 6m long. The column AB is subjected to a horizontal concentrated load 20 kN acting at the middle point of AB. Determine reactions at the supports and draw BM diagram for the frame.



20

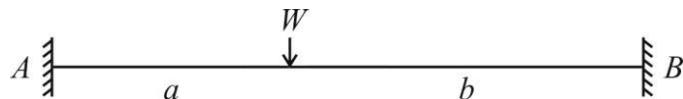
PART-B

Q.5 a) A semi-circular arch of radius R is subjected to a UDL of W/unit length over the entire span. Assume $EI = \text{constant}$, determine horizontal thrust. **12**
 b) Determine the horizontal thrust developed in the semicircular arch of radius 18 m loaded as shown below:



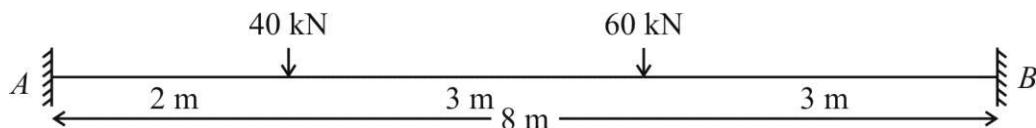
8

- Q.6 a) Using column analogy method, determine the end moment in the fixed beam of span L , subjected to a concentrated load W at a distance of ' a ' meter from A .



10

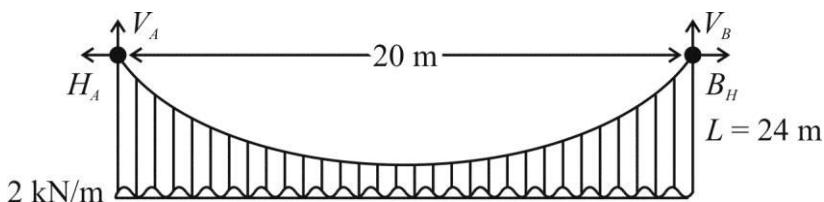
- b) Determine the end moment in the beam shown below:



Take $EI = \text{constant}$.

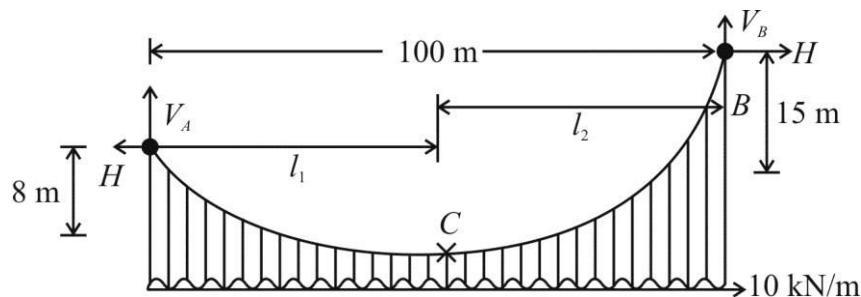
10

- Q.7 a) A light flexible cable 24 m long is supported at two ends at the same level. The supports are 20 m apart. The cable is subjected to UDL of 2kN/m of horizontal length over the entire span. Determine reactions developed at the support.



10

- b) A cable of span 100 m has its ends at heights 8 m and 15 m above lowest point on cable. It carries a UDL of 101CN/m per horizontal run of the span. Determine the horizontal and vertical reactions at the support. What is the length of the cable?



10

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1

 - a) What is the effect of curvature of the earth in trigonometric leveling?
 - b) Define axis-signal correction.
 - c) What do you understand by a "well conditioned triangle"?
 - d) Differentiate between triangulation and traversing.
 - e) What do you understand by "most probable error"?
 - f) What is "weight" of a quantity?
 - g) Define photogrammetry.
 - h) What is stereoscopic vision?
 - i) Define active remote sensing.
 - j) Write brief notes on GPS.

2x10

PART-A

- Q.2 a) Define terrestrial refraction and curvature corrections. State the formulae for curvature and refraction. **10**

b) A vertical angle of elevation was observed from a station P as $2^{\circ}32'25''$. Determine the true value of it if the height of instrument at P is 1.2m and height of signal at the other station Q is 5.2m. the two stations P and Q are 5200m apart. Take the value of $R \sin 1''$ as 30.88m. The coefficient of refraction may be assumed to be 0.07. **10**

Q.3 a) What is strength of figure? What are the criteria of selection of triangulation figures? **10**

b) Briefly describe about different system of frameworks and classification of triangulation system. **10**

Q.4 a) Define the terms:

 - Observed value of a quantity
 - Residual
 - Most probable value
 - Weight

b) On a station O, three horizontal angles, closing the horizon, were measured as follow:
 $\angle A = 34^{\circ}10'20'' \pm 3''$, $\angle B = 176^{\circ}40'32'' \pm 4''$ and $\angle C = 149^{\circ}09'04'' \pm 5''$
Calculate the corrected angles. **10**

PART-B

- iv) Longitude
- v) Declination

2x5

- Q.6 a) Define relief displacement. Derive an expression for displacement due to ground relief. **10**
- b) The scale of an aerial photograph 25cmx25cm is 1km= 10m. Determine the number of photographs required to cover an area of 20km x 15km, if the longitudinal overlap is 60% and the side overlap is 30%. **10**
- Q.7 a) Define remote sensing. What are the basic process and elements involved in electromagnetic remote sensing of earth resources? **10**
- b) Write short notes on application of i) GPS ii) GIS **10**

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1

 - a) Determine the mean target strength required for the mix design of M_{25} concrete.
 - b) Why does the code limit the compressive strength of concrete in structural design to $0.67 f_{ck}$ and not f_{ck} ?
 - c) Why is the partial safety factor for concrete greater than that for reinforcing steel in consideration of ultimate limit states?
 - d) Under what circumstances are doubly reinforced beams resorted to.
 - e) Differentiate the behaviour of one-way and two-way slabs.
 - f) Draw strain-diagram and stress diagram for a singly-reinforced beam as in limit state method.
 - g) What is development length? Write its formula for LSM.
 - h) An axially loaded column is of $300 \text{ mm} \times 300 \text{ mm}$ size. Unsupported length of column is 3m. What is the minimum eccentricity of the axial load for the column?
 - i) Classify columns on the basis of reinforcement type and slenderness ratio.
 - j) What are the different types of shallow foundations?

PART-A

- Q.2 a) Draw stress diagrams for balanced, under-reinforced and over-reinforced sections in working stress method. **9**

b) Find out the moment of resistance of balanced section of an R.C.C beam by working stress method.

Given B = 300 mm, D = 800 mm, Effective Cover = 50 mm.

Also find the area of steel for the same. M_u , concrete and E = 415 steel is used. **11**

Given B = 300 mm, D = 800 mm, Effective Cover = 50 mm.

Also find the area of steel for the same. M_{20} concrete and F_e 415 steel is used.

- Q.3 a) What is the difference between working stress method and limit state method? **6**

b) Calculate the moment of resistance of a rectangular R.C.C. beam of size $B = 350$ mm, $D = 650$ mm, Effective Cover = 50 mm when area of steel is:

 - 3 bars of 16 mm ϕ
 - 6 bars of 25 mm ϕ

Use limit state method of structural design. **7×2**

Use limit state method of structural design.

- Q.4 a) Give two examples of members in structures subjected to torsion. **4**
 b) A rectangular beam of size 300 mm \times 600 mm is subjected to a load of 60 kN/m over a simply supported span of 6.5 m. Design the beam for shear if % tension reinforcement is 1.2%. Use $M_{20}F_e$ 415 and LSM of design. **16**

PART-B

- Q.5 Design a slab of size 4.2 m × 5.5 m clear span supported over walls of 300 mm thickness. The slab is discontinuous over two adjacent edges. Use M_{25} concrete, F_e 415 steel.
Live load = 6 kN/m²

Floor finish = 50 mm thick cement concrete flooring. Provide torsion reinforcement where required. **20**

- Q.6 Design an R.C.C. column of size 450 mm × 600 mm subjected to an axial load of 2000 kN under service load condition. Unsupported length of column is 3m. Use M_{20} concrete and F_e 415 steel. The column is effectively held in position at both ends but not restrained against rotation. **20**
- Q.7 Design an isolated footing for a square column, 450 mm × 450 mm, carrying a service load of 2300 kN. Assume soil with a safe bearing capacity of 300 kN/m². Assume M_{20} grade concrete and F_e 415 grade steel for the footing. Assume any other data required. **20**

End Semester Examination, May 2016

B. Tech. – Fourth 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.** Each question carries equal marks.

Q.1 Describe in brief:

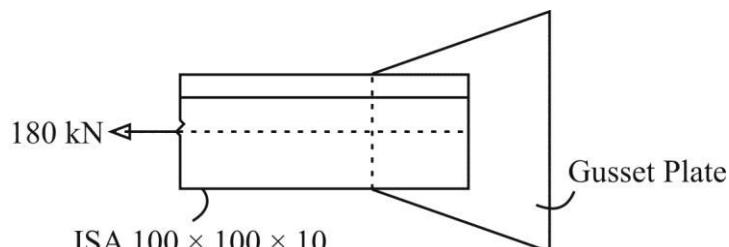
- a) Welded connection.
- b) Web crippling.
- c) Stress strain curve for mild steel.
- d) Net area of tension member.
- e) Slenderness ratio.
- f) Limit state method of design.
- g) Throat thickness.
- h) Curtailment of flanges.
- i) Plate girder
- j) Gantry girder.

2×10

PART-A

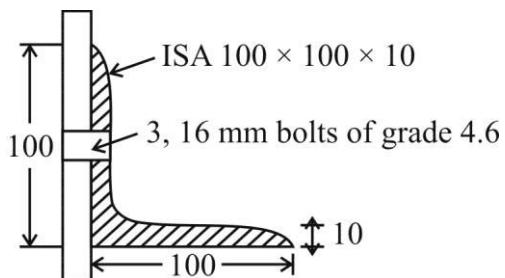
Q.2 a) Explain failure of bolted joints. **6**

b) Design the fillet weld for the ISA 100 × 100 × 10 subjected to an axial load of 180 kN and is connected to 12 mm thick gusset plate as shown in the figure.



14

Q.3 a) Determine the net effective area for the section shown in the figure. The steel is of grade Fe 410. The bolt holes have been punched. **10**



10

b) Determine the safe load carrying capacity of a 4 meter long column made of ISHB 250 @ 536.6 N/m with both ends restrained against rotation and translation. **10**

Q.4 a) Explain different types of column bases with neat sketches. **12**

b) Explain design procedure of column slab bases. **8**

PART-B

- Q.5 Design a laterally simply supported steel beam of effective span 6m subjected to uniformly distributed load of 20 kN/m. **20**
- Q.6 a) What are the different loads to which gantry girder is subjected? **10**
b) Explain the various applications of gantry girder. **10**
- Q.7 Design a critical section of a welded plate girder, 20 m in span laterally restrained throughout. It has to support a uniformly distributed load of 80 kN/m throughout the span exclusive of self-weight. The steel for flange and web plate is of grade Fe 410. **20**

End Semester Examination, May 2016

B. Tech. – Fourth Semester

DESIGN OF STEEL STRUCTURES-I (C-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.** Each question carries equal marks.

- Q.1 a) Define effective net area.
b) Explain web buckling.
c) Draw the stress-strain curve of steel mentioning its salient features.
d) Explain any two weld defects.
e) What is block shear failure?
f) Why is fillet weld preferred in comparison to butt weld?
g) Define slenderness ratio and effective length.
h) Write the equation for Euler's buckling load in case of compression members.
i) What are different types of load combination as per IS 800:2007?
j) Draw a sketch showing:
i) Double cover butt joint.
ii) Lap joint.

2×10

PART-A

- Q.2 a) Calculate the strength of 16 mm diameter bolt of grade 4.6 in a double cover butt joint, mean plates to be jointed are 12 mm, each cover plate 8 mm thick. **12**
b) Explain the following:
i) Groove weld.
ii) Slot weld.
iii) Plug weld.
iv) Fillet weld. **2×4**
- Q.3 a) Design a compression member to support a factored load of 1200 kN. The column has an effective length of 5.0m, with respect to z-axis and 7.0 m with respect to y-axis. Use steel of grade Fe 410. **14**
b) What is the use of splices in tension members? How can be they provided? **6**
- Q.4 Why are column bases needed? Explain the design procedure of slab base with appropriate diagram. **20**

PART-B

- Q.5 a) Design a laterally supported beam of effective span of 7 m for following date:
Grade of steel Fe 410.
Maximum bending moment $M = 100 \text{ kNm}$.
Maximum shear force, $V = 150 \text{ kN}$
Check for deflection not required. **16**
b) Explain web crippling with diagram. **4**
- Q.6 Explain the design procedure of gantry girder. **20**

- Q.7 Design a welded plate girder 20m in span and laterally restrained throughout. It has to support a uniform load of 100 kN/m throughout the span. Design the girder without intermediate transverse stiffeners. The steel for flange web plate is of grade Fe 410. **20**

End Semester Examination, May 2016

B. Tech. – Fourth / Fifth Semester
SOIL MECHANICS (C-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**
- a) What is relation between void ratio and porosity?
 - b) What do you understand by grain size distribution?
 - c) If voids of a soil mass are full of water only, the soil is termed as _____.
 - d) Why is study of permeability important?
 - e) What factors govern stress distribution?
 - f) An isobar is a curve which _____.
 - g) Define optimum moisture content.
 - h) Name different stages of consolidation with definition.
 - i) Write Mohr Columb's equation.
 - j) What is quick test?

2x10

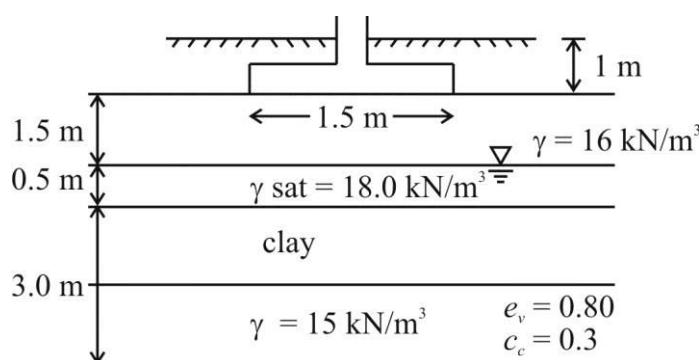
PART-A

- Q.2**
- a) Discuss Indian standard classification of soil in detail. **10**
 - b) Derive relation between dry unit, specific gravity and void ratio. **10**
- Q.3**
- a) Derive Laplace's equation for construction of flow net. **10**
 - b) State Darcy's law and define coefficient of permeability. What are the limitations in the application of Darcy's law of flow through soil media? **10**

- Q.4**
- a) Write brief explanation on:
 - i) Westergaard's analysis.
 - ii) Newmark's influence chart.**10**
 - b) A concentrated load of 20 T at the ground surface is applied. Find the intensity of vertical pressure at a depth of 10 m below ground surface situated on the axis of loading. What will be the vertical pressure at a point at a depth 5 m and at a distance 2 m from the axis? **10**

PART-B

- Q.5**
- a) What is effect of compaction of engineering properties of soil? **10**
 - b) Explain with neat diagram standard Procter test. **10**
- Q.6**
- a) A footing has a size of 3.0 m by 1.5 m and it causes a pressure increment of 200 kN/m^3 at its base. Determine the consolidation settlement at the middle of the clay layer. Assume 2:1 pressure distribution and consider the variation of pressure across the depth of clay layer $\gamma_w = 10 \text{ kN/m}^3$.



10

- b) Explain Terzaghi's theory of consolidation, stating the various assumptions and their validity. **10**

- Q.7 a) A shear vane of 7.5 cm dia and 11.0 cm length was used to measure the shear strength of soft clay. If a torque of 600 N-m was required to shear the soil, calculate the shear strength. **5**
- b) Discuss tri-axial shear test. What are its merits and demerits? **10**
- c) What are different modes of application of shear force? Explain. **5**

End Semester Examination, May 2016
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.** Each question carries equal marks.

- Q.1

 - a) List subdivision of geology.
 - b) Name two of the earth's atmospheric agents responsible for weathering.
 - c) What is a seismogram?
 - d) Name any four metamorphic rocks.
 - e) Draw a sketch to show hanging wall, footwall of a fault.
 - f) How do you identify folded strata?
 - g) What are objectives of groundwater investigation?
 - h) List out uses of geological maps.
 - i) Define artificial recharge.
 - j) What is a dam?

2x10

PART-A

PART-B

- Q.5 a) Give an account of all major types of folds. Describe difference between symmetrical and asymmetrical folds. Also mention engineering considerations of studying folds. **15**

b) Define the following terms:

i) Out crops	ii) Dip	iii) Strike
iv) Bedding plane	v) Fault	1x5

Q.6 a) Describe briefly the problems of underground water in engineering construction such as dams and reservoirs, road pavements, tunnels and water retaining structures. **10**

b) Write a short note on geological investigation. **10**

- Q.7 a) Give a broad account of geological conditions that influence the stability of a road cut. **10**
- b) In a long bridge construction, the condition of and depth of bed rock play a great role in design and stability of the structure. Discuss in detail. **10**

End Semester Examination, May 2016

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

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) Define viscosity.
b) Write expression for surface tension in a droplet.
c) State Archimedes principle of buoyancy.
d) List pressure measuring devices.
e) What are streak lines and path lines?
f) Classify different types of flows.
g) What are HGL and TEL?
h) What is the difference between prototype and model?
i) What is the difference between pipe flow and open channel flow?
j) What is the expression of Froude number? **2x10**

PART-A

- Q.2 a) Explain why in a capillarity tube, the meniscus of water is concave upwards. **5**
b) Derive the relation between units of viscosity in different systems of measurement. **5**
c) Calculate dynamic viscosity of oil which is used for lubrication between a square plate of size 0.6 m x 0.6 m and an inclined plate with an angle of inclination of 25°. The weight of square plate is 250 N and it slides down the inclined plane with a uniform velocity of 0.6 m/s. Thickness of film is 3 mm. **5**
d) Calculate the capillary effect in mm in a glass tube of 6 mm dia when immersed in i) water ii) mercury. The temperature of the liquid is 20° C and the values of surface tension of water and mercury at 20°C in contact with air are 0.0625 N/m and 0.57 N/m respectively. **5**
- Q.3 a) Define center of pressure and total pressure. Derive an expression for center of pressure and total pressure on a vertical plane surface submerged in liquid. **10**
b) Define metacentric height. A solid cylinder of 4 m diameter has a height of 4 m. Find the metacentric height of cylinder if the Sp.gr of the material is 0.6 and it is floating in water with its axis vertical. State the condition of equilibrium. **10**
- Q.4 a) Define velocity potential and stream functions and derive corresponding Laplace equations and rotational components. **10**
b) The velocity potential function for a 2D flow $\phi = (x^2 - y^2)$, determine the velocity at the point (2, 3) and also obtain the value of stream function at the same point. **10**

PART-B

- Q.5 a) State assumptions and derive Euler's equation of motion. **10**
b) Three pipes of 400 mm, 200 mm, and 300 mm diameter have lengths of 400 m, 200 m and 300 m respectively. They are connected in series to make a compound pipe. The ends of this compound pipe are connected with two tanks whose difference of water level is 16 m if coefficient of friction for these pipes is same and

equal to 0.005. Determine the discharge through the compound pipe including minor losses. **10**

Q.6 a) What do you understand by displacement thickness and momentum thickness and also explain the factors affecting the boundary layer thickness? **8**

b) The resistance R experienced by a partially submerged body depends upon the velocity V , length of the body L , viscosity of the fluid μ , density of the fluid ρ , and gravitational acceleration g . Obtain a dimensionless expression for R by Buckingham π -method. **12**

Q.7 a) Give classification and explain complete working of any turbine along with neat sketches of components. **10**

b) Derive expression of most economical rectangular section for a flow in open channel. **10**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

TRANSPORTATION ENGINEERING-I (C-501)

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 answer:

- Write two main features of Roman roads.
- Why we do map study in engineering surveys?
- List different types of road patterns.
- What is off tracking?
- With a neat sketch show two warning signs and two regulatory signs. Mention their names properly.
- Write aligning a hill road with a ruling gradient of 5.8%, a horizontal curve of radius 50 m is encountered. Find the grade compensation and the compensated gradient at the curve.
- What is purpose of ballast?
- Explain ESWL.
- What is the objective of providing contraction joints in CC pavements?
- A vehicle was stopped in 1.5 sec. by fully jamming the brakes and the skid marks measured 7.8 m. Determine the average skid resistance developed.

2x10

PART-A

Q.2 a) Briefly outline the highway development in India during the 20th century. **5**

b) There are five alternate proposals of road plans for a 'backward district'. The details are given below. Justify with reasons which proposal is the best assuming utility units of 0.5, 1.0, 2, 4 and 8 for the five population ranges and utility units of 1.0 and 5.0 per 1000 tonnes of agricultural and industrial products served.

Proposal	Road Length	No. of towns and villages served with population range					Productively in 1000 tonnes	
		<2000	2001 – 5000	5001 – 10000	10001 – 20000	>20000	Agriculture	Industrial
P	500	100	150	40	20	3	150	20
Q	600	200	250	68	28	3	220	25
R	700	270	350	82	36	4	300	35
S	800	280	410	91	41	4	400	42
T	900	290	430	96	44	4	430	45

5

c) What are the policies and goals of the third road development plan for 1981 –2001? Determine the length of different categories of roads in a State of India by the year 2001, using the following data: total area of State= 80000 km², total number of towns as per 1981 census = 86, overall road density aimed at = 82 km per 100 km² area. **10**

Q.3 a) What are the objectives of preliminary survey for the alignments? Enumerate the details to be collected and the steps in the conventional method. **10**

- b) Explain with sketches the various factors controlling the alignment of the road. **10**
- Q.4** a) A state highway passing through a rolling terrain has a horizontal curve of radius equal to the ruling radius.
 i) Design all the geometric features of this horizontal curve, assuming suitable data.
 ii) Specify the minimum set back distance from the centre line of the two lane highway on the inner side of the curve upto which the buildings etc. obstructing vision should not be constructed so that intermediate sight distance is available throughout the circular curve. Assume the length of circular curve greater than the sight distance. **15**
- b) An ascending gradient of 1 in 100 meets a descending gradient of 1 in 120. A summit curve is to be designed for a speed of 80 kmph so as to have an overtaking sight distance of 480 m. **5**

PART-B

- Q.5** a) What is significance of road user characteristics in traffic engineering? Discuss in detail the factors which affect the road user characteristics and their effects in traffic performance. **10**
 b) What are advantages and disadvantages of traffic signals? **5**
 c) Enumerate the various types of intersections and bring out the basic principles. **5**
- Q.6** a) Draw a sketch of flexible pavement cross-section and show its components. Enumerate the functions and importance of each component of the pavement. Also write down the factors to be considered for the design of flexible pavements. **10**
 b) Using the data given below, calculate the wheel load stresses at a) interior b) edge and c) corner, regions of a cement concrete pavement using Wertergaard's stress equations. Also determine the probable location where the crack is likely to develop due to corner loading.
 Wheel load = 5100 kg, modulus of elasticity of CC = 3×10^5 kg/cm, pavement thickness = 25 cm, Poisson's ratio of concrete = 0.15, modulus of subgrade reaction = 12 kg/cm³, radius of contact area = 16 cm. **10**
- Q.7** a) Explain the wind rose diagram, mention the two types of wind rose diagrams with proper figure. **10**
 b) What are sleepers? Explain the function and types of sleepers in detail. What are the various materials used in sleeper construction? **10**

End Semester Examination, May 2016

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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) Define domestic water demand.
- b) What is the full form of 'CPHEEO'?
- c) What do you understand by 'Per Capita Water Demand'?
- d) Write the permissible limit of Nitrates and Chlorides.
- e) Write two types of common water-borne diseases.
- f) What is the full form of 'JTU' and VNTU'.
- g) What is super chlorination?
- h) Write the chemical formula of alum.
- i) Write down the formula of 'Stoke's law'.
- j) Name all the filter media used in dual media filter.

2×10

PART-A

- Q.2**
- a) Explain the variations and fluctuations in rate of water demand of a society. **10**
 - b) Estimate the population in 2021 for the following data by:
 - i) Arithmetical increase method.
 - ii) Geometric Increase method.

Year:	1981	1991	2001	2011
Population:	10000	15000	20000	25000

10

- Q.3**
- a) Define temporary hardness and permanent hardness and process of their removal. **10**
 - b) Wastewater from a factory having pH=8 contains KOH only. Find the total quantity of KOH per day if the wastewater discharge is $100 \text{ m}^3/\text{day}$. **10**

- Q.4**
- a) What is an intake? Explain how the location and site of intake are selected. **10**
 - b) Find the settling velocity of spherical silica particle of size $4 \times 10^{-3}\text{cm}$. The specific gravity is 2.67 and the kinematic viscosity of water at 20°C is $1.01 \times 4 \times 10^{-2}\text{cm}^2/\text{s}$. If the specific gravity of another particle of identical size is 0.9, also check at what rate the particle will rise or settle down. **10**

PART-B

- Q.5**
- a) Explain the process of water softening. Describe the necessity of water softening. **10**
 - b) Determine the quantity of copperas and lime required per year to treat 4×10^6 litre/day, if 11mg/l of copperas is consumed with lime at a coagulation basin. **10**

- Q.6**
- Design a bell mouth canal intake for a city of 80000 persons drawing water from a canal which runs for 10 hours a day with a depth of 1.8 m. The treatment works are $\frac{1}{2}$ km away. Assume average consumption per person is 150 litres/day. Assume the velocity through the screen and bell mouth to be less than 16 cm/sec and 32 cm/sec respectively.

Compute the following:

- a) Discharge through intake.
- b) Design of Coarse screen.
- c) Design of bell mouth entry.
- d) Design of intake conduit.
- e) Draw a sketch of the canal intake.

4×5

- Q.7 a) Explain all methods of detection of leaks and wastage of water in the distribution system. **10**
- b) Write the function of distribution reservoir. Explain how the total capacity of are reservoir can be estimated. **10**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

IRRIGATION ENGINEERING-I (C-503A)

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 Write short notes on:

- a) Differentiate between weir and barrage.
- b) Role of roughening devices.
- c) Most economical sections.
- d) Flexibility of an outlet.
- e) Utility of escapes.
- f) Hydraulic gradient line.
- g) Cross drainage works.
- h) Total energy line.
- i) Phreatic line.
- j) Ogee spillway.

2x10

PART-A

Q.2 a) What are canal falls? Explain their necessity. Also describe the design parameters of Sarda fall with a neat sketch. **10**
 b) What are canal diversion headworks? What are the considerations for selection of site for diversion headworks? **10**

Q.3 a) List the advantages of lining a canal. **5**
 b) What are the different types of outlets? Describe anyone in detail. **5**
 c) Design an alluvial channel with discharge $27 \text{ m}^3/\text{sec}$ and silt factor 1.1. **10**

Q.4 a) Differentiate between cross head regulator and distributary head regulator with the help of diagrams showing the alignment and location of both. **10**
 b) Describe different modes of failures of hydraulic structures on permeable foundations. Also describe the corrective measure suggested by Bligh. **10**

PART-B

Q.5 a) Classify different cross drainage works along with their structures. **5**
 b) For the given data, design drainage and canal waterways, bed levels at different canal sections and design of transitions:
 Canal discharge = $45 \text{ m}^3/\text{s}$
 Bed width of canal = 30 m
 Full Supply Depth = 1.6 m
 Bed level of canal = 206.4 m
 Side slopes of canal = 1.5 H : 1 V
 High Flood discharge = $500 \text{ m}^3/\text{s}$
 High Flood Level = 207 m
 Bed level of drainage = 204.5 m
 General ground level = 206.5 m **15**

- Q.6**
- a) Describe the types of dams as classified by the material used for construction.
 - b) List the merits and demerits of Gravity dams.
 - c) An earth dam made of homogenous material has the following data:
 Coefficient of permeability of dam material = 5×10^{-4} cm/sec
 Level of top of dam = 200 m
 Level of deepest river bed = 178 m
 H. F. L. of reservoir = 197.5 m
 Width of top of dam = 4.5 m
 Upstream slope = 3:1
 Downstream slope = 2:1
 Determine the phreatic line and the discharge passing through the dam if a horizontal filter of length 30 m is provided inward from the downstream toe of the dam.
- 10**
- Q.7**
- a) How to calculate or fix the spillway capacity for a storage dam?
 - b) Describe under what condition we provide:
 - i) Shaft spillway.
 - ii) Saddle siphon spillway.
 - iii) Side channel spillway.
- Support answer with sketches.
- 12**

End Semester Examination, May 2016

B. Tech. – Fifth / Sixth Semester

BRIDGE ENGINEERING (C-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 Write short notes on:

- a) Normal scomdepth.
- b) Erection stress.
- c) Seismic forces.
- d) Longitudinal girder T-beam bridge.
- e) Flanges in plate girder bridge.
- f) Lateral bracing.
- g) Staining.
- h) Pile foundation.
- i) Well cap.
- j) Curb.

2x10

PART-A

- Q.2 a) Briefly explain the different phases of bridge design. **10**
- b) Determine the water way with a flood discharge of $200 \text{ m}^3/\text{sec}$ velocity 1.5 m/sec and width of flow at HFL 55 m , is the allowable velocity under the bridge is 1.8 m/sec . **10**
- Q.3 a) Define the following terms:
i) Thermal forces.
ii) Deformation and horizontal forces.
iii) Erection stresses.
iv) Seismic forces.
v) Impact effect, if span > 9 m. **5x2**
- b) Explain briefly the following loads:
i) IRC class AA loading.
ii) IRC class A and B loading. **5x2**
- Q.4 a) Explain briefly **any two** of the following:
i) Rankine-Grashoff method.
ii) Diagonal methdod.
iii) Waster guards.
iv) Pigcauds method **10**
- b) Design T-beam bridge for the following data; design bridge deck,
Flood discharge = $30 \text{ m}^3/\text{sec}$, bed width=12 m, Gide slope 1:1, bed level =50 m, HFL=51.25 mm maximum allowable afflux=1.52 m, general ground level=52 m, hard roch available at 48 m, road formation level =54 m, National highway 2 lane, Foot path 1 m wide on either side, loading IRC class AA, M25 concrete, Fe 415 steel, number of longitudinal girder=3. **10**

PART-B

- Q.5** a) What are different shape of piers? Explain briefly solid piers and different type of load on piers. **10**
b) Verify the stability analysis procedure of abutment. **10**
- Q.6** a) Design a well foundation for a bridge using the following particulars:
Diameter of the well : 3 m
Depth of the well : 15 m
Type of soil : stiff clay
Materials : M25 concrete, Fe 415 steel. **10**
b) Briefly explain the following:
i) Well foundation.
ii) Pile foundation. **5x2**
- Q.7** a) Briefly explain different components of a plate girder bridge. **10**
b) Using the following particulars to design a plate girder bridge for a broad gauge track
Span=25 m
Top level of railway embankment : 115 m
Bed level of the stream : 100 m
Ground level suitable for foundation =98 m
Stream bund top level = 101.5 m **10**

End Semester Examination, May 2016

B. Tech. – Fifth / Sixth Semester
BRIDGE ENGINEERING (C-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 Explain briefly:

- a) IRC class-A loading.
- b) Pier and abatement.
- c) Tracked and wheeled load.
- d) Impact factor.
- e) Culvert and Kerb.
- f) Wearing coarse.
- g) (BOT) Projects.
- h) Ease water and cut water.
- i) Appurtenances in bridge.
- j) Pigeaud's method.

2×10

PART-A

Q.2 a) Draw a neat and clean sketch of a bridge and label its components. **10**

b) What is economical span of bridge? What are the loads to be considered in bridge design? **10**

Q.3 a) Explain with a neat and clean diagram of 70 R loading. **10**

b) Explain impact effects or seismic effects on the bridge. **10**

Q.4 a) Explain various types of R.C.C. Bridges. Explain any one in detail. **10**

b) Calculate design bending moment for the R.C. slab culvert for the following data:

Width of bridge = 12.0 m

Clear span = 5.0 m

Height of vent = 3.0 m

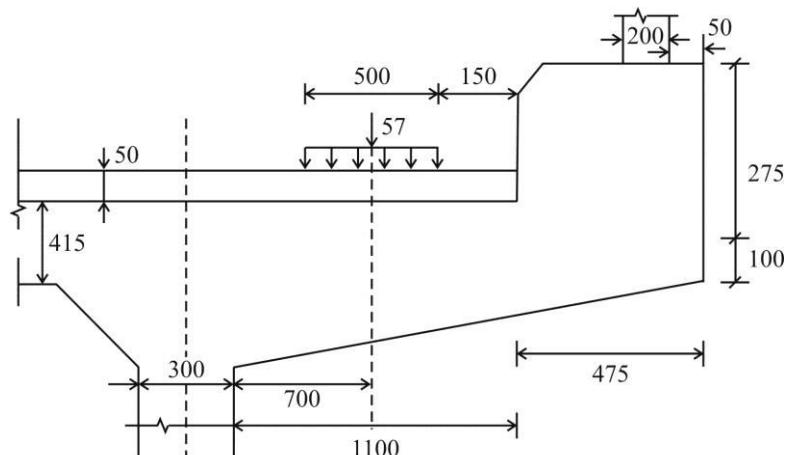
Depth of foundation = 1.35 m

Wearing coarse = 56 mm

Assume any suitable data if required. **10**

OR

Design the cantilever slab for the T-beam bridge as shown below. Given that live load for meter width including impact = 68.95 kN.



PART-B

- Q.5**

 - a) What are the advantages of steel bridges over R.C.C. bridges? **5**
 - b) What are the different types of steel bridges? Explain any one in brief with sketch. **5**
 - c) Design a steel beam culvert with following data:
 Clear span = 5 m
 Dead load due to track = 7.5 kN/m
 Equivalent uniform load due to live load for B.M = 741 kN
 Equivalent Udl for shear = 888 kN
 CDA = 0.877
 Adopt any suitable data if needed. **10**

Q.6

 - a) What is pier? Draw its typical sketch. **5**
 - b) Why bearings in bridge are important? What are the different types of expansion and fixed bearings? Explain any two in details with sketches. **15**

Q.7

 - a) What is grip length in foundation? **5**
 - b) What are the different components of a well foundation? **5**
 - c) How will you calculate load carrying capacity of a single pile and load carrying capacity of a pile group? **10**

End Semester Examination, May 2016
B. Tech. – Fifth / Sixth Semester
DESIGN OF CONCRETE STRUCTURES-II (C-601)

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) Give two advantages of pre-stressed concrete.
 b) Draw the sketch of intze tank.
 c) Define the elevated tank.
 d) Why is raft foundation provided?
 e) Define post-tensioning.
 f) Define anchorage.
 g) Explain plastic hinge formation in continuous beam.
 h) Define flat slab and list down its types.
 i) Describe the steel for pre-stressing.
 j) Draw the sketch of open-well staircase.

2x10

PART-A

- Q.2 Design a continuous beam of two spans supported on stone masonry walls using the limit state method and allowing for 20% redistribution of moments. Adopt M-20 grade concrete and Fe-415 HYSD bars. And use the following data:

Clear span between supports = 6 m

Width of masonry supports = 300 mm

Thickness of slab = 150 mm

Spacing of continuous beams = 3 m c/c

Self weight of floor finish = 0.5 kN/m^2

Service live load = 5 kN/m^2 .

Draw the reinforcement details as per IS:456:2000.

20

- Q.3 Design the interior panel of flat slab floor system for a ware house $24m \times 24m$ divided into panels of $7m \times 7m$.

Loading class = 6 kN/m^2

Materials: M20 grade concrete

Fe 415 HYSD

Column size: 400 mm diameter

Sketch the reinforcement details of interior panel of slab.

20

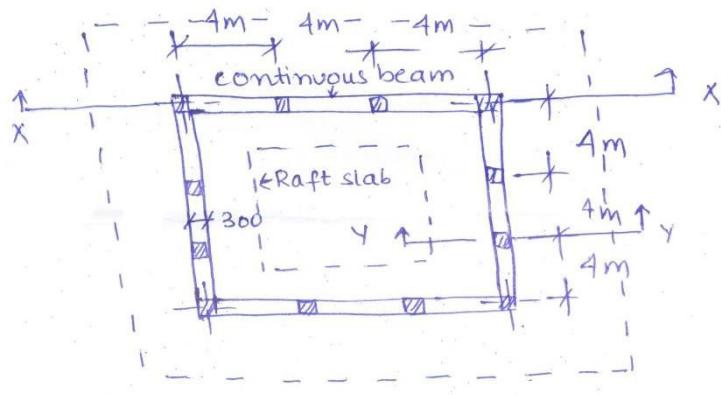
- Q.4 Design a suitable continuous raft foundation connecting the columns of a building $12 \text{ m} \times 12 \text{ m}$ shown in the figure. To suit the following data:

Size of building = $12 \text{ m} \times 12 \text{ m}$

Spacing of columns all round = 4 m intervals.

Service load transmitted = 525 kN on each column.

20



Plan of raft foundation.

Size of columns = 300 mm x 300 mm

Safe bearing capacity of soil = 100 kN/m^2

Materials: M-20 grade concrete
Fe-415 HYSD bars.

Use percentage of reinforcement $\rho_t = 0.737$ for raft slab and $\rho_t = 0.781$ for continuous beams over raft slab. Draw the reinforcement details at the section X-X and Y-Y of figure. **20**

PART-B

- Q.5 a) Give the assumptions of Janssen's theory. **3**
 b) Discuss the difference between the bunker and silos. Draw sketches also. **7**
 c) Design a section to resist a bending moment of 15 kNm per meter width producing tension on water face. Use M₂₅ concrete and Fe 415 grade steel.
 [take $\sigma_{cb'} = 8.5 \text{ MPa}$, $\sigma_{bt'} = 1.8 \text{ MPa}$, $m = 11$, $\sigma_{st} = 150 \text{ MPa}10$
- Q.6 a) Define the losses of pre-stress. **2**
 b) Describe the various losses of pre-stressed concrete. **8**
 c) A concrete beam of rectangular section, 100 mm wide and 300 mm deep, is pre-stressed by five wires of 7 mm diameter located at eccentricity of 50 mm, the initial stress in the wires being 1200 N/mm^2 . Estimate the percentage loss of stress in steel due to creep of concrete. Use creep coefficient method.
 Use following data:
 $E_s = 210 \text{ kN/mm}^2$
 $E_c = 35 \text{ kN/mm}^2$
 $A = 3 \times 10^4 \text{ mm}^2$
 Creep coefficient $\phi = 1.6$ **10**
- Q.7 a) What are the assumptions of cantilever method? **3**
 b) What is the effect of horizontal loads on multistorey buildings? Explain the need of bracing. **10**
 c) Explain tube structures with the help of diagrams. **7**

End Semester Examination, May 2016

B. Tech. – Sixth Semester

DESIGN OF STEEL STRUCTURES-II (C-602)

Time: 3 hrs

Max Marks: **100**

No. of pages: **3**

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 beam mechanism.
b) Define plastic moment.
c) Write down classification of class of industrial building.
d) What do you understand by permeability of industrial building give their different type?
e) Define upper and lower steel stay and their purpose in tank.
f) Define with neat sketch self supported stack and goyed steel stack.
g) Differentiate between self supported towers and masts.
h) Write down expression for self wt of stack and self wt of five brick liner in steel stack and their stresses in N/mm².
i) What do you understand by form factor in light gauge steel section?
j) Explain design effective width and web crippling. **2x10**

PART-A

- Q.2 a) Explain material behavior of steel section with neat sketch. **2**
b) Discuss the concept of plastic moment carrying capacity of a member.

Show $M_p = \sigma_y \cdot \frac{A}{2} (\bar{x}_1 + \bar{x}_2)$

Find out plastic moment of a rectangular section of width = 3m and depth = 2m and $\sigma_y = 250 \text{ N/mm}^2$ **5**

- c) (i) Find out plastic moment carrying capacity of a portal from shown figure.
(ii) ;Find out rolled steel section if $\sigma_y = 250 \text{ N/mm}^2$ and shape factor of rolled steel section as 1.12

10

- Q.3 a) An industrial building is to be built at Gauhati near a small hill. The hill is 160m high with a slope or 1 vertical to 3 horizontal, the building is planned to be provided at a height of 120m above the base of the hill. The terrain may be considered as an open terrain with scattered obstruction. The height of obstruction being in the range of 1.5m to 10m above the ground level. The building is to have a height of 18m. Find the design wind pressure assume the building size in the range of 20m to 50m and its life period is 50 years.

10

- b) Determine the wind pressure to be considered on a sloping roof under the following condition.
- When the wind blows normal to the ridge.
 - When wind blows parallel to ridge.
- And with the following data:
- Building is located in Delhi
 - Span of roof = 12m
 - Inclination of roof with horizontal = $\alpha = 30^\circ$.
 - Ht of eaves above ground level = 6m
 - $K_1 = 1, K_2 = 0.85, K_3 = 1.0$
 - Assume low permeability or normal permeability.

10

- Q.4 a) An elevated rectangular steel water tank open at top is required to have a capacity of 91500 litres with a free board not less than 150mm. The bottom of tank is at 10m above ground levels using 1.25m x 1.25m standard pressed steel plates.

Allowable stress in axial tension

$$0.8 \times 0.6 \times 250 \text{ N/mm}^2$$

Unit wt of water = 10 kN/m^3

Use of IS code 894 and 800

Longitudinal beam is laterally on supported allowable bending stress = 90 N/mm^2
Cross beam is laterally on supported, allowable bending stress = 94 N/mm^2

Design:

- Pressed steel tank
- Upper slotted stay
- One of the longitudinal beam laterally unsupported.
- Cross sectional beam laterally unsupported.

16

- b) Explain different type of pressed steel tank and show arrangement of internal and external flange.

4

PART-B

- Q.5 a) Find out reaction R_c and R_b , shear at the collar and base, maximum bending moment of Guyed steel stack.

10

- b) Design welded self supported steel stack located in outskirts of Chandigarh for the following data:

Terrain category	= 01
Topography	= almost flat
Height of stack	= 100mm
Diameter of stack	= 3.0m
Thickness of brick lining	= 100mm
Corrosion allowance	= 3mm

Design self supported stack for thickness of each segment.

Use butt-weld with efficiency 85%, σ_u = allowable tensile stress $= 127.5 \text{ N/mm}^2$.

Take allowable compressive stress from IS code 6533 part – 1 (as per assumed thickness of segment). **10**

- Q.6** a) Concept for analysis and design of lattice towers. Explain for the following base:
- i) Square base
 - ii) Triangular base
 - iii) Multi post tower base **10**
- b) Briefly explain with sketch of masts. What are different type of load subjected with masts? **5**
- c) Briefly explain the configuration of lattice towers and various type of load acting on lattice towers. **5**
- Q.7** a) Explain the following terms:
- i) Stiffened compression element
 - ii) Unstiffened compression element
 - iii) Multiple stiffened element **3**
- b) Explain effective design width and stress curve. **2**
- c) Find the column section properties and allowable load for the column section shown in figure. The effective length of the column is 3.5m. Take $f_y = 235 \text{ N/mm}^2$.

15

End Semester Examination, May 2016

B. Tech. – Sixth Semester

DESIGN OF STEEL STRUCTURES-II (C-602)

Time: 3 hrs

Max Marks: **100**

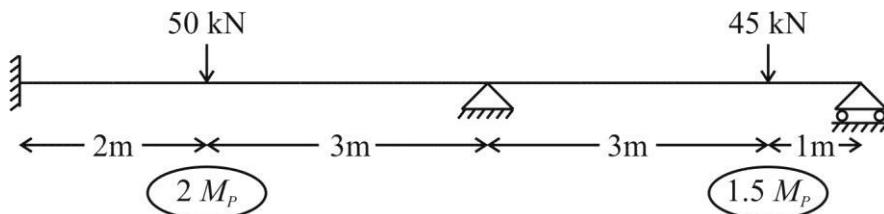
No. of pages: **2**

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

- Q.1 a) Define shape factor.
b) What is a plastic hinge?
c) What is the role of purlin in an industrial building?
d) If $V_b = 55 \text{ m/sec}$, $k_1 = 0.89$, $k_2 = 1.22$ and $k_3 = 1.0$; what is the design wind pressure?
e) How the permissible stresses modified in case of water tank?
f) What is a stand-pipe?
g) What is a guyed steel stack?
h) Draw the constructional details of a self-supporting chimney.
i) Differentiate between mast and tower.
j) How are cold formed sections rolled? **2x10**

PART-A

- Q.2 a) What is lower bound theorem and upper bound theorem? **5**
b) Determine the M_p required for the beam upto collapse shown in the figure below. Find the beam section if yield stress and shape factor of rolled steel beam section are 250 N/mm^2 and 1.12 respectively.



15

- Q.3 a) Explain the following:
i) Principal rafter.
ii) Sag rods. **2½x2**
b) Design angle purlin for the following data:
Spacing of trusses = 3 m
Spacing of purlins = 1.45 m
Weight of AC sheets including fixtures = 0.205 kN/m^2
Live load = 0.6 kN/m^2
Wind load = 1 kN/m^2 (SUCTION)
Inclination of rafter of truss = 23° **15**

- Q.4 a) Write short note on circular tank. **5**
b) Find the loads acting on the end longitudinal top tier beam of an elevated pressed steel tank of 1,25,000 litres capacity. **15**

PART-B

- Q.5 a) Describe the forces acting on a stack. **5**
b) Compute the wind pressures at various sections for a self-supported steel stack located at the outskirts of Bhopal.

Diameter of shaft = 3 m		
Height above foundation = 75 m		
Terrain category = 2		
Topography almost flat, thickness of lining = 100 mm	15	
Q.6	a) Give the guidelines for the structural configuration of a tower.	10
	b) Explain different types of towers with sketches.	10
Q.7	a) What are the advantages of cold formed sections?	5
	b) What do you understand by stiffened and unstiffened compression elements?	5
	c) Explain concept of effective width of light gauge steel with a neat sketch.	10

End Semester Examination, May 2016

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 Write short notes on:

- a) Safe exit gradient.
- b) Utility of a weir.
- c) Super-passage.
- d) Stilling basins.
- e) Hydraulic jump.
- f) Meander ratio.
- g) Necessity of canal falls.
- h) Flood routing in rivers.
- i) Middle-third rule.
- j) Earthquake forces in a dam.

2×10

PART-A

Q.2 a) Describe Khosla's theory in detail. Also explain the procedure to calculate the exit gradient. **10**

b) Describe Bligh's Creep Theory with the corrections given against failure of hydraulic structures made on permeable foundations. **10**

Q.3 a) What are the different types of river training works available? Describe in detail with sketches. **10**

b) The following data pertains to a bridge site of a river:

Flood discharge: 14000 cumecs

H.F.L. = 286m

River Bed = 280m

Average diameter of the river bed material=0.10mm

Work out various components of the guide bank along with launching apron to train the river. Draw a neat sketch showing the components. **10**

Q.4 a) What are cross drainage works? Describe the different types of cross drainage works with their diagrams. **12**

b) Explain the design principles for design of a syphon aqueduct in brief. **8**

PART-B

Q.5 a) What is meant by an 'energy dissipater'? Discuss the various methods used for energy dissipation below spillways. **10**

b) Enumerate the different types of spillways and draw neat sketches showing different components. **10**

Q.6 a) Design a 1.5 meters Sarda type fall for canal having a discharge of 13 cumecs with the following data:

Bed level upstream=103 m

Side slopes of channel = 1:1 m

Bed level downstream = 101.5 m

Full supply level upstream = 104.5 m

Bed width upstream and downstream = 1 m

Assume Bligh's coefficient = 6

12

- b) What are sloping glacis falls? Explain the manner of energy dissipation in sloping glacis falls. **8**

- Q.7 a) Discuss the two-dimensional stability analysis for a gravity dam. State the assumptions and describe the procedure in detail. **12**
- b) Describe the forces acting on a gravity dam along with a neat sketch. **8**

End Semester Examination, May 2016

B. Tech. – Sixth Semester

TRANSPORTATION ENGINEERING-II (C-604)

Time: 3 hrs

Max Marks: **100**

No. of pages: 2

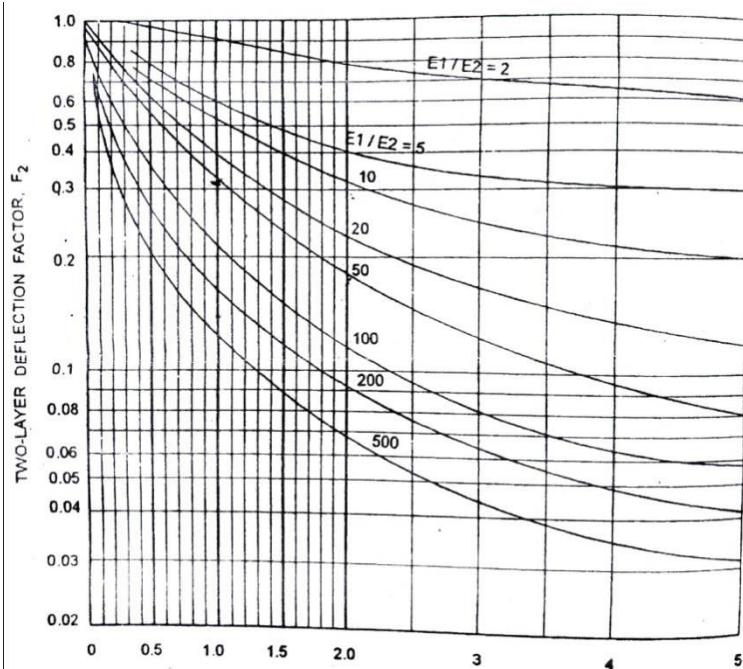
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B**. Each question carries equal marks.

- Q.1
- a) What is the fourth power law?
 - b) Find out the value of CBR if pressure carried by a CBR specimen at 2.5 mm penetration is 3.5 N/mm^2 .
 - c) What is the function of dowel bar in joints?
 - d) What type of road machinery is generally used for construction of flexible pavement?
 - e) Write the importance of compacting moisture content and amount of compaction during the construction of highway embankment/subgrade.
 - f) Write the objective and type of material used in prime coat and tack coat.
 - g) Name the type of mixers used in road construction.
 - h) Write down the expression for discharge and Manning's roughness coefficient.
 - i) Explain advantages and limitation of drift method.
 - j) How is mastic asphalt concrete produced?

2x10

PART-A

- Q.2
- a) Plate bearing tests were conducted using 30 cm diameter plate on soil subgrade and over a base course of thickness 45 cm . The pressure yielded at 0.5 cm deflection on the subgrade and base course were 1.2 kg/cm^2 and 7.5 kg/cm^2 , respectively. Design the thickness requirement of flexible pavement for a wheel load of 6000 kg with tyre pressure of 8.0 kg/cm^2 for an allowable deflection of 0.5 cm using Burmister's two layer deflection factor chart.



10

RATIO, THICKNESS OF REINFORCING LAYER TO RADIUS OF CONTACT, $\frac{z}{a}$

Burmister's two-layer deflection factors

- b) A flexible pavement of thickness 60 cm is laid over a subgrade. A circular load of radius 15 cm with uniform contact pressure, 7.5 kg/cm^2 is applied. Assuming homogeneous elastic single layer, determine the vertical stress and deflection of the pavement surface under the centre of the load. Assume the elastic modulus of the subgrade as well as pavement layer to be 850 kg/cm^2 . **5**
- c) Explain how wheel load effects the design of flexible pavement using contact pressure, ESWL and EWLF. **5**
- Q.3 a) The design thickness of a CC pavement is 25 cm considering a design axle load (98^{th} percentile load) of $12,000\text{ kg}$ on single axle and $M - 40$ concrete with characteristic compressive strength of 400 kg/cm^2 . The radius of relative stiffness is found to be 62.2 cm . If elastic modulus of dowel bar steel is $2 \times 10^6\text{ kg/cm}^2$, modulus of dowel-bar-concrete interaction is 41500 kg/cm^3 and joint width is 1.5 cm , design the dowel bars for 40% load transfer considering edge loading. **10**
- b) Explain the various types of joints in CC pavement by using proper diagrams. **10**
- Q.4 a) Explain the difference between WMM and WBM. **10**
- b) What are the common types of earthwork machinery used for excavation of soil? Mention the uses and limitations of each. **10**
- PART-B**
- Q.5 a) Mention the specifications of materials, construction steps and quality control checks for laying bituminous surface dressing. **10**
- b) What are the main features and advantages of bitumen mastic wearing course. Mention the construction method. **10**
- Q.6 a) The maximum quantity of water expected in one of the open longitudinal drains on clayey soil is $1.4\text{ m}^3/\text{sec}$. Design the cross section and longitudinal slope of trapezoidal drain assuming the bottom width of trapezoidal section to be 1.2 m and cross-slope to be 1.0 vertical to 1.5 horizontal. The allowable velocity of flow in the drain is 0.8 m/sec and Manning's roughness coefficient is 0.022. **10**
- b) Write short notes on:
- Resisting length.
 - Hair-pin bend.
 - Precipice work.
 - Scupper.
 - Preventive measures for landslides on hill roads. **10**
- Q.7 a) What are the different methods of tunneling in soft rocks? Explain any one in detail. **10**
- b) Explain the heading and bench method of tunneling in detail. **10**

End Semester Examination, May 2016

B. Tech. – Sixth Semester

ENVIRONMENTAL ENGINEERING (C-605)

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 is atmospheric stability?
 b) What is biosphere?
 c) Define recyclable wastes with example.
 d) What is anaerobic decomposition?
 e) What do you mean by hydraulic mean depth?
 f) Write the value of hydraulic mean depth of full running circular sewer.
 g) Why 1st stage BOD is called ultimate BOD?
 h) Write the removal of suspended solids and BOD in PST.
 i) What is eutrophication of lake?
 j) What is minimum DO value required for aquatic life? **2x10**

PART-A

- Q.2 a) Explain the objectives of air pollution control equipment's. List a few equipment used to control particulate pollutants. **10**
 b) Explain various effects of air pollution on plants and animals. **5**
 c) Differentiate between adsorption and absorption with examples. **5**
- Q.3 a) Explain sanitary landfill and its functions with a neat diagram. **10**
 b) Estimate the (i) Overall moisture content(ii) Average energy content (iii) Unit energy content (on dry basis) (iv) Unit energy content (on ash free dry basis) from the following data for a sample of 100 kg having ash content 5%:

Component	% by Mass	Moisture content (%)	Energy content (kJ/kg)
Food waste	20	70	4650
Paper	30	5	16750
Cardboard	10	5	16300
Plastic	10	2	32600
Yard waste	10	70	6500
Wood	8	20	18600
Tin Can	8	2	700

10

- Q.4 a) Make a comparison of separate sewerage system and combined sewerage system. **10**
 b) Design a sewer to serve a population of 36,000, the daily per capita water supply being 135 litres, of which 80% finds its way into the sewer. The slope available for the sewer to be laid is 1:625 and the sewer should be designed to carry four times the dry weather flow when running full. What would be the velocity of flow in the sewer when running full? Assume n=0.012 in Manning's formula. **10**

PART-B

- Q.5 a) What are different methods of sewage disposal? Explain the dilution method of sewage disposal. **10**
- b) The following observation were made on a 3% dilution of waste water:
Dissolved oxygen of aerated water used for dilution = 3.0 mg/l.
Dissolved oxygen of diluted sample after 5 days incubation = 0.8 mg/l.
Dissolved oxygen of original sample = 0.6 mg/l.
Calculate the (i) BOD of 5 days and (ii) Ultimate BOD of the sample. Assuming that de-oxygenation coefficient at test temperature is 0.1. **10**
- Q.6 a) Make a comparison between trickling filter and activated sludge process. **10**
- b) Design a septic tank for a small colony of 100 persons with daily sewage flow of 135 lpcd. **10**
- Q.7 a) Explain different prevention measures for control of water pollution **10**
- b) Explain physico-chemical effects and biological effects of pollutants. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

ESTIMATING AND COSTING (C-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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) Define estimate.
- b) Mention the names of any four types of estimates.
- c) Define detailed specification.
- d) Define overhead cost.
- e) Define task work or out turn work of a labour.
- f) Define retention money.
- g) What do you understand by a tender?
- h) What do you understand by a measurement book?
- i) Explain salvage value.
- j) Explain depreciation.

2×10

PART-A

- Q.2** a) Explain purpose and objectives of estimation. Describe any three types of estimation in detail. **10**
- b) Prepare an estimate for the portion of a road from chainage 1 to 6 from the data given below:
The rate of earthwork in cutting is Rs 8/- per cum and in filling is Rs.7/- per cum.
The formation width of proposed road is 10m. Side slope is 2:1 (H:V) and longitudinal slope of road is 1:100 downward throughout the length.

Chainage	1	2	3	4	5	6
R.L. of grounds	108.60	109.25	109.40	108.85	108.50	107.25
Formation Level	112					

Length of chainage is 30 m.

10

- Q.3** a) Write down the detailed specification of earthwork in foundation. **10**
- b) Write short notes on:
- i) White washing.
 - ii) Distempering.
 - iii) DPC.
 - iv) Plastering. **10**

- Q.4** a) Derive rate analysis for cement concrete (1:2:4) in foundation per cubic meter. Assume rates of different parameters required. (Take 10 cum) **10**
- b) i) Describe task work or out turn work. Explain with an example. **5**
- ii) Calculate number of bricks required in 10 cum brickwork and also calculate quantity of mortar required. **5**

PART-B

- Q.5** a) Describe various items included in tender documents in detail. **10**
- b) Explain in detail administrative approval and acceptance of tenders. **10**

107/4

- Q.6 a) What do you understand by a muster roll. Explain earnest money and security money in brief. **10**
- b) Write short notes on:
- i) Cashbook.
 - ii) Cancelled cheque.
 - iii) Measurement book.
 - iv) First and final payment. **10**
- Q.7 a) Describe in detail purpose of valuation and its components. Explain sinking fund and retention money in brief. **10**
- b) Describe concept of valuation and depreciation. Explain various methods of valuation in detail. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

TENDERING AND VALUATION (C-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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) Explain one of the bid awards tenders.
- b) What do you understand by corrigendum?
- c) Differentiate between tender drawing and contract drawing.
- d) Definition of specification.
- e) What is meaning of liquidated damage?
- f) What is the meaning of Negotiation?
- g) Explain key selection criteria.
- h) Define wager contract.
- i) Define coercion.
- j) How to define mitigation of penalty?

2×10

PART-A

- Q.2** a) Briefly discuss the classification of the tender according to the role based on e-tendering system. **10**
- b) Give advantage and disadvantage of national and global tender. **10**
- Q.3** a) Write down the specification of reinforced cement concrete and plain concrete. **10**
- b) Explain the classification of engineering drawing. Discuss interpretation of engineering drawing. **10**
- Q.4** a) What are the different processes of tendering? What do you understand by the selection panel and responsibilities of selection panel? **10**
- b) Explain briefly steps of evaluation and contract award stage. Elaborate the evaluation, negotiation consideration and notification. **10**

PART-B

- Q.5** a) Explain the following terms:
 - i) Attestation and correction of rates.
 - ii) Sorting and tallying number.
 - iii) Financial capacity.
 - iv) Project risk.
 - v) Project time frame.**2×5**
- b) Show critical analysis of tender, if the plinth area of a housing project is $12m \times 11m$ and ceiling height is 3.5m. Justify with the help of project estimates, bills of quantity, rate analysis, construction schedule, schedule of tender etc. **10**
- Q.6** a) What do you understand by contract? Define the following contract with examples:
 - i) Item rate contract.
 - ii) Lump sum contract.
 - iii) Schedule contract.List out the various clauses of contract. **10**

b) Explain advantage and disadvantage of unit price contract and lump sum contract.
List out general provisions or general condition of contract. **10**

Q.7 a) Explain the basics and goal of arbitration in detail. **10**
b) Explain scheme of following acts:
i) Domestic arbitration.
ii) Enforcement of foreign awards.
iii) Conciliation.
iv) Supplementary provision. **2½×4**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

HYDROLOGY (C-803)

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 Write short notes on:

- a) Hydrologic cycle.
- b) Different forms of precipitation.
- c) Probable maximum precipitation.
- d) Evapotranspiration.
- e) Instantaneous infiltration rate and infiltration capacity.
- f) Factors affecting runoff.
- g) Methods of base flow separation.
- h) Assumptions of unit hydrograph.
- i) Aquifers and aquiclude.
- j) Specific retention and specific yield.

2x10

PART-A

Q.2 a) Explain the following relationships related to the precipitation over a basin:

- i) Intensity-duration-frequency relationship.
- ii) Depth-area relationship.
- iii) Maximum depth-area-duration curve.

12

b) Analysis of data on one day maximum rainfall depth indicated that a depth of 300 mm had a return period of 500 years. Determine the probability of one day rainfall depth equal to or greater than 300 mm occurring:

- i) Once in 20 successive years.
- ii) Two times in 15 successive years.
- iii) Atleast once in 20 successive years.

8

Q.3 a) A reservoir with a surface area of 300 hectares has the following meteorological values during a given winter:

Water temperature= $30^{\circ}C$, relative humidity=50%, wind velocity above ground is 12 km/hr, mean barometric reading is 750 mm of mercury. Estimate the average daily evaporation from the reservoir. Use Meyer's equation.

10

b) A class A pan was set up adjacent to a lake. The depth of water in the pan at the beginning of a certain week was 195 mm. In that week there was a rainfall of 45 mm and 15 mm of water was removed from the pan to keep the water level within the specified depth range. If the depth of the water in the pan at the end of the week was 190 mm, calculate the pan evaporation. Using a suitable pan coefficient, estimate the lake evaporation in that week.

10

Q.4 a) With the help of a diagram, explain the infiltration indices:

- i) ϕ -index
- ii) W-index

3x2

b) A 12-hour storm rainfall with the following depth in cm occurred over a basin; 2.0, 2.5, 7.6, 3.8, 10.6, 5.0, 7.0, 10.0, 6.4, 3.8, 1.4 and 1.4. The surface runoff

111/4

resulting from the above storm is equivalent to 25.5 cm of depth over the basin. Determine the average infiltration index (ϕ -index) for the basin. **7**

- c) Explain Horton's equation of infiltration. What are the assumptions for the application of this equation? **7**

PART-B

- Q.5 a) Describe the different methods used for river gauging. How will you develop a stage-discharge relationship at the gauging station? **10**
b) Explain different methods used for estimation of:
i) runoff volume.
ii) Peak discharge rate from a basin. **5x2**

- Q.6 a) Explain briefly the factors affecting flood hydrograph. **5**
b) Describe in detail Synder's synthetic unit hydrograph. **7**
c) Derive the S-curve for the 4-h unit hydrograph given below:

Time (h)	0	4	8	12	16	20	24	28
Ordinate of 4-h UH (m^3/s)	0	10	30	25	18	10	5	0

8

- Q.7 a) Derive an expression for steady flow to a well in an unconfined aquifer. **10**
b) A 45 cm well penetrates an unconfined aquifer of saturated thickness 30 m completely. Under a steady pumping rate for a long time the draw downs at two observation wells 15 m and 30 m from the well are 5.0 m and 4.2 m respectively. If the permeability of the aquifer is 20 m/day, determine the discharge and the drawdown at the pumping well. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

FOUNDATION ENGINEERING (C-804)

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 finite and infinite slopes? Give two examples.
 - b) Write down any three assumptions of Rankine's theory of earth pressure.
 - c) What are the different types of gravity retaining walls? Give three examples.
 - d) What are coffer dams?
 - e) Write down Rankine's formula for minimum depth of foundation.
 - f) Define shallow foundation and deep foundation.
 - g) Name any three factors affecting bearing capacity of soil.
 - h) What are geotextiles? Where are they used?
 - i) Define: i) Natural frequency ii) Resonance
 - j) Give any four general criteria for the design of machine foundations.

PART-A

- Q.2 a) Explain Swedish slip circle method for stability of slopes. **10**

b) A slope is 10 meter high and has an inclination of 30° . If the soil of the slope has $c=25 \text{ kN/m}^2$, $\phi=12^\circ$ and $\gamma=19 \text{ kN/m}^3$, determine the factor of safety with respect to shear strength. **10**

Q.3 a) A smooth retaining wall 6 meter high retains the dry granular backfill weighing 16 kN/m^2 to its level surface. The active thrust on the wall is 96 kN/m of wall. What will be the total active thrust if the water level comes upto backfill surface? Take $G=2.65$ and $\gamma'=19.77 \text{ kN/m}^3$. **8**

b) Derive the expression for the design of retaining wall against:
 i) Sliding ii) Overturning **12**

Q.4 Write short note on any two:
 a) Cantilever sheet pile walls in cohesive soil.
 b) Friction circle method of designing earth slope.
 c) Assumptions of coulomb's wedge theory for earth support. **10x2**

PART-B

- Q.5 a) Explain in detail the various component of settlement of foundation. **8**

b) A square footing 1.5 meter X 1.5 meter rests at a depth of 2 meter in a saturated clay layer and meter deep. The clay is normally consolidated having an unconfined compressive strength of 40 kN/m^2 . Liquid limit of soil is 35%, $\gamma' = 17.8 \text{ kN/m}^2$, $\omega = 28\%$ and $G = 2.68$. Determine the load which the footing can carry safely with a factor of safety of a 3 against shear. Also determine the settlement of footing if the footing is loaded with this safe load. Use Tertzaghi's analysis for bearing capacity.

- Q.6 a) Define any two:

- i) Safe bearing capacity of soil.
 - ii) Net ultimate bearing capacity of soil.
 - iii) Net safe bearing capacity of soil. 8
- b) A square footing 2 meter X 2 meter built in a homogenous bed of sand of unit weight 20 kN/m^3 and having an angle of shear resistance of 36° , the depth of the base of footing is 2.0 meter below the ground surface. Calculate the safe load that can be carried by a footing with a factor of safety of 3 against complete shear failure. Use Terzaghi's analysis. 12

Q.7 Write short notes on **(any two):**

- a) Design of block foundation.
- b) Plate load test.
- c) Indian standard method of finding bearing capacity of soil.

10x2

End Semester Examination, May 2016

B. Tech. – Seventh Semester

ELEMENTS OF EARTHQUAKE ENGINEERING (C-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**. Each question carries equal marks.

Q.1 Write short notes on the following:

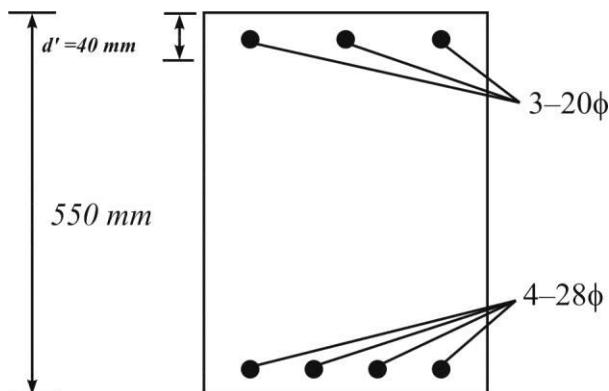
- a) Seismograph.
- b) D' Alembert principle.
- c) Intensity and magnitude of an earthquake.
- d) Weak beam and strong column concepts.
- e) Ductility and factors effecting ductility.
- f) Dynamic loads and its different types.
- g) Irregular building.
- h) Damping and its various types.
- i) In-plane and out-of-plane behavior of masonry wall.
- j) Brittle failure.

2x10

PART-A

Q.2 a) Explain the methods of retrofitting of RCC column and beams. **10**

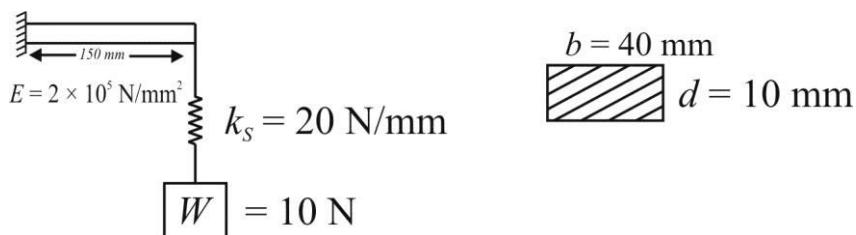
- b) Determine ductility with respect to curvature of beam shown in the figure using M30 grade concrete and Fe 415 grade of steel.



10

Q.3 a) Derive equation of motion for undamped free vibration system. **8**

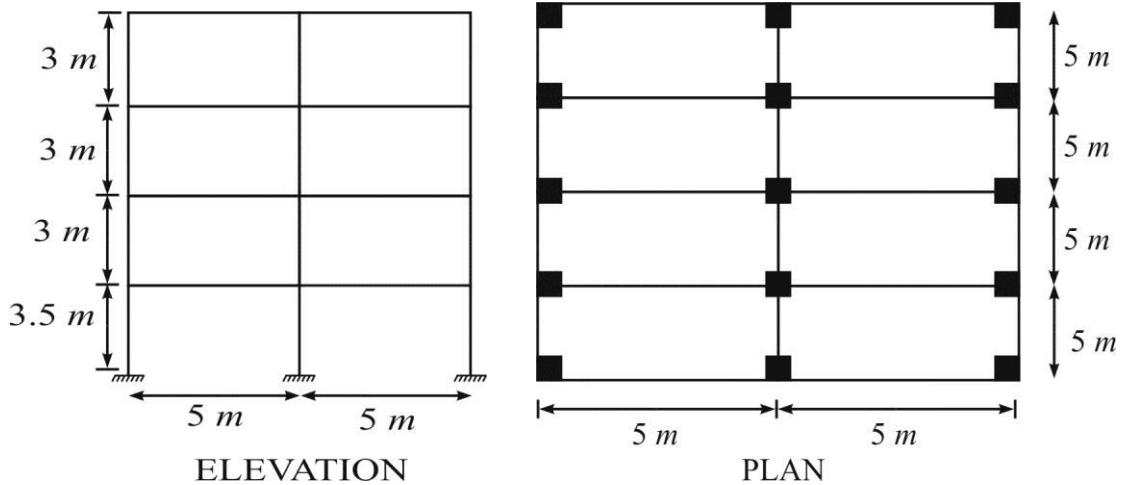
- b) Determine time period and natural frequency of the system in the figure given below.



$$E = 2 \times 10^5 \text{ N/mm}^2$$

12

Q.4 A four storey building shown in the figure is to be constructed in Agra with following data:



- a) Floor finish = 1.3 kN/m^2 ,
- b) Live load on floor = 23 kN/m^2 ,
- b) Thickness of slab = 120 mm,
- c) Thickness of panel wall = 230 mm,
- d) Size of all beams = 350 mm x 650 mm,
- e) Size of each column = 300 mm x 450 mm.

Frames are ordinary moment resisting and detailed as per IS-456:2000. Find the base shear and distribute it to the floors and sketch the same. **20**

PART-B

Q.5 A Simple supported beam 4m long supports a mass of 180 kg at the mid span. Determine its natural frequency and natural period of vibration $E = 2.4 \times 10^5 \text{ N/mm}^2$, $I = 15 \times 10^6 \text{ mm}^4$. **20**

Q.6 a) Differentiate between **(any two)**:

- i) Plan and vertical irregularity.
- ii) Soft storey and extreme soft storey.
- iii) Fibre reinforcement grout and polymer grout. **4x2**

b) Write short notes on:

- i) Strengthening of RC slabs.
- ii) Strengthening of RC beams. **6x2**

Q.7 Explain different techniques to improve the behavior of a masonry wall. **20**

End Semester Examination, May 2016

B. Tech. – Seventh Semester

GROUND WATER ENGINEERING (C-823)

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 Write short notes on:

- a) Porosity and specific yield.
- b) Darcy's law.
- c) Hydraulic conductivity and specific permeability.
- d) Transmissibility and permeameter.
- e) Storativity and storage coefficient.
- f) Barometric efficiency and formation constant.
- g) Leaky aquifer.
- h) Gravel packing.
- i) Sickness in well.
- j) Tube well.

2x10

PART-A

Q.2

- a) Derive an equation for compressibility of aquifer. **12**
- b) A field test for permeability consist in observing the time required for a tracer to travel between two observation wells. A tracer was found to take 10 h to travel between two wells 50 m apart when the difference in the water surface elevation in them was 0.5 m. The mean particle size of the aquifer was 2 mm and porosity of the medium 0.3. If kinematic viscosity $\nu = 0.01 \text{ cm}^2/\text{s}$ estimate (a) coefficient of permeability and intrinsic permeability of the aquifer (b) the volume of recharge during wet season. **8**

Q.3

- a) A 30 cm diameter well completely penetrates a confined aquifer of permeability 45 m/day. The length of strainer is 20 m. The drawdown was found to be 3 m and the radius of influence was 300 m. Calculate the discharge. **6**
- b) Calculate the discharge (a) if the well diameter is 45 cm and all other data remains same in above example (b) If the drawdown is increased to 4.5 m and all other data remains same in above example. **14**

Q.4

- a) Write a classical notes on construction and working of tube well with a suitable sketch. **13**
- b) Discuss in details the various parameter considered for site selection of tube well. **7**

PART-B

Q.5

- a) Write notes on well screen assembly installation, verticality and alignment of tubewell with the help of a sketch. **12**
- b) Discuss in details the corrosion and failure of a tubewell. **8**

Q.6

- What do you mean by shaft and recharge well? Discuss the various artificial ground water recharge technique with the help of a suitable sketch. **20**

- Q.7** a) Discuss the pump affinity law and their significance for centrifugal pump. **10**
 b) Discuss the various pumping equipments used with suitable sketches. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

ADVANCED TRAFFIC ENGINEERING (C-824)

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 desire lines and LOS in traffic engineering?
 b) What are the factors on which PCU values depend?
 c) Define basic capacity and practical capacity of road.
 d) What are the different types of traffic markings?
 e) What are the objectives of highway lighting?
 f) Define on-street and off-street parking in brief.
 g) Mention at least four parts of a vehicle that affect the fuel consumption of motor vehicle.
 h) Mention the name of equipment useful in determining spot speed of vehicle in traffic engineering.
 i) A vehicle travelling at 30 kmph was stopped within 1.7 sec after the application of the brakes. Determine average skid resistance.
 j) Explain the terms: space headway and time headway of traffic flow. **2x10**

PART-A

- Q.2 a) What are the objectives and scope of traffic engineering? Show organizational setup of a traffic engineering department in India. **10**
 b) Explain the effect of traffic characteristics on various design elements of the road in detail. **10**
- Q.3 a) Enumerate the different methods of carrying out traffic volume studies. Indicate the principle of each. **10**
 b) The following data were obtained from the spot speed studies carried out at a city road during a certain period of time. Suggest (a) speed limit for regulation (b) the design speed for checking the geometric design elements of the highway (c) lower speed group causing congestion.

Spped group kmph	No. of vehicle	Speed group kmph	No of vehicles
<5	45	30-35	430
5-10	230	35-40	290
10-15	375	40-50	110
15-20	500	50-60	25
20-25	680	60-70	8
25-30	525	>70	2

10

- Q.4 a) Explain level of service concept while deciding the design capacity of a road. **10**
 b) i) Discuss briefly the various factors affecting the practical capacity of a road. **5**
 ii) Estimate the basic capacity of traffic lane at a speed of 60 kmph. Assume that all the vehicles are of average length of 6 m. **5**

PART-B

- Q.5 a) Explain with neat sketches, various types of traffic signs and classifying them in proper groups. **5**
- b) An isolated signal with pedestrians indication is to be installed on a right angled intersection with road A 18 m wide and road B, 12 m wide. The heaviest volume per hour for each lane of road A and road B are 275 and 225, respectively. The approach speeds are 55 and 40 kmph, for A and B road respectively. Design the timings of traffic and pedestrian signal. **15**
- Q.6 a) What are the various traffic management measures? Explain in detail. **10**
- b) Explain the terms:
- i) Tidal flow operation.
 - ii) Road pricing. **5x2**
- Q.7 a) Explain various measures in detail to control the traffic noise. **10**
- b) Explain various factors affecting fuel consumption in detail. **10**

End Semester Examination, May 2016

B. Tech. – Sixth / Eighth Semester

PROJECT PLANNING AND MANAGEMENT (C-826)

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 and explain the following:

- a) Slack.
- b) Latest start time.
- c) Earliest start time.
- d) Earliest event time.
- e) Latest event time.
- f) Project updating.
- g) Economical life of construction equipment.
- h) Indirect cost.
- i) Direct cost.
- j) Project crashing.

2x10

PART-A

Q.2 a) Draw a project organization chart required for the execution and planning of a flyover with piling work with a estimated cost of Rs. 500/- crores. Discuss the working of various groups and their roles. **12**

- b) How are the following terms represented on network? Discuss with two examples for each one:
- i) Time.
 - ii) Activity.
 - iii) Critical path.
 - iv) Dummy activity.

2x4

Q.3 a) i) What is project estimated time? Write down its mathematical expression and discuss all the terms in brief. **6**

ii) Discuss a project life cycle phases with examples. **8**

- b) Differentiate between PERT and CPM with examples. **6**

Q.4 a) Draw and mark critical path for the following case:

Sl.No.	Activity	T_0	T_m	T_p	Preceding Activity	Succeeding activity
1	A	10	12	16	Nil	B
2	B	6	9	12	A	C
3	C	2	3	5	B, D	Nil
4	D	8	10	15	Nil	E
5	E	5	6	8	D	F, J
6	F	2	3	4	E	Nil
7	G	7	9	11	Nil	H
8	H	1	2	3	G	J
9	J	1	2	3	E, H	Nil

12

- b) Define the following and explain there usage:

- i) Total float.
- ii) Interference float.

- iii) Free float.
- iv) AON.

8

PART-B

- Q.5 a) A project consists of five activities as detailed below. Determine optimum project completion time and cost assuming indirect cost @ Rs. 7,500 per week:

Activity	Time in week		Direct cost in Rs.	
	Normal time	Crash time	Normal cost	Crash cost
1-2	6	5	7000	9000
1-3	4	3	6000	8000
1-4	10	8	12000	14000
2-4	9	7	8000	12000
3-4	8	6	7000	10000

12

- b) What is a cost slope? What are its units? Write down its mathematical formula and explain it.

8

- Q.6 a) State the working of a ready mix plant. What are advantages and disadvantages over 10/7 concrete mixer unit?

10

- b) What are your criteria for selection of crawler crane over tyred crane of 30 tonne **End**

Semester Examination, May 2016

B. Tech. - Seventh Semester

ENVIRONMENTAL AIR POLLUTION (C-831)

Time: 3 hrs

Max Marks: **100**

No. of pages: **3**

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 the following: **2x10**
- What are greenhouse gases?
 - Expand WHO, CPCM.
 - What parameters are considered for calculating air quality index?
 - List a few air quality stakeholders.
 - When was the System of Air Quality Forecasting and Research (SAFAR) test for the first time?
 - Define adiabatic lapse rate.
 - What is an air dispersion model?
 - What problems are associated with enclosed spaces inhabited by humans?
 - Define emission inventory.
 - What causes acid rain?

PART A

- Q.2** a) Discuss the effects of air pollution on human beings? **10**
 b) Write short notes on:
 i) Bhopal gas tragedy
 ii) Occupational air pollution. **5x2**
- Q.3** The table below shows the summary of air quality of different Indian cities for the year 2015. All the values are in $\mu\text{g}/\text{m}^3$: **10**

City	SPM	SO₂	NO₂
Bangalore	247	29	3.26
Kanpur	193	36	5.08
Lucknow	147	38	2.86
Madras	486	60	6.23
Kerela	497	46	3.23

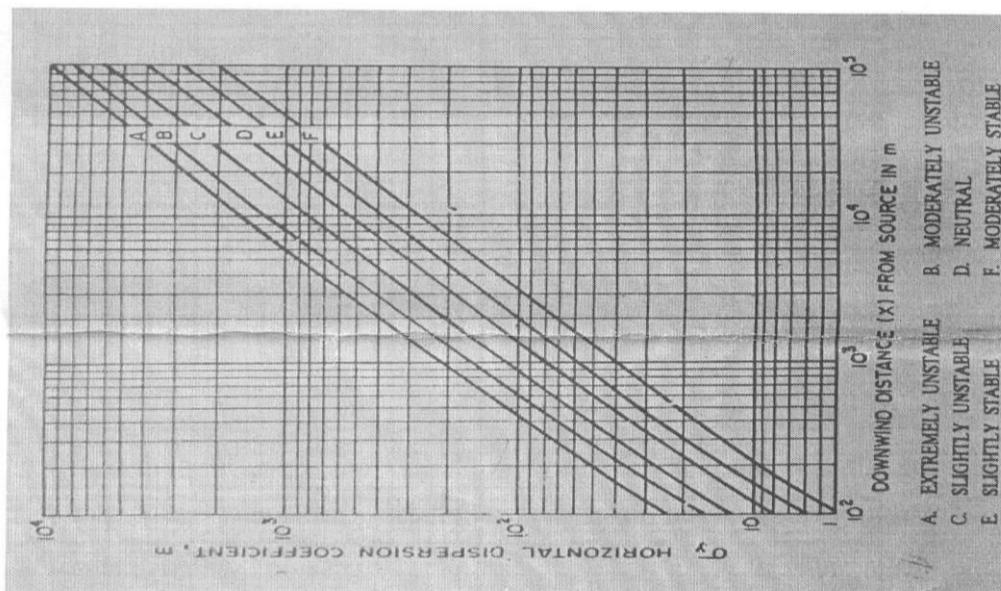
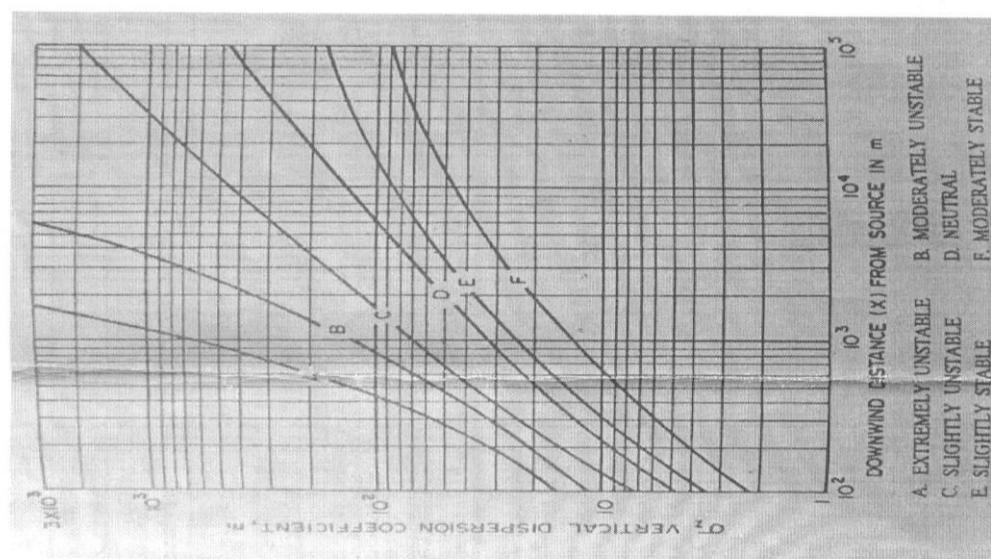
Compute the air quality index of these cities and state which of the abovementioned cities are cleanest amongst all. **10**

- b) Write short notes on:
 i) Working of hi-volume sampler with their advantages.
 ii) Uses of air pollution index. **5x2**
- Q.4** a) List a few air quality stakeholders and explain the role of Ministry of Earth Science. **5**
 b) Explain the working of fabric filter along with its advantages and disadvantages. **5**
 c) A packed filter handling 1.8 m^3 per second of std. air is packed with fibers of size 125 micrometer in diameter. Dust laden air passes through the filter with a velocity of 1.8 m/sec and the packing density is 0.2. The avg. diameter of particles in the air is 1.2 micrometers and individual fiber efficiency $\eta_f = 0.7$.

- i) Determine the dimensions of packed filter if the overall efficiency is 99.3%. Assume $W=H$.
ii) What is the filter length if efficiency is 98.99%? **5x2**

PART B

- Q.5 a) What is the principle of particulate matter monitoring? **5**
b) What is an air dispersion model? List uses of these models. **5**
c) A thermal power plant burns coal at the rate of 8 tons/hour and discharge flue gases through a chimney having effective height of 90 m. The coal has sulphur content of 4.5%. The wind velocity at the top of the stack is 8.5 m/sec. The atmospheric conditions are slightly unstable. Determine the maximum ground level concentration of SO_2 and the distance from the stack at which this occurs.



Gaussian Plume Curve **10**

- Q.6 a) What are the various factors taken into consideration for monitoring of indoor air pollution? **10**
b) In a museum visited by 75 tourist/ day with volume of 750 m^3 the smoke generation is at the rate of 1.3 cigarettes per head per hour. To maintain proper ventilation

fresh air is pumped @ $1490 \text{ m}^3/\text{hr}$. The stale air is pumped out at the same rate. Estimate the concentration of formaldehyde inside the hall. Assume the process to be ready and complete mixing; cigarette contains 1.3 mg of formaldehyde per cigarette.

5

- c) How does space occupancy contribute to deterioration in air quality? **5**

- Q.7 a) Why ozone depletion is predominant in Antarctica? **5**
b) What are the potential effects of ozone depletion on human and animal health? **10**
c) What are the targets of Kyoto protocol? **5**

End Semester Examination, May 2016

B. Tech. – Seventh Semester

EARTHQUAKE RESISTANT DESIGN OF STRUCTURES (C-829)

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 answer:

- a) Define an earthquake.
- b) What are the different types of seismic waves?
- c) Define dynamic loads. What are its various types?
- d) What is critical damping?
- e) Define natural frequency and damped frequency.
- f) What do you understand by mode shapes?
- g) Define ductility.
- h) What is gas forming grout?
- i) Explain in-plane and out of plane behaviour of masonry wall.
- j) What are the different factors affecting ductility?

2×10

PART-A

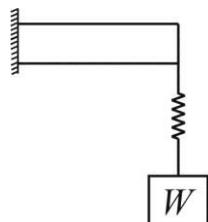
Q.2 a) Write a short note on "Elastic Rebound Theory". **8**

b) Explain in detail, the difference between magnitude and intensity of an earthquake. **6**

c) What are seismograph and seismograms? **6**

Q.3 a) Define the following:

- i) Lumped Mass.
 - ii) Damping Factor.
 - iii) D'Almbert's principle.
- b) Derive equation of motions for undamped free vibration system. **6**
- c) Determine the time period and natural frequency of the figure given below. **8**



$$k_s = 55 \text{ N/mm}$$

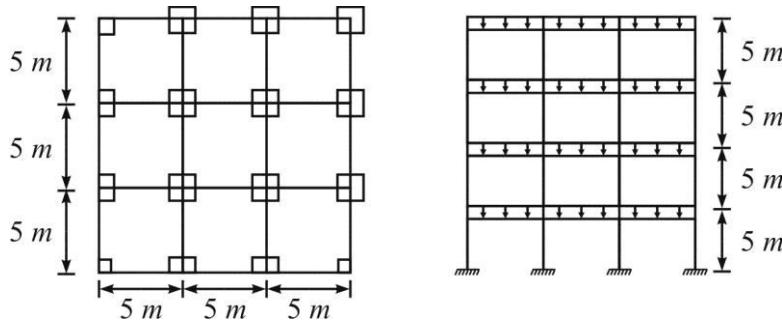
$$b = 400 \text{ mm}$$

$$d = 450 \text{ mm}$$

$$L = 4.3 \text{ m}$$

$$W = 10 \text{ kN}$$

Q.4 The plan and elevations of four storey RCC school building is shown in the figure given below. The building is located in Bangalore. The type of soil encountered is hard soil and it is proposed to design with ordinary moment resisting frame. The intensity of dead load is 20 kN/m^2 and the floor has live load 10 kN/m^2 . Determine the design seismic load on structure by static analysis. Also show design seismic forces at different floor levels.



Given data: Slab thickness = 120 mm
 All columns = 350 × 350
 All beams = 500 × 550
 Wall thickness = 120 mm

20

PART-B

- Q.5** a) What are the different types of failures that occur in RC buildings? **4**
 b) Do the designing and ductile detailing of RC column of size 450 mm × 450 mm subjected to following loads. The column has an unsupported length of 4.5 m. Use M20 grds concreted and Fe 415. Assume d/D = 0.1.

	DL	LL	Seismic Load
Axial Load (kN)	850	650	550
Moment (kNm)	60	40	100

16

- Q.6** a) Differentiate between:
 i) Plan and vertical irregularity.
 i) Soft storey and extreme soft storey.
 iii) Fibre reinforced grouts and polymer grouts. **2x3**
 b) Write short notes on:
 i) Strengthening of RC columns.
 ii) Strengthening of RC slabs. **7x2**
- Q.7** a) What are the different modes of failure of a masonry structure? **7**
 b) Explain different techniques to improve the behaviour of masonry walls. **6**
 c) Write a short note on 'retrofitting of roofs and floors'. **7**

End Semester Examination, May 2016

B. Tech. – Seventh Semester

ADVANCED CONCRETE TECHNOLOGY (C-830)

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 answer:

- a) Define gap graded aggregate.
- b) Write two mineral admixtures.
- c) Name any four test for measuring workability.
- d) State Duff Abram's law.
- e) Define dynamic modulus of elasticity.
- f) What are different slump failures?
- g) Define efflorescence.
- h) Why volume batching is not preferred?
- i) Define fineness modulus.
- j) Explain deleterious substances.

2×10

PART-A

Q.2 a) Define hydration of cement and write hydration reaction for cement compounds. **7**

- b) Write a short note on Portland slag cement. **7**

- c) Classify the aggregates on the basis of shape, source and size. **6**

Q.3 Write short notes on:

- a) Water reducing admixture.
- b) Pozzolana.
- c) Air entraining admixture.
- d) Retarders.

5×4

Q.4 Prepare a M40 grade concrete using flyash and OPC-43 grade cement and fly ash confirming to IS 3812 (Part 1). Maximum nominal size of aggregate is 10 mm. Minimum cement content is 320 kg/m³. Maximum cement content is 450 kg/m³. W/C ratio is 0.45 (maximum). Workability required is 50 mm (slump). Exposure condition is severe, method of placing the concrete is normal, degree of supervision is good, aggregates are crushed angular in shape, no chemical super-plasticizer is used, specific gravity of cement is 3.15, specific gravity of flyash is 2.2, specific gravity of coarse and fine aggregate is 2.74. **20**

PART-B

Q.5 a) What are the factors that affect workability of concrete? **8**

- b) What is creep in concrete? How do we measure creep? **6**

- c) What are the factors that affect creep in concrete? **6**

Q.6 Write short notes on:

- a) Carbonation in concrete.
- b) Permeability of concrete.
- c) Chloride attack.
- d) What is i) Initial tangent modulus.

128/4

- ii) Tangent modulus.
- iii) Secant modulus.

5×4

Q.7 Write short notes on:

- a) Self compacting concrete.
- b) Hot weather concreting.
- c) Cold weather concreting.
- d) Durability of concrete.

5×4

End Semester Examination, May 2016

B. Tech. – Seventh Semester

ENVIRONMENTAL AIR POLLUTION (C-831)

Time: 3 hrs

Max Marks: **100**

No. of pages: **3**

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) What are criteria pollutants?
- b) Define biosphere.
- c) Expand EIA, MoEF and SPCB.
- d) What are the important characteristics of ambient air sampling systems?
- e) Council of Scientific and Industrial Research (CSIR) works under aegis of which ministry.
- f) When was System of Air Quality Forecasting and Research (SAFAR) tested for the first time?
- g) What is an air dispersion model?
- h) Name a few organizations that help in monitoring ozone layer.
- i) What is green carbon?
- j) How does air emission inventory help us?

2×10

PART-A

Q.2 a) Describe the following air pollution episodes:

- i) Discuss the effects of air pollutant on materials.
- ii) Explain the sources of various particulate pollutants.

5

- b) Tabulate the effects of any five air pollutants, dosage and their effects.

10

Q.3 a) The table below shows the summary of air quality of different Indian cities for the year 1981. All the readings are in $\mu\text{gm}/\text{m}^3$.

City	SPM	SO ₂	NO ₂
Ahmedabad	227	31	5.34
Bombay	184	38	6.07
Calcutta	522	40	3.10
Delhi	433	58	6.50
Hyderabad	143	30	2.44

Compute the air pollution index of these cities and state which is the cleanest and the most polluted city amongst them. **10**

b) Write short notes on:

- i) Ambient air quality standards.
- ii) Quasi emission standards.

2½×2

- c) State the functions of State Pollution Control Boards.

5

Q.4 a) When were Central Pollution Control Board constituted and what all initiatives it took in context of air quality management? **5**

- b) List various air quality stakeholders?

Or

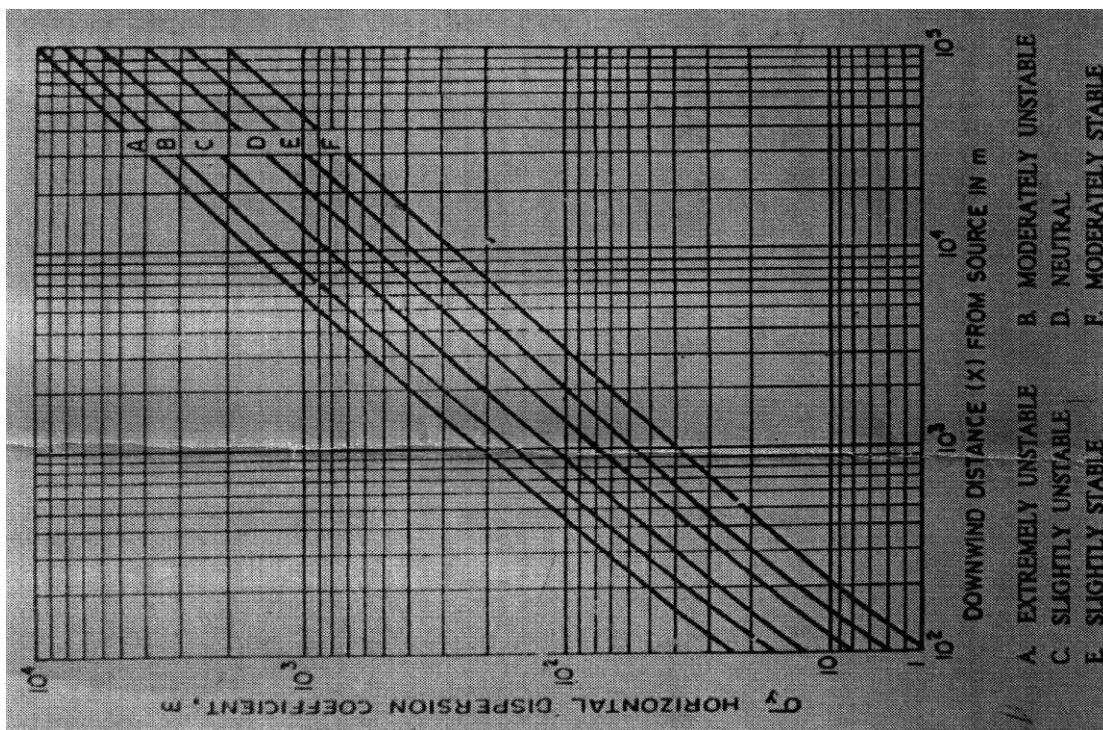
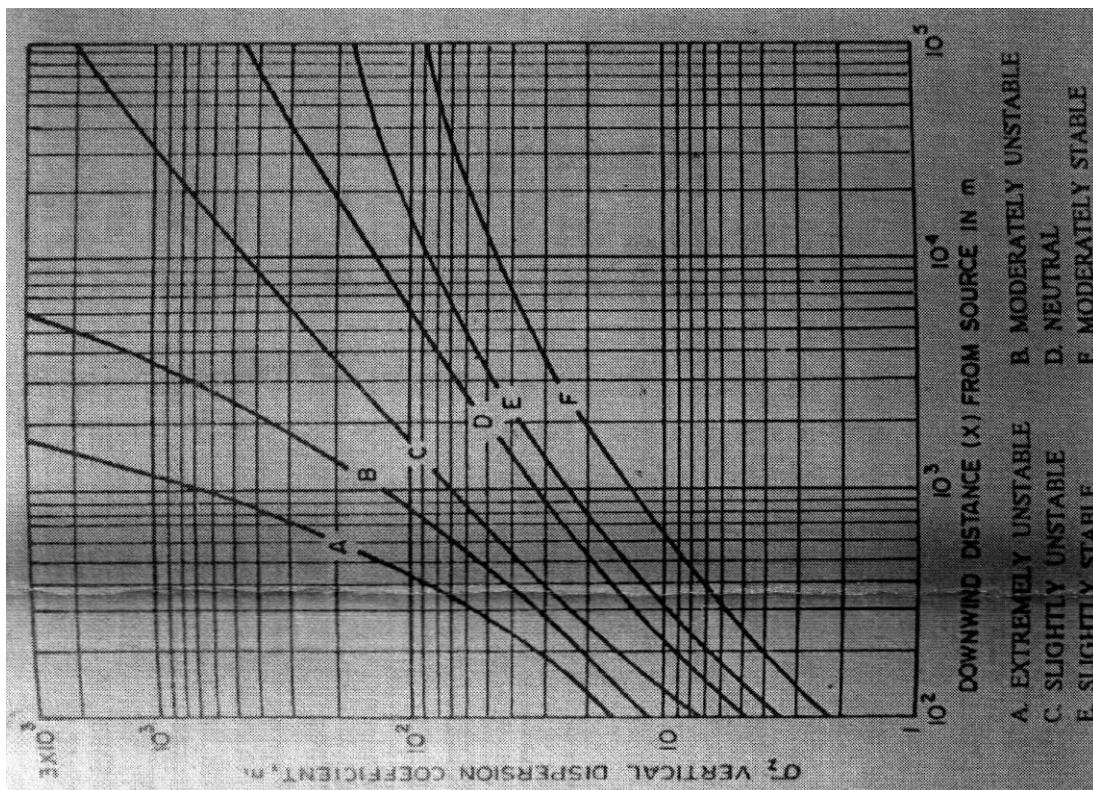
Explain the working of electrostatic precipitator with a neat sketch. **5**

- c) A packed filter handling $1.0 \text{ m}^3/\text{s}$ of standard air is packed with fibers of size $100 \mu\text{m}$ in diameter. Dust laden air passes through the filter with a velocity of 1.5 m/s and the packing density is 0.1 . The average diameter of particles in the air is $1.0 \mu\text{m}$ and the individual fibre efficiency $\eta_f=0.6$.

- i) Determine the dimensions of the packed filter if the overall efficiency is 99.5% .
Assume $W=H$.
ii) What is the filter length if the $\eta=99.99$ per cent? **10**

PART-B

- Q.5 a) A thermal power plant burns coal at the rate of 8 tons/hour and discharge flue gases through a chimney having effective height of 90 m . The coal has a sulphur content of 4.5% . The wind velocity at the top of the stack is 8.5 m/s . The atmospheric conditions are slightly unstable. Determine the maximum ground level concentration of SO_2 and the distance from the stack at which this occurs.



- b) What inferences are encountered in NO_2 monitoring? **5**
- c) What is an air dispersion model? List few uses of air dispersion model. **5**
- Q.6** a) What are various causes of Indoor air pollution? **10**
- b) In a small hall (volume 500 m^3), occupants (capacity 50 persons) are smoking @ 1.2 cigarettes per head/hr. To maintain proper ventilation, fresh air is pumped @ $1250 \text{ m}^3/\text{hr}$ and the stale air is pumped out at the same rate. Estimate the concentration of formaldehyde inside the hall. Assume the process to be ready and complete mixing; cigarette contains 1.3 mg of formaldehyde per cigarette? **5**
- c) What is the purpose of ventilation? **5**
- Q.7** a) What are the causes of ozone depletion? **5**
- b) What were the objectives of BALI meet on climate change held in December, 2007? **5**
- c) What are salient features of Kyoto Protocol? What targets were set in this meet? **10**
- capacity? Discuss with argument. **10**
- Q.7** Write short notes on **(any four):** **4x5**
- a) Hot mix plant.
 - b) Ripper.
 - c) Boom placer.
 - d) Excavator.
 - e) Transit mixer.

End Semester Examination, May 2016

B. Tech. – Seventh Semester

PRESTRESSED CONCRETE (C-827)

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 in brief:

- a) Advantages of pre-stressed concrete over reinforced concrete.
- b) Need of high strength material in pre-stressed concrete.
- c) Post-tensioning method of pre-stress.
- d) Disadvantages of pre-tensioning over post-tensioning.
- e) Loss of pre-stress in pre-tensioning.
- f) Limitations of deflection of pre-stressed concrete beam.
- g) Limit state method of design of pre-stressed concrete beam considering strain compatibility.
- h) Why compression member of concrete is required to be pre-stressing?
- i) Eccentric and concentric pre-stressing.
- j) Disadvantages of post tensioning.

2×10

PART-A

Q.2 A rectangular re-stressed concrete beam 100 mm wide and 250 mm deep spanning over 8 m is pre-stressed by a straight cable carrying an effective pre-stressing force of 250 kN located at an eccentricity of 40 mm. The beam supports a imposed load of 1.2 kN/m.

- a) Calculate the resultant stress distribution for the mid span of the beam.
- b) Find the magnitude of pre-stressing force with an eccentricity of 40 mm which can balance the stress due to loads and line loads at the bottom fibre of central section of the beam.

20

Q.3 a) Explain principle of pre-stressing.

5

- b) Explain long-line system of pre-stressing.

5

- c) Draw stress strain curve for reinforcing and pre-stressing steels.

7

- d) What is relaxation of stress in steel?

3

Q.4 An unsymmetrical I-section is used to support an imposed load of 2 kN/m over a span of 8 m. The sectional details of top flange 300 mm wide and 60 mm thick, bottom flange 100 mm wide and 60 mm thick. The thickness of web is 80 mm and overall depth of beam is 400 mm. At the centre of the span the effective pre-stressing force is 100 kN located at 50 mm from the soffit of the beam. Estimate the stresses at the centre section.

- a) Pre-stress + self weight.

20

- b) Pre-stress + self weight + live load with 15% loss of pre-stress.

PART-B

Q.5 a) Write, losses of pre-stress in post tensioning and explain any two in detail.

10

- b) Find the total percentage loss of pre-stress in a post tensioned beam of length 8 m and width 250 mm and depth 500 mm is pre-stressed with 20 numbers of 7 mm diameter placed at 120 mm from bottom. Initial pre-stress is 1200 N/mm².

Take $E_s = 2 \times 10^5$ N/mm²

$E_c = 3.5 \times 10^4$ N/mm²

Shrinkage strain = 2×10^{-4}

Creep coefficient = 2

Relaxation of steel = 3.5%

10

- Q.6** A concrete rectangular beam of cross section 200 mm wide and 450 mm deep is simply supported over a span of 10 m and is pre-stressed by means of straight cable at a distance of 60 mm from the soffit of beam. If the force in the cable is 425 kN and M60 grade concrete is used then calculate:

a) Deflection at mid span when the beam is supporting its own weight.

b) Udl over the entire span must be applied so that the net downward deflection is zero.

20

- Q.7** A post tensioned pre-stressed concrete T-beam having a flange width of 1200 mm and flange thickness of 220 mm, thickness of web being 300 mm is pre-stressed by 2000 mm² of high-tensile steel located at an effective depth of 1500 mm. If $f_{ck} = 40$ N/mm² and $f_y = 2000$ N/mm², estimate the ultimate flexural strength of the tee-section.

20

End Semester Examination, May 2016

B. Tech. - Seventh Semester

ENVIRONMENTAL AIR POLLUTION (C-831)

Time: 3 hrs

Max Marks: **100**

No. of pages: **3**

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 the following:

- a) What are greenhouse gases?
- b) Expand WHO, CPCM.
- c) What parameters are considered for calculating air quality index?
- d) List a few air quality stakeholders.
- e) When was the System of Air Quality Forecasting and Research (SAFAR) test for the first time?
- f) Define adiabatic lapse rate.
- g) What is an air dispersion model?
- h) What problems are associated with enclosed spaces inhabited by humans?
- i) Define emission inventory.
- j) What causes acid rain?

2x10

PART A

Q.2 a) Discuss the effects of air pollution on human beings? **10**

- b) Write short notes on:
 - i) Bhopal gas tragedy
 - ii) Occupational air pollution.

5x2

Q.3 The table below shows the summary of air quality of different Indian cities for the year 2015. All the values are in $\mu\text{g}/\text{m}^3$:

City	SPM	SO₂	NO₂
Bangalore	247	29	3.26
Kanpur	193	36	5.08
Lucknow	147	38	2.86
Madras	486	60	6.23
Kerela	497	46	3.23

Compute the air quality index of these cities and state which of the abovementioned cities are cleanest amongst all. **10**

b) Write short notes on:

- i) Working of hi-volume sampler with their advantages.
- ii) Uses of air pollution index.

5x2

Q.4 a) List a few air quality stakeholders and explain the role of Ministry of Earth Science. **5**

- b) Explain the working of fabric filter along with its advantages and disadvantages. **5**
- c) A packed filter handling 1.8 m^3 per second of std. air is packed with fibers of size 125 micrometer in diameter. Dust laden air passes through the filter with a velocity

of 1.8 m/sec and the packing density is 0.2. The avg. diameter of particles in the air is 1.2 micrometers and individual fiber efficiency $\eta_f = 0.7$.

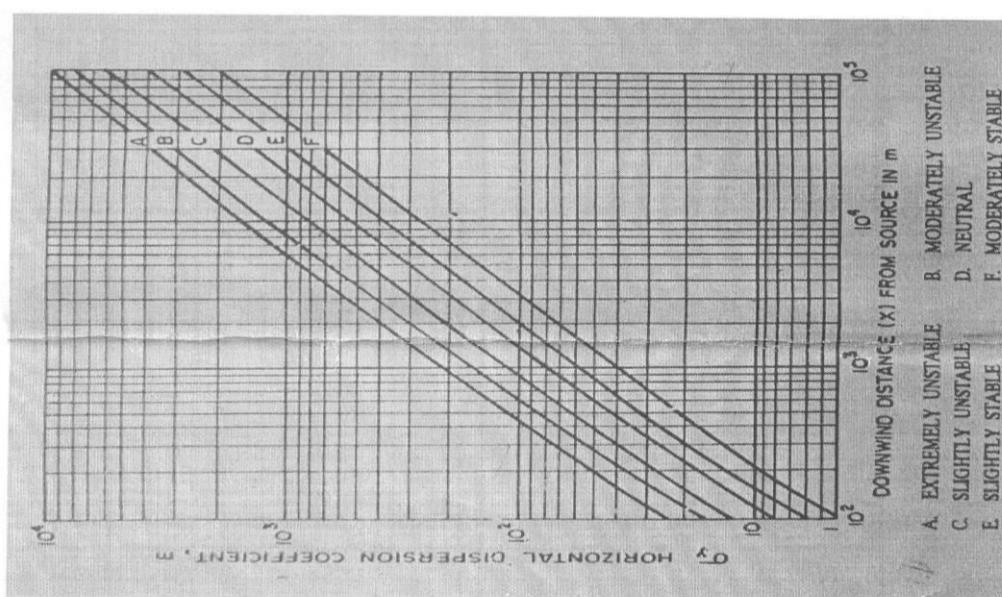
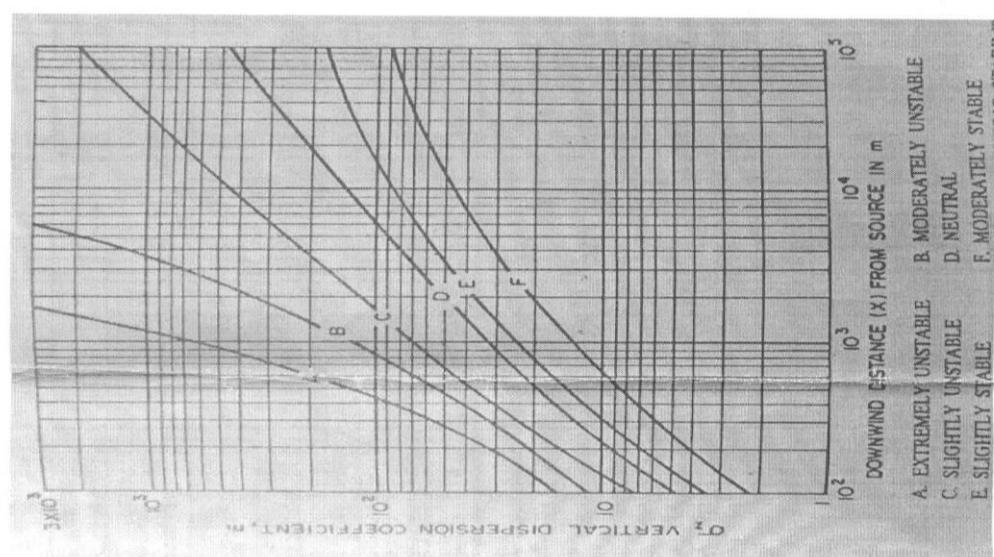
ii) Determine the dimensions of packed filter if the overall efficiency is 99.3%.

Assume W=H.

ii) What is the filter length if efficiency is 98.99%? **5x2**

PART B

- Q.5 a) What is the principle of particulate matter monitoring? **5**
 b) What is an air dispersion model? List uses of these models. **5**
 c) A thermal power plant burns coal at the rate of 8 tons/hour and discharge flue gases through a chimney having effective height of 90 m. The coal has sulphur content of 4.5%. The wind velocity at the top of the stack is 8.5 m/sec. The atmospheric conditions are slightly unstable. Determine the maximum ground level concentration of SO_2 and the distance from the stack at which this occurs.



Gaussian Plume Curve **10**

- Q.6 a) What are the various factors taken into consideration for monitoring of indoor air pollution? **10**

- b) In a museum visited by 75 tourist/ day with volume of 750 m^3 the smoke generation is at the rate of 1.3 cigarettes per head per hour. To maintain proper ventilation fresh air is pumped @ $1490 \text{ m}^3/\text{hr}$. The stale air is pumped out at the same rate. Estimate the concentration of formaldehyde inside the hall. Assume the process to be ready and complete mixing; cigarette contains 1.3 mg of formaldehyde per cigarette. **5**
- c) How does space occupancy contribute to deterioration in air quality? **5**
- Q.7 a) Why ozone depletion is predominant in Antarctica? **5**
- b) What are the potential effects of ozone depletion on human and animal health? **10**
- c) What are the targets of Kyoto protocol? **5**

End Semester Examination, May 2016

B. Tech. – Seventh Semester

EARTHQUAKE RESISTANT DESIGN OF STRUCTURES (C-829)

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 answer:

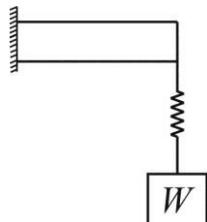
- a) Define an earthquake.
- b) What are the different types of seismic waves?
- c) Define dynamic loads. What are its various types?
- d) What is critical damping?
- e) Define natural frequency and damped frequency.
- f) What do you understand by mode shapes?
- g) Define ductility.
- h) What is gas forming grout?
- i) Explain in-plane and out of plane behaviour of masonry wall.
- j) What are the different factors affecting ductility?

2×10

PART-A

Q.2 a) Write a short note on “Elastic Rebound Theory”. **8**
b) Explain in detail, the difference between magnitude and intensity of an earthquake. **6**
c) What are seismograph and seismograms? **6**

Q.3 a) Define the following:
i) Lumped Mass.
ii) Damping Factor.
iii) D’Almbert’s principle. **6**
b) Derive equation of motions for undamped free vibration system. **6**
c) Determine the time period and natural frequency of the figure given below. **8**



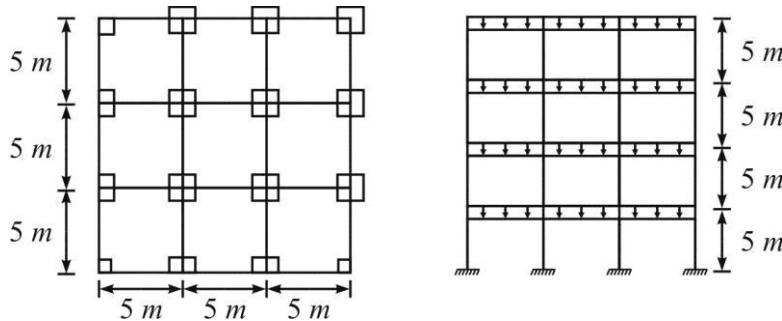
$$b = 400 \text{ mm}$$

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Given data: Slab thickness = 120 mm
 All columns = 350 × 350
 All beams = 500 × 550
 Wall thickness = 120 mm

20

PART-B

- Q.5** a) What are the different types of failures that occur in RC buildings? **4**
 b) Do the designing and ductile detailing of RC column of size 450 mm × 450 mm subjected to following loads. The column has an unsupported length of 4.5 m. Use M20 grds concreted and Fe 415. Assume d/D = 0.1.

	DL	LL	Seismic Load
Axial Load (kN)	850	650	550
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- Q.6** a) Differentiate between:
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- Q.7** a) What are the different modes of failure of a masonry structure? **7**
 b) Explain different techniques to improve the behaviour of masonry walls. **6**
 c) Write a short note on 'retrofitting of roofs and floors'. **7**

End Semester Examination, May 2016
B. Tech. – Seventh Semester
ADVANCED CONCRETE TECHNOLOGY (C-830)

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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- a) Define gap graded aggregate.
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2×10

PART-A

Q.2 a) Define hydration of cement and write hydration reaction for cement compounds. **7**
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5×4

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PART-B

Q.5 a) What are the factors that affect workability of concrete? **8**
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- d) What is i) Initial tangent modulus.

140/4

- ii) Tangent modulus.
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5×4

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- c) Cold weather concreting.
- d) Durability of concrete.

5×4

End Semester Examination, May 2016

B. Tech. – Seventh Semester

ENVIRONMENTAL AIR POLLUTION (C-831)

Time: 3 hrs

Max Marks: **100**

No. of pages: **3**

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- g) What is an air dispersion model?
- h) Name a few organizations that help in monitoring ozone layer.
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2×10

PART-A

Q.2 a) Describe the following air pollution episodes:

- i) Discuss the effects of air pollutant on materials.
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- b) Tabulate the effects of any five air pollutants, dosage and their effects.

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2½×2

c) State the functions of State Pollution Control Boards.

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b) List various air quality stakeholders?

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Explain the working of electrostatic precipitator with a neat sketch.

5

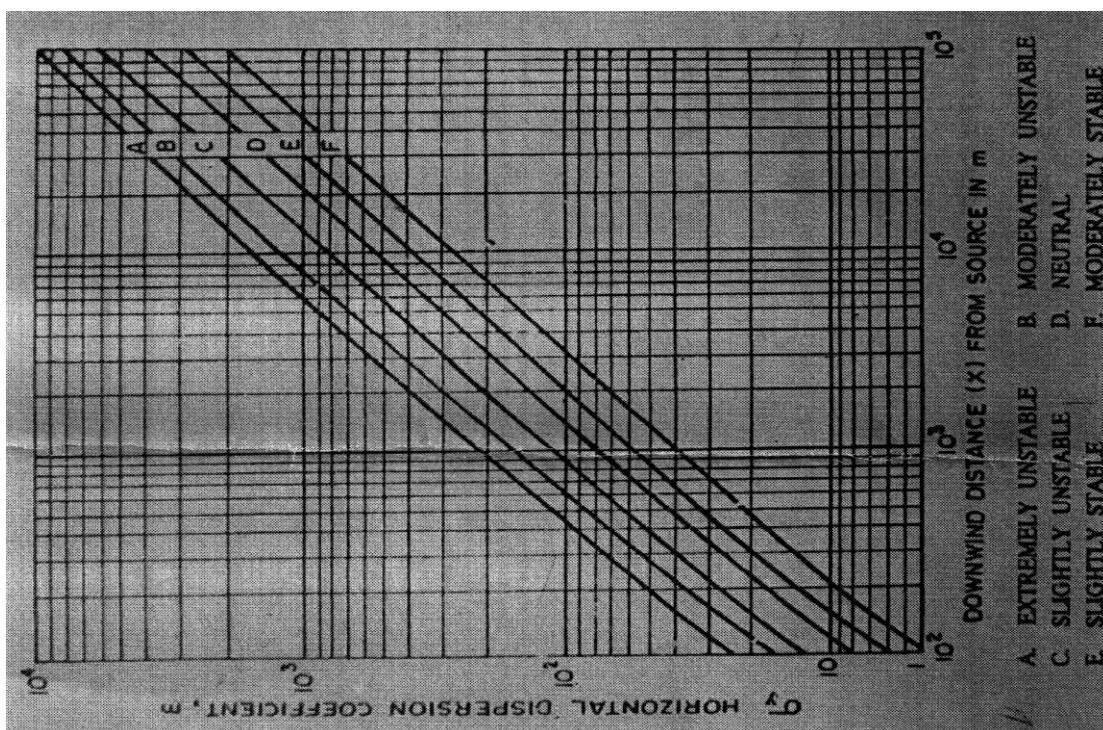
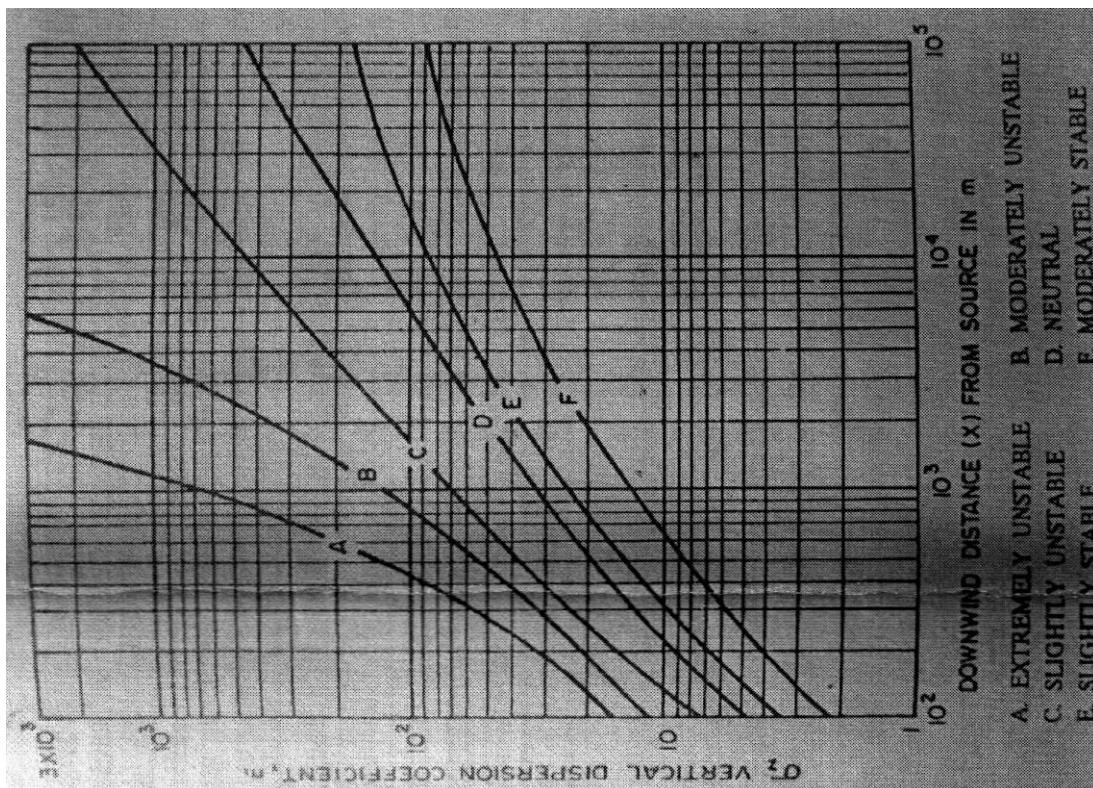
- c) A packed filter handling $1.0 \text{ m}^3/\text{s}$ of standard air is packed with fibers of size $100 \mu\text{m}$ in diameter. Dust laden air passes through the filter with a velocity of 1.5 m/s and the packing density is 0.1 . The average diameter of particles in the air is $1.0 \mu\text{m}$ and the individual fibre efficiency $\eta_f = 0.6$.

- i) Determine the dimensions of the packed filter if the overall efficiency is 99.5% .
Assume $W=H$.
ii) What is the filter length if the $\eta=99.99$ per cent?

10

PART-B

- Q.5 a) A thermal power plant burns coal at the rate of 8 tons/hour and discharge flue gases through a chimney having effective height of 90 m . The coal has a sulphur content of 4.5% . The wind velocity at the top of the stack is 8.5 m/s . The atmospheric conditions are slightly unstable. Determine the maximum ground level concentration of SO_2 and the distance from the stack at which this occurs.



Use Gaussian Plume Curve.

10

- b) What inferences are encountered in NO_2 monitoring? **5**
 - c) What is an air dispersion model? List few uses of air dispersion model. **5**
- Q.6**
- a) What are various causes of Indoor air pollution? **10**
 - b) In a small hall (volume 500 m^3), occupants (capacity 50 persons) are smoking @ 1.2 cigarettes per head/hr. To maintain proper ventilation, fresh air is pumped @ $1250 \text{ m}^3/\text{hr}$ and the stale air is pumped out at the same rate. Estimate the concentration of formaldehyde inside the hall. Assume the process to be ready and complete mixing; cigarette contains 1.3 mg of formaldehyde per cigarette? **5**
 - c) What is the purpose of ventilation? **5**
- Q.7**
- a) What are the causes of ozone depletion? **5**
 - b) What were the objectives of BALI meet on climate change held in December, 2007? **5**
 - c) What are salient features of Kyoto Protocol? What targets were set in this meet? **10**

End Semester Examination, May 2016

B. Tech. – Second Semester

ENVIRONMENTAL STUDIES (CH-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.** Each question carries equal marks.

- Q.1 a) Define environment. What is the scope of environmental studies? **2x10**
b) What are renewable and non-renewable resources? Give examples.
c) What is soil erosion?
d) Define energy distribution law in an ecosystem.
e) Differentiate between detritus and grazing food chain.
f) Define ecosystem biodiversity with its types.
g) Define thermal pollution with its causes.
h) What is rain water harvesting? What is the purpose served by it?
i) What is population explosion?
j) How can we use nuclear energy for peaceful purposes?

PART-A

- Q.2 a) What is the role of an individual to conserve natural resources? **5**
b) Briefly discuss drought and floods with respect to their occurrence and impacts. **5**
c) What are minerals? Discuss the major environmental impacts of over exploitation of mining. **5**
d) Give a brief account of all non-conventional sources of energy. **5**
- Q.3 a) Discuss the process of ecological succession with an example. **5**
b) Discuss ecological pyramids and their types. Explain why some of these pyramids are upright and others are inverted in an ecosystem. **5**
c) Define grassland. Discuss grassland ecosystem with its structure and functions. **5**
d) Write the common producers and consumers near by your environment and discuss food web with an example. **5**
- Q.4 a) What is biodiversity? What are the conservation methods of biodiversity? **5**
b) What are the major threats to biodiversity? **5**
c) What are hot spots biodiversity? Which hotspots are present in India? **5**
d) Explain: i) Endemic species ii) Endangered species with an example. **5**

PART-B

- Q.5 a) Define pollution. Name various atmospheric pollutants. **5**
b) Explain water pollution with its sources, effects and control methods. **5**
c) Classify solid waste. What are the sources of urban and industrial solid waste? **5**
d) Write short notes on: i) Earthquake ii) Cyclones **5**
- Q.6 a) Explain ozone depletion with reactions and its effect on environment and living beings. **5**
b) What is acid rain? What are its major impacts? How can we control it? **5**
c) Discuss the salient features of Water Pollution Prevention Act. **5**
d) What are the major issues related to rehabilitation of the displaced people? Discuss with one small case study. **5**
- Q.7 a) What are human rights? Give salient points. **5**
b) Briefly discuss:

- | | | |
|--|----------------------------|-------------|
| i) Demographic transition. | ii) Zero population growth | 2½x2 |
| c) Discuss the role of IT in environment and human health. | | 5 |
| d) What do you mean by bioterrorism? Explain with example. | | 5 |

End Semester Examination, May 2016
B. Tech. – First Semester
INDUSTRIAL CHEMISTRY (CH-101A)

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 two main functions of coagulants?
 - b) Write any two differences between temporary any permanent hardness.
 - c) Define phase rule for heterogeneous system.
 - d) What is metastable curve in water phase diagram?
 - e) What is the reason behind corrosion? Explain.
 - f) Write any two application of composites.
 - g) What are the main constituents of composites?
 - h) What is the significance of viscosity index?
 - i) Write any two main differences between dry and wet cells.
 - j) What are the two advantages of AFM over SEM? **2x10**

PART-A

- Q.2**

 - a) Explain with a diagram reverse osmosis (RO) process for desalination of sea water. **6**
 - b) What is demineralization? Describe the ION exchange process for softening of water. **6**
 - c) 1 gm of CaCO_3 was dissolved in dilute HCl and solution diluted to 1 litre. 50 ml of this standard hard water required 20 ml of EDTA solution for end point. 50 ml of water sample required 15 ml of EDTA solution, 50 ml of water sample after boiling required 10 ml of EDTA solution. Calculate total, temporary and permanent hardness of water. **8**

Q.3

 - a) Discuss following with equation and diagram:
 - i) Galvanic corrosion
 - ii) Sacrificial anodic protection (SAP)**6**
 - b) How corrosion can be controlled by material selection and proper designing? **6**
 - c) What is wet corrosion? Explain the mechanism of wet corrosion in detail. **8**

Q.4

 - a) Calculate number of phase, component and degree of freedom in following system:
 - i) $2\text{NH}_{3(g)} \rightleftharpoons \text{N}_{2(g)} + 3\text{H}_{2(g)}$
 - ii) $\text{Cu}_{(s)} + \text{H}_2\text{O}_{(g)} \rightleftharpoons \text{CuO}_{(s)} + \text{H}_{2(g)}$**6**
 - b) Explain following with examples:
 - i) Triple point
 - ii) Eutectic point**6**
 - c) Draw and discuss the labeled phase diagram of Zn-Mg system. **8**

PART-B

- Q.5 a) Write short notes on:
i) Aniline point. ii) Flash and fire points. 6
b) What are lubricants? Discuss boundary mechanism of lubrication. 6
c) What do you mean by composites? How they are classified on the basis of matrix phases? Explain in detail. 8

- Q.6 a) Write short notes on:
i) Uses and hazards of batteries.
ii) Liquid crystal polymers. **3x2**
b) What are smart batteries? Write the applications of smart batteries. **6**
c) Define conducting polymers. How they are classified? Discuss four applications of conducting polymers. **8**

- Q.7 a) What is sol-gel process? Discuss the various stages involved in the synthesis of nanomaterials by sol-gel process. **6**
b) What is nanoscience? Discuss any four potential applications of nanoscience in different fields. **6**
c) Explain the principle of atomic force microscope (AFM) techniques. Write any two disadvantages of AFM. **8**

End Semester Examination, May 2016

M. Tech. – First Semester

QUANTITY CONTROL AND SAFETY IN CONSTRUCTION (C-MC-102)

Time: 3 hrs

Max Marks: **75**

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 term quality.
b) State tests to be organized for manufacturing of concrete.
c) Abbreviate ISO-9000 and brief it.
d) List factors affecting safety while constructing a flyover.
e) List out safety appliances for laying brick work at 3m height.
f) Draw a check list for conducting 3m deep excavation.
g) When do we need rubber hand gloves?
h) Where will you use nail proof shoes?
i) Name any safety standard.
j) Name any safety standard. **1½×10**

PART-A

- Q.2 How will you ensure quality control while designing the structures? Support your view of argument with three examples. **15**
- Q.3 What do you understand by quantitative techniques in quality control. How does it differ from quantitative techniques discuss in detail. **15**
- Q.4 Explain ISO-TQM and explain its philosophy in detail. **15**

PART-B

- Q.5 What are the factors effecting safety in construction explain with four examples. **15**
- Q.6 What safety precautions will you recommend while demolishing two storied building with equipment? Explain hazards involved. **15**
- Q.7 Is safety training essential before deputing workmen in construction? What personal safety appliances do you recommend for working at following conditions?
a) Heights
b) Gas cutting and welding
c) Loose soil excavations
d) Tunneling **15**

End Semester Examination, May 2016
M. Tech. (Construction Management) – Second Semester
CONSTRUCTION ECONOMICS AND FINANCE (C-MC-201)

Time: 3 hrs.

Max Marks: **75**

No. of pages: **1**

Note: Attempt **ANY FIVE** questions in all. Each question carries equal marks.

- Q.1 Explain the concept of the value of money. Explain its importance in construction industries with suitable examples. **15**

- Q.2 Define depreciation and inflation with examples. Also write in detail about the straight line depreciation method and how it is taken into account while calculating the present worth. **15**

- Q.3 Describe the financial expression for uniform series compound factors (USCF)

$$= \frac{(i+1)^n - 1}{i(1+i)^n}$$

15

- Q.4 Draw a cash flow diagram for following two alternatives. Select best economical alternative based on present worth method.

	Alternative 1(in Rs.)	Alternative 2 (in Rs.)
Initial purchase cost	10,00,000/-	7,00,000/-
Annual operation cost	10,000/-	15,000/-
Expected annual income	1,75,000/-	1,65,000/-
Expected Salvage value	2,00,000/-	2,50,000/-
Useful life	10 years	5 years

15

- Q.5 The following data has two alternatives for equipments. Calculate the most economical alternative based on Future Worth Method. Also draw a cash flow diagram.

	Equipment 1 (in Rs.)	Equipment 2 (in Rs.)
Initial purchase cost	12,00,000/-	10,50,000/-
Annual operation cost	30,000/-	55,000/-
Salvage value	2,60,000/-	2,30,000/-
Useful life	8 years	8 years

15

- Q.6 What is cash flow diagram? Explain its usefulness in predicting present worth or future worth of investments. **15**

End Semester Examination, May 2016
M. Tech. (Construction Management) - Second Semester
ENERGY CONSERVATION TECHNOLOGY IN BUILDING CONSTRUCTION
(C-MC-202)

Time: 3 hrs

Max Marks: **75**

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 Write short notes on the following:

- a) Provisions of the Energy Conservation Act.
- b) Stack effect of building.
- c) GRIHA system.
- d) Radiant heating system.
- e) Strategies for green building.

3x5

PART-A

Q.2 What is energy conservation? Explain different methodology steps for detailed energy audit. **15**

Q.3 An interior zone of 300 sq.m in a commercial building containing 30 persons for 7 hr. per day, 5 Days per week and office equipment with total connected power load of 2000 watt and average usage of 40 min per hour. The building contain 80 light fixtures of 60 watt per fixture with ventilation air supply with 4 litre per second per person and indoor design temp $T_2=28$ degree at 60% RH with indoor air humidity factor $H_2=9.40$ and cooling design temp, condition $T_1 =32$ degree at 60% RH with outdoor air humidity factor $H_1 = 13$ and degree above 22 degree $DD_c=140$ and 5 month during which monthly temp is above 22 degree and factor of utilization for people and light will be 55 min per hr. and for equipment 35 min per hr. and sensible heat gain per person 215 KJ/h and latent heat gain per person 180 KJ/h and factor of duration is 0.8.

Calculate:

- a) Annual internal cooling load.
- b) Annual ventilation cooling load.
- c) Annual cooling gain load.

5x3

Q.4 **Write short notes on the following:**

a) Green building rating system-LEED standard.

10

b) Ventilation system.

5

PART-B

Q.5 **What are the causes of indoor air pollution? Explain an integrated indoor air quality protocol with a flow chart.**

15

- Q.6** a) **Define solar energy. Explain the working principle of solar energy conservation with merits and demerits.** 10
b) **What are factors to be considered in passive design feature of a solar building? 5**
- Q.7** a) **Explain the different types of air conditioning system.** 10
b) **What are strategies for the design of an energy efficient building?** 5

End Semester Examination, May 2016
M. Tech. (Construction Management) - Second Semester
CONSTRUCTION PERSONNEL MANAGEMENT (C-MC-203)

Time: 3 hrs

Max Marks: **75**

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 important resources in an organization.
b) Name the different levels of management in an organization.
c) Define the term: 'span of supervision'.
d) Define the term: 'organizational chart'.
e) Define the term: 'job analysis'.
f) Write down the steps in a recruitment process.
g) Define the term: 'group'.
h) Define the term: 'communication'.
i) Define the term: 'leadership'.
j) Define the term: 'compensation'. **1½x10**

PART-A

- Q.2 Discuss the managerial functions of a personnel management. **15**
- Q.3 a) Discuss the strength and weaknesses of centralized and decentralized organizations.
b) Discuss the hierarchy in a formal organization.
c) Differentiate between 'line organization' and 'staff organization'. **5x3**
- Q.4 a) Write notes on:
i) Direct.
ii) Indirect.
iii) Third party recruitment methods. **10**
b) Draw the flow chart for a selection process. **5**

PART-B

- Q.5 a) Differentiate between 'extrinsic' and 'intrinsic' motivation. **7**
b) Differentiate between 'financial' and 'non-financial' motivation. **8**
- Q.6 Discuss the key elements of a good communication. **15**
- Q.7 Discuss the factors affecting wages in detail. **15**

End Semester Examination, May 2016

M. Tech. (Construction Management) – Second Semester

RESOURCE MANAGEMENT AND CONTROL IN CONSTRUCTION (CM-C-204)

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.** Each question carries equal marks.

Q.1 Write short notes on the following:

- a) Construction cost breakdown structures.
- b) Construction task force.
- c) Material provisioning process.
- d) Resource leveling.
- e) Depreciation cost.

3×5

PART-A

- Q.2** Explain the different phases through which construction procurement of project passes. **15**
- Q.3** A construction company stores various item in central store. The average annual consumption and cost per unit store are given in table. Classify the item ABC analysis.

Name of Items	Average annual consumption (No.)	Average cost per unit (`)
a	5000	50
b	1000	100
c	1200	200
d	2500	28
e	45	275
f	4500	70
g	1500	75
h	5000	70
i	48	350
j	250	120
k	200	240
l	50	175

15

- Q.4** a) What are different categories of financial incentives schemes provided to construction worker? **5**
- b) What are the adjustments required for a daily manpower in construction? **10**

PART-B

- Q.5** a) What factors are considered in the process of equipment selection? **5**
- b) A crawler tractor purchase price is ` 3,00,000/- and assessed resale value after using for 6 years is 12% of the delivered price. The equipment is planned to operate 2500 hr per year. Find:
- i) Annual and hourly depreciation.
 - ii) Residual value. **10**

- Q.6** a) What are the different methods of estimating cost of a project? **5**
b) The table below gives the activities in a construction project and other relevant information.

Activity	Duration in days
1-2	20
1-3	26
2-3	12
2-4	13
3-4	6
4-5	11

- i) Draw the network for the project.
ii) Find the critical path.
iii) Find free, total and independent floats for each activity. **10**

- Q.7** a) What tools and techniques are used in value engineering? **5**
b) Explain the different phases of value engineering job plan of value management in construction. **10**

End Semester Examination, May 2016

M. Tech. (Construction Management) – Second Semester
IMPACT ASSESSMENT AND MANAGEMENT(C-MC-205)

Time: 3 hrs

Max Marks: **75**

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 Write a short note on the following: **3×5**
a) Check list method of impact assessment.
b) Importance of public participation in EIA.
c) Essential components of an environmental management plan.
d) Purpose of screening in EIA.
e) Environmental imbalance.

PART-A

- Q.2 a) What are the environmental attributes of EIA? Explain. **8**
b) How do you consider socio-economic factors in on impact prediction study? **7**
- Q.3 a) Quantify the environmental impact of a water resources project. **8**
b) How do EIA contribute to the sustainable development? **7**
- Q.4 Discuss the socio-economic impact due to highway development project in a medium sized city in India. **15**

PART-B

- Q.5 a) Discuss the objective of public participation in EIA studies. **7**
b) What are the various mechanism for public involvement of various stages of EIA? **8**
- Q.6 a) What are the EIA guidelines followed in India? **8**
b) Discuss the various Government by laws of EIA in India. **7**
- Q.7 Explain briefly the preparation of environmental management plan for a hydroelectric power project. **15**
- Q.7 Define air pollution. Give an account of sources, nature and effects of air pollution. Suggest suitable methods to control air pollution. **10**
- Q.8 Write short notes on the following (**ANY TWO**): **5×2**
a) Ozone depletion.
b) Global Warming.
c) Acid Rain.
- Q.9 a) Define age structure, death rate and birth rate in brief.
b) Discuss the role of IT in environment and human health. **5×2**

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) Explain the functions of ALU.
 b) What is internet?
 c) Define WAN.
 d) What are the key principles of security?
 e) Explain the working principle of optical disk.
 f) What is time sharing?
 g) Define POST.
 h) List the advantages of procedure oriented languages.
 i) Explain ROM and its types.
 j) What is password? How can crackers crack it?

2x10

PART-A

- Q.2 a) Explain various components of a computer system. Also explain various types of computer system. **10**
 b) Convert the following:
 i) $(312.25)_{10} = (?)_2$ ii) $(DEA)_{16} = (?)_{10}$ iii) $(1011.1101)_2 = (?)_{10}$
 iv) $(3462)_8 = (?)_{16}$ v) $(724)_8 = (?)_{10}$ **2x5**
- Q.3 a) Explain the working principle of the following devices. **10**
 i) Cathode Ray Tube ii) Hard Disk Drive
 b) Describe the role of cache memory in a system. **5**
 c) Differentiate between static RAM and dynamic RAM. **5**
- Q.4 a) Explain various functions performed by an operating system. **8**
 b) Differentiate between assembler, compiler and interpreter. **8**
 c) Explain key features of UNIX operating system. **4**

PART-B

- Q.5 a) "High level languages are machine independent while low level languages are machine dependent". Justify this statement by taking suitable example. **10**
 b) Define system software? Explain the functions of some system softwares. **10**
- Q.6 a) Explain the difference between wired and wireless network technology. **4**
 b) What is topology? Explain the ring, bus, star and tree topology with their advantages and disadvantages. **8**
 c) What is the need of network devices? Explain all the network devices along with their advantages and disadvantages. **8**
- Q.7 a) Define Trojan horse. How it is different from virus and worm? Explain with example. **10**
 b) Write short notes on **(any two):**
 i) Antivirus ii) Security threats iii) Firewall **10**

End Semester Examination, May 2016

B. Tech. – First / Second Semester

PROGRAMMING IN 'C' (CS-103)

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) Why do we use header files?
b) Explain the difference between keywords and identifiers.
c) What is the use of strcpy() function?
d) Define data-type. What is the size of float data-type in C?
e) Write two advantages of using array.
f) Give any two features of pointers.
g) Differentiate between actual parameters and formal parameters.
h) Explain feof() function with an example.
i) What is the need for using functions in C?
j) Differentiate between strlen() and sizeof() functions. **2×10**

PART-A

- Q.2 a) Explain for loop, while loop and do-while loop with the help of an example. **12**
b) Write a program in 'C' to print sum of digits of a number. **8**
- Q.3 a) Define 2-D array. How it is declared? Write a program in 'C' for matrix multiplication. **12**
b) Explain string handling functions with an example. **8**
- Q.4 a) Explain the difference between structure and union? Write a program in 'C' to implement structures. **10**
b) Explain the following with an example:
i) Array of structure.
ii) Structure within structures. **5×2**

PART-B

- Q.5 a) What is a pointer? Write a program in 'C' to explain the usage of pointers. **10**
b) Explain array of pointers and pointer to an array with the help of an example. **10**
- Q.6 a) Explain parameter passing in functions with the help of an example. **10**
b) What is recursion? Write a program in 'C' to print Fibonacci series using recursion. **10**
- Q.7 a) What is file? What are the different modes of opening a file? **10**
b) Write a 'C' program to copy the contents of one file to another. **10**

End Semester Examination, May 2016

B. Tech. – First / Second Semester

INTRODUCTION TO OPEN SOURCE SOFTWARE AND OPEN STANDARDS (CS-104)

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 is De facto standard? Give examples.
b) Give at least four examples of open source projects.
c) Briefly explain the term: vendor lock-in.
d) What are the different categories of degree of association of open standards?
e) Differentiate between 'gratis' and 'libre'.
f) What is BIS? Explain briefly.
g) What do you understand by early adopter of open standards?
h) Differentiate between freedom 0 and freedom 2 for open source as defined by Stallman.
i) Briefly explain international telecommunication union.
j) What do you understand by derived work in open source? **2x10**

PART-A

- Q.2 a) Why do we require standards? What are the benefits to industry for adopting standards? Why still many industries are not adopting standards? **10**
b) Explain different phases of life cycle that a standard goes through. **10**
- Q.3 a) Explain in detail about De jure standard setters. **10**
b) What are the various drivers for adopting an open standard by any organization? Explain briefly. **10**
- Q.4 a) Explain the various stages of the process of adoption for an open standard in detail. **10**
b) What are the attributes and the major principles of open standards? **10**

PART-B

- Q.5 a) What is the difference between open source and closed source? Explain briefly with examples. **10**
b) How one can contribute to open source projects? Explain briefly. **10**
- Q.6 a) What are the common challenges in open source projects? Explain briefly. **10**
b) Explain the prominent drivers for the wide spread adoption of open source. **10**
- Q.7 Write short notes on:
a) Free software foundation in India.
b) Brook's law.
c) The license review process.
d) GNU general public license. **5x4**

End Semester Examination, May 2016

B. Tech. –Second Semester

ELEMENTS OF DISCRETE STRUCTURES (CS-203)

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) Draw a Venn diagram for:

$$A \cup B \subset A \cup C \text{ but } B \not\subset C$$

- b) Make a truth table for $(P \vee q) \wedge r.$
- c) Give an example of a semi-group.
- d) State the Pigeon Hole Principle.
- e) Solve the difference equation

$$a_r - 6a_{r-1} + 8a_{r-2} = 0$$
- f) Determine the value of n if $3 \times {}^n p_4 = 7 \times {}^{n-1} p_4$
- g) Define an Euler path in a graph.
- h) How many lines can be drawn through 10 points on a circle?
- i) Explain spanning tree with an example.
- j) Define lattice with an example.

2×10

PART-A

- Q.2** a) Prove that $A \times (B \cup C) = (A \times B) \cup (A \times C).$ **4**

- b) Among the first 1000 positive integers
 - i) Determine the integers which are not divisible by 5, nor by 7, nor by 9.
 - ii) Determine the integers divisible by 5, but not by 7, not by 9.**8**

- c) Determine whether the relation

$$R = \{(a, b) \in R, a - b \leq 1 \text{ on the set } I_+ \text{ (Set of +ve integer)}\} \text{ is:}$$

- | | |
|-------------------------------|-----------------------------|
| i) Transitive | ii) Antisymmetric |
| iii) A partial order relation | iv) An equivalence relation |
- 8**

- Q.3** a) What do you mean by existential quantifier? Explain with a suitable example. **5**

- b) From the following formulae find out tautology, contingency and contradiction

- i) $\square(A \rightarrow B) \vee (\square A \vee (A \wedge B))$
 - ii) $(H \rightarrow (I \wedge J)) \rightarrow \square(H \rightarrow I)$
 - iii) $(P \leftrightarrow Q) \equiv (P \wedge Q) \vee (\neg P \wedge Q)$
- 15**

- Q.4** a) Prove $\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{n(n+1)} = \frac{n}{n+1}$ **6**

- b) Show that ${}^n c_r + {}^n c_{r-1} = {}^{n+1} c_r$
where $n \geq r \geq 1$ and n and r are natural numbers. **6**

- c) What are the ways to select five programmers from a group of 10 programmers when:

- i) A particular programmer is included every time.
 - ii) A particular programmer is not included at all.
- 8**

PART-B

Q.5 a) Solve the recurrence relation

$$a_{r+2} - 3a_{r+1} + 2a_r = 0$$

10

b) Solve the difference equation

$$a_r + 6a_{r-1} + 9a_{r-2} = 3$$

10

Q.6 a) Consider a ring $(R, +, *)$ defined by $a * a = a$. Determine whether the ring is commutative or not.

10

b) Explain the concepts of Integral Domain, Abelian Group and Monoid with the help of an example.

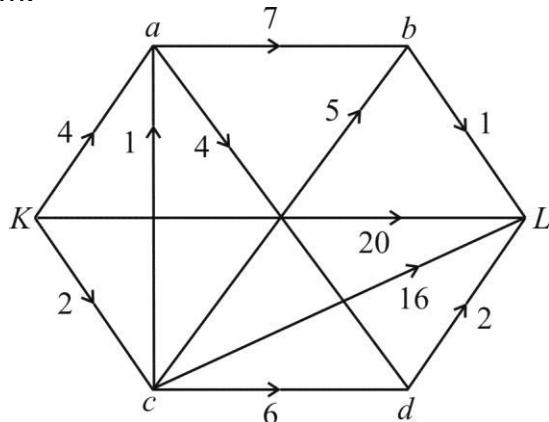
10

Q.7 a) Write short notes on:

- i) Graph colouring.
- ii) Binary tree.
- iii) Planer graph.

10

b) Find the shortest path between K and L in the graph shown in figure by using Dijkstra's Algorithm.



10

End Semester Examination, May 2016

B. Tech. –Second Semester

WEB PROGRAMMING THROUGH PHP AND HTML (CS-205)

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) Show how PHP code is embedded in an HTML file.
b) How constants are declared in PHP?
c) Give an example of ternary operator.
d) Give an example of static variable.
e) Differentiate between include and require.
f) Which function is used to find the size of an array?
g) List the functions to sort an array in ascending order.
h) Differentiate between class and object.
i) What is the use of a PHP framework?
j) How a table is deleted in SQL?

2×10

PART-A

- Q.2 a) Explain isset(), unset(), empty() and is__NULL() functions with examples. **10**
b) Write down the features of PHP. Explain how do we work with PHP? **10**
- Q.3 a) Explain any five string manipulation functions with example. **10**
b) Take a number from user as input and calculate its factorial using for loop, while loop and do while loop. **10**
- Q.4 a) Create an associative array of five elements. Delete the third element, modify the fifth element and add two new elements. Print the array after each operation. **10**
b) Enter records of three employees in a file. Read each record individually and print it. **10**

PART-B

- Q.5 a) What is a constructor? Give example of constructor with parameters. **5**
b) What do you understand by exception propagation? Give an example to create custom exceptions. **10**
c) Create an HTML form and apply validations using JavaScript. **5**
- Q.6 a) Explain any two advanced functions in PHP with example. **6**
b) How pattern matching is done in PHP? **4**
c) Write a short note on any two PHP frameworks. **10**
- Q.7 a) Write a short note on Eclipse. **5**
b) Explain the various views of PHP in brief. **5**
c) Create a table of student details in SQL. Enter three records into it. Update any two records and display all the data. **10**

End Semester Examination, May 2016

B. Tech. – Third Semester

DISCRETE STRUCTURES (CS-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 Briefly answer:

- a) Prove $(A \cap B) \cap C = A \cap (B \cap C)$.
- b) Determine the value of n if $3x^n P_4 = 7x^{n-1} P_4$.
- c) Negate the following proposition:
 $(\forall x \in \cup)(x < 25)$
- d) Find the probability of getting 8 or 11 in single throw of two dice.
- e) State Langrange's theorem.
- f) What do you understand by a recurrence relation? Give an example.
- g) Consider the relation R on $A = \{4, 5, 6, 7\}$ defined by $R = \{(4, 5) (5, 5) (5, 6) (6, 7) (7, 4) (7, 7)\}$. Find the symmetric closure of R .
- h) Define an Euler path in a graph.
- i) A card is drawn from a deck of cards. Find probability of getting king or a heart or a red card.
- j) Define a weighted graph. Give an example.

2×10

PART-A

Q.2 a) Among the first 500 positive integers:

i) Determine the integers which are not divisible by 2, nor by 3, nor by 5.

ii) Determine the integers which are exactly divisible by one of them.

8

b) Let $x = \{a, b, c\}$. Define $f: x \rightarrow x$ such that

$f = \{(a, b), (b, a), (c, c)\}$. Find:

i) f^{-1} ii) f^2 iii) f^3 iv) f^4

6

c) Determine whether the relation:

$R = \{(a, b) \in R : a + b \text{ is even on the set } I_+ \text{ (Set of positive integers)}\}$ is:

i) Reflexive ii) Symmetric iii) Transitive

iv) Antisymmetric v) A partial order relation vi) An equivalence relation

6

Q.3 a) From the following formulae, find out tautology, contingency and contradiction:

i) $(H \rightarrow (I \wedge J)) \rightarrow \square (H \rightarrow I)$

ii) $(P \rightarrow q) \rightarrow t \leftrightarrow (P \wedge \square q) \rightarrow t$

12

b) Prove the following:

i) $(P \rightarrow q) \equiv (P \rightarrow q) \vee (\square P \wedge \square q)$

ii) $P \wedge (q \wedge r) \equiv (P \wedge q) \vee (P \wedge r)$

8

Q.4 a) Show that ${}^n C_r + {}^n C_{r-1} = {}^{n+1} C_r$ where $n \geq r \geq 1$ and n and r are natural numbers.

4

b) Prove by induction that for $n \geq 0$ and $a \neq 1$; $1 + a + a^2 + \dots + a^n = \frac{1 - a^{n+1}}{1 - a}$.

10

- c) A box 'A' contains 2 white and 4 black balls. Another box 'B' contains 5 white and 7 black balls. A ball is transferred from the box A to box B. Then a ball is transferred from box B to box A. Find the probability that it will be white. 6

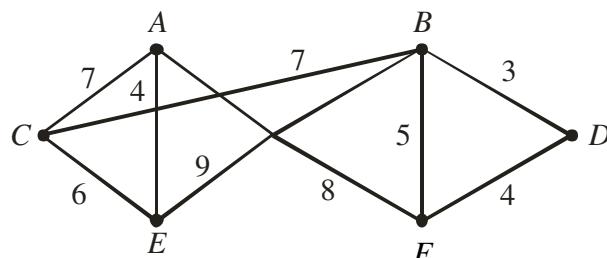
PART-B

- Q.5 a) Solve the recurrence relation:
 $a_r + a_{r-1} + a_{r-2} = 0$ satisfying the initial conditions $a_0 = 0$ and $a_1 = 2$. 10
- b) Solve the recurrence relation:
 $a_{r+2} - 5a_{r+1} + 6a_r = r^2$. Find both homogenous and total solution. 10
- Q.6 a) Consider an algebraic system $(Q, *)$ where Q is the set of rational numbers and $(*)$ is a binary operation defined by:
 $c * d = c + d - cd, \forall c, d \in Q$. Determine whether $(Q, *)$ is a group. 10
- b) Define the following terms with an example:
i) Semigroup
ii) Subrings
iii) Cosets
iv) Monoid
v) Closure property of binary operation. 10
- Q.7 a) Draw unique binary tree when in-order and post-order are given as follows:

In-order	3	2	5	4	1	7	6	9	10	8	11
Post-order	3	5	4	2	7	10	9	11	8	6	1

5

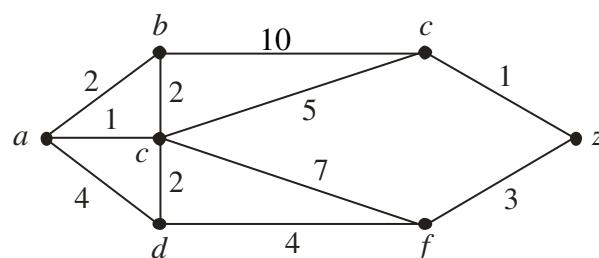
- b) Determine minimum spanning tree using KRUSKAL'S algorithm:



[Referred by Q - 7 (b)]

5

- c) Find shortest path between a and z in following graph:



10

End Semester Examination, May 2016

B. Tech. – Third Semester

DATA STRUCTURES AND ALGORITHMS (CS-302)

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:
- What is pointer? Illustrate its use.
 - List various applications of stack.
 - Define recursive by taking a suitable example.
 - How linked list is better than array?
 - Define in-degree and out-degree of a node.
 - What is shell sort?
 - What is meant by rehashing?
 - Write down the worst case, average case and best case time complexity of merge sort.
 - Explain space and time complexity.
 - What is threaded trees? **2×10**

PART-A

- Q.2**
- What is abstract data type? Which one is better concept and why? "Static or Dynamic Implementation of Data Structure". **5**
 - Differentiate between recursion and iteration taking factorial of a number as an example. **7**
 - Explain how stack is used to convert infix – expression into postfix expression. Convert the given infix expression into postfix expression.
 $15 + 16 - 4 \times (5 \times 3/2)$ **8**

- Q.3** Write down the algorithm for the following operations:
- Inserting and deleting an element in stack.
 - Insert a node at the given position in a circular link list.
 - Delete the node at the front of doubly link list.
 - Calculate the number of nodes present in a singular link list. **5×4**

- Q.4**
- Generate a Height Balance tree by inserting the following nodes into it:
81, 64, 72, 92, 81, 55, 14, 21, 36, 29 **10**
 - Differentiate between LL and LR rotation. **5**
 - Differentiate between pre-order and post-order traversal. **5**

PART-B

- Q.5**
- Explain the working principle of depth-first-search and breadth-first-search traversal with the help of an example. **10**
 - Differentiate between Kruskal's and Prim's algorithm with an example. **10**

- Q.6**
- Explain bubble sort algorithm. Also compute its time complexity. **6**
 - Create a max heap tree for the given nodes and also sort them in decreasing order using heap sort algorithm.
 $25, 15, 95, 35, 85, 45, 65, 55, 75$ **10**

- c) Write down the algorithm for insertion sort. **4**
- Q.7 a) What is binary search? Explain its algorithm with a suitable example. Also compute its time complexity. **10**
- b) What are the qualities of a good hash function? Explain all techniques to overcome collision problem in hashing. **10**

End Semester Examination, May 2016

B. Tech. – Third Semester

COMPUTER ARCHITECTURE AND ORGANIZATION (CS-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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) What is sequential circuits? Explain with the help of example.
- b) Draw and explain the multi-level viewpoint of a machine.
- c) Describe the 20 bits of micro-instruction format.
- d) Differentiate between the micro-programmed and hardwired control memory.
- e) How performance of a system can be enhanced with pipelining?

4×5

PART-A

- Q.2** a) What is addressing mode? Explain any four addressing mode with suitable example. **10**
- b) Explain the different services of operating system. **10**
- Q.3** a) What is interrupts? Draw a flow chart of interrupt cycle. **12**
- b) Differentiate between RISC and CISC. **8**
- Q.4** a) How basic computer registers are connected to a common bus? Explain with the help of example. **15**
- b) What is the role of CAR in micro-programmed control memory? **5**

PART-B

- Q.5** a) Compare the characteristics of static and dynamic RAM. **10**
- b) What is mapping? Discuss the direct and associative cache mapping. **10**
- Q.6** a) Explain the Flynn's classification of digital computer. **10**
- b) Differentiate between instruction level parallelism and processor level parallelism. **10**
- Q.7** a) What is cache coherence problem? How multiprocessors resolve this problem? **8**
- b) Write short notes on:
i) MIPS
ii) Virtual memory
iii) RPN
iv) CAR **3×4**

End Semester Examination, May 2016

B. Tech. – Third Semester

OBJECT ORIENTED PROGRAMMING AND SYSTEMS (CS-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 Briefly answer:

- a) When will you make a function inline? Why?
 - b) What is a class? How does it accomplish data hiding?
 - c) What is the application of the scope resolution operator (:) in C++?
 - d) How do we invoke a constructor function?
 - e) What is the importance of overloading an operator?
 - f) When do we use the protected visibility specifier to a class member?
 - g) When do we make a class virtual?
 - h) What is a file mode? Give the various file mode options available.
 - i) Distinguish between class template and template class.
 - j) Differentiate between multiple inheritance and multilevel inheritance.
- 2×10**

PART-A

- Q.2**
- a) What is object oriented programming structure? Does it support reusability? If yes, how? **6**
 - b) List advantages of objected oriented programming. **4**
 - c) Write a program to check whether given input is palindrome or not using C++. **10**
- Q.3**
- a) What do you mean by friend function? When do we need to declare a function as a friend? **6**
 - b) Differentiate between constructors and destructors. **4**
 - c) What are static member functions? State its characteristics. Write a program to implement static member function. **10**
- Q.4**
- a) What is operator overloading? State the rules for overloading operators. **7**
 - b) Write a program to implement binary + operator overloading. **10**
 - c) Differentiate between function overloading and operator overloading. **3**

PART-B

- Q.5**
- a) Explain multiple inheritance with an example. **10**
 - b) Write a program that implements the use of constructors and destructors in derived classes. **10**
- Q.6**
- a) Give the classes for file stream operations in C++. Explain them with the help of a neat diagram. **6**
 - b) What do you understand by generic programming? Explain how class templates are useful? **6**
 - c) Write a program to create two files with names “country” and “capital”. In country write three country names. Similarly in capital file write their respective capitals and display the contents of both the files on console. **8**
- Q.7** Write short notes on:

- | | |
|--|---|
| a) Error handling during files operations. | 7 |
| b) Random access files. | 6 |
| c) Exception handling mechanism. | 7 |

End Semester Examination, May 2016

B. Tech. – Third / Fourth Semester

DATABASE MANAGEMENT SYSTEMS (CS-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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) Explain the advantages of DBMS over traditional file system.
- b) Explain the weak entity with the help of diagram.
- c) Describe the concept of Full Functional Dependency.
- d) What is variable length record? What are its types?
- e) What are the types of damages that can take place to the database? Explain. **4×5**

PART-A

- Q.2 a) Define normalization. Explain 2 NF and 3 NF by taking suitable examples. **8**
- b) Discuss the concept of data independence and explain its importance in database environment. **12**
- Q.3 a) Discuss three schema architecture of DBMS. How these schema layers are related to physical and logical data independence? **12**
- b) Define the terms relation, cardinality and relation degree with an example. **8**
- Q.4 a) What do you mean by relational algebra? Explain the operators used in relational algebra. **12**
- b) What is the difference between JOIN and OUTER JOIN operator? **8**

PART-B

- Q.5 a) Compare sequential, indexed sequential and direct file organization techniques. **10**
- b) Explain the difference between the following:
 - i) Primary Vs secondary indexes.
 - ii) Dense Vs sparse indexes.**10**
- Q.6 a) Explain various locking mechanisms used during concurrency control. **10**
- b) Discuss deferred update technique database recovery in detail. **10**
- Q.7 Write short notes on:
 - a) Deadlock
 - b) Clustering index
 - c) Authentication
 - d) Authorization**5×4**

End Semester Examination, May 2016

B. Tech. – Third Semester

DATA STRUCTURES USING JAVA (CS-306)

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 answer:

- a) What is dynamic binding?
- b) What is iteration?
- c) Describe finally block.
- d) What are asymptotic notations?
- e) What is max heap?
- f) Describe the use of protected keyword.
- g) Describe pass by value.
- h) What is exception?
- i) Define collections.
- j) Evaluate the following postfix expression.

$593 + 42 ** 7 + *$

2×10

PART-A

Q.2 a) Define a constructor. Why they are used? Can constructors be overloaded? Write a program to support your answer. **10**
b) Write a program in Java to read a file. **10**

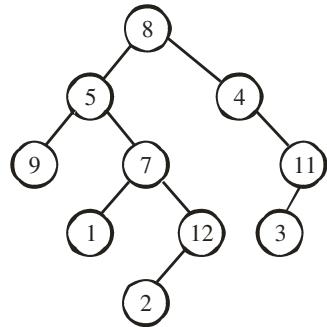
Q.3 a) What do you understand by queue? Write an algorithm to insert and delete an element from linear queue. **10**
b) Explain BFS algorithm by taking a suitable example. **10**

Q.4 a) What is super keyword? Write Java program to show its usage. **10**
b) What is collision? Explain in detail. What are various collision resolution techniques? **10**

PART-B

Q.5 What is sorting? Write bubble sort algorithm. Explain it on following input:
 $7, 5, 2, 4, 3, 9$
Show each step of the algorithm. **20**

Q.6 a) What is heap sort? Write an algorithm for heap sort. **12**
b) Consider the following tree:



Write its:

- i) Pre-order traversal.
- ii) Post-order traversal.
- iii) In-order traversal.
- iv) Level-order traversal.

2x4

- Q.7 a) Define recursion. Write a recursive algorithm to find solve Tower of Hanoi problem. **10**
- b) Discuss various asymptotic notations used to find complexity of algorithms. **10**

End Semester Examination, May 2016

B. Tech. – Third Semester

INTRODUCTION TO IT INFRASTRUCTURE AND LANDSCAPE (CS-308)

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 answer:

- | | |
|---|------------|
| a) Explain briefly the three SQL categories based on the functionality involved. | 2 |
| b) Differentiate between JDBC and ODBC. | 2 |
| c) What are the various interface technologies used in storage networking? | 1 |
| d) Explain briefly the basic OLAP operations to analyse data. | 2 |
| e) What do you understand by operating system? | 1 |
| f) Define the following features of operating system: | |
| i) Multiuser | |
| ii) Multiprocessing | |
| iii) Multitasking | |
| iv) Multithreading | 1×4 |
| g) Explain briefly the various network security components that improve the network security. | 2 |
| h) Differentiate between Bus and Tree topology. | 2 |
| i) Differentiate amongst the following firewall technologies: | |
| i) Hardware firewall. | |
| ii) Software firewall. | |
| iii) Packet-filter firewall. | |
| iv) Proxy firewall. | 1×4 |

PART-A

- Q.2** a) What is DBMS? Explain briefly its fundamentals along with its advantages and disadvantages. **5**
- b) Explain the standard types of DBMS in briefly. **5**
- c) Explain various joins in SQL statements. Also write the syntax of 'Natural Join' and 'Left Outer Join'. **5**
- d) What is relational database schema? Also write the syntax for the following:
- i) To automatically generate default values for certain columns.
 - ii) To create a desired view on the table.
 - iii) To modify and rename database objects. **5**
- Q.3** a) Explain the various storage network technologies in briefly. **5**
- b) Explain the types of storage systems and the various devices/drives used for each type with the help of examples. **10**
- c) What is zoning in storage area network? Explain the types of zoning in brief. **5**
- Q.4** a) What is server technology? Explain the various types of servers in brief. **5**
- b) Explain park servers. **5**
- c) Explain various types of operating systems. **5**
- d) Define virtualization and list its benefits. Also explain virtual machine and its types. **5**

PART-B

- Q.5 a) What is directory and its type? Also explain what is a directory server. **5**
b) Explain briefly the various aspects of security models in the world of networked computers. **5**
c) Explain briefly LDAP functional model. **5**
d) What is LDAP interchange format? Also explain LDIF file format along with the descriptions of the fields. **5**
- Q.6 a) Explain briefly the various network security zones found in an organization. **5**
b) What are the switching concepts in computer network? What are the functions and limitations of layer 2 switching? **5**
c) What is virtual LAN? When does one need a VLAN? Explain briefly the benefits of VLAN. **5**
d) What is private key and public key data encryption? Explain briefly message Digest, Digital Signature and Authentication Protocol for secure messaging. **5**
- Q.7 a) What is IBM web-sphere MQ and what are its objects? **5**
b) Define application server and discuss its services including cluster deployment. **5**
c) What is data warehousing? Explain briefly the various warehouse modeling approaches. **5**
d) Differentiate between Lotus Notes and Lotus Domino. Explain briefly various Lotus Domino server types. Also give the access control list in the Lotus Domino and Lotus Notes. **5**

End Semester Examination, May 2016
B. Tech. – Fourth / Seventh / Eighth Semester
COMPUTER NETWORKS (CS-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 | a) Define modulation.
b) Explain data link layer in frame relay.
c) Define router.
d) Define line configuration.
e) Explain firewall.
f) What is voice over IP?
g) Define co-axial pair.
h) Write a note on BISDN.
i) What is mobile IP?
j) Define HTTP. | 2x10 |
|-----|---|-------------|

PART-A

- | | | |
|-----|--|----------------------------------|
| Q.2 | a) Define multiplexing. Explain different types of multiplexing in computer networks. | 8 |
| | b) Explain TCP/IP reference model in detail. | 12 |
| Q.3 | a) What is Aloha? Compare pure Aloha and slotted Aloha.
b) Write a short note on 'Gigabit Ethernet'.
c) What is hidden and exposed station problem? Explain with an example. | 8
4
8 |
| Q.4 | a) Differentiate between X.25 and frame relay.
b) Explain ATM layers.
c) Define SONET devices with diagrams. | 6
7
7 |

PART-B

- | | | |
|-----|--|-----------------------|
| Q.5 | a) Explain types of errors handled by IC MP.
b) Write in detail about RIP, BGP and OSPF protocols. | 8
12 |
| Q.6 | a) Write short notes on:
i) DNS
ii) IMAP
iii) FTP
b) What is MIME? Explain MIME with header format. | 12
8 |
| Q.7 | a) Explain the security protocols defined by IP Security with frame format.
b) What do you mean by cryptography? Explain. | 15
5 |

End Semester Examination, May 2016

B. Tech. – Fourth Semester

ANALYSIS AND DESIGN OF ALGORITHMS (CS-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.** Each question carries equal marks.

- Q.1 a) What do you understand by non-deterministic algorithm?
b) What is algorithm? What are the essential criteria which an algorithm must satisfy?
c) What is divide and conquer technique? In which searching and sorting algorithms this technique used?
d) Write the straight forward algorithm for string matching.
e) How many key comparisons are made in the quick-sort if the input data is already sorted?
f) What are the general characteristics of greedy algorithms and the problems solved by these algorithms?
g) What are the similarities and differences between the divide & conquer and dynamic programming?
h) What is 0/1 knapsack problem?
i) Use backtracking to show that there is no solution for 3-queen problem.
j) Give a necessary and sufficient condition for a graph to be colourable with one colour.

2x10

PART-A

- Q.2 a) What do you mean by space and time complexity of an algorithm? How can you find both? Explain with suitable examples. **10**
b) Name the procedure for sorting data in linear time and write the algorithm for same. **10**
- Q.3 a) Write Robin-Karp algorithm and use it to find the pattern p = 'love' in the text T = 'live a little and love a little'. **10**
b) Draw the finite automata for the pattern 'ABAABA', where $\Sigma = \{A, B, C\}$. **10**
- Q.4 a) Write the algorithm for finding maximum and minimum from an array using divide and conquer strategy. Also find its time complexity. **12**
b) Write Strassen's Matrix Multiplication Algorithm. **8**

PART-B

- Q.5 a) Solve the following Knapsack problem using greedy method:
 $m = 20$
 $w = <18, 15, 10>$
 $p = <25, 24, 15>$ **12**
b) Write and explain the Prim's algorithm for finding the minimum spanning tree. **8**
- Q.6 What is dynamic programming? Write the algorithm for finding longest common subsequence (LCS) using dynamic programming. Use the algorithm to find the LCS from the following:
 $A = <0010000111011>$

$B = \langle 0011 \rangle$

20

- Q.7 Prove that Clique Decision and Directed Hamiltonian Cycle problems are NP-complete.

20

End Semester Examination, May 2016

B. Tech. – Third / Fourth Semester

PRINCIPLES OF OPERATING SYSTEMS (CS-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

 - a) What is a system call?
 - b) What is PCB?
 - c) What are the benefit of multithreaded programming?
 - d) How can we prevent a deadlock?
 - e) What are semaphores?
 - f) What is virtual memory concept?
 - g) What is dynamic linking?
 - h) What are different directory structures?
 - i) Define I/O hardware and application I/O interface.
 - j) Define distributed file system.

2x10

PART-A

PART-B

- Q.5 a) Differentiate between paging and segmentation. How logical address is converted into physical address in paging and segmentation? **14**

b) Consider the page reference string:
1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.
How many page faults would occur for the FIFO and LRU page replacement algorithm with four available frames? **6**

Q.6 a) Explain various file allocation methods with their advantages and disadvantages. **10**

b) What is disk scheduling? Differentiate between SCAN scheduling and LOOK scheduling algorithms. **10**

Q.7 Compare LINUX and WINDOWS XP operating systems.

20

End Semester Examination, May 2016
 B. Tech. – Fourth Semester
THEORY OF AUTOMATA AND COMPUTATION (CS-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.** Each question carries equal marks.

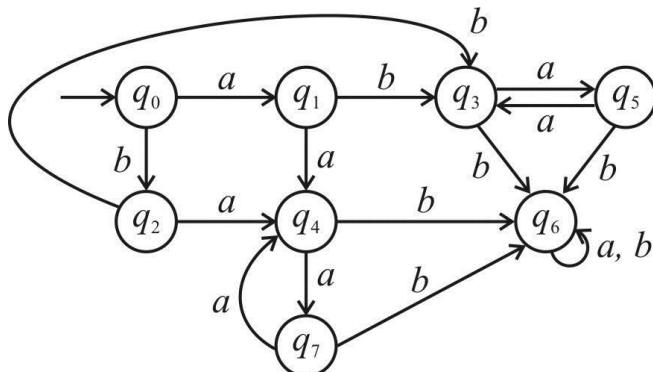
- Q.1 a) Differentiate between DFA and NDFA.
 b) What is sentence and sentential form in grammar?
 c) Prove that, if L is regular set over Σ , then $\Sigma - L$ is also regular over Σ .
 d) Define push down automata model, with all its tuples.
 e) Show the processing of string by a turing machine for the given transition table, for string – 1b11.

<u>Q</u>	<u>Next state</u>	
	1	b
q_0	$1Rq_0$	$1Rq_1$
q_1	$1Rq_1$	bLq_2
q_2	bLq_3	-
q_3	$1Lq_3$	bRq_f
q_f	-	-

4x5

PART-A

- Q.2 a) Construct a minimum state automate for the given transition diagram.



10

- b) Construct a melay machine M equivalent to moore machine:

Present state <u>Q</u>	Next state		O/P
	a=0	a=1	
$\rightarrow q_0$	q_1	q_2	1
q_1	q_3	q_2	0
q_2	q_2	q_1	1
q_3	q_0	q_3	1

10

- Q.3 a) Construct a grammar G such that $L(G) = \{W \in (a,b) \mid w \text{ has equal no a's and b's}\}$. 6
- b) Consider the grammar G given by
 $S \rightarrow 0SA_12, S \rightarrow 012, 2A_1 \rightarrow A_12, 1A_1 \rightarrow 11$, Test whether $00112 \in L(G)$. 6
- c) Describe Chomsky classification of grammar with example of each. 8
- Q.4 a) State and prove Arden's Theorem. 6
- b) Show that:
 $L = \{0^i 1^i \mid i \geq 1\}$ is not regular. 8
- c) Construct a DFA with reduced state equivalent to the regular expression $10 + (0+11)0^*1$. 8

PART-B

- Q.5 a) Show that the grammar
 $S \rightarrow aB|ab, A \rightarrow aAB|a, B \rightarrow ABb|b$ is ambiguous. 5
- b) Remove the unit production from the given grammar.
 $S \rightarrow AB, A \rightarrow a, B \rightarrow C/b, C \rightarrow D, D \rightarrow E, E \rightarrow a$ 5
- c) Reduce the following grammar to GNF.
 $S \rightarrow SS, S \rightarrow 0S1|01$ 10
- Q.6 a) Construct a PDA for the language
 $L = \{a^n b^{2n} \mid n \geq 1\}$ by null store. 10
- b) Convert the grammar
 $S \rightarrow aSb/A, A \rightarrow bSa|s|\lambda$ to a PDA that accepts the same language by empty stack. 6
- c) Give the applications of PDA. 4
- Q.7 a) Design a turing machine that accepts $L = \{0^n 1^n \mid n \geq 1\}$. 10
- b) Show that the function:
 $f(x, y) = x * y$ is a primitive recursive function. 6
- c) Define linear bounded automata. 4

End Semester Examination, May 2016

B. Tech. – Fourth / Fifth Semester

CYBER SECURITY (CS-405)

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.** Each question carries equal marks.

- Q.1 a) Explain various components of a network.
b) What is the difference between virus and worm?
c) Define bid shielding.
d) How hackers are different from crackers?
e) Explain telnet and ftp utilities.

2x5

PART-A

- Q.2 a) Explain various protocol layers in a network. **7**
b) How one can identify the class of an IP address? **3**
- Q.3 a) Explain the following:
i) Script kidding.
ii) Phreaking **4x2**
b) What are the various ways to secure the information? **2**
- Q.4 What do you mean by cyber attack? Explain in terms of cyberstaking and investment offer. **10**

PART-B

- Q.5 What are the various scanning techniques? Explain these in detail. **10**
- Q.6 Explain **any two** of the following methods:
a) Finding evidence in system logs.
b) Secure the evidence.
c) Document trail. **5x2**
- Q.7 What is the need of cyber laws? Explain their scope and coverage. Also discuss the issues that are still not covered in cyber laws. **10**

End Semester Examination, May 2016

B. Tech. – Fourth Semester

INTRODUCTION TO VIRTUALIZATION AND CLOUD COMPUTING (CS-421)

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 term 'virtualization'.
b) What do you mean by virtual machine?
c) What do you mean by Hypervisor?
d) Define the term: 'provisioning'.
e) What do you mean by application virtualization?
f) Discuss how grid computing is related to cloud computing?
g) Define private clouds.
h) What do you mean by cloud computing?
i) What is a logical volume manager?
j) Name any two cloud vendors each for public and private clouds. **2x10**

PART-A

- Q.2 a) Differentiate between traditional IT infrastructure and virtualized data centers. Also discuss the benefits of virtualization. **12**
b) Discuss various types of virtualization. **8**
- Q.3 a) Discuss in detail server and storage virtualizations. What are their advantages? **15**
b) Discuss different types of hypervisors. **5**
- Q.4 a) What do you mean by VPN? Discuss in detail how it works. **10**
b) What do you mean by a virtual LAN? Discuss the benefits of using a V-LAN. **10**

PART-B

- Q.5 a) Discuss the four cloud deployment models in detail with an example. **8**
b) Discuss virtualization as a stepping stone towards cloud. **4**
c) Discuss the major components of cloud in detail. **8**
- Q.6 a) Discuss software as a service delivery model for cloud. **10**
b) What are the decision factors for implementing cloud? Explain. **10**
- Q.7 Discuss:
a) Transition tools for virtualization. **10**
b) Cloud workloads most suitable and not suitable for cloud. **10**

End Semester Examination, May 2016
B. Tech. – Fifth Semester
INFORMATION STORAGE AND MANAGEMENT (CS-501)

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 Describe in brief the following: **2x10**
- a) Define data and its types.
 - b) What do you mean by DAS?
 - c) Define parity.
 - d) Discuss FCIP.
 - e) Define RAID 5 level.
 - f) What is problem reporting and prioritization?
 - g) Discuss gateway NAS connection.
 - h) Differentiate between RPO and RTO.
 - i) What is SNMP? Why it is used?
 - j) Discuss memory virtualization.

PART-A

- Q.2 a) What are different key requirements of data center? **10**
- b) Explain the information life cycle process in detail. **10**
- Q.3 a) Define RAID. Differentiate between RAID 1+0 and RAID 0+1. **10**
- b) Write down the difference between logical and physical addressing. **10**
- Q.4 a) Define iSCSI and also explain its topologies in detail. **10**
- b) i) What are the different components of iSCSI? **5**
- ii) How CAS stores a data object? **5**

PART-B

- Q.5 a) Define business continuity. Explain various techniques used for local replication. **10**
- b) Define disaster recovery. Explain various techniques used for disaster recovery. **10**
- Q.6 a) Explain the monitoring storage infrastructure parameters in detail. **10**
- b) Write short notes on:
- i) SMI
 - ii) CIM
- 5x2**
- Q.7 a) Explain the key elements of risk triad in detail. **10**
- b) Write short notes on:
- i) Storage virtualization. **5**
 - ii) Describe the threats against user access to data. **5**

End Semester Examination, May 2016

B. Tech. – Fifth Semester
COMPUTER GRAPHICS (CS-502A)

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 term: 'persistence'.
b) Give the reflection transformation matrix for reflecting a point about the line $x = 2$.
c) What are homogeneous coordinates?
d) Prove that 2-D rotation and scales do not commute in general. Under what conditions are they commutative?
e) What do you mean by perspective foreshortening?
f) What do you mean by hidden surface removal?
g) Scale a square with vertices $A(0,0)$, $B(0,4)$, $C(4,4)$, $D(4,0)$ to four times its size.
h) What do you mean by image manipulation?
i) Define Bezier curves.
j) What is specular reflection? **2x10**

PART-A

- Q.2 a) Discuss DDA line drawing algorithm. **5**
b) Discuss and derive expression for Bresenham's circle drawing algorithm. Plot a circle using eight way symmetry with centre $(10,3)$ and radius of 5 units. **15**
- Q.3 a) Discuss the boundary fill and flood fill algorithms for polygon filling. Also give their pseudocodes. **10**
b) Magnify a triangle $P(0,0)$, $Q(2,2)$ and $R(10,4)$ to four times its size while keeping $R(10,4)$ fixed. **5**
c) Prove that a triangle PQR with coordinates $P(8,2)$, $Q(10,4)$, $R(8,6)$ after reflection about $X-axis$ and about $Y = -X$ will be the same as the rotation about the origin by an angle 270° . **5**
- Q.4 a) Discuss Cohen-Sutherland line clipping algorithm. Given a clipping window $P(0,0)$, $Q(340,0)$, $R(340,340)$, $S(0,340)$ find visible portions of line $AB[(-170,595), (170,255)]$ against the given window using Cohen-Sutherland algorithm. **15**
b) Discuss 2-D viewing pipeline. **5**

PART-B

- Q.5 a) Discuss 3-D transformations for translation, rotation, scaling and reflections in detail. **10**
b) What is projection? Discuss different types of projections in detail. **10**
- Q.6 a) Discuss B-spline curves in detail. **10**
b) Differentiate between Bezier and B-spline curves. **10**
- Q.7 a) Discuss scalline hidden surface removal algorithm. **8**

- b) What are image space and object space methods for visible surface determination. **4**
- c) Write short notes on:
i) Ambient light. ii) Phong shading model. **8**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

COMPONENT BASED PROGRAMMING TECHNOLOGY (CS-503)

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) Explain the concept of Namespace, using suitable example.
b) Compare arrays in C# language, with arrays in C/C++ language.
c) What are the types of applications that can be developed under .NET framework?
d) Give syntax/example for iterating array/collection elements using for-each loop.
e) Differentiate between managed and unmanaged code in .NET.
f) Explain the concept of .NET collections with example.
g) Define window forms. How forms are created?
h) What is the role of ADO.NET in developing windows and web applications?
i) Explain the use of assemblies in .NET framework.
j) List key features of .NET technology. **2x10**

PART-A

- Q.2 a) Give detailed classification of data types in C# by specifying storage size of primitive types. Is unboxing an explicit conversion? Differentiate between boxing and unboxing with example. **10**
b) Define the concept of “automatic fall through” in switch-case statement. Explain, how automatic fall through is prohibited in C#, with the help of a program. **5**
c) Compare mutable and immutable strings by taking suitable examples. **5**
- Q.3 a) Explain the role of the following:
i) Delegates ii) Events iii) Properties iv) Indexers **10**
b) Define exceptions. Write a program for handling exceptions using try-catch and finally block. **5**
c) What are the key benefits of inheritance? Write a program for implementing multiple interfaces by a single class. **5**
- Q.4 a) What is the significance of MSIL in .NET? Discuss the stages of code compilation in .NET framework architecture. **10**
b) How garbage collection is different in .NET as compared to other technologies? Explain the process of ‘Automatic garbage collection’ in .NET. **5**
c) Write short notes on the following:
i) FCL
ii) CTS **2½x2**

PART-B

- Q.5 a) Give detailed steps of designing a GUI and developing windows applications for performing arithmetic operations (addition, subtraction, multiplication and division) between two operands, entered by the user at run time. **10**
b) Define MDI applications, with example. How MDI parent and MDI child are created? What is the method of arranging child forms? **5**
c) What are custom controls? Define the role of radio button and checkbox controls. **5**

- Q.6 a) List features of ADO.NET technology. Discuss complete ADO.NET architecture with diagram. Briefly explain .NET data objects, namely- command objects, data-reader objects, data-set objects and data tables. **15**
- b) Compare connected and disconnected architecture of data access models in ADO.NET. **5**
- Q.7 a) Describe ASP.NET security architecture in detail. **10**
- b) Write steps for developing simple input-output based web applications. **5**
- c) Write short notes on the following:
i) Code access security.
ii) Role based security. **2½x2**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

WEB TECHNOLOGY AND CYBER SECURITY (CS-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.** Each question carries equal marks.

- Q.1 a) What is the purpose of HTTP?
b) What do you mean by server side programming?
c) What is the need for additional suffixes such as com, edu and gov?
d) What are inline elements in CSS?
e) Define cyber forensics.
f) What is cross-drives analysis process?
g) What are semantic tags? Give an example.
h) What is the purpose of MIME in the internet?
i) Define e-mail.
j) Differentiate between internet and extranet. **2x10**

PART-A

- Q.2 a) Discuss email architecture with its main components in detail. **10**
b) Explain the various modes of connecting to internet in brief. **7**
c) Discuss any three HTTP commands. **3**
- Q.3 a) Discuss different methods of incorporating style information in an HTML document with an example. **10**
b) Create an ordered list of items: Asia, Africa and Australia. Use capital roman numbers to order them. **6**
c) Differentiate between absolute and relative links. **4**
- Q.4 a) Write an HTML page for accepting userID and password from the user and also write a JavaScript to ensure that the input is not empty. **10**
b) Explain JavaScript document object model in detail with an example. **10**

PART-B

- Q.5 a) What is a servelet? How the servelet is processed? **7**
b) What are web servers? Explain any two web servers in detail. **8**
c) How servers are configured to support CGI? **5**
- Q.6 a) Explain the procedure for finding evidence in the browser in case of cyber crime. **10**
b) How do we secure the evidence in a cyber crime? **5**
c) What are the various FBI forensics guidelines? **5**
- Q.7 a) What is identity theft? Explain its types in detail. **8**
b) Explain SQL injection script with an example. **8**
c) Explain the steps required for protecting against investment frauds. **4**

End Semester Examination, May 2016

B. Tech. (ECE, EEE, MECH, CSE, AUTO, AERO) – Sixth 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.** Each question carries equal marks.

PART-A

- Q.1 a) List at least three cross industry applications of SAP.
 b) What does “R” symbolizes in R3?
 c) How many sessions can be opened at a time on a SAP system?
 d) What does these transactional codes mean?
 i) /n
 ii) /xxxxx
 iii) /o
 e) Briefly explain the sales order management process.
 f) Key capabilities of SAP CRM are _____, _____ and _____.
 g) What is meant by Product Lifecycle Management?
 h) What is the difference between Sourcing and Procurement?
 i) What is Sarbanes Oxley Act of 2002?
 j) What is SAP HCM?

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 List and describe the various forms of help in the SAP system. **10**
- Q.4 State the purpose of an organizational element in SAP system. Using a diagram, explain the organizational structure. **10**
- Q.5 Explain how SAP ERP supports key processes in sales order management. **10**
- Q.6 Explains how SAP ERP supports key processes in supply chain management. **10**
- Q.7 Explain with the help of diagram, various tasks in financial accounting in SAP. Also explain in detail with suitable diagram how SAP ERP HCM supports to the entire recruitment process. **10**
- Q.8 Differentiate between OLTP and OLAP environment. Describe the advantages of SAP NETWEAVER. **10**

End Semester Examination, May 2016

BCA, MCA, B. Com. (Hons.) & B. Com (Hons. (II)) / BBA (GEN) & BBA (BANKING) / BBA (G) IB– Fourth / Sixth Semester

BUSINESS PROCESSES (CS-610)

Time: 2hrs

Max Marks: **50**

No. of pages: **1**

Note: Attempt **FIVE** questions in all; **Part A** is compulsory. Attempt any **FOUR** questions from **Part B**. Each question carries equal marks.

PART-A

- Q.1 a) What does "R" symbolizes in R3?
b) Name various products offered by SAP.
c) Status bar on a SAP system has what all information.
d) What is F1/F4 used for?
e) Which SAP components are included in SAP CRM?
f) Which applications are parts of a production process?
g) What is SAP SRM?
h) What are the key functional areas of SAP PLM?
i) What is Sarbanes Oxley Act of 2002?
j) Give full form of US GAAP and LAS.

1×10

PART-B

- Q.2 Discuss SAP's business suite and its various applications. Discuss SAP's history. **10**
- Q.3 What are "Transactions" in SAP system? What are various help options in SAP? **10**
- Q.4 State the purpose of an organizational element in SAP system. Explain the organizational structure with suitable diagram. **10**
- Q.5 Explain how SAP ERP supports key processes in production. **10**
- Q.6 Explain what is SAP supply chain management and how it integrates with other components and systems? **10**
- Q.7 Outline the tasks associated with SAP ERP Human Capital Management. Also explain the advantages of SAP ERP financials. **10**
- Q.8 Differentiate between OLTP and OLAP environment. Discuss the client/server technology developed on the SAP Net weaver application server. **10**

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh 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.** Each question carries equal marks.

- Q.1 a) Write a short note on type checking with the help of a suitable example.
b) What do you mean by sequence control?
c) Differentiate between compiler and interpreter.
d) Write a short note on context free grammar. **5x4**

PART-A

- Q.2 a) What is sequence control? Define types of sequence control. Also explain sequence control within expressions. **10**
b) Explain syntactic and semantic rules of programming language. **10**
- Q.3 a) Define structure of compiler. Explain various phases of compiler with suitable examples. **10**
b) Write a note on compiler construction tools. **10**
- Q.4 a) What is parsing? Define LR-parsers in detail. **10**
b) Differentiate between SLR and LALR parsing techniques. **10**

PART-B

- Q.5 a) Write a note on syntax directed translation schemes. Construct a syntax tree based on these schemes. **10**
b) What is the difference between quadruples, triples and indirect triples? **10**
- Q.6 a) Define symbol table data structures in detail. **10**
b) What are errors in compiler design? Define different phases of errors. **10**
- Q.7 a) Differentiate between code generation and code optimization with suitable examples. **10**
b) How do we define machine dependent codes? Give examples. **10**

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh Semester

SOFTWARE DEVELOPMENT PROCESSES (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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) Differentiate between traditional and object oriented methodologies.
- b) Explain the concept of encapsulation using an example.
- c) What is a role name?
- d) Define component.
- e) What are the capabilities of UML?
- f) What are packages?
- g) What is the use of boundary class in interaction diagrams?
- h) Discuss the process view of 4 + 1 architecture.
- i) What is reverse engineering?
- j) Define a Node.

2×10

PART-A

- Q.2** a) Draw and explain the activity diagram for ATM machine. **10**
b) What is the significance of elaboration and construction stages in object oriented software development process? **10**
- Q.3** a) Explain object-oriented software development process curv time domain. What are the various activities involved? **10**
b) Critically examine the spiral and prototype models for software development. **10**
- Q.4** Explain using suitable examples:
a) Packages.
b) Stereotypes and classes.
c) Reflexive relations.
d) Multiplicity indicators. **5×4**

PART-B

- Q.5** a) Draw a sequence diagram for establishing a landline telephonic call. **10**
b) Explain how we add and represent behaviour and structure to an interaction diagram. **10**
- Q.6** a) Why do we need to revisit the model? Discuss the various cases when we need to split, combine or eliminate classes. **12**
b) Discuss the deployment view of 4 + 1 architecture. **8**
- Q.7** a) What is a design class? What decisions do we need to take before designing relationships? **12**
b) Explain the significance of design inheritance in software development. **8**

End Semester Examination, May 2016

B. Tech. – Sixth/Seventh/Eighth 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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) State the function of relocating loader.
- b) Explain any 5 WNIX commands.
- c) What is a kernel?
- d) Define Inodes.
- e) Explain Vi editor.
- f) Diagrammatically explain UNIX architecture.
- g) Define Macro.
- h) Differentiate between absolute and relative path names.
- i) Discuss the various changing permission modes of files.
- j) Define Text Editor.

2×10

PART-A

Q.2 What is a macro language? Explain conditional macro and macro cells within a macro by giving suitable examples. **20**

Q.3 a) What is a loader? Explain direct linking loader in detail. **10**
b) What are the data structures used for 2 pass assembler? Explain its working in detail. **10**

Q.4 a) What is the concept of memory management? Discuss the concept of demand paging in context of UNIX OS. **10**
b) What is a file and directory? How contents of a file can be looked into? How files are splitted in UNIX OS? Explain with the help of an example. **10**

PART-B

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh / Eighth Semester

SOFTWARE TESTING (CS-723)

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 does testing help in producing quality software?
- b) Differentiate between static and dynamic testing.
- c) Define the term 'reproducible bug'.
- d) Define bug. List various states of a bug.
- e) State prime objective of a problem tracking system.
- f) What are characteristics of a good test?
- g) What is translucent-box testing?
- h) Explain load testing.
- i) Differentiate between alpha and beta testing.
- j) When can you say "a software is reliable"?

2×10

PART-A

Q.2 a) What is software error? State and explain various categories of errors. **10**
b) Explain various stages that a software has to undergo during its lifecycle. **10**

Q.3 a) Explain lifecycle of a bug with the help of a diagram. **10**
b) State characteristics of a problem report. **4**
c) What are the tactics for analyzing a reproducible bug? **6**

Q.4 a) What is problem tracking system? Explain in detail. **10**
b) List users of a tracking system. Explain functions of each in detail. **10**

PART-B

Q.5 a) 'Sometimes the test plan is a product; sometimes it is a tool'. Justify this statement. **10**
b) A program compute a^b where 'a' lies in the range [1, 10] and 'b' within [1, 5]. Design test cases for this program using BVC, robot testing and worst-case testing methods. **10**

Q.6 a) Explain various fundamental tools used by a test engineer. **10**
b) What is manual testing? Why automated testing is needed? Explain automated testing in detail. **10**

Q.7 a) What is Software Quality Assurance (SQA)? Discuss its activities in detail. **7**
b) Discuss the various software reliability matrices. **6**
c) What is capability maturity model? Explain various capability maturity models in detail. **7**

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh / Eighth Semester

ARTIFICIAL INTELLIGENCE (CS-801)

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 answer:

- a) Define state space search.
- b) Write the advantages of BFS algorithm.
- c) What are semantic nets?
- d) Explain procedural vs declarative knowledge.
- e) Define learning agents.
- f) What is game tree?
- g) Write the concept of alpha-beta pruning.
- h) What is default reasoning?
- i) Write atleast 2 heuristic functions for 8-puzzle problem.
- j) Write various features of PROLOG.

2×10

PART-A

- Q.2** a) Define ‘artificial intelligence’. Explain various application areas of artificial intelligence. **4**
 b) Discuss water-jug problem with suitable example. **10**
 c) Write a program in PROLOG to append two lists. **6**
- Q.3** a) Draw the partitioned semantic net for the following:
 i) Every dog has bitten a mail carrier. **3**
 ii) The dog bit the mail carrier. **3**
 b) Explain the various approaches to knowledge representation. **4**
 c) Consider the following sentences:
 i) The members of the Mahindra Club are Joe, Sally, Bill and Ellen.
 ii) Joe is married to Sally.
 iii) Bill is Ellen’s brother.
 iv) The spouse of every married person in the club is also in the club.
 v) The last meeting of the club was at Joe’s house.
 Prove that “Ellen is not married” using resolution. **10**

- Q.4** a) Write A* algorithm. Solve the following using A* algorithm:

1	2	3
8	5	6
4	7	

1	2	3
4	5	6
7	8	

10

- b) Write the difficulties faced in Hill Climbing. What steps should be taken to solve them. **6**
 c) Differentiate between uninformed and heuristic search. **4**

PART-B

- | | | |
|-----|---|-----------|
| Q.5 | a) What are intelligent agents? Explain goal based agents with their architecture. | 10 |
| | b) What is an expert system? Explain the rule based architecture of an expert system. | 10 |
| Q.6 | a) What is min-max tree? Write the algorithm for min-max search procedure. | 8 |
| | b) Explain the concept of natural language processing. | 8 |
| | c) Write short note on robotics. | 4 |
| Q.7 | a) Write short notes on: | |
| | i) Fuzzy Logic. | 7 |
| | ii) Probability based reasoning. | 7 |
| | b) Differentiate between monotonic and non-monotonic systems. | 6 |

End Semester Examination, May 2016

B. Tech. – Seventh Semester

DIGITAL IMAGE PROCESSING (CS-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.** Each question carries equal marks.

Q.1 Answer in brief:

- a) Write Sobel horizontal and vertical edge detection masks.
- b) What is global, local and dynamic or adaptive threshold?
- c) Define region splitting and merging.
- d) What is image negative?
- e) Define brightness and contrast.
- f) Why noise is always considered to be additive in images?
- g) What is the difference between Y in CMY and YIQ models?
- h) Define the terms pattern recognition and pattern classifiers.
- i) Why image filtering is done in frequency domain?
- j) Define mask.

2×10

PART-A

- Q.2** a) Elucidate the image enhancement using arithmetic/logic operators. **10**
b) Explain image subtraction, image averaging, smoothing and sharpening in detail. **10**
- Q.3** a) What are the stages through which an image passes in an image processing system? Explain. **10**
b) Explain some of the basic relationships that exist between pixels in a digital image. **10**
- Q.4** a) What are the various colour models? How conversion can be done from one model to another? Explain the algorithm for the same. **12**
b) Describe in detail:
i) Image restoration model. **4**
ii) Mean filters. **4**

PART-B

- Q.5** a) Explain how image segmentation algorithms are categorized. Discuss how point detection and line detection algorithms work. **10**
b) Explain with different steps, the working of region based segmentation algorithm. **10**
- Q.6** a) Define channel codes. Explain the three different types of polygon approximation techniques in detail. **10**
b) Explain various regional descriptors along with mathematical formulation. **10**
- Q.7** a) What do you understand by pattern recognition? Explain various decision theoretic approaches to pattern recognition. **14**
b) What do you understand by pattern and pattern matching? What are various pattern classes? **6**

End Semester Examination, May 2016
B. Tech. – 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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) Discuss advantages of DOS over centralized systems.
- b) What is use of Berkeley algorithm?
- c) Difference between user level and kernel level threads.
- d) Discuss delayed write policy for cache management.
- e) What is NUMA?
- f) Give any two threads call in MACH.
- g) Discuss atomicity meaning in group communication.
- h) What is role of ATM adaption lager?
- i) What is meant by lightly coupled software? Give are example.
- j) What is dirty cache?

2×10

PART-A

- | | | |
|------------|---|-----------|
| Q.2 | a) What are design issues for Distributed Operating Systems? Discuss in detail. | 12 |
| | b) What do you meant by RPC? Discuss working of RP in detail. | 8 |
| Q.3 | a) Why mutual exclusion required in DOS? Explain Ricart and Agrawala's algo for mutual exclusion. | 10 |
| | b) Discuss Lamport Algorithm for logical clock synchronization. | 10 |
| Q.4 | a) Discuss design issues for real time distributed systems. | 12 |
| | b) Discuss process allocation models. | 8 |

PART-B

- | | | |
|------------|---|-----------|
| Q.5 | a) What is need of replication in distributed file systems? Discuss update protocols. | 12 |
| | b) What is meant by file service interface? Discuss different models for file service. | 8 |
| Q.6 | a) Discuss shared variable distributed memory with its properties. | 10 |
| | b) How shared memory architecture works? Discuss bus and switched multiprocessor architectures. | 10 |
| Q.7 | a) What is MACH? Discuss goals of MACH. | 10 |
| | b) Discuss the architecture of MACH microkernel. | 10 |

End Semester Examination, May 2016

B. Tech. – Fifth / Seventh / Eighth Semester

DISTRIBUTED OPERATING SYSTEMS (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.** Each question carries equal marks.

- Q.1 a) What do you mean by distributed systems? Discuss centralized and distributed operating systems with suitable examples.
b) Explain clock synchronization. Discuss logical and physical clock.
c) Describe real time distributed systems.
d) What do you mean by mutable and immutable files? What are its advantages in distributed file systems?
e) Explain in brief MACH process. **4x5**

PART-A

- Q.2 a) Describe layered protocols, ATM networks and client-server model as communication techniques in distributed systems. **10**
b) Explain mutual exclusion and election algorithm in detail. **10**
- Q.3 a) What do you mean by synchronization in distributed system? How clock synchronization is achieved? **10**
b) What are the causes of deadlock in distributed system? Explain distributed deadlock prevention and detection in detail. **10**
- Q.4 Write short notes on:
a) Processes and processors in distributed system.
b) Scheduling in distributed system. **10x2**

PART-B

- Q.5 a) Discuss directory and file system design in detail. **10**
b) Discuss distributed file system implementation techniques with suitable examples. **10**
- Q.6 What is the distinctive role of shared variables in distributed shared memory? How the concept of shared memory is supportive in creating consistency models? **10**
- Q.7 Write short notes on:
a) Management in MACH. **10**
b) UNIX emulation in MACH. **10**
- Q.5 a) Explain the following events in UNIX OS:
i) User names and groups logging in.
ii) Rearranging files.
iii) Basic files operations. **10**
b) Write a shell script to check if the given string is a palindrome or not. **10**
- Q.6 a) Describe UNIX as a system administrator. **10**
b) Explain the concept of standard files as input/output/error. **10**

Q.7 Write short notes on (***any four***):

- a) Virus control managements.
- b) I/O devices and drivers.
- c) Filters and pipeline.
- d) Wild cards.
- e) Assembler.
- f) Bourne and C-Shell

5x4

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh Semester

NETWORK SECURITY AND MANAGEMENT (CS-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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) Define the three security goals.
- b) Distinguish between a stream cipher and a block cipher.
- c) Define an S-box and mention the necessary condition for an S-box to be invertible.
- d) What is the block size, cipher key size, round key size and number of rounds in DES?
- e) Distinguish between symmetric-key and asymmetric-key cryptosystem.
- f) Explain MAC in brief.
- g) List the security services provided by a digital signature.
- h) Define Kerberos and name its servers.
- i) Explain malicious software in brief.
- j) Explain DSL briefly.

2×10

PART-A

- Q.2 a) What do you understand by substitution cipher? Explain various types of substitution ciphers. **5**
- b) Use the additive cipher with key = 15 to encrypt the message “hello” and decrypt it with the same key. **10**
- c) What are transposition ciphers? Encrypt “meet me at park” using rail fence cipher. **5**
- Q.3 Explain the structure of DES in detail. **20**
- Q.4 a) Explain the process of key-distribution centre. **10**
- b) Explain Diffie-Hellman Key Agreement with the help of an example. **10**

PART-B

- Q.5 a) What are digital signatures? Explain its types. **10**
- b) Explain how SMIME can provide security services for e-mail. **10**
- Q.6 a) What do you mean by intruders? Explain different kind of intrusion detection systems. **10**
- b) What are viruses? Explain the life cycle of a virus in detail. **10**
- Q.7 Write short notes on (**any two**):
- a) Broadband Network Management.
 - b) Firewalls.
 - c) Data Compression Techniques.

10x2

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh / Eighth Semester

SOFTWARE TESTING (CS-723)

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 does testing help in producing quality software?
- b) Differentiate between static and dynamic testing.
- c) Define the term 'reproducible bug'.
- d) Define bug. List various states of a bug.
- e) State prime objective of a problem tracking system.
- f) What are characteristics of a good test?
- g) What is translucent-box testing?
- h) Explain load testing.
- i) Differentiate between alpha and beta testing.
- j) When can you say "a software is reliable"?

2×10

PART-A

- Q.2 a) What is software error? State and explain various categories of errors. **10**
b) Explain various stages that a software has to undergo during its lifecycle. **10**
- Q.3 a) Explain lifecycle of a bug with the help of a diagram. **10**
b) State characteristics of a problem report. **4**
c) What are the tactics for analyzing a reproducible bug? **6**
- Q.4 a) What is problem tracking system? Explain in detail. **10**
b) List users of a tracking system. Explain functions of each in detail. **10**

PART-B

- Q.5 a) 'Sometimes the test plan is a product; sometimes it is a tool'. Justify this statement. **10**
b) A program compute a^b where 'a' lies in the range [1, 10] and 'b' within [1, 5]. Design test cases for this program using BVC, robot testing and worst-case testing methods. **10**
- Q.6 a) Explain various fundamental tools used by a test engineer. **10**
b) What is manual testing? Why automated testing is needed? Explain automated testing in detail. **10**
- Q.7 a) What is Software Quality Assurance (SQA)? Discuss its activities in detail. **7**
b) Discuss the various software reliability matrices. **6**
c) What is capability maturity model? Explain various capability maturity models in detail. **7**

ELEMENTS OF COMPUTERS AND PROGRAMMING (CS-101)

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) Convert $(89.6875)_{10} \rightarrow (\)_2$. | 2 |
| | b) Convert $(721)_8 \rightarrow (\)_{16}$. | 2 |
| | c) Subtract $(10110010)_2$ from $(11110000)_2$. | 2 |
| | d) Multiply $(10101)_2$ by $(101)_2$. | 2 |
| | e) Give difference between while and do while. | 2 |
| | f) Define function. | 2 |
| | g) Differentiate between call-by-value and call-by-reference. | 4 |
| | h) Explain ternary operator with an example. | 2 |
| | i) What is unary operator? | 2 |

PART-A

- | | | |
|-----|---|-----------|
| Q.2 | a) Explain a block diagram of computer in detail. | 10 |
| | b) Explain the hierarchy of memory in detail. | 10 |
| Q.3 | a) Define programming language. Differentiate between high level language and low level language. | 10 |
| | b) Explain algorithm and flowchart. Write algorithm and flowchart for finding largest of three numbers. | 8 |
| | c) Differentiate between compiler and interpreter. | 2 |
| Q.4 | a) Explain one dimensional array with syntax. | 5 |
| | b) Write a programme to find factorial of a number. | 5 |
| | c) Write a programme which reads a list of ten numbers and print the list in reverse order. | 10 |

PART-B

- | | | |
|-----|---|-----------|
| Q.5 | a) Explain the difference between actual parameters and formal parameters with an example. | 10 |
| | b) Define recursion. Write a programme that generates the first n terms of Fibonacci sequence by recursion. The sequence is given below:
0, 1, 1, 2, 3, 5, 8 | 10 |
| Q.6 | a) Explain all string handling functions with examples. | 10 |
| | b) Write a programme to swap two numbers using call-by-value and call-by-reference. | 10 |
| Q.7 | a) What are pre-processor directives? | 5 |
| | b) Write short notes on header files and user defined header files. | 5 |
| | c) Explain all file handling functions by taking suitable examples. | 10 |

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh / Eighth Semester

SOFTWARE TESTING (CS-723)

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 does testing help in producing quality software?
- b) Differentiate between static and dynamic testing.
- c) Define the term 'reproducible bug'.
- d) Define bug. List various states of a bug.
- e) State prime objective of a problem tracking system.
- f) What are characteristics of a good test?
- g) What is translucent-box testing?
- h) Explain load testing.
- i) Differentiate between alpha and beta testing.
- j) When can you say "a software is reliable"?

2×10

PART-A

- Q.2 a) What is software error? State and explain various categories of errors. **10**
b) Explain various stages that a software has to undergo during its lifecycle. **10**
- Q.3 a) Explain lifecycle of a bug with the help of a diagram. **10**
b) State characteristics of a problem report. **4**
c) What are the tactics for analyzing a reproducible bug? **6**
- Q.4 a) What is problem tracking system? Explain in detail. **10**
b) List users of a tracking system. Explain functions of each in detail. **10**

PART-B

- Q.5 a) 'Sometimes the test plan is a product; sometimes it is a tool'. Justify this statement. **10**
b) A program compute a^b where 'a' lies in the range [1, 10] and 'b' within [1, 5]. Design test cases for this program using BVC, robot testing and worst-case testing methods. **10**
- Q.6 a) Explain various fundamental tools used by a test engineer. **10**
b) What is manual testing? Why automated testing is needed? Explain automated testing in detail. **10**
- Q.7 a) What is Software Quality Assurance (SQA)? Discuss its activities in detail. **7**
b) Discuss the various software reliability matrices. **6**
c) What is capability maturity model? Explain various capability maturity models in detail. **7**

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh / Eighth Semester

ARTIFICIAL INTELLIGENCE (CS-801)

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 answer:

- a) Define state space search.
- b) Write the advantages of BFS algorithm.
- c) What are semantic nets?
- d) Explain procedural vs declarative knowledge.
- e) Define learning agents.
- f) What is game tree?
- g) Write the concept of alpha-beta pruning.
- h) What is default reasoning?
- i) Write atleast 2 heuristic functions for 8-puzzle problem.
- j) Write various features of PROLOG.

2×10

PART-A

Q.2 a) Define 'artificial intelligence'. Explain various application areas of artificial intelligence. **4**
b) Discuss water-jug problem with suitable example. **10**
c) Write a program in PROLOG to append two lists. **6**

Q.3 a) Draw the partitioned semantic net for the following:
i) Every dog has bitten a mail carrier. **3**
ii) The dog bit the mail carrier. **3**
b) Explain the various approaches to knowledge representation. **4**
c) Consider the following sentences:
i) The members of the Mahindra Club are Joe, Sally, Bill and Ellen.
ii) Joe is married to Sally.
iii) Bill is Ellen's brother.
iv) The spouse of every married person in the club is also in the club.
v) The last meeting of the club was at Joe's house.
Prove that "Ellen is not married" using resolution. **10**

Q.4 a) Write A* algorithm. Solve the following using A* algorithm:

1	2	3
8	5	6
4	7	

1	2	3
4	5	6
7	8	

10

- b) Write the difficulties faced in Hill Climbing. What steps should be taken to solve them. **6**
- c) Differentiate between uninformed and heuristic search. **4**

PART-B

- | | | |
|-----|---|-----------|
| Q.5 | a) What are intelligent agents? Explain goal based agents with their architecture. | 10 |
| | b) What is an expert system? Explain the rule based architecture of an expert system. | 10 |
| Q.6 | a) What is min-max tree? Write the algorithm for min-max search procedure. | 8 |
| | b) Explain the concept of natural language processing. | 8 |
| | c) Write short note on robotics. | 4 |
| Q.7 | a) Write short notes on: | |
| | i) Fuzzy Logic. | 7 |
| | ii) Probability based reasoning. | 7 |
| | b) Differentiate between monotonic and non-monotonic systems. | 6 |

End Semester Examination, May 2016

B. Tech. – Seventh Semester

DIGITAL IMAGE PROCESSING (CS-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.** Each question carries equal marks.

Q.1 Answer in brief:

- a) Write Sobel horizontal and vertical edge detection masks.
- b) What is global, local and dynamic or adaptive threshold?
- c) Define region splitting and merging.
- d) What is image negative?
- e) Define brightness and contrast.
- f) Why noise is always considered to be additive in images?
- g) What is the difference between Y in CMY and YIQ models?
- h) Define the terms pattern recognition and pattern classifiers.
- i) Why image filtering is done in frequency domain?
- j) Define mask.

2×10

PART-A

Q.2 a) Elucidate the image enhancement using arithmetic/logic operators. **10**
b) Explain image subtraction, image averaging, smoothing and sharpening in detail. **10**

Q.3 a) What are the stages through which an image passes in an image processing system? Explain. **10**
b) Explain some of the basic relationships that exist between pixels in a digital image. **10**

Q.4 a) What are the various colour models? How conversion can be done from one model to another? Explain the algorithm for the same. **12**
b) Describe in detail:
i) Image restoration model. **4**
ii) Mean filters. **4**

PART-B

Q.5 a) Explain how image segmentation algorithms are categorized. Discuss how point detection and line detection algorithms work. **10**
b) Explain with different steps, the working of region based segmentation algorithm. **10**

Q.6 a) Define channel codes. Explain the three different types of polygon approximation techniques in detail. **10**
b) Explain various regional descriptors along with mathematical formulation. **10**

Q.7 a) What do you understand by pattern recognition? Explain various decision theoretic approaches to pattern recognition. **14**
b) What do you understand by pattern and pattern matching? What are various pattern classes? **6**

End Semester Examination, May 2016

B. Tech. – 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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) Discuss advantages of DOS over centralized systems.
- b) What is use of Berkeley algorithm?
- c) Difference between user level and kernel level threads.
- d) Discuss delayed write policy for cache management.
- e) What is NUMA?
- f) Give any two threads call in MACH.
- g) Discuss atomicity meaning in group communication.
- h) What is role of ATM adaption lager?
- i) What is meant by lightly coupled software? Give are example.
- j) What is dirty cache?

2×10

PART-A

Q.2 a) What are design issues for Distributed Operating Systems? Discuss in detail. **12**
b) What do you meant by RPC? Discuss working of RP in detail. **8**

Q.3 a) Why mutual exclusion required in DOS? Explain Ricart and Agrawala's algo for mutual exclusion. **10**
b) Discuss Lamport Algorithm for logical clock synchronization. **10**

Q.4 a) Discuss design issues for real time distributed systems. **12**
b) Discuss process allocation models. **8**

PART-B

Q.5 a) What is need of replication in distributed file systems? Discuss update protocols. **12**
b) What is meant by file service interface? Discuss different models for file service. **8**

Q.6 a) Discuss shared variable distributed memory with its properties. **10**
b) How shared memory architecture works? Discuss bus and switched multiprocessor architectures. **10**

Q.7 a) What is MACH? Discuss goals of MACH. **10**
b) Discuss the architecture of MACH microkernel. **10**

End Semester Examination, May 2016

B. Tech. – Fifth / Seventh / Eighth Semester

DISTRIBUTED OPERATING SYSTEMS (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.** Each question carries equal marks.

- Q.1 a) What do you mean by distributed systems? Discuss centralized and distributed operating systems with suitable examples.
b) Explain clock synchronization. Discuss logical and physical clock.
c) Describe real time distributed systems.
d) What do you mean by mutable and immutable files? What are its advantages in distributed file systems?
e) Explain in brief MACH process. **4x5**

PART-A

- Q.2 a) Describe layered protocols, ATM networks and client-server model as communication techniques in distributed systems. **10**
b) Explain mutual exclusion and election algorithm in detail. **10**
- Q.3 a) What do you mean by synchronization in distributed system? How clock synchronization is achieved? **10**
b) What are the causes of deadlock in distributed system? Explain distributed deadlock prevention and detection in detail. **10**
- Q.4 Write short notes on:
a) Processes and processors in distributed system.
b) Scheduling in distributed system. **10x2**

PART-B

- Q.5 a) Discuss directory and file system design in detail. **10**
b) Discuss distributed file system implementation techniques with suitable examples. **10**
- Q.6 What is the distinctive role of shared variables in distributed shared memory? How the concept of shared memory is supportive in creating consistency models? **10**
- Q.7 Write short notes on:
a) Management in MACH. **10**
b) UNIX emulation in MACH. **10**

End Semester Examination, May 2016

B. Tech. – First / Second Semester

ELEMENTS OF ELECTRONICS ENGINEERING (EC-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 a) Differentiate between insulator, semiconductor and a conductor.
 b) Define PIV. What is PIV for a half wave rectifier?
 c) Draw the characteristics of an ideal diode.
 d) Differentiate between BJT and JFET (2 points only).
 e) What are different regions in JFET?
 f) Convert: $(357.156)_8 = ()_{16}$
 g) Write truth table for $S - R$, $J - K$ flip flop.
 h) Define: i) Knee voltage ii) Static resistance
 i) Draw the circuit diagram of voltage follower.
 j) What is a microcontroller?

2x10

PART-A

- Q.2 a) Explain the working principle of Schottky diode with its applications. **8**
 b) Explain the breakdown mechanism in Pn junction diode. **5**
 c) Explain the working of centre tapped full wave rectifier along with its various parameters. **7**
- Q.3 a) Draw and explain the input and output characteristics of a transistor in CB configuration. **8**
 b) Explain the working principle of oscillator. **5**
 c) What is MOSFET? List its various types and explain any one in detail. **7**
- Q.4 a) Convert: i) $(BDE.FF)_{16} = ()_2$ ii) $(5227.12)_8 = ()_{10}$ **3x2**
 b) Explain the working of $S - R$ flip flop. **6**
 c) Prove that: i) $(A + B)(A + C)(B + C) = AB + AC + BC$
 ii) $A\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}\bar{D} + B\bar{C}D = B\bar{C}$ **4x2**

PART-B

- Q.5 a) Draw the block diagram of an op-amp and list its ideal characteristics. **6**
 b) Explain the working of an op-amp as a:
 i) Adder ii) Differentiator **. 5x2**
 c) Explain the working of voltage follower. **4**
- Q.6 a) What are the specifications of D/A converter? Draw and explain 4 bit weighted resistor type DAC. **10**
 b) Explain in detail successive approximation type A/D converter. **10**
- Q.7 Write short notes on **(any two):**
 a) Architecture of 8085 microprocessor.
 b) Comparison between microprocessor and microcontroller.
 c) Working principle of photodiode and LED.

d) Zener diode as a voltage regulator.

10x2

End Semester Examination, May 2016

B. Tech. – Second Semester

ANALOG ELECTRONICS (EC-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) What is dark current in case of photodiode?
 - b) Why schottky diode is called hot carrier diode?
 - c) Among diffusion and transition capacitance, which one is greater and why?
 - d) What is peak inverse voltage? What is its significance?
 - e) What is emitter follower? Why is it called so?
 - f) What is the need of transistor biasing and stabilization?
 - g) Differentiate between depletion and enhancement MoSFET.
 - h) What is load regulation? What is its significance?
 - i) What is Knee voltage? What is its significance?
 - j) Differentiate between CB, CE and CC configuration?

PART-A

- Q.2** a) Explain switching characteristics of P-N junction diode with its switching times. **8**
b) Explain working principle of schottky barrier diode with its characteristics. **7**
c) Differentiate between zener and avalanche breakdowns. **5**

- Q.4 a) Draw and explain input and output characteristics of common emitter configuration of transistor. **10**
 b) What is an amplifier? How common base transistor works as an amplifier? **5**
 c) Discuss various transistor current components and prove that $I_E = I_B + I_C$. **5**

PART-B

- Q.5 a) Explain potential divider bias method and calculate its stability factor. **10**
b) What are compensation techniques? Explain thermistor and sensistor compensation. **10**

- Q.6 a) Draw and explain construction, working and characteristics of n-channel enhancement MoSFET. **10**
b) Explain how FET can be utilized as VVR. **6**
c) Compare BJT and JFET in terms of advantages and disadvantages. **4**

- Q.7** a) Draw and explain block diagram of regulated power supply. **5**
 b) Explain series and shunt voltage regulators with circuit diagram and working. **10**
 c) Explain basic working principle of emitter follower regulator. **5**

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1**
- a) What is the difference between positive logic system and negative logic system?
 - b) Show how NOR gate can be used as inverter.
 - c) Convert $(163.875)_{10}$ to binary.
 - d) What is the binary equivalent of gray code 1101?
 - e) Compare a decoder with demultiplexer.
 - f) List the differences between PAL and PLA.
 - g) What is meant by race around condition in flip-flops?
 - h) Why is a ring counter named so?
 - i) What are the merits of emitter coupled logic?
 - j) Define resolution of DAC.
- 2×10**

PART-A

- Q.2**
- a) i) Convert $(4057.06)_8$ to decimal. **5**
ii) Add $(6E)_{16}$ and $(CF)_{16}$. **4**
 - b) Encode data bits 1101 into 7-bit even parity Hamming Code. **8**
 - c) Reduce the expression $F = \overline{AB} + \overline{A} + AB$. **3**
- Q.3**
- a) Reduce the expression:
 $f = \sum m(0, 2, 3, 4, 5, 6)$ using mapping and implement it in AOI logic. **12**
 - b) Implement the following function with a multiplexer:
 $F(a, b, c) = \sum m(1, 3, 5, 6)$ **8**
- Q.4**
- a) Explain the edge triggered JK flip-flop in detail. **10**
 - b) Convert a SR flip-flop into JK flip-flop. **10**

PART-B

- Q.5**
- a) Explain in detail the 4-bit universal shift register. **10**
 - b) Design a MOD 6 asynchronous counter using T flip-flops. **10**
- Q.6**
- a) Explain R-2R ladder type DAC. **15**
 - b) A certain 12-bit BCD DAC has a full scale output of 19.98V. Determine:
i) % resolution.
ii) Converter step size. **5**
- Q.7**
- a) Write notes on the following characteristics of digital IC's:
i) Threshold Voltage.
ii) Propagation Delay.
iii) Power Dissipation.
iv) Noise Margin. **2½×4**
 - b) Explain the working of 2 input ECL OR/NOR gate. **10**

End Semester Examination, May 2016

B. Tech. – Third Semester

ELECTRONIC DEVICES AND CIRCUITS (EC-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 a) What is reverse recovery time of PN junction diode?
b) Define capacitance of PN junction diode.
c) Draw small signal model of transistor.
d) What are the differences between BJT and FET?
e) What is 3dB?
f) What is coupling? Define its types.
g) What is harmonic distortion?
h) What is cross over distortion?
i) What is the need of feedback amplifier?
j) What is oscillator? Name types of oscillator.

2x10

PART-A

- Q.2 a) Explain PN diode switching time. **7**
b) What is breakdown mechanism of diode? Explain Zener and avalanche breakdown mechanism. **7**
c) Draw the volt-ampere characteristics of tunnel diode. **6**
- Q.3 a) Sketch input and output characteristic of common base configuration of transistor. Clearly indicate the cut off, active and saturation regions. **10**
b) Describe the potential divider method in detail. Define stability factor and calculate its value. **10**
- Q.4 a) Draw a circuit diagram of two stage R-C coupled amplifier. Draw its ac equivalent circuit at mid-frequency range. Give expression for i) input impedance ii) output impedance and iii) voltage gain. **15**
b) Explain source follower in brief. **5**

PART-B

- Q.5 a) Explain transformer coupled class A power amplifier. Also show that maximum collector efficiency of class A-Transformer coupled power amplifier is 50%. **8**
b) Draw a circuit of class-B push-pull amplifier and explain its operation. Derive an expression for its maximum conversion efficiency. **12**
- Q.6 a) Draw block diagram of a negative feedback amplifier. Derive an expression for the voltage gain of an amplifier of gain A, when subjected to negative feedback with a feedback fraction B. **10**
b) Explain advantages of negative feedback. **10**
- Q.7 a) Draw the circuit diagram of Hartley oscillator. Derive an expression for resonance frequency. **10**

- b) What is the basic principle of operation of RC oscillator? Draw a circuit diagram of phase shift oscillator and explain its operation by deriving expression for frequency of oscillation. **10**

End Semester Examination, May 2016

B. Tech. – Third / Fourth Semester

DIGITAL ELECTRONICS (EC-302A)

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 Attempt **any ten** questions:

- a) Differentiate between analog and digital signals.
- b) Why is hexadecimal code widely used in digital systems?
- c) Convert $(756.603)_8$ to hex.
- d) Compare a demultiplexer and a decoder.
- e) What are the drawbacks of ECL?
- f) What is the meaning of universal gate?
- g) Compare a register and counter.
- h) What is the maximum modulus of a counter with 8 flip-flops?
- i) What is the advantage of ripple counter?
- j) What is offset voltage of a DAC?
- k) What is a negative logic system?

2x10

PART-A

- Q.2** a) Given the 8 bit data word 01011011, generate the 12 bit composite word for the Hamming code that corrects and detects single errors. **10**
- b) Using the tabular method obtain the minimal expression for the function $f = \sum m(6, 7, 8, 9) + d(10, 11, 12, 13, 14, 15)$ **10**
- Q.3** a) Design an odd parity generator for 4 bit I/P. **12**
- b) Use a multiplexer having 3 select inputs to implement the logic for the function given below. Also realize the same using a 16:1 MUX.
 $F = \sum m(0, 1, 2, 3, 4, 10, 11, 14, 15)$ **8**

- Q.4** a) Implement the two Boolean functions with a PLA:

$$F_1(A, B, C) = \sum m(0, 1, 3, 4)$$

$$F_2(A, B, C) = \sum m(0, 5, 6, 7)$$

10

- b) Draw the basic CMOS inverter. How will one implement 2 input NAND gate using CMOS? **10**

PART-B

- Q.5** a) Draw the diagram of a master slave JK flip-flop and explain its operation. **10**
- b) Explain the conversion of SR flip-flop to JK flip-flop. **10**
- Q.6** a) Explain in detail a 8 bit universal shift register. **10**
- b) Design a synchronous 3 bit down counter. **10**
- Q.7** a) Explain in detail the dual slope type A/D converter. **15**
- b) Determine the resolution of a 12 bit DAC. **5**

End Semester Examination, May 2016

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**. Each question carries equal marks.

- Q.1 a) Define even and odd signals.
b) Plot $u(n-5)$.
c) What is BIBO stability?
d) Define stable and unstable systems.
e) Write down the trigonometric formula of Fourier series representation.
f) State and prove time shifting property of Laplace transform.
g) Explain modulation property of Fourier transform.
h) Determine DTFT of $x(n) = (-1)^n \cdot u(n)$.
i) What are necessary conditions for Fourier series to exist?
j) Define Fourier transform pair.

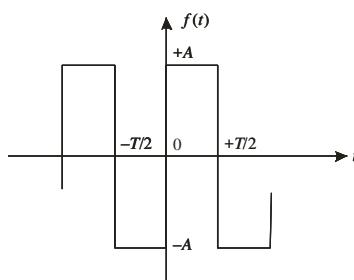
2x10

PART-A

- Q.2 a) Find whether the signal $x(n) = (2e^{-t} - 6e^{-2t})u(t)$ is energy signal or power signal. **7**
b) A discrete time signal $x(n) = [3, 2, 1, 0, 1, 2, 3]$, plot $y(n) = x(n-1) + 3x(n) - 2x(n+1)$ **8**
c) State relation between unit impulse, unit step and ramp signal. **5**
- Q.3 a) Determine whether the following systems are linear or non linear and also test for time invariance.
i) $y(n) = x(n^2)$ ii) $y(n) = e^{x(n)}$ **10**
b) The input signal $x(t)$ and impulse response $h(t)$ of a continuous time system are described as $x(t) = e^{-3t} \cdot u(t)$ and $h(t) = u(t-1)$. Find out the output. **10**
- Q.4 a) Determine the steady state response of the following system to unit step excitation:
$$H(s) = \frac{s+1}{s^2 + 3s + 2}$$
 10
b) Determine the Laplace transform of $x(t) = t \cdot e^{-at} \cdot u(t)$ **10**

PART-B

- Q.5 a) Determine exponential Fourier series expansion of the following periodic wave:



12

219/4

- b) Derive equation for power spectrum of a periodic function. **8**
- Q.6 a) Obtain the Fourier transform of a single sided exponential function $x(t) = e^{-at} \cdot u(t)$.
Also calculate its magnitude and phase spectrum. **10**
- b) State and prove convolution property of Fourier transform. **10**
- Q.7 a) State and prove Parseval's power theorem for DTFT. **10**
- b) Given the discrete time periodic signal $x(n) = \cos \omega_0 n$ with $\omega_0 = \frac{2\pi}{5}$. Evaluate its DTFT. **10**

End Semester Examination, May 2016

B. Tech. – Third / Fourth Semester

ELECTROMAGNETIC FIELD AND WAVES (EC-304A)

Time: 3 hrs

Max Marks: **100**

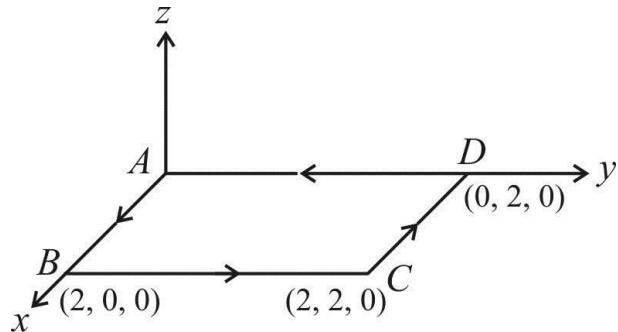
No. of pages: **2**

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

- Q.1**
- a) Convert point $p(2, 5\pi/3, -2)$ specified in cylindrical coordinates into Cartesian coordinates.
 - b) Explain the physical significance of divergence.
 - c) What is electric field intensity?
 - d) In free space potential $V = 6xy^2z + 8$
Find \vec{E} at point $P (1, 2, -5)$.
 - e) Explain Biot Savart's law.
 - f) If magnetic field intensity in a region is $\vec{H} = x^2 \vec{a}_x + 2yz \vec{a}_y - x^2 \vec{a}_z$ then find the current density at point $P (2, 3, 4)$.
 - g) Write down Maxwell's equations in integral form.
 - h) What is depth of penetration?
 - i) What is Smith chart?
 - j) What is the relation between VSWR and reflection coefficient of a transmission line?
- 2×10**

PART-A

- Q.2**
- a) Verify the stroke's theorem for the vector field $\vec{F} = x \vec{a}_x + x^2 y \vec{a}_y + xy^2 \vec{a}_z$ around the rectangular contour C in the xy plane as shown in figure below:



10

- b) Verify that the vector field given by $\vec{A} = yz \vec{a}_x + zx \vec{a}_y + xy \vec{a}_z$ is irrotational and solenoidal.
- 10**

- Q.3**
- a) State and explain Gauss's law. Derive an expression for the potential at a point outside a hollow sphere having a uniform charge density.
 - b) Explain the method of images for computing the electrostatic field due to charge distribution in air adjacent to a plane conducting surface.
- 10**

- Q.4**
- a) Obtain an expression for the flux density \vec{B} at a distance R from a thin linear conductor of infinite length with a constant current I.
 - b) State and explain Ampere's circuital law.
 - c) Write a short note on magnetic boundary conditions.
- 8**
- 7**
- 5**

PART-B

- Q.5 a) State Poynting theorem for an electromagnetic field. Show that the instantaneous power flow is given by $\vec{E} \times \vec{H}$. **10**
b) Explain what is displacement current density and why is it necessary to include it as a term in Ampere's law. **10**
- Q.6 a) Starting with Maxwell's equation derive the wave equation for \vec{E} and \vec{H} in free space. **7**
b) Show that \vec{E} and \vec{H} are related by the characteristic impedance of the medium. **8**
c) Show that the ratio of conduction current density to displacement current density is equal to $\sigma/\omega\epsilon$ where σ is conductivity of the medium, ϵ is permittivity of medium and ω is angular frequency. **5**
- Q.7 a) Derive an expression for the characteristic impedance Z_0 , attenuation constant α , phase constant β of a transmission line in terms of primary constants. **10**
b) Explain impedance transformation property of a quarter wave transmission line. **7**
c) A transmission line of characteristic impedance 50Ω is terminated by a resistor of 100Ω . What will be the VSWR in the line? **3**

End Semester Examination, May 2016

B. Tech. – Third Semester

ANALOG ELECTRONIC CIRCUITS-I (EC-321)

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) Derive relation between α and β .
 b) Draw Eber's Moll model of transistor.
 c) What are the limitation of h-parameter?
 d) Draw π -model of transistor.
 e) Define base spreading resistance of transistor.
 f) State Miller's theorem.
 g) Name the various coupling methods used in amplifier.
 h) Define tilt and sag.
 i) How power amplifiers are classified?
 j) What is harmonic distortion?

2x10

PART-A

- Q.2 a) Draw the h-parameter equivalent circuits of a transistor in different configurations. Why the h-parameters are known as hybrid parameters? Calculate input impedance, voltage gain and current gain in terms of h-parameters for common emitter. **15**
 b) How h-parameters for a transistor in common emitter configuration are graphically analyzed? **5**
- Q.3 a) Derive relation between various conductance parameters and h-parameters for high frequency response of common emitter configuration of transistor. **10**
 b) Calculate voltage gain for high frequency response of emitter follower configuration of transistor. **10**
- Q.4 a) Explain static characteristic curve of n-channel field effect transistor. Also explain why drain current remains constant with V_{DS} in the region beyond Pinch-off. **10**
 b) Explain potential divider biasing for n-channel field effect transistor. Also draw small signal model of n-channel field effect transistor. **10**

PART-B

- Q.5 a) Differentiate the characteristics of common base, common emitter and common collector amplifiers. Also explain which amplifier mode is suitable for cascading and why? **8**
 b) Explain how phase reversal of signal takes place when it is amplified by single stage voltage amplifier. **7**
 c) Classify amplifiers. **5**
- Q.6 a) Draw circuit diagram of two stage RC coupled amplifier. Draw its ac equivalent circuit at mid frequency range. Also derive expression for input impedance, output impedance and voltage gain. **8**
 b) The R-C coupled amplifier has mid frequency gain of 100. The values of lower and upper cutoff frequencies are 20 Hz and 50 KHz. Find frequency at which the gain is reduced to 80. **6**
 c) Explain frequency response curve for RC coupled amplifier. **6**

- Q.7**
- a) Derive expression for harmonic distortion in amplifier. **6**
 - b) Explain class A push-pull amplifier and calculate its overall efficiency. **10**
 - c) Explain difference between voltage and power amplifier. **4**

End Semester Examination, May 2016

B. Tech. – Fourth / Fifth Semester

MICRO PROCESSORS AND INTERFACING (EC-401A / EC-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.** Each question carries equal marks.

- Q.1

 - a) Explain the need for demultiplexing the bus $AD_7 - AD_0$ by showing the importance of ALE signal.
 - b) Differentiate between maskable and non maskable interrupts with an example.
 - c) Explain the concept of pipelining with its advantages.
 - d) What is memory segmentation? What are its advantages?
 - e) Differentiate between intersegment and intrasegment branching with an example.
 - f) What are assembler directives? Explain with an example.
 - g) What is the advantage of partial decoding over absolute decoding? Also specify its disadvantages.
 - h) What are hand shaking signals in 8255?
 - i) What are different priority modes of 8259?
 - j) Differentiate between microprocessor and microcontroller.

PART-A

- Q.2**

 - a) Describe the purpose of following pins in 8085:
 - i) S0, S1
 - ii) HOLD
 - iii) RESET
 - iv) READY
 - v) X1, X25
 - b) Explain the following instructions of 8085 microprocessor with suitable example and addressing mode:
 - i) LDAX
 - ii) SHLD
 - iii) ANI
 - iv) DAA8
 - c) Draw and explain interrupt structure of 8085 microprocessor.
 7

Q.3

 - a) Draw and explain architecture of 8086 microprocessor.
 8
 - b) Differentiate between minimum and maximum mode configuration of 8086 with description of all signals.
 10
 - c) What is the concept of memory banking? Explain utility of BHE signal in conjunction with A_0 .
 2

Q.4

 - a) Explain addressing modes of 8086 microprocessor with an example.
 5
 - b) Explain following instructions with proper format and examples:
 - i) LAHF
 - ii) XLAT
 - iii) NOP
 - iv) JG/JNLE
 - v) MOVS
 - vi) SHR9
 - c) If $BX = 0158_H$, $DI = 10A5_H$, $DISPLACEMENT = 1B57_H$ $DS = 2100_H$ and DS is used as the segment register. Compute the physical address using direct, register, register indirect, register relative, based indexed and relative based indexed addressing modes.
 6

PART-B

- Q.5 a) Interface 2KRAM and 4KEPROM to 8085 microprocessor. Draw the address mapping and interfacing diagram. **10**

- b) Differentiate between memory mapped I/O and peripheral mapped I/O with advantages and disadvantages. **10**
- Q.6 a) Draw and explain architecture of 8255. **8**
- b) Determine control word for the following configurations of ports of 8255.
- Port A – output
- Mode of Port A – mode 1
- Port B – output
- Mode of Port B – Mode 0
- Port C_{lower} – output
- Remaining pins of port C_{upper} = PC₄, PC₅ – output **5**
- c) Explain the working of 8255 in mode 2. **7**
- Q.7 Write short notes on **(any two):** **10x2**
- a) DMA
 - b) ICW_s and OCW_s of 8259
 - c) Rate Generator and square wave Generator of 8253
 - d) Coprocessor 8087

End Semester Examination, May 2016

B. Tech. – Fourth Semester

ANALOG ELECTRONIC CIRCUITS (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.** Each question carries equal marks.

- Q.1 a) Draw circuit diagram of current mirror.
b) What is slew rate? Also define full power band width of an operational amplifier.
c) Draw a circuit diagram of voltage follower and explain its working.
d) Define subtractor or with the help of circuit diagram.
e) Draw a circuit diagram of peak detector. Also write its application.
f) Why precision rectifier is known as super diode?
g) Draw a circuit diagram of antilog amplifier. Also explain its working in brief.
h) Write the principle of OTA.
i) What is waveform generator? Also write its application.
j) What are fixed IC voltage regulator? **2x10**

PART-A

- Q.2 a) Draw a block diagram of operational amplifier and explain its each block. Also explain its ideal characteristics. **10**
b) Derive an expression for closed loop gain of non-inverting configuration of operational amplifier. **10**
- Q.3 a) Derive an expression for output voltage of inverting configuration of adder. **5**
b) Explain differentiator with the help of a circuit diagram. Also explain its frequency response. **10**
c) Explain grounded load voltage to current converter in brief. **5**
- Q.4 a) Explain full wave precision rectifier with the help of a circuit diagram. Also derive an expression for it. **10**
b) What is logarithmic amplifier? Explain it with the help of a circuit diagram and derive an expression for output voltage. **10**

PART-B

- Q.5 a) Draw a circuit diagram of 2nd order high pass filter. Also derive expression for its transfer function. **10**
b) Why state variable filter is known as universal filter? Explain state variable filter in detail. **10**
- Q.6 a) Explain triangular waveform generator with the help of a circuit diagram. **10**
b) Explain PLL with the help of a block diagram. **10**
- Q.7 a) What is voltage regulator? Explain series voltage regulator with the help of a circuit diagram. **10**
b) Explain SMPS with the help of a circuit diagram. **10**

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1 a) What is the need for modulation?
 b) Draw the spectrum of the following signal:
 $s(t) = 10\cos 100t + 5\sin 200t + \cos 300t$
 c) State and prove frequency shifting property of fourier transform.
 d) What is the percentage of power saving in SSB transmission as compared to DSB signal (Take modulation index as 1)?
 e) What is vestigial sideband transmission?
 f) State Carson's rule for determining the bandwidth for a FM signal.
 g) Draw the block diagram for generation of PM signal using FM modulator.
 h) Discuss the role of mixer in super heterodyne receiver.
 i) What is the difference between low level and high level modulation?
 j) An amplifier is operating at 17°C with a bandwidth of 15 KHz. Find thermal noise power in watts and rms noise voltage for a $60\ \Omega$ internal resistance and a $60\ \Omega$ load resistance.
- 2x10**

PART-A

- Q.2 a) Define the following signals:
 i) Unit step ii) unit ramp iii) Unit impulse
 Plot the signal $u(t - \tau)$ against τ . **8**
 b) What are the elements of a communication system? Explain their fundamental limitations. **6**
 c) Explain the properties of continuous time LTI system. **6**
- Q.3 a) Find the fourier series expansion of half wave rectified sine signal. **10**
 b) Find the inverse fourier transform of the rectangular spectrum given by:

$$x(j\omega) = \begin{cases} 1 & -\alpha \leq \omega \leq \alpha \\ 0 & |\omega| > \alpha \end{cases}$$
 10

- Q.4 a) An AM signal that appears across $50\ \Omega$ load, has the equation $s(t) = 12\{1 + \sin(12.566 \times 10^3 t)\} \sin(18.85 \times 10^6 t)$ volts. Sketch the envelope of this signal in time domain. Calculate the modulation index, sideband frequency, total power and bandwidth. **8**
 b) Describe the phase discriminator method of generation of SSB modulated signal. **6**
 c) Describe envelope detector method for demodulation of AM waves. **6**

PART-B

- Q.5 a) What are the drawbacks of direct method of FM generation? Discuss with suitable block diagram indirect method of FM generation. **8**
 b) Explain the principle and working of phase locked loop FM demodulator. **6**
 c) A FM signal is represented by:

$$V(t) = 12 \cos(6 \times 10^8 t + 5 \sin 1250t)$$

Determine the following:

- i) Carrier frequency.
- ii) Modulation frequency.
- iii) Modulation index.
- iv) Power dissipated in 10Ω resistor.

6

Q.6 a) Explain TRF receiver with suitable block diagram and give its advantages and disadvantages. **8**

b) What is intermediate frequency? What is the criteria for selecting intermediate frequency? **6**

c) Write short notes on:

- i) AGC
- ii) Image frequency

6

Q.7 a) What is noise? List and explain different types of noise that occur in an electronic circuit. **10**

b) What is meant by noise figure? A mixer stage has a noise figure of 25 dB and stage before it is an amplifier with a noise figure of 20 dB and an available power gain of 10 dB. Find the overall noise figure referred to input. **10**

End Semester Examination, May 2016

B. Tech. – Third / Fourth Semester

COMMUNICATION ENGINEERING-I (EC-404)

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 is the need of modulation?
b) What is the difference between baseband and pass band signals?
c) State Parseval's energy theorem.
d) State and prove time scaling property of Fourier transform.
e) What do you mean by cohe森ent detection?
f) A 400 watts carrier is modulated to a depth of 75 %. Find the total power in the AM wave. Assume that the modulating signal is sinusoidal.
g) State Carson's rule for determining the bandwidth for a FM signal.
h) Draw the block diagram for generation of phase modulation signal using frequency modulator.
i) What is intermediate frequency and what is its significance?
j) Define noise figure and noise temperature. **2x10**

PART-A

- Q.2 a) What are the elements of digital communication system? Explain each in detail. **8**
b) Define system. Explain the difference between the following systems:
i) Time invariant and time variant system.
ii) Linear and non linear system.
iii) Stable and unstable system. **12**
- Q.3 a) Find the Fourier series expansion of full wave rectified sine wave. **8**
b) State and prove the following properties of Fourier transform:
i) Conjugate function.
ii) Time differentiation theorem.
iii) Frequency convolution theorem. **12**

- Q.4 a) With a neat block diagram, explain the balanced modulator method of generating DSBSC wave. **6**
b) Explain FDM with a neat block diagram. **6**
c) With a block diagram approach, explain the phase discrimination method for generating SSB modulated wave. **8**

PART-B

- Q.5 a) Explain in detail, direct method for FM generation. What are its drawbacks? **10**
b) Explain the operation of ratio detector. **10**
- Q.6 a) Explain the difference between AM and FM receiver. What are the characteristics of FM receiver. **10**
b) Name the constituent stages of AM radio transmitter and briefly give the function of each stage. **10**
- Q.7 a) Define noise. Explain in detail different types of internal noise. **10**

- b) For a bandwidth of 150 kHz, calculate the thermal noise voltage generated by two resistors of 30 and 60 kOhm, when they are connected in series and in parallel. **6**

c) Write note on the following: **4**

 - i) Thermal noise.
 - ii) S/N ratio.

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1**
- a) State Stokes' Theorem.
 - b) Three points $P(1, -3, 5)$, $Q(2, 4, 6)$ and $R(0, 3, 8)$ are given in Cartesian coordinates.
Find:
 - i) The distance vector \vec{r}_{QR} .
 - ii) The angle between \vec{QP} and \vec{QR} .
 - c) What is scalar potential? Obtain the relation between \vec{E} and V .
 - d) Explain the method of images.
 - e) Define magnetic field intensity and magnetic flux density.
 - f) State the inconsistency in Ampere's law.
 - g) State Biot Savart's law.
 - h) Define surface impedance.
 - i) What are uniform plane waves?
 - j) What do you mean by open and short circuited lines?
- 2×10**

PART-A

- Q.2**
- a) Transform the vector $\vec{A} = A_x a_x + A_y a_y + A_z a_z$ into cylindrical coordinates. **5**
 - b) Explain the terms i) Divergence ii) Curl and iii) Gradient with examples. **5**
 - c) Given $\vec{D} = \left(\frac{10r^3}{4}\right) a_r$ in cylindrical coordinate system. Verify Gauss theorem of divergence for the volume enclosed by $r = 1\text{m}$, $r = 2\text{m}$ and $z = 0$ to 10m .

$$\left[\text{Prove } \int_V (\nabla \cdot \vec{D}) du = \iint_S \vec{D} \cdot \vec{ds} \right].$$
 10

- Q.3**
- a) State and prove Gauss law. **5**
 - b) Find the potential at point P due to an electric dipole. **5**
 - c) State and derive Uniqueness theorem. **10**

- Q.4**
- a) State and prove Ampere's circuital law in differential vector form. **10**
 - b) Write short notes on **(any two):**
 - i) Magnetic vector potential.
 - ii) Magnetic boundary conditions.
 - iii) Inductor and inductances.
 - iv) Magnetic field intensity due to infinite wire carrying current-I.
- 5×2**

PART-B

- Q.5**
- a) State and prove Poynting's theorem and give the interpretation of various terms. **10**
 - b) Write short notes on **(any two):**
 - i) Maxwell's equations in integral and differential form.
 - ii) Continuity equation for current in time-varying fields.

- iii) Displacement current.
- iv) Faraday's law.

5×2

- Q.6**
- a) Define polarization. Discuss circular polarization in brief. **5**
 - b) Derive the electromagnetic wave equation for free space. **7**
 - c) For free space, show that the intrinsic impedance: **8**

$$\eta_0 = \sqrt{\frac{\mu_0}{\epsilon_0}}$$

- Q.7**
- a) Derive the transmission line equations. **6**
 - b) A low loss transmission line of characteristic impedance of 100Ω is connected to a load of 200Ω . Calculate the voltage reflection coefficient and the standing wave ratio. **4**
 - c) Write short notes on: Impedance matching and Smith chart. **10**

End Semester Examination, May 2016

B. Tech. – Fourth Semester

HARDWARE DIGITAL DESIGN (EC-422)

Time: 3 hrs

Max Marks: **100**

No. of pages: **1**

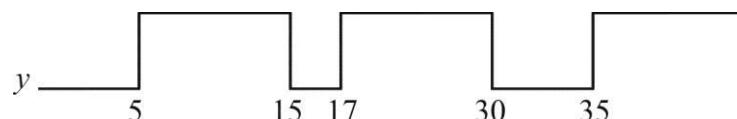
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B.** Each question carries equal marks.

- Q.1 a) What are different computer aided design tools for digital systems.
 b) What do you mean by hardware abstraction?
 c) Define delay and its type.
 d) What is the difference between encoder and multiplexer?
 e) Write entity declaration for the 3:8 decoder circuits.
 f) Differentiate between a positional association and named association in component instantiation with an example.
 g) What is library clause and why it is used?
 h) Discuss the use of function as a type conversion function.
 i) Perform the operation: 11001101 SII-2.
 j) What are the advantages of using hardware description language as compared to schematic capture in the design process? **2×10**

PART-A

- Q.2 a) Differentiate between data flow, behavioural and structural style of modeling with an examples. **10**
 b) How are sequential statements different from concurrent statements? **10**

- Q.3 a) What is overloading? Explain operator overloading and subprogram overloading with examples. **10**
 b) What is inertial delay? Draw the output waveform for:
 $z \leftarrow \text{reject } 5\text{ns inertial } y \text{ after } 12 \text{ ns};$
 if



- Q.4 a) Design a 4:1 multiplexer. Give its entity declaration and behavioural model. Also draw the waveform giving relation between its input and output. **10**
 b) Write down the truth table, entity declaration and architecture for the comparator. Also draw the circuit and output waveforms. **10**

PART-B

- Q.5 a) Write down the truth table and VHDL code for D latch. Also draw the circuit and output waveform. **10**
 b) Design and implement counter using VHDL which counts upto 9 and down counts again from 9 to 0. **10**
- Q.6 a) Design an FSM using Moore state model that has an input w and an output z . The machine is a sequence detector that produces $z = 1$ when the previous two values of w were 11; otherwise $z = 0$. **12**
 b) Discuss predefined attributes of VHDL with an example. **8**

- Q.7 a) Explain how a simple microcomputer system works. Explain its implementation using VHDL. **10**
- b) Discuss designing of PLDs (Programmable Logic Devices) using CPLDs (Complex Programmable Logic Devices) and FPGAs (Field Programmable Gate Arrays). **10**

End Semester Examination, May 2016

B. Tech. – Fourth Semester

ANALOG ELECTRONIC CIRCUITS-II (EC-423)

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 sensitivity of feedback amplifier. Also derive expression for it.
b) What is crystal oscillator? Draw circuit diagram for it.
c) What is full power bandwidth of operational amplifier? Derive an expression for it.
d) Define:
i) Offset voltage.
ii) CMRR.
e) What is subtractor? Derive expression for it, with the help of a circuit diagram.
f) Draw a circuit diagram for current to voltage converter. Also write its application.
g) What is super diode?
h) Draw a circuit diagram of sample-hold circuit. Write its working in brief.
i) Tabulate difference between active and passive filter.
j) Why state variable filter is known as universal filter? **2x10**

PART-A

- Q.2 a) What is feedback amplifier? Explain advantages of negative feedback amplifier. **12**
b) Draw a circuit diagram of current amplifier. Derive expression for its gain, input impedance and output impedance. **8**
- Q.3 a) Draw a circuit diagram of Colpitt's oscillator. Derive an expression for its resonance frequency. Also explain how Colpitt's oscillator is different from Clap oscillator. **10**
b) Why three RC network are used in a RC-phase shift oscillator? Also derive an expression for resonance frequency of RC phase shift oscillator. **10**
- Q.4 a) With the help of a circuit diagram, derive expression for differential gain, common mode gain, input impedance and output impedance of dual input balanced output differential amplifier configuration. **12**
b) Draw a block diagram of operational amplifier and explain its ideal characteristics. Also derive an expression for closed loop gain of non-inverting configuration of operational amplifier. **8**

PART-B

- Q.5 a) Explain inverting adder with the help of a circuit diagram. Also derive an expression for output voltage. **4**
b) Design a practical integrator circuit to process sinusoidal input of 1 KHz. The input amplitude is 10 mV. (Assume, gain of practical integrator = 10). **6**
c) What is instrumentation amplifier? Derive an expression for its output voltage. Also write its application. **10**
- Q.6 a) Derive an expression for output voltage for logarithmic amplifier with the help of a circuit diagram. **6**
b) Explain regenerative comparator for non-inverting configuration of op-amp with the help of a circuit diagram. **7**
c) Explain analog multiplier with the help of a circuit diagram. **7**

- Q.7 a) Explain Sallen-Key filter with the help of a circuit diagram. Also derive its transfer function. **10**
- b) What is Notch filter? Explain it with the help of a circuit diagram and derive an expression for its resonance frequency. **10**

End Semester Examination, May 2016
B. Tech. – Fifth Semester
ANTENNA AND WAVE PROPAGATION (EC-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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) What is characteristic impedance of free space?
- b) Explain the term 'beam solid angle'.
- c) State reciprocity principle for antenna.
- d) What is maximum usable frequency (MUF)?
- e) What is a half wave dipole?
- f) Differentiate between end fire array and broadside array.
- g) What is zoned lens antenna?
- h) Is YagiUda antenna an array or not? Justify your answer.
- i) Define skip distance.
- j) What is noise figure of an antenna?

2×10

PART-A

- Q.2** a) What is radiation resistance of an antenna? Prove that radiation resistance of a half wave dipole is 73 ohms. **10**
- b) What do you mean by retarded vector potential? Explain with a suitable diagram. **10**
- Q.3** a) An antenna has a radiation resistance of 72Ω , loss resistance of 8Ω and power gain of 12 dB. Determine antenna efficiency and its directive gain. **10**
- b) Explain the terms 'Antenna Beam Width' and 'Radiation Pattern'. **10**
- Q.4** a) What is a horn antenna? Write down its types. What are its design equations? **10**
- b) What is lens antenna? Explain its working. What are its types and applications? **10**

PART-B

- Q.5** a) What is an antenna array? What is its necessity? Explain broadside and end fire array in detail. **10**
- b) An end fire array consisting of several half-wave length long radiations is required to have a gain of 30. Find the array length and BWFN. **10**
- Q.6** a) What are the modes of wave propagation? Briefly explain each mode and mention salient features. **10**
- b) What is Duct Propagation? Explain the phenomenon in detail. **10**
- Q.7** Write short notes on **(any two):**
- a) Radiation efficiency measurement.
 - b) Noise temperature measurement.
 - c) Gain measurement.
 - d) Phase measurement.

10x2

End Semester Examination, May 2016

B. Tech. – Fifth / Sixth Semester

DIGITAL SIGNAL PROCESSING (EC-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 Briefly answer:

- a) Plot the signal $y(n) = 3\delta(n+2) + \delta(n) - 2\delta(n-1)$.
- b) Calculate z transform of $x(n) = \delta(n) + 3\delta(n-1)$.
- c) Find linear correlation between $x_1(n) = \{2, 1, 1\}$ and $x_2(n) = \{1, 4\}$.
- d) Find DTFT of $x(n) = a^n u(n-1)$.
- e) State and prove symmetry property of phase factor ω_n .
- f) What is finite word length effect in DSP?
- g) Write expression for Hamming window function.
- h) What are digital filters?
- i) What is frequency warping?
- j) Draw the block diagram of decimator.

2×10

PART-A

Q.2 a) Determine $x(z)$ if $x(n)$ is given as

$$x(n) = \begin{cases} 2^n & , n < 0 \\ \left(\frac{1}{2}\right)^n & , n = 0, 2, 4 \dots \\ \left(\frac{1}{3}\right)^n & , n = 1, 3, 5 \dots \end{cases} \quad \text{10}$$

b) Find $x(n)$ by using partial fraction expression for $x(z) = \frac{1}{(1 - \frac{1}{2}z^{-1})(1 + \frac{1}{4}z^{-1})}$. **10**

Q.3 a) Determine IDFT of $x(k) = [3, 2+j, 1, 2-j]$. **10**

b) Find circular convolution for given sequences $x(n) = [1, 2, 1, 3]$ and $h(n) = [1, 2, -1, 2]$. **10**

Q.4 a) Explain DIT FFT butterfly algorithm. **5**

b) Obtain DFT of following sequence using DIF-FFT algorithm.

$$x(n) = \left[\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}, 0, 0, 0, 0 \right]$$

15

PART-B

Q.5 a) A filter is to be designed with following desired frequency response:

$$H_d(e^{j\omega}) = \begin{cases} 0 & , -\frac{\Pi}{4} \leq \omega \leq \frac{\Pi}{4} \\ e^{-j2\omega} & , \frac{\Pi}{4} < |\omega| < \Pi \end{cases}$$

Determine filter coefficients $h_d(n)$ if the window function is defined as $\omega(n) = \begin{cases} 1 & , \quad 0 \leq n \leq 4 \\ 0 & , \quad \text{otherwise} \end{cases}$. Also determine the frequency response $H(e^{j\omega})$ of the designed filter. **15**

b) Explain the concept of Gibbs Phenomenon. **5**

Q.6 a) What is impulse invariant technique? Derive mapping formula and mapping graph. **12**
b) Describe Chebyeshev filters and comment on their passband and stopband characteristics. **8**

Q.7 a) What is the need of multirate DSP? Explain by giving an example. **10**
b) Explain the process of decimating and interpolating a signal $x(n)$ by a factor 3. **10**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

DIGITAL SYSTEM DESIGN (EC-503A)

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) What is delta delay? Why is it required?
- b) What is enumeration data type? Give one example.
- c) Write the syntax of case statement.
- d) What are concurrent signal assignment statements?
- e) Write VHDL code of Half Adder using data Flow modeling.
- f) Write the entity of 2-bit comparator.
- g) Write the component declaration of a T Flip-Flop designed using J-K Flip-Flop for structural modeling.
- h) What is difference between synchronous and asynchronous counter?
- i) List various types of operations that can be performed by ALU.
- j) Differentiate between PAL and PLA.

2×10

PART-A

- Q.2** a) Explain transport and inertial delay model in detail. **10**
b) What is operator overloading? Using the concept of operator overloading, describe how can the binary numbers be added using an arithmetic operator. **10**
- Q.3** a) Why are functions used? Give an example. Also describe pure and impure functions in brief. **15**
b) Why are procedures used? Explain with an example. **5**
- Q.4** a) Write VHDL code of 1-bit comparator using behavioral modeling. **10**
b) Write VHDL code of 4 to 2 line binary encoder using structural modeling. **10**

PART-B

- Q.5** a) Write behavioral model of T Flip-Flop in detail. **10**
b) Write VHDL code for asynchronous counter in detail. **10**
- Q.6** a) Discuss briefly the basic concepts of a microcomputer system. **10**
b) Design architecture of simple ALU of a microcomputer system using VHDL. **10**
- Q.7** a) Design BCD to Excess-3 code converter using PLA. **15**
b) Write short notes on:
i) LUT
ii) CLB **5**

End Semester Examination, May 2016

B. Tech. – Fifth / 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 a) List various types of data traffic channels in a GSM system.
b) Differentiate between FDD and TDD.
c) Define coherence bandwidth and coherence time.
d) What is the frequency used in blue tooth?
e) Define scattering and diffraction in radio propagation.
f) List any two 2.5G and 3G standards.
g) What is ISI and what are the remedial measures to correct it?
h) List various types of fading channels and define fast fading channel.
i) What does AFRCN stand for in GSM, how many users are supported by one ARFCN?
j) What do you understand by spread spectrum technique? Define CDMA. **2x10**

PART-A

- Q.2 a) Explain with the help of block diagram how call is made from landline to mobile and mobile to landline in wireless communication system. **10**
b) What are various control channels in GSM system? **10**
- Q.3 a) Explain various upgrade paths for 2G technologies. **10**
b) Write short notes on:
i) PAN ii) 4G **10**
- Q.4 Explain the path loss for two ray ground reflection model. Show that the received power falls off with a distance raised to the fourth power. **20**

PART-B

- Q.5 a) Define equalization. What are the fundamentals of equalization? With the help of a block diagram explain simple communication system using an adaptive equalizer at the receiver. **10**
b) What is diversity? What is its need? Explain space diversity technique in brief. **10**
- Q.6 a) Briefly explain frequency reuse concept. Explain why 7-cell cluster of cell is best using co-channel interference concept. **10**
b) Find the frequency reuse factor and the cluster size that should be used for maximum capacity for the path loss exponent.
i) $n = 4$ ii) $n = 3$
The signal to interference ratio of 15 dB is minimum required for satisfactory performance. There are 6 co-channel in their first tier at equal distance from the mobile. **10**
- Q.7 Write short notes on (**any two**):
a) Slotted and pure Aloha.
b) Spread spectrum multiple access.

- c) Differentiate between FDMA, TDMA and CDMA.
- d) Fading effects due to Doppler spread.

10x2

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1 a) If the encoding bits/sample in PCM is increased from 6 bits to 8 bits, what will be the increase in SNR.
 b) What is sampling? Find the Nyquist rate for the following signal:

$$x(t) = \frac{1}{2\pi} \cos(4000\pi t) \cdot \cos(1000\pi t)$$

- c) Explain ASK modulation scheme.
 d) State the difference between coherent and non-coherent detection.
 e) What is meant by a matched filter?
 f) Give the equation for average probability of error for a baseband signal receiver.
 g) State central limit theorem.
 h) Explain Gaussian distribution.
 i) Define Information. One of four possible messages Q_1, Q_2, Q_3 and Q_4 having probabilities 0.4, 0.3, 0.2 and 0.1 respectively is transmitted. Calculate the average information per message.
 j) Find the channel capacity of the given BSC:

$$P\left(\frac{Y}{X}\right) = \begin{bmatrix} 0.8 & 0.2 \\ 0.2 & 0.8 \end{bmatrix}$$

2×10

PART-A

- Q.2 a) Explain the difference between uniform and non-uniform quantization. **10**
 b) A television signal having a bandwidth of 4.2 MHz is transmitted using binary PCM system. Given that the number of quantization level is 512. Determine:
 i) Code word length.
 ii) Transmission bandwidth.
 iii) Bit rate.
 iv) Output signal to quantization noise ratio. **10**

- Q.3 a) Explain QPSK modulator, demodulator and bandwidth required for QPSK signal. **10**
 b) Explain working principle of OFDM technique. How this scheme overcomes multipath related impairments? **10**

- Q.4 What is an optimum filter? Derive the expression for probability of error, P_e and transfer function of optimum filter. **20**

PART-B

- Q.5 a) Find the probability density function of a linear function of a random variable y in terms of Pdf of x .
 Let $y = ax + b, a \neq 0$. **10**

- b) A Discrete Memory Source (DMS) has five messages with their probabilities given below:

Messages (x_1)	x_1	x_2	x_3	x_4	x_5
Prob $P(x_1)$	0.4	0.19	0.16	0.15	0.1

Calculate the average code length and efficiency by Shannon-Fano coding method. **10**

- Q.6 a) Explain the term: power spectral density. Show that the power spectrum of a (real) random process is real i.e.

$$S_{xx}(-f) = S_{xx}(f) \quad \text{10}$$

- b) The power spectral density of stationary random process is given by:

$$S_{xx}(f) = A, -k < f < k$$

$$0, \text{ otherwise}$$

Determine the autocorrelation function. **10**

- Q.7 a) Let: $x(t)$ and $y(t)$ be defined by

$$x(t) = A \cos(\omega t + \theta)$$

$$y(t) = A \sin(\omega t + \theta)$$

Where ω and A are constants and θ is a uniform random variable over $[0, 2\pi]$.

Find the cross correlation of $x(t)$ and $y(t)$. **10**

- b) Write short notes on:

i) Random process transmission through linear filter.

ii) Cross spectral density. **5×2**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

PRINCIPLES OF COMMUNICATION (EC-605)

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) What is the need of modulation in communication system?
- b) Discuss the merits of digital signals over analog signals.
- c) Discuss the advantages of using SSB-SC over AM signal.
- d) Explain FSK modulation.
- e) Define the term PLL.
- f) Compare PCM with DPCM.
- g) Write various applications of spread spectrum system.
- h) Define the term Noise temperature.
- i) Compare pass band with base band signal.
- j) What is companding? State various laws of companding.

2×10

PART-A

- Q.2** a) Draw and explain the block diagram of communication systems in detail. **10**
b) What is signal? Classify various types of signals. **10**
- Q.3** a) How SSB can be generated. Discuss its merits with respect to DSB-SC modulated signal. **10**
b) Discuss in detail various types of AM transmitter with its block diagram. **10**
- Q.4** a) Compare NBFM and WBFM. **10**
b) What is angle modulation? Discuss any method of demodulation of FM. **10**

PART-B

- Q.5** a) Discuss Pulse Code modulation with help of suitable diagram. **10**
b) What is delta modulation? How it is different from DPCM and ADM? **10**
- Q.6** a) How ASK can be generated? **5**
b) Write short notes on:
i) QAM
ii) FSK **5**
c) What are the advantages of spread spectrum techniques? Also, give applications of spread spectrum system. **10**
- Q.7** a) Write short notes on:
i) Shot Noise.
ii) Equivalent Noise bandwidth.
iii) Noise Figure. **10**
b) An amplifier operating over the frequency range of 470 to 520 KHz has an input resistor of $200 \text{ k}\Omega$. Find the r.m.s noise voltage at the input of this amplifier if the ambient temperature is 37°C . **5**

- c) The noise figure of individual stage of a two stage amplifier is 2.04 and 1.56 respectively. The available power gain of the first stage is 18 dB. Evaluate the overall noise figure. **5**

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1 a) Discuss cut-off phenomena in rectangular waveguide.
b) What is a cavity resonator? What do you mean by quality factor of resonators?
c) Show that TEM wave cannot be propagated in a waveguide.
d) What is velocity modulation? Explain its significance.
e) What is an attenuator? What are its types? **5x4**

PART-A

- Q.2 a) What are the advantages of microwaves over low frequencies? Are there any drawbacks? **10**
b) What are microwave frequency bands and their designations? What are major applications of microwaves? **10**
- Q.3 a) An air filled rectangular waveguide has dimensions of $a=6.0$ cm and $b=4.0$ cm. The signal frequency is 3 GHz. Compute the following for TE_{10} mode:
i) Cut off frequency.
ii) Wavelength in the waveguide.
iii) Phase constant and phase velocity.
iv) Group velocity and wave impedance in waveguide. **10**
b) What are microstrip lines? What are their types? Briefly discuss the characteristics of each type. **10**
- Q.4 a) What do you mean by E-plane Tee and H-plane Tee? Compare their propagation characteristics. **10**
b) Describe in detail operation of a 2-hole directional coupler. Calculate the coupling factor, if power in primary waveguide is 72 mW and power delivered by the coupler is 8 mW. **10**

PART-B

- Q.5 a) Explain any three limitations of a conventional tubes for their operation at microwave frequencies. **10**
b) What are slow wave structures? Explain how a helical TWT achieves amplification. **10**
- Q.6 a) A slotted line is used to measure the frequency. It was observed that distance between nulls is 1.85 cm. Given that the waveguide dimensions are 3 cm X 1.5 cm, calculate the value of frequency. **10**
b) Derive basic form of radar range equation, starting from fundamentals. **10**
- Q.7 Write short notes on (**any two**):
a) Gunn diode.
b) IMPATT diode.
c) Varactor diode.

d) PIN diode.

10x2

End Semester Examination, May 2016

B. Tech. – Fifth/Sixth/Seventh/ Eighth Semester

MICROCONTROLLER AND APPLICATIONS (EC-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 Briefly answer:

- a) Show the status of various flags after execution of following instructions:
 - i) MOV A, #9 CH
 - ii) ADD A, # 64 H
- b) Explain the difference between Mov and Movx instructions.
- c) What is the purpose of TF₀ bit in T_{CON} register?
- d) Why mode-2 operation of timer is known as auto reload mode?
- e) What is meant by term interrupt vector?
- f) What instructions are used to enable and disable all interrupts of 8051 microcontroller?
- g) What is function of REN bit in serial communication?
- h) For XTAL = 12 MHz, find TH1 value for 1200 baud rate.
- i) What is function of SOC pin in ADC?
- j) Which register caters to the function of changing interrupt priorities and how? **2×10**

PART-A

- Q.2** a) Draw the pin diagram of 8051 microcontroller and explain the functions of each pin. **10**
- b) Explain the difference between microprocessor and microcontroller. **5**
- c) Explain following registers of 8051 microcontroller:
i) PSW ii) IE **5**
- Q.3** a) Explain following instructions with examples:
i) LJMP ii) RET iii) CLR iv) XRL **10**
- b) Write a program to copy the value 55 H to 10 RAM locations starting from RAM locations 60 H. **10**
- Q.4** a) Explain mode-2 operation of timer of 8051 microcontroller. **6**
- b) Write a subroutine using timer 0 to generate a time delay of 1 sec. **9**
- c) Explain TMOD register of 8051 microcontroller. **5**

PART-B

- Q.5** Explain various modes of operation of serial port of 8051 microcontroller. **20**
- Q.6** a) Write a program to generate square wave of 10 KHz on pin P₁₂ using interrupts. Assume crystal frequency 12 MHz. **12**
- b) What are various SFRs required to use 8051 microcontroller interrupts? Explain. **8**
- Q.7** a) Interface DAC with 8051 microcontroller and write a program to generate a square wave using DAC. **10**
- b) Interface seven segment LED with 8051 microcontroller. **10**

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh 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.** Each question carries equal marks.

- Q.1 a) What will be the average power of a radar which has, peak power of 500 W and duty cycle of 0.2?
b) What will be effect on echo signal frequency, if the target is moving away from radar?
c) What will be target range, if echo signal is received after $600 \mu\text{ sec}$?
d) If pulse repetition frequency of a radar is 400 pulses per sec, what will be maximum unambiguous range?
e) Write limitations of a CW radar.
f) State Doppler frequency effect.
g) An aircraft is circling around a radar at constant distance, will it be detected by an MTI Radar?
h) What is the advantage of use of staggered p.r.p. in MTI Radar?
i) Define Noise Figure.
j) Which tracking radar gives better accuracy? **2×10**

PART-A

- Q.2 a) How are range and angular coordinates determined in a pulse radar? Which parameter determines maximum unambiguous range? **10**
b) What are major applications of radar? Briefly discuss each. **10**
- Q.3 a) What is peak power of a radar whose average power is 200 W, pulse width $1 \mu\text{ sec}$, p.r.f. 1000 pulses per sec? Also calculate the range of this ground based surveillance radar, if it has to detect a target whose radar cross-section is 2m^2 , operating frequency 2.9 GHz, with rectangular antenna of size $5\text{ m} \times 2.7\text{ m}$, aperture efficiency of 0.6 and minimum detectable signal is 10^{-12} W . **10**
b) Does Radar Range Equation predict range of a target accurately? Justify your answer with applicable reasons. **10**
- Q.4 a) With the help of a block diagram explain the functioning of an FMCW Radar. **10**
b) Derive an expression for Doppler frequency for a radar. What are its applications? **10**

PART-B

- Q.5 a) Calculate the first three blind speeds for an MTI Radar operating at 3 GHz and p.r.f = 2000 Hz. **10**
b) Derive an expression for blind speed for an MTI Radar. From this expression, can you suggest any two remedial measures to overcome blind speed problem. **10**
- Q.6 a) What is the principle of a conical scanning tracking radar? Briefly discuss its operation, with the help of a block diagram. **10**
b) What are basic techniques for tracking a target in angles? Briefly discuss each technique with example of application in tracking radar. **10**
- Q.7 Write short notes on (**any two**):
a) Balanced Duplexer.

- b) Synthetic Aperture Radar.
- c) Receiver Protectors.
- d) SONAR.

10×2

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh Semester

ELECTRONIC SYSTEM DESIGN (EC-722)

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) Solve the following equation using Boolean algebra: $\bar{A}B + AB + \bar{A}\bar{B}$. **2x10**
 b) Find the 9's complement of following numbers:
 i) 25 ii) 155
 c) What is the difference between PAL and PLA?
 d) What do you mean by factoring?
 e) Explain tri-state bus system.
 f) What do you mean by wired logic?
 g) What is race around condition in JK flip flop and how is it removed?
 h) What is the difference between Moore and Mealy model?
 i) What is one hot encoding?
 j) What is the difference between synchronous and asynchronous circuits? **2x10**

PART-A

- Q.2 a) Convert:
 i) $(326.74)_{10}$ to binary, octal and hexadecimal. **10**
 ii) $(3FA.C2)_{16}$ to binary and octal.
 b) Explain digital design process. **4**
 c) Find the minimum cost SoP and PoS form for function:

$$f(x_1, x_2, x_3) = \pi M(0, 2, 3, 5, 6)$$
 6

- Q.3 a) Solve the following equation using K-map and implement using CMOS logic:

$$f(A, B, C, D) = \sum m(1, 3, 5, 8, 9, 11, 15) + d(2, 13)$$
 12
 b) Implement following using PLA:

$$f_1 = x_1\bar{x}_2 + \bar{x}_1\bar{x}_3 + x_1x_2\bar{x}_3$$

$$f_2 = x_1x_2 + x_1\bar{x}_2x_3 + \bar{x}_2x_3$$
 8

- Q.4 a) Implement 4:16 decoder using a decoder tree. **10**
 b) Synthesize a MUX using Shannon's expansion. **10**

PART-B

- Q.5 a) Design a modulo 12 up/down counter. **12**
 b) Convert SR flip flop to D flip flop and T flip flop. **8**
- Q.6 a) Design an FSM that has an input w and output z. The machine has to generate z=1 when previous values of w are 1001 otherwise z=0. Overlaps input patterns are allowed. **10**
 b) Minimize the following state table into minimum number of states. (Use partitioning process).

Present state	Next state		Output
	$\omega = 0$	$\omega = 1$	Z
A	B	C	1
B	D	F	1
C	F	E	0
D	B	G	1
E	F	C	0
F	E	D	0
G	F	G	0

10

Q.7 Write short notes on the following:

- a) State assignment.
- b) Hazards and their significances.
- c) Synthesis of asynchronous circuit.

7

6

7

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh Semester

OPTICAL COMMUNICATION (EC-723A)

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) Define the term refractive index. Describe the function of core and cladding in optical fibre.
b) Sketch the initial and final energy states showing:
i) Absorption.
ii) Stimulated emission.
c) Define intensity modulation.
d) If the refractive index of an optical fibre core is 1.40 and the relative refractive index difference is 1%, determine the refractive index of cladding.
e) Write two requirements of photodetectors.
f) A p-n photodiode has a quantum efficiency of 50% at a wavelength of $0.9 \mu m$. Calculate its responsivity at $0.9 \mu m$.
g) Sketch the attenuation spectra for intrinsic loss in pure GeO_2 and SiO_2 .
h) Define the term population inversion.
i) Define dispersion.
j) Derive the relationship between n_1 , n_2 and Q_a . **2x10**

PART-A

- Q.2 a) Draw and explain the block diagrams of optical transmitter circuit and optical receiver circuit. **12**
b) Write the advantages of optical communication system. **8**
- Q.3 a) A typical relative refractive index difference for an optical fiber designed for long distance transmission is 1%. Estimate the NA and solid acceptance angle in air for the fiber when the core index is 1.46. Further calculate the critical angle at the core-cladding interface within the fiber. **8**
b) Describe the complete mechanism of intermodal dispersion in a multimode step index fiber. **12**
- Q.4 a) Outline the common LED structures for optical fibre communications discussing their relative merits and demerits. **10**
b) What are internal and external quantum efficiencies? Derive an expression for internal quantum efficiency showing its relationship with power generated internally P_{int} to LED. **10**

PART-B

- Q.5 a) Briefly explain the working of distributed feedback lasers with a suitable diagram. **10**
b) Write short notes on:
i) Fabry Perot laser.
ii) Quantum well laser. **5x2**

- Q.6 a) Explain the principle construction and working of APD. **10**
b) What are phototransistors? Derive an expression for the responsivity of an intrinsic photodetector in terms of quantum efficiency. **10**
- Q.7 a) The following parameters are established for a single mode fibre at wavelength of $1.3 \mu m$.
Mean power launched = $-3 dBm$ Cabled loss = $0.4 dB/km$
Splice loss = $0.1 dB/km$ Connector loss = $1 dB$ each
Mean power at APD receiver = $-55 dBm$ Safety margin = $7 dB$
Estimate maximum possible link length operating at $35 M/bits$. **10**
- b) Write short notes on:
i) Intensity modulation.
ii) Power budgeting of optical systems.
iii) Fibre couplers.
iv) Fibre connectors. **2½x4**

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1 a) What is Moore's law? Draw the profile followed by Moore's law.
b) What is photolithography?
c) What do you mean by annealing?
d) Describe channel length modulation.
e) Define scaling and why it is required?
f) What is latch up in CMOS circuitry?
g) What is BiCMOS and give its advantage over CMOS inverter?
h) Implement 2:1 MUX using transmission gate.
i) What is stick diagram?
j) Write the demerits of RAM.

2x10

PART-A

- Q.2 a) Explain the Y-chart in detail. **10**
b) Why is CMOS technology preferred over bipolar technology? Also list the advantage of bipolar transistor over MOSFET. **4**
c) Explain the following:
i) Monolithic integrated circuit. ii) Evaluation of VLSI. **6**
- Q.3 a) Discuss the transport phenomenon for C_Z crystal growth technique. **10**
b) Explain the fabrication process of CMOS inverter using n-well. **10**
- Q.4 a) Define threshold voltage. **10**
b) What is channel length modulation? Discuss its impact on saturation region in MOSFET. **10**

PART-B

- Q.5 a) Explain the five regions of DC transfer characteristics of CMOS inverter. Also derive the expression for V_{IH}, V_{IL}, V_{th} and pull up to pull down ratio. **10**
b) Describe the marking of transmission gate. **10**
- Q.6 a) Implement the given equation using CMOS $Y = \{(A + B)C + D\}E$ **10**
b) Draw the stick diagram of OR gate. **10**
- Q.7 a) Implement the circuit of half adder using PLA. **10**
b) Explain FPGA in detail and write its applications. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

ADVANCED TELEVISION ENGINEERING (EC-801A)

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 term: pixel.
b) How many lines get skipped during one complete scan in 625 B systems?
c) Calculate % interface error if 2nd field starts with a delay of 32 MS.
d) Define pedestal height.
e) Define post equalizing pulses.
f) Calculate the transmitted power for a system working with a modulation index of 25% with a carrier power of 3 watts.
g) Define cross over point.
h) Define photo electric field.
i) What is additive mixing?
j) What is PAL B television standard? **2x10**

PART-A

- Q.2 a) Draw the block diagram of TV receiver system and explain each block. **10**
b) Explain the vertical sync details and also mention the two short comings in the basic design and also mention their solutions. **10**
- Q.3 a) Prove that a total channel bandwidth of 7 MHz is required to transmit any picture and sound signal in VHF or UHF bands in 625 B systems. **10**
b) Explain how vestigial side band reception is done. Also state demerits of VSB transmission. **10**
- Q.4 a) Sketch the sectional view of a picture tube which employs electrostatic focusing and electromagnetic deflection. Explain the function of all the electrodes in detail. **10**
b) What is the working principle of vidicon camera tube? Explain its working in detail. **10**

PART-B

- Q.5 a) Why is (G-Y) difference signal not chosen for transmission? Explain how it is obtained in the receiver for modulating the corresponding beam of the picture tube. **10**
b) Discuss the construction and working of a delta gun picture tube. Explain its drawbacks in detail. **10**
- Q.6 a) Describe the factors that influence the choice of picture $IF = 38.9\text{ MHz}$ and sound $IF = 33.4\text{ MHz}$ in the 625 B monochrome TV systems. **10**
b) Discuss the merits and demerits of positive and negative amplitude modulation in TV systems. **10**
- Q.7 Write short notes on (**any four**):
a) LCD TV
b) CATV

- c) Plasma TV
- d) Remote control
- e) CC TV

5x4

End Semester Examination, May 2016

B. Tech. –Sixth / Seventh Semester

DATA COMMUNICATION (EC-802)

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) Discuss merits of parallel transmission.
- b) Compare analog and digital transmission.
- c) Define interleaving with its various types.
- d) Write the application of TDM.
- e) Expand the following terms:
 - i) DSC
 - ii) ISDN
- f) Explain the need of multiplexing.
- g) Draw the frame format of control field for an U frame.
- h) Draw the NRZ and RZ pattern for 110010 data signal.
- i) Give an example of parallel interface.
- j) Define the term error control.

2x10

PART-A

- Q.2** a) Discuss in detail various types of transmission media. **10**
b) Discuss in detail various types of standard organization used for data communication. **10**
- Q.3** a) Why there is a need of digital to digital encoding? Explain polar encoding in detail. **10**
b) Write notes on:
 - i) AMI
 - ii) B8ZS
 - iii) Differential Manchester encoding.**10**
- Q.4** a) Discuss various methods of error detection in detail. **10**
b) Explain serial interface RS-232 in detail. **10**

PART-B

- Q.5** a) Explain in detail various types of character oriented protocols. **10**
b) Discuss various services provided by data link layer. **10**
- Q.6** a) Explain in detail the formation of super group in FDM hierarchy. **10**
b) Compare FDM with TDM systems. **10**
- Q.7** a) Compare narrowband ISDN and broadband ISDN. **5**
b) Discuss in details various channels used in ISDN. **5**
c) Write short notes on:
 - i) SONET
 - ii) VOIP**5x2**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

SATELLITE COMMUNICATION (EC-821A)

Time: 3 hrs

Max Marks: **100**

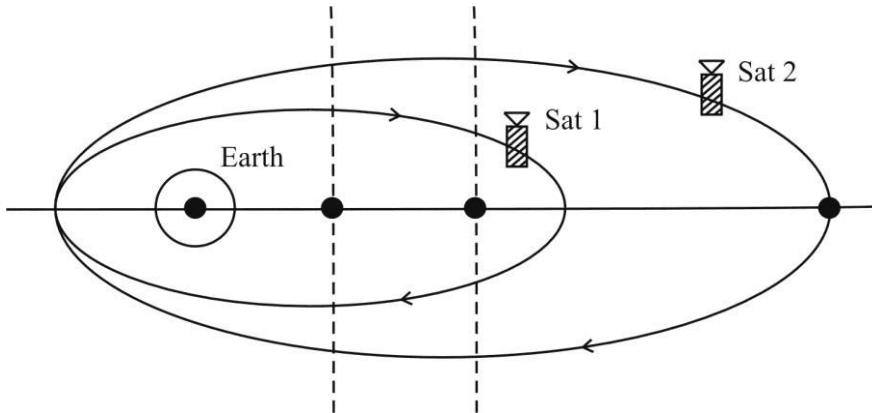
No. of pages: **2**

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

- Q.1 a) What is a satellite and how does a communication satellite differ from a communication relay?
b) Explain the basic difference between a geostationary satellite and a low altitude satellite.
c) State Kepler's third law of planetary motion. Find the orbital time period for a geostationary satellite. (Take $R=42000$ km)
d) Define the following terms w.r.t. a satellite:
i) Ascending and descending node.
ii) Mean anomaly and true anomaly.
e) A satellite is located at a distance of 30,000 km with an operating frequency of 14.25 GHz. Calculate the value of path loss in dB.
f) What is meant by threshold in FM detector?
g) What is meant by noise weighting? State typical improvement levels in S/N ratios which result from the introduction of noise weighting for FDM telephony.
h) Distinguish between pre-assigned and demand assigned traffic in relation to a satellite communication network.
i) What is TDMA? What are its advantages?
j) Give brief description of VSAT. **2x10**

PART-A

- Q.2 a) What are the elements of satellite communication system? Explain each block in detail. **7**
b) Give the reasons as to why the uplink frequency is different than the downlink frequency. Also, mention the reasons for keeping uplink frequency higher than the downlink frequency. **6**
c) Explain various satellite subsystems in detail. **7**
- Q.3 a) What is meant by station keeping? **7**
b) Two satellites are orbiting in different elliptical orbits with same perigee but different apogee distances as shown below. The semi-major axis of the two orbits are 16000 km and 24000 km. If the orbital period of satellite 1 is 10 hrs, determine the orbital period of satellite 2.



7

- c) Explain how does solar eclipse affect the working of a communication system. **6**

- Q.4**
- a) Derive general link equations. Find out expressions for C/N and G/T ratio. Explain the importance of these ratios on satellite link design. **15**
 - b) For a satellite earth station receiver working at 4 GHz, the typical gains and noise temperatures are $T_{in} = 50k$, $T_{RF} = 50k$, $T_M = 500k$, $T_{IF} = 1000k$, $G_{RF} = 20dB$, $G_m = 0dB$, $G_{IF} = 30dB$. Calculate the system noise temperature. **5**

PART-B

- Q.5**
- a) What is loading factor and how does it affect FM/FDM signal transmission? Compare the performance of FM/FDM SCPC and CSSB systems. **15**
 - b) What is meant by bit error rate? What is its optimum acceptable value for digital satellite communication? What is its counterpart in an analog link? **5**
- Q.6**
- a) What is a burst? Explain the difference between the reference burst and traffic burst. Explain their positions in a TDMA frame and structures too. **7**
 - b) What is CDMA? In what way is it superior to TDMA? Mention the potential applications of CDMA. **7**
 - c) Explain satellite switched TDMA. **6**
- Q.7**
- a) Write short notes on:
 - i) MSAT.
 - ii) Earth sensing satellite. **6x2**
 - b) What are the advantages and disadvantages of laser satellite communication? **8**

End Semester Examination, May 2016

B. Tech. – Seventh Semester

EMBEDDED SYSTEM DESIGN (EC-822A)

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) Write any two logical instructions used in PIC16FXX.
b) Draw the block diagram of Harvard architecture.
c) Explain the need of ROM in microcontrollers.
d) Explain the basic operation of interrupts.
e) What is the role of stack upon generation of interrupts?
f) How many register banks are used in 8051? Which register bank is default register bank?
g) Name different modes of accessing data in 8051 microcontroller.
h) Name the method to control the speed of DC motor.
i) Explain pre and post scaling used in microcontroller.
j) What do you understand by response time? **2x10**

PART-A

- Q.2 a) Differentiate microprocessor and microcontroller on the basis of:
i) Applications ii) ROM iii) Hardware iv) Clock. **8**
b) What do you understand by embedded system? Explain the need of following peripherals in embedded systems:
i) I/O pins ii) Timers **6**
c) What is the difference between Harvard and Princeton architectures? Explain their advantages and disadvantages. **6**
- Q.3 a) Write a program in assembly language to add first 20 natural numbers. Also draw the flow chart. **10**
b) Write down the process to create and run the project using KEIL software. **10**

- Q.4 a) What is the need of timers in microcontrollers? What are the various modes of operation in 8051 microcontrollers? Explain in detail. **8**
b) Write assembly language program to generate a 10 KHz square wave using mode 1 on pin P0.1 using i) timers ii) interrupts.
Assume XTAL=12 MHz. **12**

PART-B

- Q.5 a) Explain the architecture and pipelining concept used in PIC16F8TIA in detail. **8**
b) Explain the following instructions used in PIC:
i) MOVLW K ii) CLRW
iii) SUBLW K iv) DECFSZf, d
v) CLRWD T vi) RETFIE **12**
- Q.6 a) Explain the working of timer 2 in PIC. Also explain timer 2 scalar initialization in detail. **10**
b) Explain all registers associated with synchronous serial port module. Also explain the input and output port expansion. **10**

- Q.7 Draw and explain interfacing diagram/circuit of ***any two*** of the following:
a) Interfacing of memory with 8051.
b) Keyboard interfacing with 8051.
c) LCD interfacing with 8051.

10x2

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

MOBILE COMPUTING (EC-823)

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 mobile computing.
- b) Define concept of frequency re-use.
- c) Define consistency in CODA.
- d) What is triangular routing? How it can be avoided?
- e) List three stages of client of CODA file system.
- f) What is the concept of IP micro mobility? Name any one technique.
- g) List four applications of WATM.
- h) What are proactive and reactive protocols?
- i) What is class 0 and class 1 wireless transaction protocol?
- j) What is a transaction model? List any two types of transactions.

2x10

PART-A

- Q.2 a) Briefly explain the architecture of GSM system. Also explain briefly the roles of HLR, VLR and AUC. **10**
- b) Explain:
i) TDMA **5**
ii) FDMA **5**
- Q.3 a) Explain generic reference model of WATM. Explain various requirements set up for handover. **10**
b) What is tunneling and encapsulation? List various types of encapsulation techniques and explain any one in brief. **10**
- Q.4 a) Explain the working of snooping TCP along with its advantages and disadvantages. **10**
b) Explain with the help of a flow diagram, WSP/B session establishment and session termination. **10**

PART-B

- Q.5 a) Give an overview of CODA. **12**
b) Explain high bandwidth internet access using digital video broadcasting. **8**
- Q.6 a) Explain routing in mobile adhoc network based on destination sequence distance vector routing protocol. **10**
b) List the differences between fixed (wired) and adhoc wireless network from routing point of view. **10**
- Q.7 Write short notes on (**any two**):
a) IP packet delivery to and from the mobile node.
b) Architecture of WAP1.X
c) Kangaroo Joey transaction.
d) Push architecture in WAP. **10x2**

End Semester Examination, May 2016

B. Tech.– Seventh / Eighth Semester

ADVANCED MICROPROCESSOR AND MICROCONTROLLER (EC-824A)

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 is the function of TRAP and IOPL Flags?
b) What is relocatable program?
c) Differentiate between 80186 and 80286 microprocessor.
d) Name all the interrupts of an 80186 microprocessor and explain the following:
i) Divide error.
ii) Bound Index.
e) Name and explain the control signals of 80386 microprocessors.
f) A segment starting address is 2003ACB2 H and limit is 2F003H. Find out the ending address if:
i) G=0.
ii) G=1.
g) What are the available versions of 80486 microprocessor? Differentiate them.
h) Why do we use parity checker and generator?
i) Why Timer1 is called free running counter?
j) Give the example of indirect without autopost increment and with post increment addressing mode.

2×10

PART-A

- Q.2 a) What is the purpose of segmentation? What are the segment registers present in 32 bit processor?
8
b) Describe the contents of descriptor for designing a readable code segment with the following specifications:
Starting address=50073000 H
Ending address=805A8FFF H
Privilege level = 10
12
- Q.3 a) What are the different peripherals connected inside the 80186 microprocessor? Explain the function of each peripheral.
12
b) Explain the function of the following pins:
i) RES
ii) RESET
iii) LOCK
iv) SRDY
v) ARDY
vi) LCS
vii) UCS
viii) DEN
8
- Q.4 a) Explain the Input / Output system of 80386 microprocessor.
6
b) What are different types of registers available in 80386 microprocessor? Explain with the help of programming model.
12

c) What is the function of *BS16* pin of 80386 microprocessor?

2

PART-B

- | | | |
|-----|---|-----------|
| Q.5 | a) Write a short note on Pentium processor. | 10 |
| | b) How the memory system of 80486 is different from 80386? | 6 |
| | c) What do you mean by logical address? | 4 |
| Q.6 | a) What are the major building blocks of 80196? Explain in detail. | 12 |
| | b) Why the ALU of 80196 is called RALU? Compare and contrast 80196 with 8051. | 8 |
| Q.7 | a) Describe the function of HSO and HSI unit in 80196. | 8 |
| | b) What do you mean by addressing modes? Explain all the addressing modes of 80196 with an example. | 12 |

End Semester Examination, May 2016

B. Tech. – Sixth / 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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) What are HLR and VLR?
- b) What are NAMPS and AMPS? Which multiple access technique is used in their case?
- c) What is spread spectrum technique? List any two.
- d) Define frequency reuse concept.
- e) What are main modes of propagation? List them all and define any one.
- f) What is power delivery cell?
- g) Define processing gain in a CDMA system.
- h) If total spectrum allocation is 20 MHz and channel bandwidth is 20 KHz, calculate the no. of channels in a 7-cell cellular system.
- i) What is small scale fading?
- j) What is quantization?

2×10

PART-A

- Q.2** a) With the help of diagram explain wide area paging system. **10**
b) Draw the block diagram depicting various upgrade paths for 2G technologies. Explain 2.5G TDMA standards. **10**
- Q.3** a) Calculate the power received $P_r(d)$ in a free space propagation model. **10**
b) Find the far field distance for the antenna with maximum dimension of 1 m and operating frequency of 900 MHz. **2**
c) List various types of small scale fading and explain the effects based on multipath time delay spread. **8**
- Q.4** a) Explain control channels in GSM system. **10**
b) Write short notes on:
i) W-CDMA **5**
ii) GPRS **5**

PART-B

- Q.5** a) Explain various features of FDMA system. How to calculate the number of channels in a FDMA system? **10**
b) If 12.5 MHz is allocated for each simplex bandwidth and if B_s is 12.5 MHz and B_{guard} is 10 KHz and B_C is 30 KHz, find the number of channels available in an FDMA system. **3**
c) Explain space division multiple access. **7**
- Q.6** a) With the help of diagram, illustrate handoff scenario at the cell boundary in the handoff strategy. What are various types of handoff in the cellular system? **10**
b) What are various channel assignment strategies? **8**
c) What is cell sectoring? **2**
- Q.7** Write short notes on (**any two**):
a) Diversity techniques.

- b) Fundamentals of equalization.
- c) Characteristics of speech signals.
- d) DS-SS technique with the help of diagram.

10x2

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh 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.** Each question carries equal marks.

- Q.1 a) What will be the average power of a radar which has, peak power of 500 W and duty cycle of 0.2?
b) What will be effect on echo signal frequency, if the target is moving away from radar?
c) What will be target range, if echo signal is received after $600 \mu\text{ sec}$?
d) If pulse repetition frequency of a radar is 400 pulses per sec, what will be maximum unambiguous range?
e) Write limitations of a CW radar.
f) State Doppler frequency effect.
g) An aircraft is circling around a radar at constant distance, will it be detected by an MTI Radar.
h) What is the advantage of use of staggered p.r.p. in MTI Radar?
i) Define Noise Figure.
j) Which tracking radar gives better accuracy? **2×10**

PART-A

- Q.2 a) How are range and angular coordinates determined in a pulse radar? Which parameter determines maximum unambiguous range? **10**
b) What are major applications of radar? Briefly discuss each. **10**
- Q.3 a) What is peak power of a radar whose average power is 200 W, pulse width $1 \mu\text{ sec}$, p.r.f. 1000 pulses per sec? Also calculate the range of this ground based surveillance radar, if it has to detect a target whose radar cross-section is 2m^2 , operating frequency 2.9 GHz, with rectangular antenna of size $5\text{ m} \times 2.7\text{ m}$, aperture efficiency of 0.6 and minimum detectable signal is 10^{-12} W . **10**
b) Does Radar Range Equation predict range of a target accurately? Justify your answer with applicable reasons. **10**
- Q.4 a) With the help of a block diagram explain the functioning of an FMCW Radar. **10**
b) Derive an expression for Doppler frequency for a radar. What are its applications? **10**

PART-B

- Q.5 a) Calculate the first three blind speeds for an MTI Radar operating at 3 GHz and p.r.f = 2000 Hz. **10**
b) Derive an expression for blind speed for an MTI Radar. From this expression, can you suggest any two remedial measures to overcome blind speed problem. **10**
- Q.6 a) What is the principle of a conical scanning tracking radar? Briefly discuss its operation, with the help of a block diagram. **10**
b) What are basic techniques for tracking a target in angles? Briefly discuss each technique with example of application in tracking radar. **10**
- Q.7 Write short notes on (**any two**):
a) Balanced Duplexer.

- b) Synthetic Aperture Radar.
- c) Receiver Protectors.
- d) SONAR.

10×2

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh Semester

ELECTRONIC SYSTEM DESIGN (EC-722)

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) Solve the following equation using Boolean algebra: $\bar{A}B + AB + \bar{A}\bar{B}$. **2x10**
 b) Find the 9's complement of following numbers:
 i) 25 ii) 155
 c) What is the difference between PAL and PLA?
 d) What do you mean by factoring?
 e) Explain tri-state bus system.
 f) What do you mean by wired logic?
 g) What is race around condition in JK flip flop and how is it removed?
 h) What is the difference between Moore and Mealy model?
 i) What is one hot encoding?
 j) What is the difference between synchronous and asynchronous circuits? **2x10**

PART-A

- Q.2 a) Convert:
 i) $(326.74)_{10}$ to binary, octal and hexadecimal. **10**
 ii) $(3FA.C2)_{16}$ to binary and octal.
 b) Explain digital design process. **4**
 c) Find the minimum cost SoP and PoS form for function:

$$f(x_1, x_2, x_3) = \pi M(0, 2, 3, 5, 6)$$
 6

- Q.3 a) Solve the following equation using K-map and implement using CMOS logic:

$$f(A, B, C, D) = \sum m(1, 3, 5, 8, 9, 11, 15) + d(2, 13)$$
 12
 b) Implement following using PLA:

$$f_1 = x_1\bar{x}_2 + \bar{x}_1\bar{x}_3 + x_1x_2\bar{x}_3$$

$$f_2 = x_1x_2 + x_1\bar{x}_2x_3 + \bar{x}_2x_3$$
 8

- Q.4 a) Implement 4:16 decoder using a decoder tree. **10**
 b) Synthesize a MUX using Shannon's expansion. **10**

PART-B

- Q.5 a) Design a modulo 12 up/down counter. **12**
 b) Convert SR flip flop to D flip flop and T flip flop. **8**
- Q.6 a) Design an FSM that has an input w and output z. The machine has to generate z=1 when previous values of w are 1001 otherwise z=0. Overlaps input patterns are allowed. **10**
 b) Minimize the following state table into minimum number of states. (Use partitioning process).

Present state	Next state		Output
	$\omega = 0$	$\omega = 1$	Z
A	B	C	1
B	D	F	1
C	F	E	0
D	B	G	1
E	F	C	0
F	E	D	0
G	F	G	0

10

Q.7 Write short notes on the following:

- a) State assignment.
- b) Hazards and their significances.
- c) Synthesis of asynchronous circuit.

7

6

7

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh Semester

OPTICAL COMMUNICATION (EC-723A)

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) Define the term refractive index. Describe the function of core and cladding in optical fibre.
b) Sketch the initial and final energy states showing:
i) Absorption.
ii) Stimulated emission.
c) Define intensity modulation.
d) If the refractive index of an optical fibre core is 1.40 and the relative refractive index difference is 1%, determine the refractive index of cladding.
e) Write two requirements of photodetectors.
f) A p-n photodiode has a quantum efficiency of 50% at a wavelength of $0.9 \mu m$. Calculate its responsivity at $0.9 \mu m$.
g) Sketch the attenuation spectra for intrinsic loss in pure GeO_2 and SiO_2 .
h) Define the term population inversion.
i) Define dispersion.
j) Derive the relationship between n_1 , n_2 and Q_a . **2x10**

PART-A

- Q.2 a) Draw and explain the block diagrams of optical transmitter circuit and optical receiver circuit. **12**
b) Write the advantages of optical communication system. **8**
- Q.3 a) A typical relative refractive index difference for an optical fiber designed for long distance transmission is 1%. Estimate the NA and solid acceptance angle in air for the fiber when the core index is 1.46. Further calculate the critical angle at the core-cladding interface within the fiber. **8**
b) Describe the complete mechanism of intermodal dispersion in a multimode step index fiber. **12**
- Q.4 a) Outline the common LED structures for optical fibre communications discussing their relative merits and demerits. **10**
b) What are internal and external quantum efficiencies? Derive an expression for internal quantum efficiency showing its relationship with power generated internally P_{int} to LED. **10**

PART-B

- Q.5 a) Briefly explain the working of distributed feedback lasers with a suitable diagram. **10**
b) Write short notes on:
i) Fabry Perot laser.
ii) Quantum well laser. **5x2**

- Q.6 a) Explain the principle construction and working of APD. **10**
b) What are phototransistors? Derive an expression for the responsivity of an intrinsic photodetector in terms of quantum efficiency. **10**
- Q.7 a) The following parameters are established for a single mode fibre at wavelength of $1.3 \mu m$.
Mean power launched = $-3 dBm$ Cabled loss = $0.4 dB/km$
Splice loss = $0.1 dB/km$ Connector loss = $1 dB$ each
Mean power at APD receiver = $-55 dBm$ Safety margin = $7 dB$
Estimate maximum possible link length operating at $35 M/bits$. **10**
- b) Write shorts notes on:
i) Intensity modulation.
ii) Power budgeting of optical systems.
iii) Fibre couplers.
iv) Fibre connectors. **2½x4**

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1 a) What is Moore's law? Draw the profile followed by Moore's law.
b) What is photolithography?
c) What do you mean by annealing?
d) Describe channel length modulation.
e) Define scaling and why it is required?
f) What is latch up in CMOS circuitry?
g) What is BiCMOS and give its advantage over CMOS inverter?
h) Implement 2:1 MUX using transmission gate.
i) What is stick diagram?
j) Write the demerits of RAM.

2x10

PART-A

- Q.2 a) Explain the Y-chart in detail. **10**
b) Why is CMOS technology preferred over bipolar technology? Also list the advantage of bipolar transistor over MOSFET. **4**
c) Explain the following:
i) Monolithic integrated circuit. ii) Evaluation of VLSI. **6**
- Q.3 a) Discuss the transport phenomenon for C_Z crystal growth technique. **10**
b) Explain the fabrication process of CMOS inverter using n-well. **10**
- Q.4 a) Define threshold voltage. **10**
b) What is channel length modulation? Discuss its impact on saturation region in MOSFET. **10**

PART-B

- Q.5 a) Explain the five regions of DC transfer characteristics of CMOS inverter. Also derive the expression for V_{IH}, V_{IL}, V_{th} and pull up to pull down ratio. **10**
b) Describe the marking of transmission gate. **10**
- Q.6 a) Implement the given equation using CMOS $Y = \{(A + B)C + D\}E$ **10**
b) Draw the stick diagram of OR gate. **10**
- Q.7 a) Implement the circuit of half adder using PLA. **10**
b) Explain FPGA in detail and write its applications. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

ADVANCED TELEVISION ENGINEERING (EC-801A)

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 term: pixel.
b) How many lines get skipped during one complete scan in 625 B systems?
c) Calculate % interface error if 2nd field starts with a delay of 32 MS.
d) Define pedestal height.
e) Define post equalizing pulses.
f) Calculate the transmitted power for a system working with a modulation index of 25% with a carrier power of 3 watts.
g) Define cross over point.
h) Define photo electric field.
i) What is additive mixing?
j) What is PAL B television standard? **2x10**

PART-A

- Q.2 a) Draw the block diagram of TV receiver system and explain each block. **10**
b) Explain the vertical sync details and also mention the two short comings in the basic design and also mention their solutions. **10**
- Q.3 a) Prove that a total channel bandwidth of 7 MHz is required to transmit any picture and sound signal in VHF or UHF bands in 625 B systems. **10**
b) Explain how vestigial side band reception is done. Also state demerits of VSB transmission. **10**
- Q.4 a) Sketch the sectional view of a picture tube which employs electrostatic focusing and electromagnetic deflection. Explain the function of all the electrodes in detail. **10**
b) What is the working principle of vidicon camera tube? Explain its working in detail. **10**

PART-B

- Q.5 a) Why is (G-Y) difference signal not chosen for transmission? Explain how it is obtained in the receiver for modulating the corresponding beam of the picture tube. **10**
b) Discuss the construction and working of a delta gun picture tube. Explain its drawbacks in detail. **10**
- Q.6 a) Describe the factors that influence the choice of picture $IF = 38.9\text{ MHz}$ and sound $IF = 33.4\text{ MHz}$ in the 625 B monochrome TV systems. **10**
b) Discuss the merits and demerits of positive and negative amplitude modulation in TV systems. **10**
- Q.7 Write short notes on (**any four**):
a) LCD TV
b) CATV

- c) Plasma TV
- d) Remote control
- e) CC TV

5x4

End Semester Examination, May 2016

B. Tech. –Sixth / Seventh Semester

DATA COMMUNICATION (EC-802)

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) Discuss merits of parallel transmission.
- b) Compare analog and digital transmission.
- c) Define interleaving with its various types.
- d) Write the application of TDM.
- e) Expand the following terms:
 - i) DSC
 - ii) ISDN
- f) Explain the need of multiplexing.
- g) Draw the frame format of control field for an U frame.
- h) Draw the NRZ and RZ pattern for 110010 data signal.
- i) Give an example of parallel interface.
- j) Define the term error control.

2x10

PART-A

- Q.2** a) Discuss in detail various types of transmission media. **10**
- b) Discuss in detail various types of standard organization used for data communication. **10**
- Q.3** a) Why there is a need of digital to digital encoding? Explain polar encoding in detail. **10**
- b) Write notes on:
 - i) AMI
 - ii) B8ZS
 - iii) Differential Manchester encoding.**10**
- Q.4** a) Discuss various methods of error detection in detail. **10**
- b) Explain serial interface RS-232 in detail. **10**

PART-B

- Q.5** a) Explain in detail various types of character oriented protocols. **10**
- b) Discuss various services provided by data link layer. **10**
- Q.6** a) Explain in detail the formation of super group in FDM hierarchy. **10**
- b) Compare FDM with TDM systems. **10**
- Q.7** a) Compare narrowband ISDN and broadband ISDN. **5**
- b) Discuss in details various channels used in ISDN. **5**
- c) Write short notes on:
 - i) SONET
 - ii) VOIP**5x2**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

SATELLITE COMMUNICATION (EC-821A)

Time: 3 hrs

Max Marks: **100**

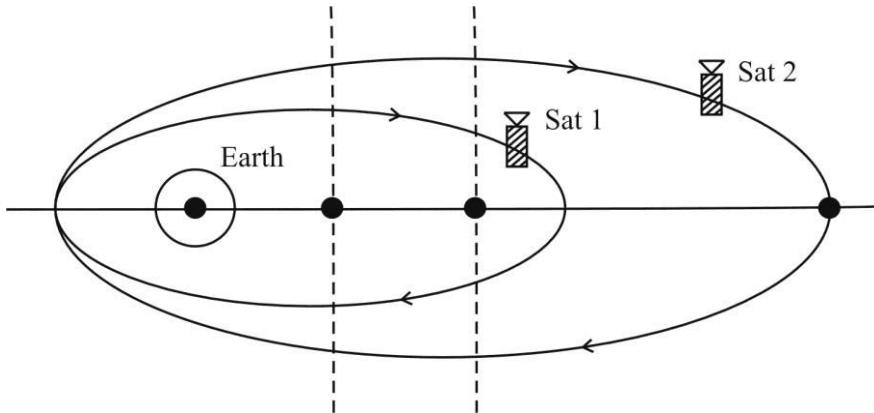
No. of pages: **2**

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

- Q.1 a) What is a satellite and how does a communication satellite differ from a communication relay?
b) Explain the basic difference between a geostationary satellite and a low altitude satellite.
c) State Kepler's third law of planetary motion. Find the orbital time period for a geostationary satellite. (Take $R=42000$ km)
d) Define the following terms w.r.t. a satellite:
i) Ascending and descending node.
ii) Mean anomaly and true anomaly.
e) A satellite is located at a distance of 30,000 km with an operating frequency of 14.25 GHz. Calculate the value of path loss in dB.
f) What is meant by threshold in FM detector?
g) What is meant by noise weighting? State typical improvement levels in S/N ratios which result from the introduction of noise weighting for FDM telephony.
h) Distinguish between pre-assigned and demand assigned traffic in relation to a satellite communication network.
i) What is TDMA? What are its advantages?
j) Give brief description of VSAT. **2x10**

PART-A

- Q.2 a) What are the elements of satellite communication system? Explain each block in detail. **7**
b) Give the reasons as to why the uplink frequency is different than the downlink frequency. Also, mention the reasons for keeping uplink frequency higher than the downlink frequency. **6**
c) Explain various satellite subsystems in detail. **7**
- Q.3 a) What is meant by station keeping? **7**
b) Two satellites are orbiting in different elliptical orbits with same perigee but different apogee distances as shown below. The semi-major axis of the two orbits are 16000 km and 24000 km. If the orbital period of satellite 1 is 10 hrs, determine the orbital period of satellite 2.



- 7**
- c) Explain how does solar eclipse affect the working of a communication system. **6**
- Q.4 a) Derive general link equations. Find out expressions for C/N and G/T ratio. Explain the importance of these ratios on satellite link design. **15**
- b) For a satellite earth station receiver working at 4 GHz, the typical gains and noise temperatures are $T_{in} = 50k$, $T_{RF} = 50k$, $T_M = 500k$, $T_{IF} = 1000k$, $G_{RF} = 20dB$, $G_m = 0dB$, $G_{IF} = 30dB$. Calculate the system noise temperature. **5**

PART-B

- Q.5 a) What is loading factor and how does it affect FM/FDM signal transmission? Compare the performance of FM/FDM SCPC and CSSB systems. **15**
- b) What is meant by bit error rate? What is its optimum acceptable value for digital satellite communication? What is its counterpart in an analog link? **5**
- Q.6 a) What is a burst? Explain the difference between the reference burst and traffic burst. Explain their positions in a TDMA frame and structures too. **7**
- b) What is CDMA? In what way is it superior to TDMA? Mention the potential applications of CDMA. **7**
- c) Explain satellite switched TDMA. **6**
- Q.7 a) Write short notes on:
 i) MSAT.
 ii) Earth sensing satellite. **6x2**
- b) What are the advantages and disadvantages of laser satellite communication? **8**

End Semester Examination, May 2016

B. Tech. – Seventh Semester

EMBEDDED SYSTEM DESIGN (EC-822A)

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) Write any two logical instructions used in PIC16FXX.
 - b) Draw the block diagram of Harvard architecture.
 - c) Explain the need of ROM in microcontrollers.
 - d) Explain the basic operation of interrupts.
 - e) What is the role of stack upon generation of interrupts?
 - f) How many register banks are used in 8051? Which register bank is default register bank?
 - g) Name different modes of accessing data in 8051 microcontroller.
 - h) Name the method to control the speed of DC motor.
 - i) Explain pre and post scaling used in microcontroller.
 - j) What do you understand by response time?

PART-A

- Q.2**

 - a) Differentiate microprocessor and microcontroller on the basis of:
i) Applications ii) ROM iii) Hardware iv) Clock. 8
 - b) What do you understand by embedded system? Explain the need of following peripherals in embedded systems:
i) I/O pins ii) Timers 6
 - c) What is the difference between Harvard and Princeton architectures? Explain their advantages and disadvantages. 6

Q.3

 - a) Write a program in assembly language to add first 20 natural numbers. Also draw the flow chart. 10
 - b) Write down the process to create and run the project using KEIL software. 10

Q.4

 - a) What is the need of timers in microcontrollers? What are the various modes of operation in 8051 microcontrollers? Explain in detail. 8
 - b) Write assembly language program to generate a 10 KHz square wave using mode 1 on pin P0.1 using i) timers ii) interrupts.
Assume XTAL=12 MHz. 12

PART-B

- Q.5 a) Explain the architecture and pipelining concept used in PIC16F8TIA in detail. **8**

b) Explain the following instructions used in PIC:

i) MOVLW K	ii) CLRW
iii) SUBLW K	iv) DECFSZf, d
v) CLRWDT	vi) RETFIE

Q.6 a) Explain the working of timer 2 in PIC. Also explain timer 2 scalar initialization in detail. **10**

b) Explain all registers associated with synchronous serial port module. Also explain the input and output port expansion. **10**

- Q.7 Draw and explain interfacing diagram/circuit of ***any two*** of the following:
a) Interfacing of memory with 8051.
b) Keyboard interfacing with 8051.
c) LCD interfacing with 8051.

10x2

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

MOBILE COMPUTING (EC-823)

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 mobile computing.
- b) Define concept of frequency re-use.
- c) Define consistency in CODA.
- d) What is triangular routing? How it can be avoided?
- e) List three stages of client of CODA file system.
- f) What is the concept of IP micro mobility? Name any one technique.
- g) List four applications of WATM.
- h) What are proactive and reactive protocols?
- i) What is class 0 and class 1 wireless transaction protocol?
- j) What is a transaction model? List any two types of transactions.

2x10

PART-A

- Q.2** a) Briefly explain the architecture of GSM system. Also explain briefly the roles of HLR, VLR and AUC. **10**
- b) Explain:
i) TDMA **5**
ii) FDMA **5**
- Q.3** a) Explain generic reference model of WATM. Explain various requirements set up for handover. **10**
b) What is tunneling and encapsulation? List various types of encapsulation techniques and explain any one in brief. **10**
- Q.4** a) Explain the working of snooping TCP along with its advantages and disadvantages. **10**
b) Explain with the help of a flow diagram, WSP/B session establishment and session termination. **10**

PART-B

- Q.5** a) Give an overview of CODA. **12**
b) Explain high bandwidth internet access using digital video broadcasting. **8**
- Q.6** a) Explain routing in mobile adhoc network based on destination sequence distance vector routing protocol. **10**
b) List the differences between fixed (wired) and adhoc wireless network from routing point of view. **10**
- Q.7** Write short notes on (**any two**):
a) IP packet delivery to and from the mobile node.
b) Architecture of WAP1.X
c) Kangaroo Joey transaction.
d) Push architecture in WAP. **10x2**

End Semester Examination, May 2016

B. Tech.– Seventh / Eighth Semester

ADVANCED MICROPROCESSOR AND MICROCONTROLLER (EC-824A)

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 is the function of TRAP and IOPL Flags?
b) What is relocatable program?
c) Differentiate between 80186 and 80286 microprocessor.
d) Name all the interrupts of an 80186 microprocessor and explain the following:
i) Divide error.
ii) Bound Index.
e) Name and explain the control signals of 80386 microprocessors.
f) A segment starting address is 2003ACB2 H and limit is 2F003H. Find out the ending address if:
i) G=0.
ii) G=1.
g) What are the available versions of 80486 microprocessor? Differentiate them.
h) Why do we use parity checker and generator?
i) Why Timer1 is called free running counter?
j) Give the example of indirect without autopost increment and with post increment addressing mode.

2×10

PART-A

- Q.2 a) What is the purpose of segmentation? What are the segment registers present in 32 bit processor?
8
b) Describe the contents of descriptor for designing a readable code segment with the following specifications:
Starting address=50073000 H
Ending address=805A8FFF H
Privilege level = 10
12
- Q.3 a) What are the different peripherals connected inside the 80186 microprocessor? Explain the function of each peripheral.
12
b) Explain the function of the following pins:
i) RES
ii) RESET
iii) LOCK
iv) SRDY
v) ARDY
vi) LCS
vii) UCS
viii) DEN
8
- Q.4 a) Explain the Input / Output system of 80386 microprocessor.
6
b) What are different types of registers available in 80386 microprocessor? Explain with the help of programming model.
12

c) What is the function of *BS16* pin of 80386 microprocessor?

2

PART-B

- | | | |
|-----|---|-----------|
| Q.5 | a) Write a short note on Pentium processor. | 10 |
| | b) How the memory system of 80486 is different from 80386? | 6 |
| | c) What do you mean by logical address? | 4 |
| Q.6 | a) What are the major building blocks of 80196? Explain in detail. | 12 |
| | b) Why the ALU of 80196 is called RALU? Compare and contrast 80196 with 8051. | 8 |
| Q.7 | a) Describe the function of HSO and HSI unit in 80196. | 8 |
| | b) What do you mean by addressing modes? Explain all the addressing modes of 80196 with an example. | 12 |

End Semester Examination, May 2016

B. Tech. – First / Second Semester

ELEMENTS OF ELECTRICAL ENGINEERING (EE-101B)

Time: 3 hrs

Max Marks: **100**

No. of pages: **2**

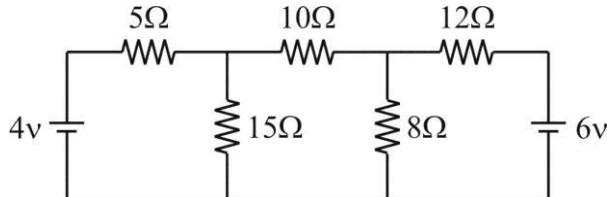
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B**. Each question carries equal marks.

- Q.1 a) State Kirchoff's voltage law.
 b) Define independent sources.
 c) Define mesh. In mesh analysis number of independent equation is _____ to number of mesh.
 d) Form factor in ratio of _____ to _____.
 e) Define power factor, active power.
 f) Name different losses in transformer.
 g) What are three torques required for a basic measuring instrument?
 h) What is a commutator in DC machine?
 i) Define slip.
 j) Name any three single phase induction motor.

2x10

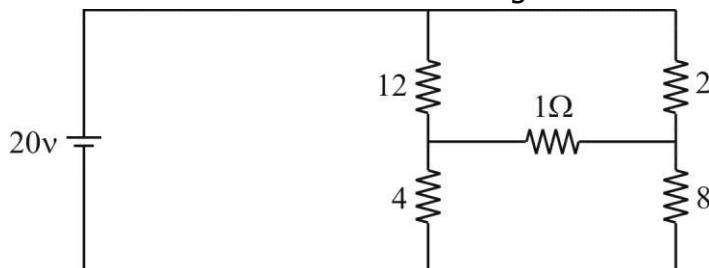
PART-A

- Q.2 a) Find the current flowing through 5Ω resistor using nodal analysis.



10

- b) Find the current in 1Ω resistor using Thevenin's theorem.



10

- Q.3 a) A $.014H$ choke coil with negligible resistance is connected to $220V, 50Hz$ supply. Find the:
 i) Inductive reactance of coil.
 ii) Current flowing through coil
 iii) Power consumed by coil.

10

- b) Derive the relationship between line current and phase current in case of delta connected system.

10

- Q.4 a) Explain principle and construction of moving coil instruments
 b) Differentiate between energy meter and wattmeter.

12

8

PART-B

- Q.5 a) Derive emf equation of transformer.

10

- b) Explain open circuit and short circuit test of transformer. **10**
- Q.6 a) Explain construction of DC machine with the help of a neat sketch. **10**
b) Write a note on brushless DC motors. **10**
- Q.7 a) Write short notes on **(any two):**
i) Capacitor start induction motor
ii) Capacitor start capacitor run induction motor
iii) Working principle of synchronous generator.
b) Differentiate between squirrel cage and slip ring type induction motor. **5x2 10**

End Semester Examination, May 2016

B. Tech. – First / Second Semester

ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING (EE-102A)

Time: 3 hrs

Max Marks: **100**

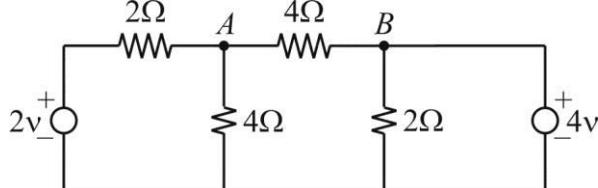
No. of pages: 2

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) State maximum power transfer theorem.
b) Define form and factor and peak factor.
c) What is impedance triangle?
d) Can transformer work on DC?
e) List various types of AC machines.
f) What is peak inverse voltage?
g) What are the advantages of bridge rectifier over centre tap full wave rectifier?
h) Develop the truth table for NAND gate with two inputs.
i) What is meant by a clamping circuit?
j) What are flip-flops? **2x10**

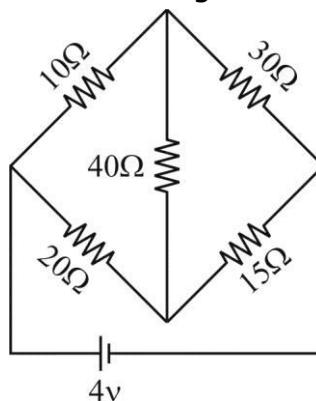
PART-A

- Q.2 a) Determine the current in 4Ω resistor for the given network using mesh analysis.



10

- b) Determine current in 40Ω resistor using thevenin's theorem.



10

- Q.3 a) A series RC circuit takes a power of 7000 Watts when connected to $200V$, $50Hz$ supply. The voltage across resistor is $130V$. Calculate:
i) The resistance, R
ii) Current, I
iii) Power factor
iv) Capacitance, C
v) Impedance, Z
vi) Also write equation for $v(t)$ and $i(t)$ **10**

- b) Derive relationship between line and phase voltages and currents for three phase delta connected system. 5
- c) Give the properties of RLC series resonance and also draw the graph showing variation of resistance, inductive reactance and capacitive reactance with frequency. 5

- Q.4** a) Discuss the construction of DC machines with proper diagram. **10**
 b) Differentiate between core and shell type of transformer. **10**

PART-B

- Q.5** a) Explain the working of full wave bridge rectifier with proper waveform. **8**
 b) Why do we need wave shaping circuits? **2**
 c) Discuss the working principle of:
 i) PN junction diode.
 ii) Zener diode. **5x2**
- Q.6** a) Draw and explain the characteristics of transistor in common emitter configuration. **10**
 b) What is an oscillator? Explain transistor as an oscillator. **10**
- Q.7** Write short notes on following:
 a) Counters.
 b) BCD to 7 segment decoder.
 c) Encoders
 d) S-R flip-flop. **5x4**

End Semester Examination, May 2016

B. Tech. – Third Semester

NETWORK ANALYSIS AND SYNTHESIS (EE-301 / EE-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 a) Find the Laplace transform of

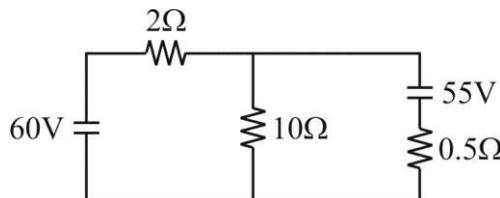
- i) $f(t) = e^{-at} \cos wt$ ii) $f(t) = kr(t-a)$
- b) Define Hurwitz polynomial and write its properties.
- c) Write any two properties of R-C impedance functions.
- d) Define active and passive elements.
- e) List two important properties of Laplace transform.
- f) Write two advantages of m-derived filter over k-derived filter.
- g) Draw parallel connection of two port network.
- h) Draw the dual circuit for series RLC circuit.
- i) Define twig and link.
- j) What are transmission parameters and why are they called so?

2x10

PART-A

Q.2 a) Derive the expression for transient response of series RC circuit if initial conditions are zero. **10**

b) Using mesh analysis, find current through 2Ω resistor.



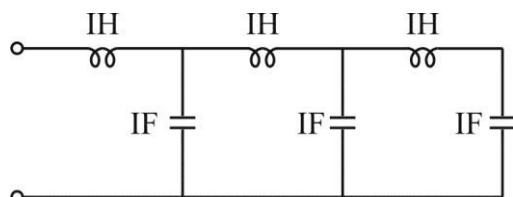
10

Q.3 a) Find $v(t)$ for the following function using pole zero plot:

$$V(s) = \frac{7s + 23}{s^2 + 7s + 10}$$

10

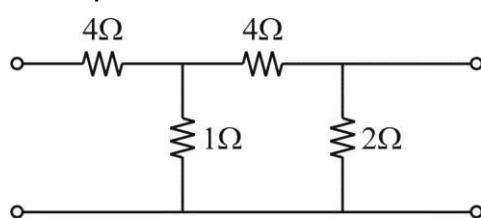
b) Determine driving point impedance function for the network shown in the figure.



10

Q.4 a) Find Z-parameters of two port network in terms of hybrid parameters. **10**

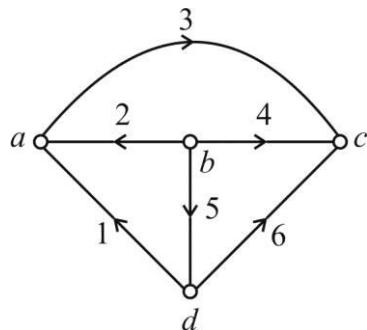
b) Determine the impedance parameters for the network given below in figure:



291/4

PART-B

- Q.5 a) List the properties of RC immitance function. 5
 b) Synthesize the impedance functions (LC) in Foster-I and Foster-II form. 15
- $$z(s) = \frac{2(s^2 + 1)(s^2 + 9)}{s(s^2 + 4)}$$
- Q.6 a) Derive the general expression for characteristic impedance of m-derived T and π section network. 12
 b) Design a constant-K HPF having $f_c = 10 \text{ KHz}$ and $R_o = 600 \Omega$. 8
- Q.7 a) For the graph given, find the loop matrix, incidence matrix and cutset matrix:



12

- b) Draw the graph for given incidence matrix A:

$$A = \begin{bmatrix} -1 & 0 & -1 & -1 & 0 \\ 1 & -1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & -1 \\ 0 & 0 & 0 & 1 & 1 \end{bmatrix}$$
8

End Semester Examination, May 2016

B. Tech. – Third Semester

ELECTRICAL MACHINES-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.** Each question carries equal marks.

Q.1 Answer in brief:

- a) Why the low voltage winding is kept near to the core in case of transformers?
- b) Define all day efficiency.
- c) Draw the phasor diagram and connection diagram of:
 - i) Yd_6
 - ii) Dy_{11}
- d) What is the function of tertiary winding?
- e) Write down energy balance equation for an electrical machine.
- f) What is armature reaction?
- g) Define critical resistance in DC generator.
- h) What is the function of back emf in DC motor?
- i) A DC shunt motor is running at 1500 rpm at a rated load torque. What happen to motor if supply terminals are reversed?
- j) Brushes in a DC motor are given backward shift, why?

2x10

PART-A

Q.2 a) Define efficiency of transformer. Derive the condition for maximum efficiency. **10**
 b) Draw equivalent circuit of $1-\phi$, 5 KVA 200/400 V, 50 Hz transformer from the following data:

OC Test:	200 V	0.5 Amp	80 W	On LV side
SC Test:	15 V	10 Amp	70 W	On HV side

10

Q.3 a) Describe the function of closed delta tertiary winding employed in some $3-\phi$ transformer. **10**
 b) Explain the construction and working of an auto transformer. Derive the expression for Cu saving in case of auto transformer as compare to 2-winding transformer. **10**

Q.4 Write down energy balance equation for electro mechanical energy conversion. Derive the expression for force for a single excited magnetic system. **20**

PART-B

Q.5 What is commutation? Explain commutation in a DC generator. Also discuss in detail methods of improving commutation. **20**

Q.6 What is the importance of back emf in DC motors? Derive the expression for torque developed in DC motor from back emf relationship in DC motor.

Or

How the speed of a DC shunt motor can be controlled by armature voltage and field flux? Explain the principle and limitations of the two methods. **20**

Q.7 Write short notes on **(any two):**

- a) Brake test.
- b) Hopkinson test
- c) Swinburne's test.

10x2

End Semester Examination, May 2016

B. Tech. – Third Semester

ELECTRICAL MEASUREMENTS (EE-303)

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 is resolution?
b) How can the range of ammeter be extended?
c) Give the circuit for electrodynamometer type wattmeters.
d) What do you mean by creep?
e) Write the advantages of Anderson's bridge.
f) What is the function of potentiometers?
g) Define permeability.
h) Why instrument transformers are needed?
i) Give the advantages of moving iron power factor meters.
j) Which methods are used to measure earth resistance? **2x10**

PART-A

- Q.2 a) Derive the dimensions of i) emf, ii) magnetic flux density iii) electric flux density iv) Flux. **10**
b) Describe the construction and working of PMMC instruments. **10**
- Q.3 a) Explain how power can be measured in a 3-phase circuit with the help of two wattmeters. Illustrate your answer with the help of a phasor diagram for a balanced Y-connected load. **10**
b) Derive the expression for deflecting torque in single phase induction type energy meters. **10**
- Q.4 a) Draw the circuit of a Kelvin's double bridge used for measurement of low resistances. Derive the condition for balance. **10**
b) Describe the working of a Carey-Foster slide-wire bridge. **10**

PART-B

- Q.5 a) Explain the construction and theory of Ballistic Galvanometer. **15**
b) Describe the operation of flux meter with its advantages and disadvantages. **5**
- Q.6 a) Draw the equivalent circuit and phasor diagram of a current transformer. Derive the expression for ratio and phase angle errors. **12**
b) State the differences between current transformer and potential transformer. **8**
- Q.7 Write short notes on **(any two):**
a) Moving coil power factor meter.
b) Meggar.
c) Loss of charge method. **10x2**

End Semester Examination, May 2016

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:

- a) A generating station has a connected load of 40 MW and max demand of 20 MW. The units generated being 60×10^6 . Calculate i) demand factor ii) load factor.
- b) What is Ferranti effect?
- c) What is significance of load factor?
- d) Define GMD of bundled conductor.
- e) Why ACSR conductors are preferred for overhead lines?
- f) Why earthing is necessary for power system protection?
- g) What do you mean by transposition of conductors?
- h) What factors are considered for the selection of unit size?
- i) What are the factors affecting corona?
- j) What are bundled conductors?

2x10

PART-A

Q.2 a) What is substation? Explain different types of substation. **10**
b) Draw schematic diagram of nuclear power plant and explain the function of each part in detail. **10**

Q.3 a) A generating station has a maximum demand of 50,000 kW. Calculate the cost per unit generated from the following data:
Capital cost=Rs. 95×10^6 ,
Annual load factor=40%
Annual cost of fuel and oil = Rs. 9×10^6
Taxes, wages and salaries =Rs. 7.5×10^6
Interest and depreciation =12% **10**
b) What do you understand by tariffs? Explain in detail different types of tariff. **10**

Q.4 Derive an expression for calculating capacitance of single and three core cables. **20**

PART-B

Q.5 a) Discuss different methods for voltage control. **10**
b) Derive an expression for inductance per phase for 3-phase system with equal spacing. **10**

Q.6 a) A 2-wire dc distributor cable AB is 2 km long and supplies load of 100 A, 150 A and 50 A situated 500 m, 1000 m, 1600 m and 2000 m from the feeding point A. Each conductor has a resistance of 0.01 ohm per 1000 m. Calculate the potential difference at each load point if a potential difference of 300 V is maintained at point A. **10**
b) Define the following terms:
i) Feeders.
ii) Distributors. **10**

Q.7 What is neutral grounding? Explain in detail methods for neutral grounding.

20

End Semester Examination, May 2016

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

 - a) What is the difference between primary and secondary transducer?
 - b) What is RTD and where it is used? Why platinum is used for the construction of RTD?
 - c) What do you mean by electrostatic focusing?
 - d) What is piezoelectric effect?
 - e) Define resolution and quantization errors.
 - f) What is the basic principle of operation of digital multimeters?
 - g) What do you mean by duty cycle? What is its value for square wave?
 - h) What is the need of time base generator in CRO?
 - i) What is PLL?
 - j) A platinum thermometer has resistance of 100Ω at 25°C . Find its resistance at 65°C if platinum has resistance temperature coefficient of $0.00392/\text{ }^\circ\text{C}$.

PART-A

- Q.2 a) Explain the construction and working principle of LVDT. **10**
b) Describe the working principle, construction of wire wound strain gauge and derive an expression for the gauge factor. **10**

Q.3 a) Draw and explain the block diagram of ECG measurement. **10**
b) Explain instrumentation amplifier in detail. **10**

Q.4 a) Draw the block diagram of CRT. Explain its various sections in detail. **15**
b) Write the short note on Lissajous pattern. **5**

PART-B

- Q.5 a) Explain the standard signal generator with the help of block diagram and also mention its applications. **12**
b) Explain wave analyzers with its block diagram. **8**

Q.6 a) Explain the block diagram of Data Acquisition System. **15**
b) What are voltages controlled oscillators? **5**

Q.7 a) Explain the working and block diagram of a universal counter. **10**
b) Discuss potentiometric type and ramp type digital voltmeters. **10**

End Semester Examination, May 2016

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 a) Name the types of starters used in 3 phase induction motor.
b) Under what condition, the slip in an induction motor is:
 i) Negative. ii) Greater than one.
c) State two advantages of speed control of induction motor by injecting an emf in the rotor circuit.
d) A 50Hz, 6 pole 3-phase induction motor runs at 970 r.p.m. Find slip.
e) List the application of a single phase induction motor.
f) What is the condition for parallel operation of an alternator?
g) What is meant by hunting in synchronous motor?
h) Define torque angle.
i) Write down the causes for reduction in terminal voltage of alternators from no load value E_0 to V for lagging power factor.
j) What are the uses of damper winding in synchronous machines? **2x10**

PART-A

- Q.2 a) Derive the equation for torque developed in 3 phase induction motor. Deduce the condition for maximum torque and find out the expression for maximum torque. **10**

b) A 40 kW, 6 pole, 50 Hz, 450 V, $3-\varphi$ slip ring induction motor furnished the following test data:

No load test: 450 V, 20 Amp, $P.f=0.15$
 Block rotor test: 200 V, 150 Amp, $P.f=0.3$

Draw a circle diagram and find:

i) Slip. ii) Rotor. iii) Losses. iv) Efficiency at full load. **10**

Q.3 a) Explain slip power recovery method of speed control of an induction motor. **10**
 b) Why starters are used in induction motors. Explain construction and working of any one starter used in induction motor. **10**

Q.4 a) Explain the working of a single phase induction motor based upon double revolving field theory. **10**
 b) Write notes on **(any two):**

i) Shaded pole motor.
 ii) Universal motor.
 iii) Capacitor start – capacitor run $1-\varphi$ motor. **5×2**

PART-B

- Q.5 a) Describe construction and working of an alternator in detail. **10**
 b) Derive the emf equation of an alternator. Explain pitch factor and distribution factor in detail. **10**

Q.6 a) Explain the effect of excitation on armature current and power factor of synchronous motor and thereby obtain 'V' and inverted 'V' curves. **10**
 b) Explain synchronizing of 3-phase alternators by dark lamp method. **10**

- Q.7**
- a) Explain construction and working of reluctance motor in detail. **10**
 - b) Permanent magnet brushless motors are DC motors running on AC supply. Explain its constructional features with the help of wave forms and neat labeled diagram. **10**

End Semester Examination, May 2016

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 a) What do you mean by see-back effect?
b) Differentiate between analog and digital transducers.
c) A platinum thermometer has a resistance of 200Ω at 20°C . Find its resistance at 60°C if platinum has resistance temperature coefficient of $0.00392/\text{ }^\circ\text{C}$.
d) Define electromagnetic deflection.
e) List the names of amplifiers used in biomedical instrumentation.
f) What is the purpose of delay in CRO?
g) What is the value of duty cycle for a square wave?
h) What is THD?
i) Differentiate between time division multiplexing and frequency division multiplexing?
j) Define: resolution and quantization error. **2×10**

PART-A

- Q.2 a) Explain construction, working and applications of LVDT. **10**
b) Derive the expression for Gauge Factor. **10**
- Q.3 Draw and explain the transducers used to measure ECG, EMG and EEG in biomedical. **20**
- Q.4 a) Explain the principle of electrostatic focusing of electron beam in a CRO. **10**
b) Explain each component of CRT in detail with a neat block diagram. **10**

PART-B

- Q.5 a) Explain the power and spectrum analyzer with the help of block diagram and also mention its applications. **15**
b) Write a short note on LED. **5**
- Q.6 a) Explain data acquisition system in detail with its block diagram. **10**
b) Give the explanation of PLL with its block diagram and Pin diagram (IC). **10**
- Q.7 Write short notes on (**any two**):
a) Frequency Measurement.
b) Universal Counter.
c) Digital Multimeter. **10×2**

End Semester Examination, May 2016

B. Tech. – Fourth / Fifth Semester

SWITCHGEAR 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:

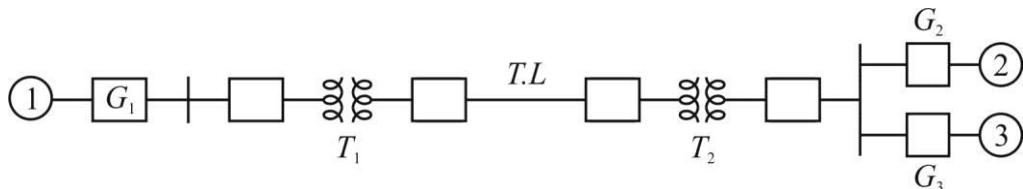
- a) What is importance of PU system?
- b) What do you understand by short circuit?
- c) List various types of shunt and series faults.
- d) What is feeder protection?
- e) Why it is necessary to protect the lines and other equipments of power system against over voltages?
- f) Name two theories of current zero interruption.
- g) Define subtransient reactance.
- h) What do you understand by switching surges?
- i) Give advantages of Buchholz's relay.
- j) What is meant by back up protection?

2x10

PART-A

Q.2 a) Explain in detail transients on a transmission line. **10**

b) Draw the reactance diagram for the below network by calculating per unit values:



$$G_1 \rightarrow 30 \text{ MVA}, 10.5 \text{ KV}, X'' = 1.6 \Omega$$

$$G_2 \rightarrow 15 \text{ MVA}, 6.6 \text{ KV}, X'' = 1.2 \Omega$$

$$G_3 \rightarrow 25 \text{ MVA}, 6.6 \text{ KV}, X'' = 0.56 \Omega$$

$$T_1 \rightarrow 15 \text{ MVA}, 11/33 \text{ KV}, X = 15.2 \Omega/\text{phase}$$

$$T_2 \rightarrow 15 \text{ MVA}, 33/6.2 \text{ KV}, X = 16 \Omega/\text{phase}$$

Transmission line reactance $20.5 \Omega/\text{phase}$ choose suitable values of base MVA and base KV. **10**

Q.3 a) Derive an expression for fault current and phase voltages at fault in case of single line to ground fault. **10**

b) A 25 MVA, 13.2 KV alternator with solidly grounded neutral has a subtransient reactance of 0.25 pu. The positive and zero sequence reactance are 0.35 and 0.1 pu respectively. A single L-G fault occurs at the terminals of unloaded alternator. Determine fault current neglecting fault reactance. **10**

Q.4 a) Explain construction and working of SF_6 circuit breaker with the help of a neat labeled diagram. Also give advantages and limitations of using SF_6 gas as an arc quenching medium. **10**

b) Name and explain the different rating of circuit breaker. **10**

PART-B

- Q.5 a) Discuss the production of torque in an induction relay. Also derive its expression. **10**
b) Explain differential relay with the help of a neat labeled diagram. **10**
- Q.6 a) Explain in detail the application of Merz-price circulating current principle of protection of an alternator. **10**
b) Explain protection of feeder and protection of transmission lines in brief. **10**
- Q.7 a) Explain in detail causes of over voltages. **10**
b) Write short notes on **(any two):**
i) Phenomenon of lightning.
ii) Rod gap lightning arrestor.
iii) Harm gap lightning arrestor. **5x2**

End Semester Examination, May 2016

B. Tech. – Fourth Semester

SWITCH GEAR AND PROTECTION (EE-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 a) Define open conductor fault.
 b) Give classification of circuit breaker.
 c) Explain primary and backup protection.
 d) On what factors does arc resistance of circuit breaker depends?
 e) Which relays are used for protection of transformer?
 f) Define plug setting multiplier.
 g) Draw the sequence impedance network for single line to ground fault.
 h) Write boundary condition in L-L fault.
 i) What are switching surges?
 j) Why is 3-phase symmetrical fault more severe than 3-phase unsymmetrical faults?
- 2×10**

PART-A

- Q.2 a) A delta connected load is supplied from a 3-phase supply. The fuse in the B line is removed and current in the other two lines is 20A. Find the symmetrical component of line currents. **10**
 b) What is Fortesque's theorem? Explain the method for finding symmetrical components for a set of unbalanced voltage phases. **10**
- Q.3 a) Derive an expression for fault current for L-L fault by symmetrical components method. **10**
 b) A 3-phase, 11KV, 10MVA alternator has sequence reactance of $X_0 = 0.05 \text{ p.u.}$ $X_1 = 0.15 \text{ p.u.}$ and $X_2 = 0.15 \text{ p.u.}$ If the generator is on no load, find the ratio of fault currents for L-G fault. **10**
- Q.4 a) Explain the construction and working of SF_6 circuit breaker with proper diagram. **10**
 b) Explain the following terms.
 i) Arc Voltage.
 ii) Restriking Voltage.
 iii) Recovery Voltage.
 iv) Current Chopping.
- 2½×4**

PART-B

- Q.5 a) Discuss the essential requirement of protective relaying. **10**
 b) Explain in details attracted armature type and solenoid type electromagnetic relay. **10**
- Q.6 a) Write the universal torque equation and hence explain Mho relay. **10**
 b) Describe the differential pilot wire method of protection of feeders. **10**
- Q.7 a) What is lightning? Describe the mechanism of lightning discharge. **10**
 b) What is lightning arrester? Explain expulsions type diverter in details. **10**

End Semester Examination, May 2016

B. Tech. – Fourth Semester

PRINCIPLES OF COMMUNICATION (EE-404)

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) Discuss merits of digital communication over analog communication.
- b) What are the functions of receiver in a communication system? Draw the block diagram of a receiver.
- c) What is the percentage of power saving in SSB transmission as compared to DSB signal (Take modulation index as 1)?
- d) What are the advantages of vestigial sideband over SSB?
- e) A 15 kHz audio signal is frequency modulated with modulation index $\beta=5$. Calculate the transmission bandwidth of FM signal.
- f) Explain the principle of demodulation of FM wave using slope detector.
- g) Six message signals each of BW, 5 kHz are TDM and transmitted. Determine the signaling rate and minimum channel BW of the PAM/TDM signal.
- h) What is slope overload error in delta modulation? How can it be avoided?
- i) Explain binary FSK modulation scheme.
- j) Define noise figure. What is its value for an ideal source?

2x10

PART-A

Q.2 a) What do you mean by electronic communication? Explain with a suitable block diagram. **10**
b) Define the terms: modulation and demodulation. Explain the need for modulation in a communication system. **10**

Q.3 a) Explain in detail the generation method of DSB-SC wave by ring modulator. **7**
b) Describe envelope detector method for demodulation of AM waves. **7**
c) What is intermediate frequency? What is the criteria for selecting intermediate frequency? **6**

Q.4 a) A carrier is frequency modulated with a sinusoidal signal of 2 kHz resulting in a maximum frequency deviation of 5 kHz.
i) Find the bandwidth of modulated signal.
ii) The amplitude of modulating sinusoid is increased by a factor of 3 and its frequency is lowered to 1 kHz. Find the maximum frequency deviation and band width of the new modulated signal. **6**
b) Explain reactance modulator used for FM generation using transistor. **7**
c) Describe in detail operation of ratio detector. **7**

PART-B

Q.5 a) What is pulse modulation? What are different pulse modulation techniques? Explain in detail giving generation and demodulation method for any one. **10**
b) Explain slope overload distortion and granular noise in delta modulation. How are they removed in ADM? **6**
c) In a PCM system, the signal to noise ratio is to be held to a minimum of 40 dB. Determine the number of quantization levels needed. **4**

Q.6 a) Explain M-ary PSK. Give the performance comparison of BPSK and QPSK. **10**

- b) What is spread spectrum technique? Explain in detail, direct sequence spread spectrum technique with necessary diagrams. **10**
- Q.7 a) What is noise? Explain in detail different types of external noise. **10**
b) Derive an expression for voltage model of a noisy resistor. **10**

End Semester Examination, May 2016

B. Tech. – Fourth Semester

POWER SYSTEM ENGINEERING (EE-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:

- a) Define surge tank and penstock in hydropower plant.
- b) Why overall efficiency of steam power plant is low?
- c) Name the fuels which are mainly used in diesel and nuclear power plant.
- d) Define GMD and GMR of bundled conductors.
- e) Give the classification of a distribution system.
- f) Why grading of cables is required in power systems?
- g) What is skin and proximity effect?
- h) Why suspension type insulator preferred over pin type insulator for high voltage transmission?
- i) Define load factor and diversity factor.
- j) Classify overhead transmission lines.

2×10

PART-A

Q.2 a) Draw the schematic diagram of nuclear power station and explain its operation. **12**
b) Give a detailed comparison between thermal and hydropower plant on the basis of operating cost, initial cost, efficiency, maintenance cost and availability of source of power. **8**

Q.3 a) A power station has a maximum demand of 15000 kW. The annual load factor is 50% and plant capacity factor is 40%. Determine the reserve capacity of the plant. **10**
b) What do you understand by tariffs? Explain in detail different types of tariffs used in power systems. **10**

Q.4 a) What is sag and tension in overhead lines? Deduce the expression for sag in overhead lines when supports are at equal level. **10**
b) What is corona? What are the factors which affect corona? And also discuss the various methods of reducing corona effect in an overhead transmission line. **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 3ϕ overhead transmission line when conductors are symmetrically placed. **10**
b) Draw equivalent T and π network for long transmission line and evaluate the general circuit constants. **10**

Q.6 a) Discuss the importance of voltage control in power systems and explain various methods of voltage control in a power system. **10**
b) Write short notes on:

- i) Differentiate between d.c and a.c distribution.
- ii) Systems of a.c distribution.

5×2

Q.7 Describe the need of equipment earthing. Explain the methods of grounding.

20

End Semester Examination, May 2016

B. Tech. – Fifth / Sixth 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.

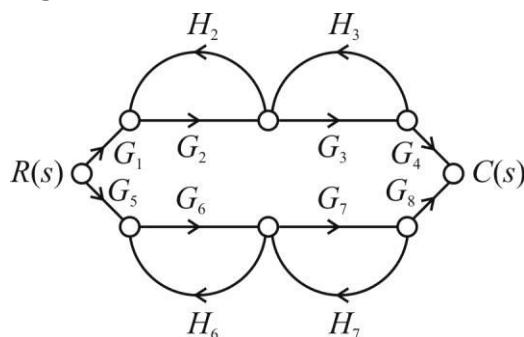
Q.1 Answer the following:

- a) Differentiate time varying and time invariant system.
- b) What do you mean by type 0 system?
- c) What is gain cross over frequency?
- d) Define peak overshoot of a second order system.
- e) Define BIBO stability.
- f) What do you mean by break away point in root locus analysis?
- g) Draw an electrical network for lead compensation.
- h) Define gain margin.
- i) Draw the polar plot of transfer function $K/s(1+sT_1)$.
- j) Define state of a system.

10×2

PART-A

Q.2 a) Obtain the overall transfer function $\frac{C(s)}{R(s)}$ of the signal flow graph shown below in figure using Mason's gain formula.



10

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 $G(s) = \frac{K(s+a)}{s(s+b)(s+c)}$. Also find the steady state error due to an input $r(t) = (a_0 + a_1t)$. **10**

Q.4 a) Using Roth Hurwitz criterion, determine the stability of 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 $G(s)H(s) = \frac{K(s+3)}{(s+1)(s+2)}$ when K is varied from 0 to ∞ . **10**

PART-B

- Q.5 a) A unity feedback control system has $G(s) = \frac{50}{(s+2)(s+10)}$. 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)**:
- a) Stepper motor and its applications.
 - b) AC servomotor.
 - c) Synchros. **10×2**
- Q.7 a) Discuss a lag compensator using an electrical network. Also draw its Bode plot. **10**
- b) Explain in brief with an example how will you represent a system in state space analysis. **10**

End Semester Examination, May 2016

B. Tech. – Fourth / Fifth Semester
POWER ELECTRONICS (EE-502A)

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) What are the applications of power electronics?
- b) Define holding current.
- c) Define V_{DWM} and V_{DRM} .
- d) Explain string efficiency.
- e) What is the function of freewheeling diode?
- f) What are circulating current?
- g) What are the industrial applications of inverter?
- h) What is time ratio control in chopper?
- i) Define extinction angle.
- j) List the application of cycloconverter.

2×10

PART-A

- Q.2** a) Explain construction details and working of IGBT. Also enumerate its application. **10**
b) Explain the types of power diodes. **10**
- Q.3** a) What do you mean by commutation. What are the various types of commutation techniques? Describe any one forced commutation technique in detail. **12**
b) S.C.R with voltage rating of 1000 V and current rating of 200 V are available to be used in a string to handle 6 KV and 1 KA. Calculate number of series and parallel units required if derating factor is 0.6. **8**
- Q.4** a) What is the effect of source impedance on single phase full wave converter? Illustrate the answer with appropriate waveforms and also the expression. **10**
b) Explain the working of single phase dual converter. **10**

PART-B

- Q.5** a) Discuss the working of a three phase 180° mode bridge inverter with appropriate voltage waveforms. **15**
b) Explain the working of basic series inverter with appropriate waveform. **5**
- Q.6** a) Explain the working of type E chopper. **10**
b) A step up chopper has input voltage of 220 V and output voltage of 660 V. If the conducting time of thyristor chopper is 100 μs . Compute the pulse width of output voltage. In case output voltage pulse is halved for constant frequency operation. Find the average value of new output voltage. **10**
- Q.7** a) Explain the working of step down cycloconverter in both continuous and discontinuous mode of operation with suitable waveform and circuit diagram. **10**
b) Explain the working of single phase voltage controller with R-load. Draw suitable waveform of load voltage and load current. **10**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

ELECTRICAL MACHINE DESIGN (EE-503)

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 in brief:

- a) Define output coefficient of machine design.
- b) Why should rotor slots never be made equal to stator slots?
- c) Name various methods adopted to cool a transformer.
- d) Define window space factor.
- e) What is the advantage of hydrogen cooling?
- f) What is meant by computer aided design?
- g) List factors that determine choice of poles of a dc machine.
- h) What is the function of damper windings?
- i) Define specific magnetic loading.
- j) What is meant by output coefficient?

2x10

PART-A

- Q.2**
- a) Derive an expression of temperature rise with time in an electrical machine. Also define heating time constant. (T_h) **10**
 - b) Discuss briefly different ratings of an electrical machine. **5**
 - c) An electrical machine has a heating time constant of 120 min and a cooling time constant when disconnected from the supply of 160 min and final temperature rise on a full load of 55°C . If the machine works on full load for 30 minutes followed by stationary period of 50 minutes, estimate the maximum temperature rise of a machine. **5**
- Q.3**
- a) Derive the output equation of a $3-\phi$ shell type transformer. **10**
 - b) Determine the main dimensions of the core for a 5kVA , $11000/400\text{ V}$, 50 Hz , single phase core type distribution transformer. The net area in the window is 0.6 times the net cross section of iron in the core. Assume a square cross section for a core, flux density is 1 Wb/m^2 , current density 1.4 A/mm^2 , and a window space factor 0.2. The height of window is 3 times of its width. **10**
- Q.4**
- a) Derive an expression for overall design of electromagnet coil. **10**
 - b) Write short notes on:
 - i) Real and apparent flux density.
 - ii) Gap contraction factor for slotted armature.**5x2**

PART-B

- Q.5**
- a) Derive an expression for output equation of a DC machine. **10**
 - b) Write short notes on:
 - i) Lap winding and wave winding.
 - ii) Insulation of armature winding.**5x2**

- Q.6 a) Design main dimensions of a salient pole synchronous machine for a 500 kVA, 50 Hz, $3-\phi$ alternator with synchronous speed=375 rpm. Specific magnetic loading is 0.55 Wb/m^2 and specific electric loading is 25000 A/m. Maximum peripheral speed should not exceed 35 m/s. **10**
- b) Describe briefly various cooling methods of turbo alternators. **10**
- Q.7 a) What do you understand by computer aided design of electrical machines? Explain various methods of machine designing in detail. **10**
- b) Write short notes on **(any two):**
- i) Output equation of a $3-\phi$ induction motor.
 - ii) Design of stator windings.
 - iii) Design of rotor bars and slots. **5x2**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

POWER GENERATION OPERATION AND CONTROL (EE-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**. Each question carries equal marks.

- Q.1 a) Draw prime mover model.
b) Define unit commitment problem.
c) Classify power system stability.
d) State the constraints of economic dispatch problem.
e) Compare capacity interchange and diversity interchange.
f) How energy banking is beneficial?
g) What is the advantage of AVR over ALFC?
h) Explain load curve.
i) What is power system security?
j) Define incremental cost and participation factor. **2x10**

PART-A

- Q.2 a) Explain the concept of AGC and develop its mathematical model for two area system. **10**
b) Discuss AVR, its exciter types and develop its model using the diagram. **10**
- Q.3 a) Discuss the factors influencing generation and operating costs of thermal unit. Discuss formulation of economic dispatch neglecting losses in network. **10**
b) Determine the economic schedule for a load of 500 MW, when operating characteristics are:
$$F_1 = 0.08P_1^2 + 30P_1 + 100 \text{ R/MW}, 50 \leq P_1 \leq 250$$

$$F_2 = 0.10P_2^2 + 32P_2 + 125 \text{ R/MW}, 50 \leq P_2 \leq 200$$

$$F_3 = 0.12P_3^2 + 35P_3 + 150 \text{ R/MW}, 50 \leq P_3 \leq 250$$
 10

- Q.4 a) Discuss the effect of fault clearing time on transient stability. **10**
b) Define transient stability. What are the factors affecting transient stability? **10**

PART-B

- Q.5 a) Explain in detail energy interchange and elaborate its various types. **10**
b) Discuss the concept of energy banking and power pools. **10**
- Q.6 Explain hydrothermal co-ordination with its advantages. Also develop the co-ordination equations for hydrothermal scheduling. **20**
- Q.7 a) Define power system security. What are its various functions? Also classify the power system security levels. **10**
b) Explain contingency analysis in power system. Also explain the use of linear sensitivity factors. **10**

End Semester Examination, May 2016

B. Tech – Sixth Semester ELECTRICAL DRIVES (EE-602)

Time: 3 hrs.

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**. Each question carries equal marks.

- Q.1 a) Draw the block diagram of an electric drive.
b) What are the types of electric braking?
c) What are the applications of a cycloconverter?
d) Draw the block diagram of closed loop speed control.
e) What is dual converter?
f) What are the various control strategies of chopper?
g) Name various methods that are used for speed control of three phase induction motor.
h) Compare VSI and CSI.
i) Why static Kramer drive has low range of speed control?
j) A drive has following motor and load torques $T_m=1+2\omega_m$ and $T_L=3\sqrt{\omega_m}$ obtain the equilibrium speed. **2×10**

PART-A

- Q.2 a) Explain the multi quadrant operation of an electric drive. **10**
b) Draw the block diagram of an electric drive. Explain the function of each component of electric drive in detail. **5**
c) Explain phase locked loop in detail with the help of block diagram. **5**
- Q.3 Explain the principle of operation of step down cycloconverter. Describe the working of single phase to single phase step down cycloconverter for continuous conduction mode and discontinuous conduction mode. Support your answers with relevant waveforms of load voltage and load current. **20**
- Q.4 a) Explain the working of single phase fully controlled rectifier control of DC separately excited motor in continuous conduction mode. **10**
b) A 220 V, 1500 rpm, 150 A separately excite DC motor has $R_a=0.06\Omega$. It is fed from single phase fully controlled rectifier with an AC source voltage of 220 V, 50 Hz. Assuming continuous conduction. Calculate:
i) Firing angle for rated motor torque and 750 rpm.
ii) Firing angle for rated motor torque and (-500 rpm).
iii) Motor speed for $\alpha = 160^\circ$ and rated torque. **10**

PART-B

- Q.5 a) Discuss the working of four quadrant chopper fed DC drive. **10**
b) Explain how the speed of DC series motor is controlled with help of chopper. **10**
- Q.6 a) Explain the voltage source inverter control of induction drives. **10**
b) Explain the variable frequency control of induction motor drive in detail **10**
- Q.7 a) Explain the static scherbius drive in detail. **10**

b) Explain the variable frequency control of synchronous motor in detail.

10

End Semester Examination, May 2016

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 briefly:

- a) Why is load flow study necessary?
- b) What is per unit system?
- c) What do you understand by graph theory?
- d) What is equal area criterion?
- e) Define Unified Power Flow Controller (UPFC).
- f) Differentiate between Gauss Seidel and Newton Raphson Method.
- g) How are buses classified in a power system?
- h) Define transient stability.
- i) Explain objectives of Automatic Generation Control (AGC).
- j) Explain and draw block diagram model of load frequency control.

2×10

PART-A

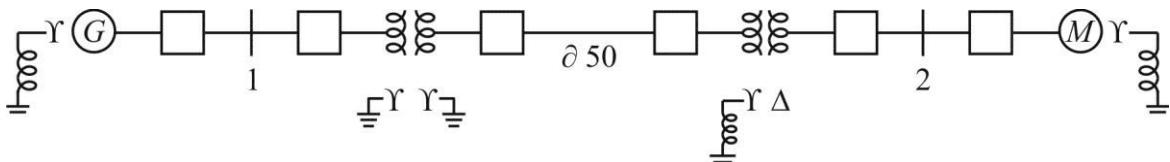
Q.2 a) Draw the p.u impedance diagram for the power system shown in the figure blow. Neglect resistance and use a base of 100 MVA, 220 KV in 50Ω line. The rating of generator, motor and transformers are:

Generator 40 MVA, 25 KV, $X'' = 20\%$

Motor 50 MVA, 11 KV, $X'' = 30\%$

$\Upsilon - \Upsilon$ transformer, 40 MVA, 33 $\Upsilon - 220 \Upsilon$ KV, $X = 15\%$

$\Upsilon - \Delta$ transformer, 30 MVA, 11 $\Delta - 220 \Upsilon$ KV, $X = 15\%$



10

- b) Give representation of loads in power system. Explain using mathematical equations. **10**

Q.3 a) Define graph, tree and cotree. Derive

$$Y_{BUS} = A^T(y) A$$

10

- b) Write algorithm for formulation of Z_{BUS} matrix. **10**

Q.4 a) Explain Gauss Seidel Method for solving load flow study. **10**

- b) Explain Fast decoupled method for load flow study. **10**

PART-B

Q.5 a) What do you understand by a control area? What is the effect of adding PI controller to dynamic response of load frequency control? **10**

- b) Two generators of rating 100 MW are operated in parallel with droop characteristics of 6% from no load to full load. Determine the load shared by each generator, if a load of 270 MW is connected across the parallel combination of those generators. **10**

Q.6 a) Derive swing equation in detail. **10**

b) Explain the concept of equal area criterion. How it can be used to study transient stability? Explain qualitatively. **10**

Q.7 Write short notes on **(any two)**:

a) Static var compensator. b) Power quality. c) STATCOM. **10×2**

End Semester Examination, May 2016

B. Tech. – Sixth Semester

DESIGN OF ELECTRICAL MACHINES (EE-604)

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 answer:

- a) Why stepped core are used in transformers?
- b) List the advantages of using open slots.
- c) Write any two guiding factors for the choice of number of poles.
- d) Define specific magnetic loading of a synchronous machine.
- e) How the induction motor can be designed for best power factor?
- f) What are the factors that affect the size of rotating machine?
- g) What is real and apparent flux density?
- h) How crawling can be prevented by design in an induction motor?
- i) Define fringing flux.
- j) What are the methods by which heat dissipation occurs in a transformer? **2x10**

PART-A

- Q.2** a) Explain in detail the various cooling methods used in electrical machines. **10**
 b) Derive the equation of temperature rise of a machine when it is run under steady load condition starting from cold condition. **10**
- Q.3** a) A 3 phase 50 Hz oil cooled core type transformer has the following dimension: Distance between core centers = 0.2 m, Height of window = 0.24 m, Diameter of circumscribing circle = 0.14 m, The flux density in the core = 1.25 wb/m², the current density in conductor = 2.5A/mm². Assume window space factor = 0.2 and core area factor = 0.56. The core is 2 stepped. Estimate KVA rating of transformer. **12**
 b) Derive the output equation of a single phase transformer in terms of core and window area. **8**
- Q.4** a) Show that the leakage reactance is directly proportional to specific slot leakage permeance. What is the effect of saturation and load on leakage coefficient? **12**
 b) Define:
 i) Field form factor.
 ii) Magnetic leakage coefficient.
 iii) Gap contraction factor.
 iv) Active iron length. **2x4**

PART-B

- Q.5** a) Explain the various factors that are affected by the selection of poles in d.c. machine. **10**
 b) Explain various steps involved in the design of shunt field winding of dc machine. **10**
- Q.6** a) Determine a suitable number of slots and conductors per slot for the stator winding of a 3 phase 3300V, 50 Hz, 300 rpm alternator. The diameter is 2.3 m and axial length of core is 0.35 m. The maximum flux density in the air gap should be

approximately 0.9 wb/m^2 . Assume sinusoidal flux distribution. Use single layer winding and star connection. **12**

- b) Derive the output equation of ac machine in terms of main dimension. **8**

Q.7 a) Write short notes on:

- i) Design of rotor slots and bars.
- ii) Design of end rings.

5x2

- b) What are the limitation in design of electrical machines using conventional method.
How hybrid techniques helps in improvement of design of electrical machines. **10**

End Semester Examination, May 2016

B. Tech – Sixth Semester

HIGH VOLTAGE ENGINEERING (EE-621A)

Time: 3 hrs.

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.** Each question carry equal marks.

- Q.1 a) What is basic impulse level (BIL)?
b) Compare lighting and switching surges.
c) What are the limitations of Townsend's theory?
d) What is a tesla coil?
e) Define the front and tail times of an impulse wave.
f) Draw the simple voltage double circuit.
g) What are the factors influencing the spark over voltages of sphere gaps?
h) Name the various mechanism of vacuum breakdown.
i) List biological effects of high voltage transmission lines.
j) What is hot line/live line maintenance? **2x10**

PART-A

- Q.2 a) Explain construction and working of voltage multiplier circuits used for production of high voltage D.C. **10**
b) A Cockcroft Walton type voltage multiplier has 8 stages with capacitance all equal to 0.05uf. The supply transformer secondary voltage is 125 kV at a frequency of 150 KHz. If the load current to be supplied is 5 mA, find:
i) % age ripple.
ii) Regulation.
iii) Optimum number of stages for minimum regulation. **10**

- Q.3 a) Explain the different schemes for cascade connection of transformers for producing very high A.C. voltages. **10**
b) Explain the main circuit arrangement for multistage impulse generators. How is the basic arrangements modified to accommodate the wave time control resistance? **10**

- Q.4 a) What are the causes for switching over voltages? How are they controlled? **10**
b) Explain construction and working of surge arrester. **10**

PART-B

- Q.5 a) State the principles that are followed in insulation design of EHV and UHV systems. **10**
b) Write notes on:
i) Rod Gaps.
ii) Protector tubes. **5x2**

- Q.6 a) Define Townsend's first and second ionization coefficients. How are the conditions for breakdown obtained in Townsend's discharge? **10**
b) Explain any one theory involved in breakdown of commercial liquid dielectrics. **10**

- Q.7 a) What tests are done on bushing? Explain in detail. **10**

b) Explain principles of live line maintenance in detail.

10

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh Semester

COMPUTER APPLICATIONS IN POWER SYSTEMS (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:

- a) What is SCADA?
- b) Draw block diagram of AGC.
- c) What is the effect of mutual coupling in formation of Y_{bus} ?
- d) Write co-ordination equation for economic dispatch.
- e) What is acceleration factor in load flow problems?
- f) What are positive, negative and zero sequence components?
- g) Differentiate between voltage controlled bus and swing bus.
- h) State drawbacks of Newton-Raphson method.
- i) What are transients?
- j) Write Jacobean matrix.

2x10

PART A

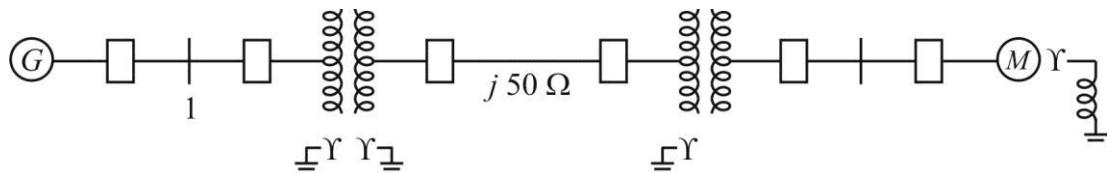
Q.2 a) What could be the impact of poor power quality on system efficiency, reliability and operation? Also explain the solution of power quality issues. **10**

b) What is SCADA? Explain the block diagram of SCADA. **10**

Q.3 a) Explain the power system representation for transmission line and synchronous machine. **10**

b) Draw the p.u diagram for the power system. Neglect resistance and use base of 100 MVA, 220 KV in 50Ω line. The rating of generator, motor and transformer are:

Generator :	40 MVA	25 KV	$X'' = 20\%$
Motor :	50 MVA	11 KV	$X'' = 30\%$
Capital $y-y$ transformer :	40 MVA	Capital $33 y-220 Y KV$	$X = 15\%$
$y-\Delta$ transformer :	30 MVA	$11 \Delta - 220 Y KV$	$X = 15\%$



10

Q.4 a) Write the flow chart for Z_{Bus} using step-by-step method. **10**
b) Develop the Y_{Bus} using singular transformation method. **10**

PART B

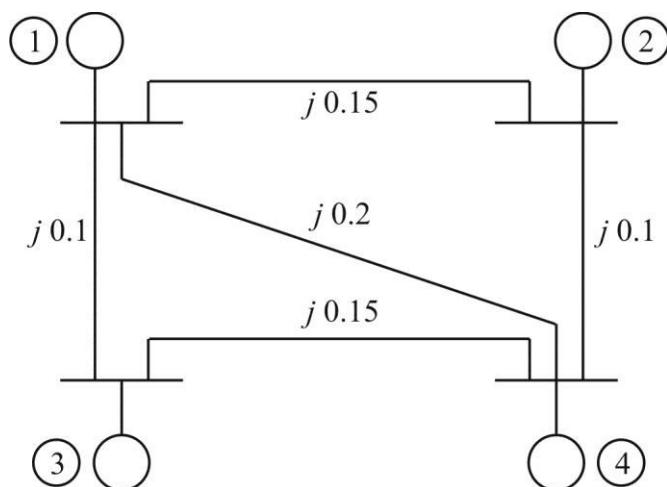
Q.5 a) Discuss the contingency analysis for power system. **10**

- b) A $3-\phi$, 11 kV, 25 MVA generator with $X_0 = 0.05 \text{ pu}$, $X_1 = 0.2 \text{ pu}$ and $X_2 = 0.2 \text{ pu}$ is grounded through a reactance of 0.3Ω . Calculate the fault current for single and ground fault. **10**

- Q.6 a) What is load flow problem? Derive the load flow equation. What are the methods used for load flow solutions? **10**

- b) For Four bus power system network, find the voltage magnitude and angles using Gauss-Seidel method.

All voltage specified are 1.0 p.u. except slack bus. Slack bus 1 voltage is $1.04 < 0^\circ$ p.u. other buses are PQ buses.



Bus	P	Q	V_{pu}	Remarks
1.	-	-	$1.04 < 0^\circ$	Slack
2.	05	0.2	-	PQ bus
3.	-1.0	0.5	-	PQ bus
4.	0.3	-0.1	-	PQ bus

10

- Q.7 a) Explain the term economic dispatch. Develop the co-ordination equation for economic dispatch for thermal units without transmission losses. **10**

- b) The fuel cost function in Rs/hr for three thermal plants are given by:

$$C_1 = 400 + 8.4 P_1 + 0.006 P_1^2 \quad 100 \leq P_1 \leq 600$$

$$C_2 = 600 + 8.93 P_2 + 0.006 P_2^2 \quad 60 \leq P_2 \leq 300$$

$$C_3 = 650 + 6.78 P_3 + 0.004 P_3^2 \quad 300 \leq P_3 \leq 650$$

Where P_1 , P_2 and P_3 are in MWs. Neglecting line losses and including generator limits, determine optimal scheduling of generation of each loading using the iteration method.

i) $P_D = 550 \text{ MW}$

ii) $P_D = 820 \text{ MW}$

10

End Semester Examination, May 2016
B. Tech – Sixth Semester
NEW AND RENEWABLE ENERGY SOURCES (EE-625)

Time: 3 hrs.

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.** Each question carries equal marks.

Q.1 Answer the following in brief:

- a) Name conventional sources of energy.
- b) Name greenhouse gases.
- c) What is photovoltaic effect?
- d) Name solar cell materials.
- e) How is wind energy related to solar energy?
- f) What is meant by wave energy?
- g) What is meant by tidal power?
- h) What is meant by refuse derived fuel?
- i) Differentiate between micro mini and small hydro projects.
- j) What is nuclear fusion?

2×10

PART-A

Q.2 a) Briefly explain global warming.

5

b) Briefly explain solar cooker.

7

c) Explain solar thermal power generation system.

8

Q.3 a) Explain power generation using solar photovoltaic cells.

10×2

b) Explain principle and working of a pyranometer.

Q.4 a) Explain working of horizontal axis wind turbine.

10×2

b) Explain the principle of wind energy conversion. Also derive an expression for power developed from wind energy.

PART-B

Q.5 a) Explain Ocean thermal energy conversion.

10×2

b) Explain tidal power generation.

Q.6 a) Explain how energy can be obtained from biomass using pyrolysis.

10×2

b) Explain the process of fermentation.

Q.7 Write short notes on:

- a) Alcohol energy.
- b) Fuel cell.
- c) Hydrogen energy.

7

7

6

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh Semester

ENERGY CONSERVATION AND MANAGEMENT (EE-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 a) What is energy database?
b) What is energy efficiency?
c) What is energy audit?
d) What is energy management?
e) What is meant by energy production?
f) Why is energy management needed for electric ventilation?
g) What is meant by electrical load analysis?
h) What is rate of return in case of energy management?
i) What is difference between sources and resources?
j) What is use of power planning? | 2×10 |
|---|-------------|

PART-A

- | | |
|---|----------------------------------|
| Q.2 a) Explain energy management planning:
b) What is energy intensity?
c) What are general principles of energy management? | 7
5
8 |
| Q.3 a) Explain concept of establishing energy database.
b) What are the steps involved in identifying feasible energy conservation opportunities?
c) How are feasible energy conservation opportunities implemented? | 7
7
6 |
| Q.4 a) How are thermodynamics and energy related?
b) Explain principle of HVAC.
c) Explain management of air conditioning. | 6
7
7 |

PART-B

- | | |
|---|------------------------|
| Q.5 a) How is energy management related with electric drives?
b) Explain management of electric load and lighting. | 10
10 |
| Q.6 Briefly explain:
a) Average rate of return method.
b) Payback method.
c) Peak demand control.
d) Electric load analysis. | 5×4 |
| Q.7 a) Explain DEFENDUS strategy.
b) Explain use of computers in energy management. | 10
10 |

End Semester Examination, May 2016
B. Tech. – Sixth Semester
ENERGY CONSERVATION AND MANAGEMENT (EE-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 in brief:

- a) What do you mean by thermal equilibrium?
- b) Define energy audit.
- c) Explain the need for conservation of energy.
- d) Define the term 'Diversity Factor'.
- e) Explain the instruments water flow-meter and fuel efficiency monitor.
- f) Define coefficient of performance.
- g) List a few advantages of cogeneration plants.
- h) Draw the organization chart for non-energy intensive organization.
- i) Define payback method.
- j) Explain direct heating.

2×10

PART-A

- Q.2** a) Draw and explain the organization chart for both non-energy and energy intensive organization. **10**
- b) Define the term energy management and also explain its general principles. **10**
- Q.3** a) Discuss the pre audit phase of energy audit in detail. **8**
- b) The data collection during an energy audit is as under:
 - i) Power consumption of geysers for bathing = 7 KW.
 - ii) Power consumption of geysers for washing = 8 KW.
 - iii) Power consumption of boiler for pantry = 10 KW.Average running hours of boilers and geysers is 10 hours per day.
Number of months for which the above consumption is 6 months? It is proposed by the energy auditors to replace the above with solar water heaters. A 50 liter solar water heater can save 1000 KWH of electricity per year.
 - i) Evaluate monetary saving and payback period.
 - ii) Evaluate monetary savings and payback period.**12**
- Q.4** a) Discuss laws of thermodynamics. **10**
- b) Explain the principle of management of air conditioning in detail. **10**

PART-B

- Q.5** a) Differentiate between Base Load and Peak Load. **8**
- b) Explain in detail how energy management is related to electric drives. **12**
- Q.6** a) Explain the concept of payback period in detail. **10**
- b) Explain life cycle costing approach. Also list down the factors to be considered for life cycle costing. **10**
- Q.7** a) What do you understand by cogeneration? Discuss its types in detail. **10**

b) What is the significance of computers in energy management? Justify your answer with the help of relevant examples. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester
ADVANCED CONTROL SYSTEM (EE-801)

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 answer:

- a) What is describing function?
- b) What are the different types of friction?
- c) Find: z-transform of $\frac{(k+1)(k+2)}{L^2} a^k$.
- d) Determine inverse z-transform of $\frac{az}{(z-a)^2}$.
- e) Explain the term: region of convergence (RoC).
- f) Define state-space.
- g) Define observability.
- h) Draw the block diagram representation of state model of a system.
- i) State the condition for observability by Kalman's method.
- j) Write the property of state transition matrix.

2×10

PART-A

Q.2 a) Construct a state model for a system characterized by the differential equation.

$$\frac{d^3y}{dt^3} + 6\frac{d^2y}{dt^2} + 11\frac{dy}{dt} + 6y + u = 0$$

10

b) Determine state model of a armature controlled separately excited d.c. motor.

10

Q.3 a) The state model of a linear time invariant system is given by:

$$\dot{x}(t) = Ax(t) + Bu(t)$$

$$y(t) = Cx(t) + Du(t)$$

Obtain expression for transfer function of the system.

10

b) The 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 observable or not.

10

Q.4 a) Determine the inverse z-transform of the following function:

$$\text{i) } F(z) = \frac{1}{1+1.5z^{-1}+0.5z^{-2}}$$

$$\text{ii) } F(z) = \frac{z^2}{z^2+z-6}$$

10

b) A system is characterized by following discrete time equation:

$$c(k+2) + 5c(k+1) + 6c(k) = r(k+1) - r(k)$$

Determine the z-transform function. Also, determine impulse response of the system. **10**

PART-B

- Q.5 a) Check the stability of the sampled data control systems represented by the following characteristic equation $z^4 - 1.7z^3 + 1.04z^2 - 0.268z + 0.024 = 0$ **10**
b) State and prove sampling theorem. **10**
- Q.6 a) Response of a system is $y = ax + b \frac{dx}{dt}$. Test whether the system is linear or nonlinear. **10**
b) Derive an expression of describing function for saturation nonlinearity. **10**
- Q.7 a) Describe Lyapunov's stability criterion for stability of a nonlinear system. **10**
b) Explain briefly variable structure control and sliding mode control. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth 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**. Each question carries equal marks.

Q.1 Answer the following:

- a) Define luminous flux and luminous intensity.
- b) Discuss ageing effect.
- c) What is pinch effect?
- d) What are the requirements of heating element?
- e) List out some of the factors on which the electric welding can be carried out properly.
- f) Explain the following terms:
 - i) Energy efficiency.
 - ii) Current efficiency.
- g) The object undergoing surface plating works as _____.
- h) What are the various passenger services?
- i) Why dc series motor is ideally suited for traction purpose.
- j) What are the properties of refrigerants?

2x10

PART A

- Q.2** a) Describe the construction and principle of operation of a fluorescent lamp. **10**
b) Explain the various factors to be taken into account for designing schemes for flood lighting. **10**
- Q.3** a) Explain with a neat sketch the principle of Ajax-Wyatt induction furnace. **12**
b) Give the design procedure of heating elements when power and voltage of the oven are known. **8**
- Q.4** a) Explain various types of arc welding processes. **12**
b) Compare flash and upset butt welding. **8**

PART B

- Q.5** a) What is electroplating? What for it is done? Describe the various operations involved in electroplating. **10**
b) A copper refining plant, using 500 electrolytic cells, carries a current of 6000 A, voltage per cell being 0.25 volt. If the plant were to work 40 hours/week, calculate the energy consumption per tonne, assuming ECE of copper as 0.3281 mg/cel of electricity. **10**
- Q.6** a) Explain electric braking in detail for electric traction. **10**
b) Discuss the various types of current collectors used in electric traction. **10**
- Q.7** a) Explain with a neat diagram the working of refrigeration cycles and systems. **10**
b) Explain the working and operation of room air conditioner. **10**

End Semester Examination, May 2016

B. Tech. – Eight Semester

ELECTRICAL POWER QUALITY (EE-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**. Each question carries equal marks.

Q.1 Answer the following in brief:

- a) What is displacement power factor?
- b) What is power quality?
- c) Write the objectives of power quality under IEEE-519-1992.
- d) Define DC offset, inter harmonics.
- e) Differentiate K-factor transformer and isolation transformer.
- f) Define THD (Total harmonic distortion).
- g) What are the demerits of passive filters?
- h) Explain how interruption occurs in power systems.
- i) What are the problems occurs due to poor quality of power?
- j) Write the methods of harmonic mitigation.

2x10

PART-A

- Q.2 a) Define power quality. Differentiate between voltage sag and swell in detail. **10**
b) Explain various causes of transients in electrical system. **10**
- Q.3 a) Explain what are the causes of voltage sag. Explain the principle of DSTATCOM and DVR used for sag mitigation. **10**
b) Discuss the origin of long and short interruptions in brief. **10**
- Q.4 a) Explain the need for protection against overvoltages. **5**
b) Explain the methods to improve power factor of a system. **8**
c) Explain the mechanism of lightning transient. **7**

PART-B

- Q.5 Explain the design and working of active and passive filter in detail. **20**
- Q.6 a) Explain the methods of harmonic mitigation in detail. **10**
b) What are the various instruments used for power quality measurements? What are the factors to be considered when selecting the instruments? **10**
- Q.7 Discuss briefly:
a) True RMS meter.
b) Data logger and chart recorder.
c) Harmonic analyzer.
d) Transient disturbance analyzer. **5x4**

End Semester Examination, May 2016

B. Tech. – Eighth Semester
POWER MANAGEMENT (EE-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.** Each question carries equal marks.

- Q.1 a) What are the conditions affecting the cost of power plant?
b) Name the conditions required for quantitative forecasting.
c) Name the organizations funding power companies in India.
d) What is the time frame for forecasting?
e) What is meant by generator cost curves?
f) Name top three privately owned power companies in India.
g) What is the aim of generation planning?
h) What is rural electrification?
i) What are the factors for providing instrumentation for a power plant?
j) What is the need of forecasting?

2x10

PART-A

- Q.2 a) State the features of Electricity Regulation Act (Indian Electricity Act 2003). **10**
b) What are load dispatch centers in a grid? **10**
- Q.3 a) Explain the layout of power plant. **10**
b) How the cost of power plant is analysed? **10**
- Q.4 a) Explain peak demand forecasting techniques. **10**
b) Explain Box Jenkins method of load forecasting. **10**

PART-B

- Q.5 a) Explain short forecasting methods. **10**
b) Explain multivariate procedures. **10**
- Q.6 a) Explain the accuracy of various forecasting methods. **10**
b) Compare subjective and univariate forecasting. **10**
- Q.7 a) Explain generation planning in detail. **10**
b) Explain in details the distribution planning. **10**

End Semester Examination, May 2016
B. Tech. – First Semester
PROFESSIONAL COMMUNICATION-I (HM-104)

Time: 2 hrs

Max Marks: **50**

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 Convert the following sentences in the correct tense as stated against each sentence (**any ten** of the following): **1x10**
- | | |
|--------------------------------|--|
| a) I usually | (go) to school. (Simple present) |
| b) You | (play) basketball. (Present Perfect Continuous) |
| c) Tom | (work) the entire day. (Present Perfect) |
| d) He always | (tell) us funny stories. (Simple Past) |
| e) She | (help) me with that! (Future) |
| f) Martha and Kevin | (swim) twice a week. (Future Continuous) |
| g) In this club people usually | (dance) a lot. (Simple Past) |
| h) We | (live) in the city for twenty years. (Past Perfect) |
| i) Lorie | (travel) to Paris every Sunday. (Simple Present) |
| j) I | (bake) cookies. (Past Perfect) |
| k) You always | (teach) me new things. (Simple Past) |
| l) She | (help) the kids of the neighborhood. (Past Continuous) |
| m) Shanaya | (take care) of her sister. (Present Continuous) |

PART-A

- Q.2 a) Use the words in sentences. (**Any Five**): **1x5**
- | | | |
|----------------|-----------|---------------|
| i) Timid | ii) Urban | iii) Inhumane |
| iv) Rejuvenate | v) Social | vi) Presence |
- b) Identify the underlined words as Parts of Speech: (**Any Five**) **1x5**
- i) The weather is cold here.
 - ii) You have to believe in yourself if you ever expect to be successful at something.
 - iii) We left for the mountain just before six in the morning.
 - iv) We first went to the store to buy a few things.
 - v) We had a breakfast at a café near the rail station.
 - vi) My friend wasn't strong enough to lift his heavy rucksack.

- Q.3 Write a paragraph of approximately 150 words on the topic "The plight of slum dwellers" **10**

- Q.4 "Honesty has ceased to be the best policy". Write a debate in favour **or** against this statement. (100 words) **10**

PART-B

- Q.5 Read the following passage carefully:

Persuasion is the art of convincing someone to agree with your point of view. According to the ancient Greek philosopher Aristotle, there are three basic tools of persuasion: ethos, pathos, and logos. Ethos is a speaker's way of convincing the audience that she

is a credible source. An audience will consider a speaker credible if she seems trustworthy, reliable, and sincere. This can be done in many ways. For example, a speaker can develop ethos by explaining how much experience or education she has in the field. After all, you would be more likely to listen to advice about how to take care of your teeth from a dentist than a firefighter. A speaker can also create ethos by convincing the audience that she is a good person who has their best interests at heart. If an audience cannot trust you, you will not be able to persuade them. Pathos is a speaker's way of connecting with an audience's emotions. For example, a speaker who is trying to convince audience to vote for him might say that he alone can save the country from a terrible war. These words are intended to fill the audience with fear, thus making them want to vote for him. Similarly, a charity organization that helps animals might show an audience pictures of injured dogs and cats. These images are intended to fill the viewers with pity. If the audience feels bad for the animals, they will be more likely to donate money. Logos is the use of facts, information, statistics, or other evidence to make your argument more convincing. An audience will be more likely to believe you if you have data to back up your claims. For example, a commercial for soap might tell you that laboratory tests have shown that their soap kills all 7,000,000 of the bacteria living on your hands right now. This piece of information might make you more likely to buy their brand of soap. Presenting this evidence is much more convincing than simply saying "our soap is the best!" Use of logos can also increase a speaker's ethos; the more facts a speaker includes in his argument, the more likely you are to think that he is educated and trustworthy. Although ethos, pathos, and logos all have their strengths, they are often most effective when they are used together. Indeed, most speakers use a combination of ethos, pathos, and logos to persuade their audiences. The next time you listen to a speech, watch a commercial, or listen to a friend try to convince you to lend him some money, be on the lookout for these ancient Greek tools of persuasion.

Answer the following question based on the above passage:

- a) Amy is trying to convince her mother to buy her a pair of \$200 shoes. She says: "Mom, the shoes I have are really old and ugly. If I don't get these new shoes, everyone at school is going to laugh at me. I will be so embarrassed that I will want to die." What form of persuasion is Amy using here? **2**
- b) According to the passage, logos can build ethos because? **2**
- c) According to the passage, the most effective tool of persuasion is? **2**
- d) Imagine you wanted to convince an uninformed person to take a political position that is the same as yours. What issue would you try to talk to this person about? How would you include ethos, pathos, and logos in your persuasion? Make your case below. **4**

- Q.6 Write a letter to the competent authority requesting her/him to provide you with some extra time to deposit your semester fees. **10**
- Q.7 Write a conversation between two friends expressing their views on "The world in 2050" (12 dialogues each). **10**

End Semester Examination, May. 2016

B. Tech. – First / Second Semester

ETHICS AND MORAL VALUES (HM-203)

Time: 1 hrs

Max Marks: **50**

No. of pages: **6**

Note: *The paper consists of **FIFTY** multiple choice questions; Each question has **FOUR** options with **ONE** correct answer. Select the correct answer. Attempt all questions. All questions are of **ONE** mark each. There is no negative marking.*

- | | | |
|------|---|--------------------------------------|
| Q.1 | Being a student you have a preference value for: | |
| | a) Studying hard. | b) Earning money. |
| | c) Family tour. | d) Social relationship. |
| | | 1 |
| Q.2 | Universal values mean: | |
| | a) Same for everyone. | b) Accepted by everybody. |
| | c) Both of the above. | d) Neither of the above. |
| | | 1 |
| Q.3 | Which of the following is not a value under positive personal values? | |
| | a) Affection. | b) Honesty. |
| | c) Anger. | d) Loyalty. |
| | | 1 |
| Q.4 | Which of the following is not a characteristic of core values? | |
| | a) Integrity. | b) Innovation. |
| | c) Greed. | d) Shared prosperity. |
| | | 1 |
| Q.5 | Human Values are: | |
| | a) Ethics+ morals+ values. | b) History+ Science+ discovery. |
| | c) Innovation+ Help+ Sincerity. | d) Nature+ Science+ Knowledge. |
| | | 1 |
| Q.6 | Morals are: | |
| | a) Standards of right and wrong. | b) Principles to guide our behavior. |
| | c) Norms or principles of right and wrong. | d) All of the above. |
| | | 1 |
| Q.7 | Values are: | |
| | a) Cooperative behaviour. | b) To be Strong or Vigorous. |
| | c) Codes for Moral behaviour. | d) All of the above. |
| | | 1 |
| Q.8 | Who was the first person to use the plural form of 'value' as values to denote moral beliefs and attitudes? | |
| | a) Rousseau. | b) Friedrich Nietzsche. |
| | c) Karl Marks. | d) Sigmund Freud. |
| | | 1 |
| Q.9 | The term value is derived from: | |
| | a) Latin word valerie. | b) French word valeur. |
| | c) English word evaluate. | d) None of the above. |
| | | 1 |
| Q.10 | Ethics refers to: | |

- a) Philosophical science.
b) The consideration of good and right for the society.
c) Knowledge of basic principles of behavior.
d) All of the above. 1
- Q.11 What among the following cannot be taken as a universal value?
a) Truth. b) Pride.
a) Charity. d) Beauty. 1
- Q.12 Values are conditioned by:
a) Socio - cultural trends. b) Physical environment.
c) Personal conscience. d) All of the above. 1
- Q.13 Principles of values help an individual:
a) To prefer one type of values over others.
b) To value those who follow the values.
c) To distinguish between moral and immoral.
d) None of the above. 1
- Q.14 Principles of values do not refer:
a) To prefer intrinsic values to those extrinsic ones.
b) To prefer permanent and productive values over less permanent and less productive ones.
c) To prefer economic values over social ones.
d) To select values on the basis of self-chosen ideals or ends. 1
- Q.15 The term ethics is derived from:
a) French word ethos. b) Greek word ethos.
c) English word ethnic. d) French word ethnic. 1
- Q.16 Modernization historically refers to the period when:
a) The Industrial Revolution promised an exciting change in industry.
b) The French revolution revolutionized society by propagating the principles of 'liberty, equity and fraternity'.
c) Charles Darwin with his publication of *Origin of Species* established that all species of life have descended over time from common ancestry.
d) Sigmund Freud developed Psychoanalysis, the study of human psychological functioning and behavior. 1
- Q.17 Which among the following is not a characteristic of modernization?
a) New in appearance and behavior. b) Focused on development.
c) Effectiveness and efficiency. d) Strife and turbulence. 1
- Q.18 What is not one of the benefits of modernization?
a) Convenient and comfortable life style.
b) Improved health, sanitary and safety conditions.
c) Schism and alienation.
d) Enhanced credibility of institutions. 1

- Q.19 Individualism is:
 a) An ideology.
 b) Political and moral philosophy.
 c) Social outlook.
 d) All of the above. 1
- Q.20 The word *ethos* means:
 a) Morality.
 b) Sensibility.
 c) Character.
 d) Integrity. 1
- Q.21 Which of the following statements about values is not correct?
 a) All values are equal in merit.
 b) Values are the powerful force affecting human thoughts, feelings and actions.
 c) Values contain a judgmental element i.e. a person's sense of right and wrong.
 d) Values are relative in their worth. 1
- Q.22 The negative emotions like anger, ill-will, lust, jealousy and so on, may most appropriately be termed as:
 a) A-values.
 b) Non- values.
 c) Anti- values.
 d) Negative- values. 1
- Q.23 Scientism does not refer to:
 a) Inadequacy of science while dealing with the realm of supernatural.
 b) Authority of natural science over all other interpretations of life.
 c) The capacity of science in solving all human problems and all aspects of human endeavor.
 d) The use of the style, assumptions and techniques, specifically displayed by scientists. 1
- Q.24 Who among the followings are not concerned with defining or interpreting the term Scientism?
 a) Jurgen Habermas.
 b) Gregory R. Peterson.
 c) Karl Jung.
 d) Mikael Stenmark. 1
- Q.25 When applied appropriately individualism does not imply?
 a) An individual's independence.
 b) An individual's self reliance.
 c) An individual's persistent clash with society.
 d) Opposition to undue societal interference by the individual. 1
- Q.26 Individualism refers to the:
 a) Moral worth of an individual.
 b) Quality of being an individual.
 c) A tendency towards self creation and experimentation.
 d) All of the above. 1
- Q.27 What among the following is not correct?
 a) Individuality is the state or quality of being an individual.
 b) Individual will is always against social norms.
 c) Individuality of a person separates him/her from other persons.
 d) Individuality of a person means possessing his / her own needs, goals and desires. 1

- Q.28** Competition is a phenomenon that occurs between different:
a) Living organism. b) Non - living objects.
c) Neither of the above. d) Both of the above. **1**

Q.29 What among the following is not correct about competition?
a) Competition is a natural phenomenon.
b) Competition occurs between two or more parties.
c) Competition always arouses ill- will between the rival parties.
d) Competition may give incentives for self improvement. **1**

Q.30 Competition may be classified as:
a) Destructive and co-operative competition.
b) Comparative and commanding competition.
c) Ordinary and specific competition.
d) Moral and immoral competition. **1**

Q.31 Evolutionary biologists take competition as:
a) The driving force of adaptation and ultimately of evolution of species.
b) A mechanism for determining the best suited group - politically, economically and ecologically.
c) Both of the above.
d) Neither of the above. **1**

Q.32 What among the following is not correct about cyber ethics?
a) Cyber ethics is a part of cyber laws.
b) Cyber ethics applies to online environment.
c) Cyber ethics cannot be enforced by police.
d) It includes concept of net etiquettes. **1**

Q.33 Which of the following organizations is not related to cyber ethics?
a) International Federation for Information Processing (IFIP).
b) The Centre for Computing and Social Responsibility (CCSR).
c) International Engineering Task Force (IETF).
d) International Center for Information Ethics (ICIE). **1**

Q.34 What is not a benefit of modernization?
a) Drive Innovation. b) Improved relationship.
c) Liberty of roaming around. d) Liberty to harm others. **1**

Q.35 Challenges to modernization are:
a) Knowledge about it. b) Social meetings.
c) Planning and implementing change. d) None of the above.

Q.36 Stress is:
a) Physical strain. b) Emotional strain.
c) External strain. d) Emotional and physical strain. **1**

Q.37 In the modern corporate context TQM stands for:
a) Team quotient. b) Team quality management.
c) Total quality management. d) Total quotient management. **1**

- Q.38 The *Darshanas* are based on:
 a) The Vedas.
 b) The Upanishads.
 c) Both of the above.
 d) None of the above. 1
- Q.39 An engineer is a vital link between:
 a) Machine and Man.
 b) Man and Manners.
 c) Science and Society.
 d) Man and Society. 1
- Q.40 A good life may be described as:
 a) A life of dignity and honour.
 b) A life of health and well being.
 c) A life of utilization of all opportunities.
 d) All of the above. 1
- Q.41 What is not a feature of *Gurukul* System?
 a) Pursuit of knowledge and wisdom at the feet of the guru.
 b) Duties of Shishya.
 c) Government control.
 d) Practice of *Brahmacharya*. 1
- Q.42 What among the following is not a negative consequence of competition?
 a) Drain of valuable resources and energy.
 b) Harm and injury to the organism involved.
 c) Compromise of ethical standards in order to gain an advantage.
 d) Natural selection and evolution of species. 1
- Q.43 Man started working in teams:
 a) From the primitive days of hunting and gathering food.
 b) From the time of Industrial revolution.
 c) From the beginning of the 20th century.
 d) With the commencement of the Corporate Age. 1
- Q.44 A “whistle blower” is a person who:
 a) Blows a whistle to organize a crowd.
 b) Blows a whistle to please himself.
 c) Tells the public or someone in authority about alleged illegal activities occurring in an organization.
 d) Is a professional who blows whistles in an orchestra. 1
- Q.45 Which among the following statements is incorrect?
 a) In direct competition products which perform the same function compete against each other.
 b) In direct competition products compete with their close substitutes.
 c) In indirect competition products compete with their close substitutes.
 d) Direct competition may be taken as the narrowest form of competition. 1
- Q.46 What among the following is not a quality possessed by a professional?
 a) Proficient in use of knowledge and expertise.
 b) Value orientation to services for the welfare of society.

- c) Adaptability to situation.
d) An autocratic approach. 1
- Q.47 What is not a professional style?
a) Ethical style.
b) Responsible style.
c) Legal style.
d) Committed style. 1
- Q.48 A professional:
a) Contests elections.
b) Participates in social festivities.
c) Distinguishes right from wrong.
d) Participates in unified professional developments. 1
- Q.49 *Darshanas* are believed to be written by:
a) Ved Vyas.
b) Valmiki.
c) Kalidas.
d) None of the above. 1
- Q.50 What is not a component of emotional intelligence?
a) Self awareness and self management.
b) Financial management.
c) Social awareness.
d) Relationship management. 1

End Semester Examination, May 2016

B. Tech. – Second Semester

PROFESSIONAL COMMUNICATION-II (HM-204)

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.** Each question carries equal marks.

Q.1 Attempt **(any five):**

- a) Communication is a two way process. Explain.
- b) What is the importance of body language?
- c) Differentiate between a group and a team.
- d) What are the different barriers to communication?
- e) Decoding is essential for effective communication. Explain.
- f) What is the importance of correct pronunciation?

2x5

PART-A

Q.2 a) Explain the process of communication.

- b) Write a letter to the Commissioner of Municipal Corporation of Faridabad, complaining about the electricity problem in your area.

5x2

Q.3 What is inter-cultural communication? Why is it important to be sensitive to cultural differences? **10**

Q.4 Prepare you resume which you shall use for the on-campus recruitment drive while graduating from Manav Rachna. **10**

PART-B

Q.5 Prepare a cover letter to which you'll annex your resume at the time of applying for a job off the campus. **10**

Q.6 What are the 7 'C's of effective communication? **10**

Q.7 Prepare a presentation in about 20 slides on the topic "Global warming and the efforts individuals can take to counter it". **10**

End Semester Examination, May 2016

B. Tech. – Third Semester

CAREER SKILLS-I (HM-302)

Time: 2 hrs

Max Marks: **50**

No. of pages: 4

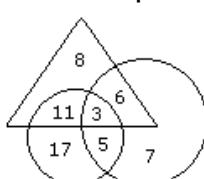
Note: *The paper consists of **FIFTY** multiple choice questions; each question has **FOUR** options with **ONE** correct answer. Select the correct answer. Attempt all questions. All questions are of **ONE** mark each. There is no negative marking.*

- Q.1** Two numbers A and B are such that the sum of 5% of A and 4% of B is two-third of the sum of 6% of A and 8% of B. Find the ratio of A:B
 a) 2:3 b) 1:1
 c) 3:4 d) 4:3
- Q.2** In 10yrs, A will be twice as old as B was 10years ago. If A is now 9years older than B, the present age of B is :
 a) 19yrs b) 29yrs
 c) 39yrs d) 49yrs
- Q.3** What was the day of the week on 16thApril, 2000?
 a) Sunday b) Monday
 c) Tuesday d) Wednesday
- Q.4** At what time between 7 and 8 o'clock will the hands of a clock be in the same straight line but, not together?
 a) 5 min. past 7
 b) $5\frac{2}{11}$ min. past 7
 c) $5\frac{3}{11}$ min. past 7
 d) $5\frac{5}{11}$ min. past 7
- Q.5** At 3:40, the hour hand and the minute hand of a clock form an angle of:
 a) 120° b) 125°
 c) 130° d) 135°
- Q.6** John introduces Mary as the daughter of the only son of my father's wife. How is Mary related to John?
 a) Mother b) Sister
 c) Daughter d) Niece
- Q.7** The average of first 50 natural numbers is:
 a) 12.25 b) 21.25
 c) 25 d) 25.5
- Q.8** In an election a candidate who gets 84% of the votes is elected by a majority of 476 votes. What is the total number of votes polled?
 a) 672 b) 700
 c) 749 d) 848
- Q.9** Which of the following numbers should be added to 11158 to make it exactly divisible by 77?
 a) 5 b) 7
 c) 8 d) 9
- Q.10** Find the sum of all odd numbers upto 100.
 a) 2000 b) 2500
 c) 3000 d) 3500
- Q.11** How many terms are there in 2,4,8,16.....1024?
 a) 8 b) 9
 c) 10 d) 11
- Q.12** In doing a division of a question with zero remainder, a candidate took 12 as divisor instead of 21. The quotient obtained by him was 35. The correct quotient is:
 a) 0 b) 12
 c) 13 d) 20
- Q.13** The least multiple of 7, which leaves a remainder of 4, when divided by 6,9,15and 18 is:
 a) 74 b) 94
 c) 184 d) 364
- Q.14** Find the greatest number which on dividing 1657 and 2037 leaves remainders 6and 5 respectively.
 a) 125 b) 126
 c) 127 d) 128
- Q.15** A man is 24years older than his son. In two years, his age will be twice the age of his son. The Present age of the son is:
 a) 14yrs b) 18yrs
 c) 20yrs d) 22yrs
- Q.16** A and B can do a work in 12 days, B and C in 15 days, C and A in 20 days. IF A,B and C work together, they will complete the work in:
 a) 5days b) 7days
 c) 9days d) 10days
- Q.17** The last day of the century cannot be:
 a) Monday b) Wednesday

- | | |
|--|---|
| <p>c) Friday d) Tuesday</p> <p>Q.18 A bag contains 2 red, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?
 a) $\frac{10}{21}$ b) $\frac{11}{21}$
 c) $\frac{2}{7}$ d) $\frac{5}{7}$</p> <p>Q.19 If two pipes function simultaneously, the reservoir will be filled in 12 hours. One pipe fills the reservoir 10 hours faster than the other. How many hours does it take the second pipe to fill the reservoir?
 a) 10 hrs b) 20 hrs
 c) 30 hrs d) 40 hrs</p> <p>Q.20 Peter can cover a certain distance in 1 hr. 24 min. by covering two-third of the distance at 4 kmph and the rest at 5 kmph. Find the total distance.
 a) 4 km b) 5 km
 c) 6 km d) 7 km</p> <p>Q.21 A sum of Rs. 12500 amounts to Rs. 15500 in 4 yrs at the rate of simple interest. What is the rate of interest?
 a) 3% b) 4%
 c) 5% d) None of these</p> <p>Q.22 Pointing to a man in the photograph, a woman says, "His mother's only daughter is my mother". How is man related to woman?
 a) Father b) Uncle
 c) Nephew d) Son</p> <p>Q.23 A man walks 5 km toward south and then turns to the right. After walking 3 km he turns to the left and walks 5 km. Now in which direction is he from the starting place?
 a) West b) North-East
 c) South d) South-West</p> <p>Q.24 If PAINT is coded as 74128 and EXCEL IS CODED AS 93596 then how would you encode ACCEPT?
 a) 455978 b) 456789
 c) 467589 d) 487956</p> <p>Q.25 The average of 11 numbers is 10.9. If the average of the first six numbers is 10.5 and that of the last six numbers is 11.4, then the middle number is:
 a) 11 b) 11.3
 c) 11.4 d) 11.5</p> | <p>the average of the first six numbers is 10.5 and that of the last six numbers is 11.4, then the middle number is:
 a) 11 b) 11.3
 c) 11.4 d) 11.5</p> <p>Q. 26 In a certain code language K is written as 11 and KEEP is written as 37. How will the word DRAFT be written in that code language?
 a) 45 b) 47
 c) 49 d) 51</p> <p>Q.27 A, P, R, X, S and Z are sitting in a row. S and Z are in the centre. A and P are at the ends. R is sitting to the left of A. Who is to the right of P?
 a) A b) X
 c) S d) Z</p> <p>Q.28 Five girls are sitting on a bench to be photographed. Seema is to the left of Rani and to the right of Bindu. Mary is to the right of Rani. Reeta is between Rani and Mary. Who is sitting immediate right to Reeta?
 a) Bindu b) Rani
 c) Mary d) Seema</p> <p>Q.29 In a box, there are 8 red, 7 blue and 6 green balls. One ball is picked up randomly. What is the probability that it is neither red nor green?
 a) $\frac{1}{3}$ b) $\frac{3}{4}$
 c) $\frac{8}{21}$ d) $\frac{9}{21}$</p> <p>Q.30 From a group of 7 men and 6 women, five persons are to be selected to form a committee so that at least 3 men are there on the committee. In how many ways can it be done?
 a) 725 b) 756
 c) 675 d) 715</p> <p>Q.31 Two pipes A and B can fill a tank in 6 hours and 4 hours respectively. If they are opened on alternate hours and If pipe A is opened first, in how many hours, the tank shall be full?
 a) 4 b) 5</p> |
|--|---|

- | | |
|---|---|
| <p>c) 6 d) 7</p> <p>Q.32 In how many different ways can the letters of the word 'CORPORATION' be arranged so that the vowels always come together?
 a) 50413 b) 50422
 c) 50400 d) 50430</p> <p>Q.33 Rahul put his timepiece on the table in such a way that at 6 P.M. hour hand points to North. In which direction the minute hand will point at 9.15 P.M.?
 a) South-East b) South
 c) North d) West</p> <p>Q.34 3 pumps, working 8 hours a day, can empty a tank in 2 days. How many hours a day must 4 pumps work to empty the tank in 1 day?
 a) 8 b) 10
 c) 12 d) 14</p> <p>Q.35 If $\log_{10} 2 = 0.3010$, the value of $\log_{10} 80$ is:
 a) 1.9030 b) 1.6020
 c) 1.7980 d) 1.2390</p> <p>Q.36 If $\log_{10} 5 + \log_{10} (5x+1) = \log_{10} (x+5) + 1$, then x is equal to:
 a) 7 b) 5
 c) 3 d) 1</p> <p>Q.37 Kim can do a work in 3 days while David can do the same in 2 days. Both of them finish the work together and get Rs.150. What is the share of Kim?
 a) Rs.30 b) Rs.60
 c) Rs.70 d) Rs.75</p> <p>Q.38 Function f is defined by $f(x) = -2x^2 + 6x - 3$, find $f(-2)$.
 a) 20 b) 21
 c) 22 d) 23</p> <p>Q.39 CMM, EOO, GQQ, _____, KUU
 Find the missing term.
 a) GRR b) ISS
 c) GSS d) IRR</p> | <p>Q.40 A man travelled from the village to the post-office at the rate of 25 kmph and walked back at the rate of 4kmph. If the whole journey took 5 hours 48 minutes, find the distance of the post-office from the village.
 a) 10km b) 20km
 c) 30km d) 40km</p> <p>Q.41 The surface area of a cube is 486 cm^2. Find its volume?
 a) 364 cm^3 b) 374 cm^3
 c) 384 cm^3 d) 394 cm^3</p> <p>Q.42 The height of a cylinder is 60 cm and the diameter of its base is 5 cm. The total surface area of the cylinder is :
 a) 981 cm^2 b) 982.13 cm^2
 c) 982.14 cm^2 d) None of these</p> <p>Q.43 The radius of a cone is 4 m, height 5 m. Find the curved surface area?
 a) 4 units b) 5 units
 c) 6 units d) 8 units</p> <p>Q.44 Two spheres of their radii in the ratio 4 : 3. Find its volumes ratio?
 a) 64:27 b) 64:26
 c) 64:25 d) None of these</p> <p>Q.45 Statement: Should India encourage exports, when most things are insufficient for internal use itself?
 Arguments: <ol style="list-style-type: none"> 1. Yes. We have to earn foreign exchange to pay for our imports. 2. No. Even selective encouragement would lead to shortages. a) Only argument I is strong
 b) Only argument II is strong
 c) Either I or II is strong
 d) Neither I nor II is strong
 e) Both I and II are strong</p> <p>Q.46 Study the following figure and answer the questions given below.</p> <p>How many educated people are</p> |
|---|---|

→ Employed people
 → Backward people
 → Educated people



employed?

- a) 7
- b) 8
- c) 9
- d) 10

- Q.47 A and B invest in a business in the ratio 3:2. If 5% of the total profit goes to charity and A's share is Rs. 855, the total profit is:
- a) 1000
 - b) 1500
 - c) 2000
 - d) 2500

- Q.48 **Statements:** Some actors are singers. All the singers are dancers.

Conclusions:

- 1. Some actors are dancers.
- 2. No singer is actor.
- a) Only (1) conclusion follows
- b) Only (2) conclusion follows
- c) Either (1) or (2) follows
- d) Neither (1) nor (2) follows
- e) Both (1) and (2) follow

- Q.49 **Question:** In which year was Rahul born?

Statements:

- 1. Rahul at present is 25 years younger to his mother.
 - 2. Rahul's brother, who was born in 1964, is 35 years younger to his mother.
- a) I alone is sufficient while II alone is not sufficient
 - b) II alone is sufficient while I alone is not sufficient
 - c) Either I or II is sufficient
 - d) Neither I nor II is sufficient
 - e) Both I and II are sufficient

- Q.50 The length of the side of a square is represented by $x+2$. The length of the side of an equilateral triangle is $2x$. If the square and the equilateral triangle have equal perimeter, then the value of x is:

- a) 5
- b) 4
- c) 3
- d) 2

End Semester Examination, May 2016

**B. Tech. – Fourth Semester
CAREER SKILLS-II (HM-402)**

Time: 2 hrs

Max Marks: **50**

No. of pages: 4

Note: *The paper consists of **FIFTY** multiple choice questions; Each question has **FOUR** options with **ONE** correct answer. Tick (✓) the correct answer. Attempt all questions. All questions are of **ONE** mark each. There is no negative marking.*

Q.1 If the price of an item is decreased by 10% and then increased by 10%, the net effect on the price of the item is:

- a) A decrease of 99%
- b) No change
- c) A decrease of 1%
- d) An increase of 1%

Q.2 What was the day of the week on 17th June, 1998?

- a) Monday
- b) Tuesday
- c) Wednesday
- d) Thursday

Q.3 Given that on 10th November 1981 is Tuesday, what was the day on 10th November 1581.

- a) Monday
- b) Thursday
- c) Sunday
- d) Tuesday

Q.4 If $(5x-3y)/(5y-3x) = \frac{3}{4}$, then the value of x:y is:

- a) 2:9
- b) 7:2
- c) 7:9
- d) None of these

Q.5 In a mixture, R is 2 parts, S is 1 part. In order to make S to 25% of the mixture, how much R is to be added?

- a) 1/2 part
- b) 2/3 part
- c) 1 part
- d) 1 1/4 part

Q.6 A can do a piece of work in 4 hours; B and C together can do it in 3 hours, while A and C together can do it in 2 hours. How long will B alone take to do it?

- a) 8 hours
- b) 10 hours
- c) 12 hours
- d) 24 hours

Q.7 The ratio between the speeds of two trains is 7 : 8. If the second train runs 400 km in 4 hours, then the speed of the first train is:

- a) 70 km/hr
- b) 75 km/hr
- c) 84 km/hr
- d) 87.5 km/hr

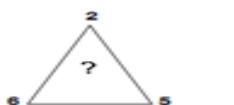
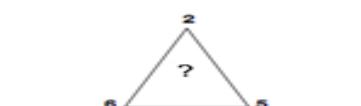
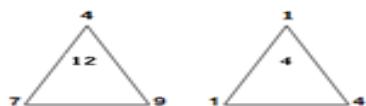
Q.8 A sum of money at simple interest amounts to Rs. 815 in 3 years and to Rs. 854 in 4 years. The sum is:

- a) Rs. 650
- b) Rs. 690
- c) Rs. 698
- d) Rs. 700

Q.9 How much time will it take for an amount of Rs. 450 to yield Rs. 81 as interest at 4.5% per annum of simple interest?

- a) 3.5 years
- b) 4 years
- c) 4.5 years
- d) 5 years

Q.10 Which number replaces the question mark?



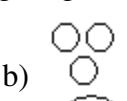
- a) 9
- b) 10
- c) 8
- d) 11

- Q.11** A can contains a mixture of two liquids A and B is the ratio 7 : 5. When 9 litres of mixture are drawn off and the can is filled with B, the ratio of A and B becomes 7 : 9. How many litres of liquid A was contained by the can initially?
- a) 10
 - b) 20
 - c) 21
 - d) 25
- Q.12** 3 pumps, working 8 hours a day, can empty a tank in 2 days. How many hours a day must 4 pumps work to empty the tank in 1 day?
- a) 9
 - b) 10
 - c) 11
 - d) 12
- Q.13** A family consists of two grandparents, two parents and three grandchildren. The average age of the grandparents is 67 years, that of the parents is 35 years and that of the grandchildren is 6 years. What is the average age of the family?
- a) $28 \frac{4}{7}$ years
 - b) $31 \frac{5}{7}$ years
 - c) $32 \frac{1}{7}$ years
 - d) None of these
- Q.14** The probability of the success of three students X, Y and Z in an examination are $\frac{1}{5}$, $\frac{1}{4}$ and $\frac{1}{3}$ respectively. Find the probability of the success of at least two.
- a) $\frac{1}{6}$
 - b) $\frac{1}{4}$
 - c) $\frac{1}{8}$
 - d) $\frac{1}{3}$
- Q.15** If a flight of 600 km an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 kmph and the time of flight increased by 30 mints. The duration of the flight is:
- a) 1 hr
 - b) 2 hr
 - c) 3 hr
 - d) 4 hr
- Q.16** A man can row 15km/h in still water. If it takes him twice as long as to row up as to row down the river, find the rate of stream.
- a) 4 km/h
 - b) 5 km/h
 - c) 6 km/h
 - d) 2 km/h
- Q.17** Two discounts of 40% and 20% equal to a single discount of:
- a) 50
 - b) 45
 - c) 46
 - d) 48
- Q.18** Kunal bought a suitcase with 15% discount on the labeled price. He sold suitcase for Rs 2880 with 20% profit on the labeled price. At what price did he buy the suitcase? (2040Rs)
- a) 1040
 - b) 2040
 - c) 4040
 - d) 3040
- Q.19** A jar full of whisky contains 40% alcohol. A part of this whisky is replaced by another containing 19% alcohol and now the percentage of alcohol was found to be 26%. The quantity of whisky replaced is:
- a) $\frac{1}{3}$
 - b) $\frac{2}{3}$
 - c) $\frac{2}{5}$
 - d) $\frac{3}{5}$
- Q.20** **Question:** In which year was Rahul born?
Statements:
I. Rahul at present is 25 years younger to his mother.

II. Rahul's brother, who was born in 1964, is 35 years younger to his mother.

- a) I alone is sufficient while II alone is not sufficient.
- b) II alone is sufficient while I alone is not sufficient.
- c) Either I or II is sufficient.
- d) Both I and II are sufficient.

Q.21 Which of the following diagrams indicates the best relation between Travelers, Train and Bus?

- a) 
- b) 
- c) 
- d) 

Q.22. Statements: Some mangoes are yellow. Some tixo are mangoes.

Conclusions:

- 1. Some mangoes are green.
- 2. Tixo is a yellow.
- a) Only (1) conclusion follows.
- b) Only (2) conclusion follows.
- c) Either (1) or (2) follows.
- d) Neither (1) nor (2) follows

Q.23 In each of the following questions find out the alternative which will replace the question mark.

Flow : River :: Stagnant : ?

- a) Rain b) Stream
- c) Pool d) Canal

Q.24 A boat can travel with a speed of 13 km/hr in still water. If the speed of the stream is 4 km/hr, find the time taken by the boat to go 68 km downstream.

- a) 2 hours b) 3 hours
- c) 4 hours d) 5 hours

Q.25 In how many different ways can the letters of the word 'LEADING' be arranged in such a way that the vowels always come together?

- a) 360 b) 480
- c) 720 d) 5040

Q.26 $1367 \times 1367 = ?$

- a) 1866239 b) 1868689
- c) 1886869 d) None of these

Q.27 The sum of ages of 5 children born at the intervals of 3 years each is 50 years. What is the age of the youngest child?

- a) 4 years b) 8 years
- c) 10 years d) None of these

Q.28 Which one of the following is not a prime number?

- a) 31 b) 61
- c) 71 d) 91

Q.29 A sum of Rs. 12,500 amounts to Rs. 15,500 in 4 years at the rate of simple interest. What is the rate of interest?

- a) 3% b) 4%
- c) 5% d) 6%

- Q.30 A father said to his son, "I was as old as you are at the present at the time of your birth". If the father's age is 38 years now, the son's age five years back was:
- a) 14 years b) 19 years
 - c) 33 years d) 38 years
- Q.31 Self assessment in career planning helps you to know.
- a) What your talents & strengths are
 - b) The activities you get most satisfaction from
 - c) The talents you achieve most with
 - d) All of the above
- Q.32 SWOT analysis helps you
- a) Plan Better
 - b) Identify things that go in your favor
 - c) Identify pitfalls
 - d) All of the above
- Q.33 Career Plan is:
- a) Life long process
 - b) Acquiring skills
 - c) Changing Careers
 - d) All of the above
- Q.34 I pass others' work as in my own work I am indulging in:
- a) Compassion
 - b) Altruism
 - c) Plagiarism
 - d) Benevolence
- Q.35 "Green, et al., 1995" means:
- a) Green is the first author
 - b) There are more than 4 authors
 - c) Both a) and b)
 - d) None of these
- Q.36 Which of these is a characteristic of high performance team where members believe in the integrity, character and ability of each other?
- a) Openness b) Worthiness
 - c) Trust d) Loyalty
- Q.37 What is the tendency to postpone things called?
- a) Overreaching
 - b) Procrastination
 - c) Delegation
 - d) Remuneration
- Q.38 A back stage presentation would include:
- a) Defining Objectives
 - b) Understanding audience
 - c) Developing effective visuals
 - d) All of the above
- Q.39 The full form of SWOT is:
- a) Skills, Weaknesses, Opportunities, Threats
 - b) Strength, Weaknesses, Opportunities, Threats
 - c) Strengths, Weaknesses, Opportunities, Time bound

- d) Strengths, Winning, Opportunities, Threats
- Q.40 Which of these is a zero tolerance area?
- a) Integrity
 - b) Communication skills
 - c) Problem solving
 - d) Time management
- Q.41 For an effective cross cultural communication, one has to be particular about
- a) Non verbal signals
 - b) Kinds of gifts that can be exchanged
 - c) Topics of discussion
 - d) All of the above
- Q.42 The biggest barrier to cross cultural communication is:
- a) Inability to accept another culture's view
 - b) Different accent
 - c) Different style of clothing
 - d) An understanding of diverse market
- Q.43 Effective team building needs to happen
- a) During appraisals
 - b) Continuously
 - c) Every month
 - d) During presentations
- Q.44 One of the best ways of improving people's performance is:
- a) Salary increment
 - b) Having lunch together
 - c) Providing timely feedback
 - d) Documenting
- Q.45 Which of these is an unhealthy way of coping with stress?
- a) Listen to music
 - b) Physical exercise
 - c) Over eating or under eating
 - d) Talking it out with family & friends
- Q.46 Urgent and Important activities will find place in your Schedule as:
- a) Could b) Must
 - c) Should d) None of these
- Q.47 Which of the following should NOT be done in a team or group presentation? a) Referring to your team members by name.
- b) Planning so the whole presentation is consistent and complete.
 - c) Using 'I' when presenting ideas and information in your own section of the presentation.
 - d) Using 'we' when presenting the ideas and information in your own section of the presentation.
- Q.48 Effective presentations require:
- a) Good presentation skills and especially the ability to present material dramatically.
 - b) A pleasant smile, good eye contact, suitable clothes and a well-modulated voice.
 - c) Planning, practice and presentation skills.
 - d) Planning, a logical order of presentation and asking the class lots of questions.

Q.49 Audience engagement is used:

- a) To help the audience to understand the information.
- b) So that the audience may be part of the experience.
- c) To show the assessor how good you are at giving presentations.
- d) To keep the audience awake during the presentation.

Q.50 What type of written format should be taken into the presentation?

- a) A formal essay
- b) Note form using short simple sentences or bullet points
- c) A 'scripted' form to be read aloud
- d) Do not take in anything at all as it is an oral presentation

End Semester Examination, May 2016

B. Tech. – Fourth Semester

QUANTITATIVE APTITUDE AND PERSONALITY DEVELOPMENT-I (HM-403)

Time: 2 hrs

Max Marks: **50**

No. of pages: 4

Note: *The paper consists of **FIFTY** multiple choice questions; Each question has **FOUR** options with **ONE** correct answer. Select the correct answer. Attempt all questions. All questions are of **ONE** mark each. There is no negative marking.*

- Q.1** The price of a shirt is increased by 15% and then reduced by 15%. The final price of the shirt is
a) 1.25% increases.
b) 1.25% decreases.
c) 2.25% increases.
d) 2.25% decreases.
- Q.2** The number which when subtracted from each of the terms of the ratio 19:31 reducing it to 1:4 is:
a) 15 b) 5
c) 1 d) None of these
- Q.3** How many times do the hands of a clock point opposite each other in a day?
a) 22 b) 11
c) 44 d) 20
- Q.4** A alone can do a piece of work in 6 days and B alone in 8 days. A and B undertook to do it for ` 3200. With the help of C, they completed the work in 3 days. How much is to be paid to C?
a) ` 375 b) ` 400
c) ` 600 d) ` 800
- Q.5** If A381 is divisible by 11, find the value of the smallest natural number A.
a) 5 b) 6
c) 7 d) 9
- Q.6** If in a triangle, the area is numerically equal to the perimeter, then the radius of the inscribed circle of the triangle is?
a) 1 b) 1.5
c) 2 d) 3
- Q.7** A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 2 days B had to leave and A alone completed the remaining work. The whole work was completed in:
a) 8 days b) 10 days
c) 12 days d) 15 days
- Q.8** Two pipes can fill a tank in 20 and 24 minutes respectively and a waste pipe can empty 3 gallons per minute. All the three pipes working together can fill the tank in 15 minutes. The capacity of the tank is:
a) 60 gallons b) 100 gallons
c) 120 gallons d) 180 gallons
- Q.9** Six bells commence tolling together and toll at intervals of 2, 4, 6, 8 10 and 12 seconds respectively. In 30 minutes, how many times do they toll together?
a) 4 b) 10
c) 15 d) 16
- Q.10** There are 54 men in a room doing handshakes, what will be minimum required handshakes for minimum 1 hand shake?
a) 2862 b) 1431
c) 1430 d) 53
- Q.11** The LCM of two numbers is 4800 and their HCF is 160. If one number is 480, then the second number is:
a) 1200 b) 1500
c) 1600 d) 1800

- Q.12 A team of 8 students goes on an excursion, in two cars, of which one can seat 5 and the other only 4. In how many ways can they travel?
 a) 9 b) 26
 c) 126 d) 392
- Q.13 If $0.75 : x :: 5 : 8$, then x is equal to:
 a) 1.12 b) 1.2
 c) 1.25 d) 1.30
- Q.14 Walking at $\frac{3}{4}$ of its usual speed, a man is late by $2 \frac{1}{2}$ hr. the usual time is:
 a) 7.5 b) 6.5
 c) 7 d) 5.5
- Q.15 Excluding stoppages the speed of the bus is 54 kmph. Including stoppages it is 45 kmph. For how many mints does the bus stop per hour?
 a) 25 b) 15
 c) 20 d) 10
- Q.16 A thief steals a car at 2.30 pm and drives it at 60 kmph. The theft is discovered at 3 pm and the owner sets off in another car at 75 kmph, when he will overtake the thief:
 a) 4 pm b) 5 pm
 c) 4.30 pm d) 5.15 pm
- Q.17 Canal bought a suitcase with 15% discount on the labelled price. He sold suitcase for Rs 2880 with 20% profit on the labeled price .At what price did he buy the suitcase?
 a) 1040 b) 2040
 c) 4040 d) 3040
- Q.18 A machine is sold at a profit of 10%. Had it been sold for Rs.40 less, there would have been a loss of 10%. What was the cost price?
 a) ` 175 b) ` 200
 c) ` 225 d) ` 250
- Q.19 In what ratio must a grocer mix two varieties of pulses costing ` 15 and ` 20 per kg respectively so as to get a mixture worth ` 16.50 kg?
 a) 3:7 b) 5:7
 c) 7:3 d) 7:5
- Q.20 Divide 32 into four parts which are in A.P such that the product of extremes is to the product of means is 7:15?
 a) 2, 6, 10, 14 b) 3, 6, 9, 12
 c) 4, 8, 12, 16 d) 5, 10, 15, 20
- Q.21 Find the sum of the numbers between 100 and 200, the sum of whose digits is divisible by 9?
 a) 1665 b) 1674
 c) 1683 d) 1692
 e) 1695
- Q.22 There are 7 meetings A, B, C, D, E, F, G. One meeting should happen in one day. Meeting A is on Sunday. C and D meetings should happen after B. Then E, F, G meetings should occur in three consecutive days. And meeting G is on Saturday. Then meeting D should occur on which day?
 a) Sun b) Mon
 c) Wed d) Fri

- Q.23** A ladder 15 m long reaches a window which is 9 m above the ground on one side of a street. Keeping its foot at the same point, the ladder is turned to the other side of the street to reach a window 12 m high. Find the width of the street?
- a) 19 m b) 21 m
c) 20 m d) 22 m
- Q.24** Tina, Mina, Gina, Lina and Bina are 5 sisters, aged in that order, with Tina being the eldest. Each of them had to carry a bucket of water from a well to their house. Their buckets' capacities were proportional to their ages. While returning, equal amount of water got splashed out of their buckets. Who lost maximum amount of water as a percentage of the bucket capacity?
- a) Tina b) Mina
c) Gina d) Bina
- Q.25** A can contains a mixture of two liquids A and B is the ratio 7 : 5. When 9 litres of mixture are drawn off and the can is filled with B, the ratio of A and B becomes 7 : 9. How many litres of liquid A was contained by the can initially?
- a) 10 b) 20
c) 21 d) 25
- Q.26** What is the probability of getting a sum 9 from two throws of a dice?
- a) $1/6$ b) $1/8$
c) $1/9$ d) $1/12$
- Q.27** What percentage of numbers from 1 to 70 have 1 or 9 in the unit's digit?
- a) 1 b) 14
c) 20 d) 21
- Q.28** Find the odd man out
1, 3, 5, 11, 14, 17, 21
a) 21 b) 17
c) 14 d) 3
- Q.29** If the cost price of 20 articles is equal to the selling price of 16 articles, what is the percentage profit or loss made by the merchant?
- a) 20% Profit b) 25% Loss
c) 25% Profit d) 33.33% Loss
- Q.30** Four horses are tied on the four corners of a square field of 14 m length so that each horse can just touch the other two horses. They were able to graze in the area accessible to them for 11 days. For how many days is the un grazed area sufficient for them?
- a) 3 days b) 4 days
c) 5 days d) 2 days
- Q.31** While working in a team, the team players while taking the decision should:
- a) Should not listen to others
b) Should concentrate on their own decision
c) Should brainstorm and involve everyone
d) Should keep themselves away from the decision
- Q.32** In SWOT analysis, T stands for:
- a) Tackling b) Treatment
c) Threat d) Teaching
- Q.33** While working in a team, delegation of task means:
- a) Assign the work to one individual

- b) Assign the work to the best performers
 - c) Assigning the work among the team members as per the efficiency
 - d) Task should only be done by the team leader
- Q.34 No. of pages in the resume should be:
- a) 2
 - b) 3
 - c) 1
 - d) As per the choice
- Q.35 The full form of CV is:
- a) Career Vitae
 - b) Curriculum Vitae
 - c) Circular Virtue
 - d) None of the above
- Q.36 Which is the best handshake?
- a) Firm Handshake
 - b) Limp Handshake
 - c) Bone Crusher
 - d) None of the above
- Q.37 The color of the belt should match with
- a) Shoes
 - b) Pants
 - c) Socks
 - d) Shirt
- Q.38 The color of the socks should match with:
- a) Shoes
 - b) Belt
 - c) Pants
 - d) Shirt
- Q.39 In group discussion, the person who keeps a watch on the other individual and allows them to speak is called
- a) Moderator
 - b) Gate Keeper
 - c) Initiator
 - d) Concluder
- Q.40 In group discussion, when you want to convey your message and wants to add something then you should:
- a) Interrupt the person at the same time
 - b) Attack and snub the person
 - c) Raise your hand and use an appropriate phrase to interrupt
 - d) You should start shouting
- Q.41 Effective teams can:
- a) Be bought
 - b) Be created through trust and safety
 - c) Exist without having a common goal
 - d) None of the above
- Q.42 At the start of the presentation, the best thing you can do is
- a) Fix your laptop
 - b) Get the audience's attention
 - c) Directly start with the topic

- d) None of the above
- Q.43 What type of written format should be taken into the presentation?
- a) Formal essay
 - b) Note form using short simple sentences or bullet points
 - c) A 'scripted' form to be read aloud
 - d) Do not take in anything at all as it is an oral presentation Top of Form
- Q.44 Audience engagement is used:
- a) To help the audience to understand the information.
 - b) Audience should not be involved
 - c) To show the assessor how good you are at giving presentations.
 - d) To keep the audience awake during the presentation.
- Q.45 The aim of cross – cultural communication training is:
- a) Improve Behavior
 - b) Develop business etiquette
 - c) Create strong cultural ties
 - d) Give social status
- Q.46 During the interview while answering the question one should:
- a) Should cross the hands
 - b) Should fiddle with the hands
 - c) Use hands and gestures
 - d) Hands in the pockets
- Q.47 Which is the best question to be asked to the interviewee?
- a) Salary Package
 - b) Joining Date
 - c) Roles and Responsibilities
 - d) Never ask a question
- Q.48 Self-assessment in career planning helps you to know
- a) What your talents & strengths are
 - b) The activities you get most satisfaction from
 - c) The talents you achieve most with
 - d) All of the above
- Q.49 Plagiarism is
- a) Unethical
 - b) Passing of others' work as your own
 - c) Both
 - d) None of the above
- Q.50 When men choose accessories they must make sure that they:\
- a) Choose a flashy watch in order to attract attention

- b) Choose a leather belt with a sleek buckle
- c) Never wear a watch
- d) All of the above

End Semester Examination, May 2016

B. Tech. – Fifth / Sixth Semester

INDUSTRIAL MANAGEMENT (HM-501)

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) Give two definitions of management.
- b) What is the importance of store management?
- c) What are the advantages of a product layout?
- d) What are the factors considered for selection of locality for a plant location?
- e) What is economic order quantity?
- f) What is the importance of good industrial relations?
- g) Define quality control.
- h) What is span of control?
- i) How does planning function assist the control function?
- j) Define time study.

2x10

PART-A

- Q.2 a) What are functions of management? Discuss in detail. **10**
b) Explain the organizing functions in detail. **10**
- Q.3 Define work study. Discuss the various methods of time measurement. **20**
- Q.4 What is plant layout? What are objectives of a good plant? **20**

PART-B

- Q.5 a) Define material management and discuss its importance. **10**
b) Discuss the objectives and functions of purchase department in a plant. **10**
- Q.6 What is the concept of employee welfare? Discuss the various labour welfare practices in India. **20**
- Q.7 Define quality control. Discuss the importance and methods of quality control. **20**

End Semester Examination, May 2016

B. Tech. – Fifth Semester
CAREER SKILLS-III (HM-503A)

Time: 2hrs

Max

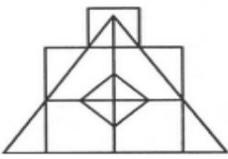
Marks: **50**

No. of

pages: 4

Note: *The paper consists of **FIFTY** multiple choice questions; Each question has **FOUR** options with **ONE** correct answer. Tick (**V**)the correct answer. Attempt all questions. All questions are of **ONE** mark each. There is no negative marking.*

- Q.1** Amit started a business by investing Rs. 30,000. Rahul joined the business after some time and invested Rs. 20,000. At the end of the year, profit was divided in the ratio of 2 : 1. After how many months did Rahul join the business?
a) 9 b) 3
c) 4 d) 5
- Q.2** A person has to completely put each of the three liquids i.e. 403 liters of petrol, 465 litres of diesel and 496 liters of Mobil oil in bottles of equal size without mixing any of the three types of liquids such that each bottle is completely filled. What is the least possible number of bottles required?
a) 31 b) 34
c) 31 d) None of these
- Q.3** In a mixture of 120 litres, the ratio of milk and water is 2 : 1. If the ratio of milk and water is 1 : 2, then the amount of water (in litres) is required to be added is?
a) 20 b) 40
c) 80 d) 120
- Q.4** A reduction of 20% in the price of oranges enables a man to buy 5 oranges more for Rs. 10/-. Find the price of an orange before reduction.
a) 20 paise b) 50 paise
c) 40 paise d) 60 paise
- Q.5** Find at what time between 8 and 9 o'clock will the hands of a clock be in the same straight line but not together?
a) $120/11$ past 8 b) $560/11$ past 8
c) $10\frac{12}{11}$ min past 8 d) 10min past 8
- Q.6** **Statements:** All thieves are men. All men are graduates. No graduates are employed.
Conclusions: (I) Some graduates are thieves. (II) No employed are thieves. (III) Some men are thieves. (IV) Some employed are men.
a) I, II and III follow
b) II, III and IV follow
c) Only I and II follow
d) Only II and II follow
- Q.7** 25 men can reap a field in 20 days. When should 15 men leave the work if the remaining field is to be reaped in 40 days after they leave the work?
a) after 3 days b) after 4 days
c) after 5 days d) after 6 days
- Q.8** What is the value of M and N respectively if $M8458N$ is divisible by 88, where M and N are single digits?
a) 5, 4 b) 8, 6
c) 6, 4 d) 3, 2
- Q.9** How many 4 digit odd numbers can be formed using digits 0, 1, 2, 3, 4, 5?
a) 540 b) 1080
c) 900 d) None of these
- Q.10** A thief steals a car and drives it at 15 km/hr. The theft has been discovered after one hour and the owner of the car sets off in another car at 25 km/hr. When will the owner overtake the thief from the starting point?
a) 1 hr b) 1.5 hr
c) 2 hr d) 2.5 hr
- Q.11** A dealer professes to sell his goods at cost price and uses an 880gm weight instead of a kg. What is his percentage of gain?
a) 13.13% b) 13.33%
c) 13.36% d) 13.63%
- Q.12** Two vessels A and B contain spirit and water mixed in the ratio 5:2 and 7:6 respectively. Find the ratio in which these mixture be mixed to obtain a new mixture in vessel c containing spirit and water in the ratio 8:5?
a) 1:7 b) 2:9
c) 7:9 d) 3:8
- Q.13** If the length of the chord of a circle is 16 cm and chord is at a distance of 15 cm from the centre of the circle. Find the radius of the circle.
a) 15 b) 16
c) 17 d) 24
- Q.14** Two pipes can fill a tank in 20 and 24 min., respectively and a waste pipe can empty 6 gallon per min. All the three pipes working together can fill the tank in 15 min. Find the capacity of the tank?

- | | |
|---|--|
| <p>a) 210 gallon b) 50 gallon</p> <p>c) 150 gallon d) 240 gallon</p> <p>Q.15 When 3-coins are tossed together, what is the chance that all coins have same face up?</p> <p>a) $\frac{1}{4}$ b) $\frac{1}{2}$</p> <p>c) $\frac{3}{4}$ d) $\frac{1}{8}$</p> <p>Q.16 A train starts from Delhi at 6:00 am and reaches Ambala cantt. at 10am. The other train starts from Ambala cantt. at 8am and reached Delhi at 11:30 am, If the distance between Delhi and Ambala cantt is 200 km, then at what time did the two trains meet each other?</p> <p>a) 8:46am b) 8:40am</p> <p>c) 8:56am d) 8:50am</p> <p>Q.17 Find the next term in the series: 4, 9, 20, 43, 90,</p> <p>a) 180 b) 185</p> <p>c) 190 d) 195</p> <p>Q.18 A trader buys 150 pens for Rs.1000 and he marks each of them at Rs.10. He gives a discount of 20% on each pen and he gives 1 pen free on bulk purchases of 9 pens. What is his minimum possible overall percentage of profit?</p> <p>a) 8% b) 10%</p> <p>c) 20% d) 5%</p> <p>Q.19 Find the number of triangles in the given figure:</p>  <p>a) 15 b) 21</p> <p>c) 24 d) 27</p> <p>Q.20 If a carton containing dozen mirrors is dropped, which of the following cannot be the ratio of broken mirrors to unbroken mirrors?</p> <p>a) 2:1 b) 3:1</p> <p>c) 3:2 d) 1:1</p> <p>Q.21 Pareto's rule is also called</p> <p>a) Kepplers Rule
b) 80:20 Rule</p> | <p>c) Doppler Rule
d) Ishikawa Rule</p> <p>Q.22 _____ drives demand for the product or service.</p> <p>a) Sales b) Marketing</p> <p>c) Product Positioning d) Media Planning</p> <p>Q.23 Scheduling is a term related to</p> <p>a) Problem Solving
b) Time Management
c) Delegation
d) Stress Management</p> <p>Q.24 Social Networking is:</p> <p>a) Urgent/ Important
b) Urgent/ Not Important
c) Not Urgent/ Not Important
d) Not Urgent/ Important</p> <p>Q.25 To create 'Scarcity' and "Urgency" are the ways of</p> <p>a) Managing customers
b) Persuasion Skills
c) Customer delight
d) Selling skills</p> <p>Q.26 Not Urgent and Not Important activities will find place in your Schedule as:</p> <p>a) Could b) Must</p> <p>c) should d) None of these</p> <p>Q.27 Time management matrix divides the work into:</p> <p>a) 4 quadrants b) 6 quadrants</p> <p>c) 2 Quadrants d) 3 Quadrants</p> <p>Q.28 Which of the following activities deserve some of your time?</p> <p>a) Urgent/ Important
b) Urgent/ Not Important
c) Not Urgent/ Not Important
d) Not Urgent/ Important</p> <p>Q.29 Customer Service is provision of service:</p> <p>a) Before Purchase
b) During Purchase
c) After Purchase
d) All of the above</p> <p>Q.30 Planning for your marriage is:</p> |
|---|--|

	a) Urgent/ Important b) Urgent/ Not Important c) Not Urgent/ Not Important d) Not Urgent/ Important	what they are going to get in exchange of their money is what type to closing technique. a) Trial Close b) Inducement Close c) Alternative Close d) Summary Close
Q.31	Which of the following techniques is not a part of problem solving process? a) Why Technique b) Root Cause Analysis c) Fish bone diagram d) Zorbing	Q.39 When you are explicit about wanting an order in return for the concession, closing technique is called: a) Trial Close b) Inducement Close c) Alternative Close d) Summary Close
Q.32	If I am trying to minimize obstacles then I am a) Managing time b) Decision Making c) Problem Solving d) None of the Above	Q.40 You display a product function and give a proof to the customer there and then and immediately make a close. This closing technique is called: a) Action Close b) Inducement Close c) Alternative Close d) Summary Close
Q.33	In Relationship selling what is a salesperson chasing. a) Profit b) Customer loyalty c) Life time value d) All of the above	Q.41 Your interviewer has asked you a question and you don't know the answer. You should: a) Beat about the bush b) Give any answer c) Say that you don't know the exact answer but would like to give it a try. d) Just say I'm SORRY
Q.34	If I am selling 3 GB of RAM instead of 1 GB, I am. a) Up selling b) Cross Selling c) Mis-selling d) None of the Above	Q.42 Customer satisfaction is: a) Meeting Promises b) Exceeding Promises c) Both d) None of the above
Q.35	I am not familiar with the topic in a GD. However I listen to other participants in the first few minutes and create my content by changing the language. This makes me a. a) Initiator b) Moderator b) Loan Taker d) Concluder	Q.43 First Impression is: a) 55% Body Language b) 38% Verbal Tone c) 7% Verbal Content d) All of the above
Q.36	If I sell a trolley with a washing machine then I am. a) Up selling b) Cross Selling c) Mis-selling d) None of the Above	Q.44 I am a participant in a GD and I am the first one to speak. By doing so I am pitching myself as a. a) Leader b) Good Communicator c) Good Listener d) None of the Above
Q.37	Which one of these does not indicate why customer satisfaction is so important –. a) It increases customer lifetime value. b) It reduces negative word of mouth. c) It's cheaper to retain customers than acquire new ones. d) One doesn't need to persuade a satisfied customer.	Q.45 Group discussions are conducted to test the following: a) Knowledge b) Communication c) Leadership d) All of the above
Q.38	Summarize the list of benefits that the other person will receive, telling them completely	Q.46 Chronology of events in a CV is: a) Reverse Chronology b) first to current c) Both

d) None of the above

Q.47 Your interviewer asks you what you think about your previous boss. You didn't get along with your previous boss. You answer.

- a) "He was alright, but we weren't that close."
- b) "He was a good leader and really kept the team focused and on-task."
- c) "We didn't exactly get along because he made a lot of impossible demands and was constantly on the phone."
- d) None of the Above

Q.48 Cover Letter and CV are best when:

- a) Standard
- b) Customized
- c) Both
- d) None of the above

Q.49 Which of the following is okay to do at an interview?

- a) Ask the employer questions.
- b) Answer your cell phone.
- c) Be a few minutes late
- d) None of the above

Q.50 Which one of the following is short lived?

- a) Emotions
- b) Mood
- c) Stress
- d) Anxiety

End Semester Examination, May 2016

B. Tech. – Fifth / Sixth Semester

INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP (HM-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.** Each question carries equal marks.

Q.1 Answer the following:

- a) Discuss the nature of management.
- b) What are the objectives of a good plant layout?
- c) Discuss VED analysis technique of inventory management.
- d) What are the objectives of good industrial relations?

5×4

PART-A

Q.2 Define controlling. Discuss the process of controlling with the help of a diagram. **20**

Q.3 Define plant layout. Discuss the types of plant layouts with the help of diagrams. **20**

Q.4 Discuss ABC analysis technique of inventory management in detail. **20**

PART-B

Q.5 Discuss workers participation in management in detail. **20**

Q.6 Discuss the role of following supporting entrepreneurs:

- a) Commercial banks.
- b) District industry centres.

10×2

Q.7 a) Discuss the importance of industrial relations to an organisation. **10**
b) Discuss in detail the role of NABARD in supporting entrepreneurs. **10**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

QUANTITATIVE APTITUDE AND PERSONALITY DEVELOPMENT-II (HM-505)

Time: 2 hrs

Max Marks: **50**

No. of pages: 5

Note: *The paper consists of **FIFTY** multiple choice questions; Each question has **FOUR** options with **ONE** correct answer. Select the correct answer. Attempt all questions. All questions are of **ONE** mark each. There is no negative marking.*

- Q.1** The sum of two numbers is 528 and their H.C.F is 33. The number of pairs of numbers satisfying the above condition is
a) 4 b) 6
c) 8 d) 12
- Q.2** Fresh fruit contains 68% water and dry fruit contains 20% water. How much dry fruit can be obtained from 100 kg of fresh fruits?
a) 20 b) 30
c) 40 d) 50
- Q.3** The Indian Cricket team consists of 16 players. It includes 2 wicket keepers and 5 bowlers. In how many ways can a cricket eleven be selected if we have to select 1 wicket keeper and at least 4 bowlers?
a) 1024 b) 1900
c) 2000 d) 1092
- Q.4** Two dice are thrown together .What is the probability that the sum of the number on the two faces is divided by 4 or 6?
a) $\frac{7}{18}$ b) $\frac{14}{35}$
c) $\frac{8}{18}$ d) $\frac{7}{35}$
- Q.5.** A and B are partners in a business. A contributes $\frac{1}{4}$ of the capital for 15 months and B received $\frac{2}{3}$ of the profit. For how long B's money was used?
a) 3months b) 6months
c) 10months d) 12months
- Q.6** Three pipes A, B and C can fill a tank in 6 hours. After working at it together for 2 hours, C is closed and A and B can fill the remaining part in 7 hours. The number of hours taken by C alone to fill the tank is?
a) 10 b) 12
c) 14 d) 16
- Q.7** A man sitting in a train which is travelling at 50 kmph observes that a goods train, travelling in opposite direction, takes 9 seconds to pass him. If the goods train is 280 m long, find its speed?
a) 60 b) 62
c) 64 d) 65
- Q.8** A trader mixes 26 kg of rice at Rs. 20 per kg with 30 kg of rice of other variety at Rs. 36 per kg and sells the mixture at Rs. 30 per kg. His profit percent is?
a) 5% b) 8%
c) 10% d) None
- Q.9** A bag contains 50 P, 25 P and 10 P coins in the ratio 5: 9: 4, amounting to Rs. 206. Find the number of coins of each type respectively?
a) 360,160,200 b) 160,360,200
c) 200,360,160 d) 200,160,300
- Q.10** The distance between two cities A and B is 330 Km. A train starts from A at 8 a.m. and travel towards B at 60 km/hr. Another train starts from B at 9 a.m. and travels towards A at 75 Km/hr. At what time do they meet?
a) 10am b) 10.30am
c) 11am d) 11.30am

- Q.11** When A, B and C are deployed for a task, A and B together do 70% of the work and B and C together do 50% of the work. Who is most efficient?
- A
 - B
 - C
 - Cannot be determined
- Q.12** 8 litres are drawn from a cask full of wine and is then filled with water. This operation is performed three more times. The ratio of the quantity of wine now left in cask to that of the water is 16:65. How much wine the cask hold originally?
- 18 ltrs
 - 24 ltrs
 - 32 ltrs
 - 42 ltrs
- Q.13** A man walked diagonally across a square lot. Approximately, what was the percent saved by not walking along the edges?
- 30
 - 40
 - 50
 - 60
- Q.14** In a dairy farm, 40 cows eat 40 bags of husk in 40 days. In how many days one cow will eat one bag of husk?
- 1
 - $1/40$
 - 40
 - 80
- Q.15** Find the angle between the hour hand and the minute hand of a clock when the time is 3.25?
- 47.5°
 - 57.5°
 - 45.5°
 - 55.5°
- Q.16** Which one will replace the question mark?
-
- a) 8 b) 14
c) 10 d) 6
- Q.17** **Statements :**
- Some ants are parrots
 - All the parrots are apples
- Conclusions:**
- All the apples are parrots
 - Some ants are apples
- If only (1) conclusion follows
 - If only (2) conclusion follows
 - If either (1) or (2) follows
 - If neither (1) nor (2) follows
- Q.18** Manoj, Prabhakar, Mash and Kamal are four friends. Who among them is the heaviest?
- Prabhakar is heavier than Manoj and Kamal but lighter than Akash
 - Manoj is lighter than Prabhakar and Mask but heavier than Kamal
- Statement I alone is sufficient to answer the question
 - Statement II alone is sufficient to answer the question
 - Either I or II alone are sufficient to answer the question
 - Both the statements together are needed
- Q.19** The curved surface area of a cylindrical pillar is 264 m^2 and its volume is 924 m^3 . Find the ratio of its diameter to its height?
- 3:7
 - 7:3

- c) 6:7 d) 7:6

Q.20 The total weight of a tin and the cookies it contains is 2 pounds. After $\frac{3}{4}$ of the cookies are eaten, the tin and the remaining cookies weigh 0.8 pounds. What is the weight of the empty tin in pounds?

- a) 0.2 b) 0.3
c) 0.4 d) 0.5

Q.21 Behavioral based questions are best answered through the use of:

- a) Proof stories
b) Skill stories
c) Results stories
d) Personal stories.

Q.22 Which of the following is a legal interview question?

- a) How old are you?
b) Do you have any children?
c) How did you get along with your previous supervisor?
d) What is your religious affiliation?

Q.23 Dining etiquette can be important to a job candidate. Which of the following would be considered good dining etiquette advice?

- a) Place used silver on the dish to which it belongs
b) Help yourself from a dish first
c) Blow on your dish to cool it
d) Stack your dishes neatly when finished eating.

Q.24 The final activity in the interview process is:

- a) the handshake
b) the negotiation
c) the thank-you note
d) the follow-up

Q.25 When negotiating, what should be addressed first?

- a) Vacation b) Salary
c) Benefits d) Perks

Q.26 Which type of interview questions are most meaningful to employers who want to assess how you will perform on the job?

- a) Traditional questions
b) Screening questions
c) Behavioral questions
d) All three

Q.27 Generally, when asked about long-term goals, candidates should talk about where they want to be professionally in how many years?

- a) 3 years b) 5 years
c) 10 years d) 15 years

Q.28 In a group discussion, which of the following projective techniques would work best when dealing with socially or personally sensitive issues?

- a) laddering
b) personification

- c) transference
 - d) half questions
- Q.29 A focus group moderator can effectively establish rapport by employing a technique known as:
- a) Meta messaging
 - b) lateral thinking
 - c) mirroring
 - d) sample framing
- Q.30 According to members of Lee's unit at work, Lee is an excellent manager. He knows what has to be done, gives his people clear orders, stays focused in the present, and generally directs people with skill. What type of leadership style best describes Lee?
- a) authoritarian
 - b) democratic
 - c) laissez faire
 - d) transformational
- Q.31 Which of the following roles is not a responsibility of a member of a group?
- a) challenge unfounded conclusions
 - b) support other group members
 - c) avoid advocating personal beliefs
 - d) question other members
- Q.32 Group members are generating ideas at rapid speed and the problem-solving process is clipping right along when suddenly Ripp blurts out, "Will somebody please give me a clear picture of all the things we've talked about so far?" By saying this, Ripp is:
- a) helping the group to manage conflict
 - b) helping the group summarize its progress
 - c) introducing conflict into the group process
 - d) showing that he has come prepared
- Q.33 Mary Anne's group has been working hard and has now come up with several solutions to their problem. At this point, Mary Anne says, "Let's just list these and vote on the best one. It's the democratic way." What step has Mary Anne overlooked in the problem-solving process?
- a) She forgot to have the group identify any other possible solutions
 - b) She forgot to have the group consider the pros and cons of each solution
 - c) She forgot to have the group set up criteria for solving the problem
 - d) She forgot to have the group summarize all the problems suggested
- Q.34 Which of the following suggestions is essential for a small group to function?
- a) a firm agenda
 - b) agreement among all members
 - c) a clear goal
 - d) an elected leader
- Q.35 When participating in a group presentation, it is imperative to:
- a) ensure everyone makes equal contributions
 - b) solve the problem or issue as quickly as possible
 - c) incorporate every suggestion
 - d) ensure everyone understands the assignment
- Q.36 Which statement about excellent customer service is correct?
- a) It results in a more positive business reputation
 - b) It results in more promises and therefore more lawsuits.
 - c) It results in fewer loyal customers

- d) It results in lower wages.
- Q.37 What is the main reason that more businesses are not actually providing excellent customer service?
- They don't care about serving customers
 - They don't know how to get started.
 - They don't like people
 - They see no value in it
- Q.38 The left part of our brain controls:
- emotions
 - creativity
 - logic and reasoning
 - imagination
- Q.39 Emotional intelligence refers to qualities such as understanding your own feelings, empathy for others, and:
- Possessing above average verbal and math skills
 - The ability to manage emotions
 - Having a good sense of humor
 - Understanding human relations research.
- Q.40 A worker high in emotional intelligence would engage in such behaviors as:
- Recognizing when a coworker needs help but is too embarrassed to ask
 - Dealing with the anger of a dissatisfied customer
 - Being able to tell whether a customer's "maybe" means "yes" or "no"
 - All of the above
- Q.41 Which of the following is NOT a component of attitudes?
- Cognitive
 - Affective
 - Negative
 - Behavioral
- Q.42 The willingness to go beyond your job description to help the company, even if the act does not lead to an immediate reward is an employee attitude which is highly valued by employers. This behavior is often known as:
- Brown nosing
 - Organizational citizenship
 - Management behavior
 - All of the above
- Q.43 Which of the following is NOT one of the six spheres of life and happiness?
- Financial health
 - Spiritual life or belief system
 - Work and career
 - Emotional superficial states
- Q.44 The résumé of a fresh graduate is generally:
- half a page
 - two pages long
 - three pages long
 - one page long
- Q.45 The cover letter is:

- a) a foreword
- b) a description of your core strengths and suitability for the job
- c) a statement of your job objective
- d) a summary of your qualifications and experiences

Q.46 A summary placed at the beginning of the CV acts as a:

- a) statement of objectives
- b) synopsis
- c) letter of recommendation
- d) preface

Q.47 Which of the following strategies will help you avoid moving from argumentativeness to aggressiveness?

- a) Interrupting as needed to state your position fully.
- b) Emotional expression.
- b) Centering arguments on issues rather than personalities
- d) Stressing the specific areas of disagreement rather than generalizing

Q.48 A person using an "avoiding" style of engaging in conflict is likely

- a) irresponsible
- b) trying to ignore a problem
- c) trying to manipulate another person
- d) unlikable

Q.49 Understanding exactly why one is angry can help one to

- a) direct it b) hide it
- c) unleash it d) manage it

Q.50 What type of approach to conflict is "competing"?

- a) I lose -- you win
- b) I lose -- you lose
- c) I win -- you lose
- d) Be both win and lose

End Semester Examination, May 2016

B. Tech. – Sixth Semester

CAREER SKILLS-IV (HM-602)

Time: 2 hrs

Max Marks: **50**

No. of pages: 4

Note: *The paper consists of **FIFTY** multiple choice questions; Each question has **FOUR** options with **ONE** correct answer. Select the correct answer. Attempt all questions. All questions are of **ONE** mark each. There is no negative marking.*

- Q.1 In spite of a discount of 20%, I managed to make a profit of 20%. What is the per-cent mark-up?
a) 40% b) 25%
c) 50% d) 0%
- Q.2 Three girls Anu, Babita and charu were paid in the ratio 4:5:6, respectively for doing a job. If the difference between the maximum amount and the minimum amount got by any two of them is ` 300/-, then what is the total amount got by Babita for doing the job?
a) `750/- b) `600/-
c) `2250/- d) `150/-
- Q.3 A bag contains 25-paise, 50-paise and 1-rupee coins in the ratio 4:2:5. If the total value of all the coins in the bag is `770/-, then find the value of all the 25 paise and 50 paise coins in the bag.
a) `220/- b) `70/-
c) `110/- d) `140/-
- Q.4 Twenty five litres of a 40% milk solution is mixed with 30 litres of a 20% milk solution. What is the % of water in the resultant mixture?
a) 30% b) 30.9%
c) 29.09% d) 35%
- Q.5 The average rainfall for the first 5 days of a month in Chennai is 5 cm while the average rainfall for the next six days of the same month is 12 cm. If Chennai recorded a rainfall of 7cm on the 11th day of the month, find the average rainfall for the first 10 days of the month.
a) 10 cm b) 11 cm
c) 12 cm d) 9 cm
- Q.6 If 30 boys can do a piece of work in 40 days working 8 hours per day, in how many days can 20 boys working at half the efficiency for 10 hours per day do the same work?
a) 36 days b) 24 days
c) 72 days d) 96 days
- Q.7 A labour contract camp had food for 80 men which was to last 120 days. After 1/4th of the time 20 men left the camp. What is the total number of days that the food will now last?
a) 120 days b) 150 days
c) 90 days d) 80 days
- Q.8 The present age of a mother and daughter is in the ratio 8:5. If the difference in their ages is 12 years, what was the ratio of their ages three years ago?
a) 17:29 b) 7:4
c) 29:17 d) None of these
- Q.9 In a class of 40 students, the ratio of boys to girls is 5:3. If 30% of the students in the class are top academic performers out of which four are boys, then what is the % of girls who are top academic performers?
a) 20% b) 53.33%
c) 40% d) 30%
- Q.10 A number when divided by 5 and 3 leaves remainders of 3 and 1, respectively. Find the smallest such 3 digit number.

- a) 101 b) 103
c) 118 d) None of these

Q.11 Two parties contest in an election where all the eligible people vote. If the winner gets 60% of the total votes and wins by 150 votes, find the number of votes polled in favour of the losing party.

- a) 300 b) 750
c) 450 d) 500

Q.12 A trader sells an item at a mark-up of 20% and uses a weight of 800 grams instead of 1 kg. Find the overall profit or loss %.

- a) 25% profit b) 45% profit
c) 20% loss d) 50% profit

Q.13 An amount becomes four times itself in nine years at simple interest. In how many years will it become 16 times itself at the same rate?

- a) 45 b) 40
c) 36 d) None of these

Q.14 The ratio of the number of married to unmarried persons in an organization of 65 people is 5:8 a year ago. If 10 people got married during the last one year and an equal number of new people joined, 60% of whom were married; find the new ratio of unmarried to married persons in the organization.

- a) 41:45 b) 41:34
c) 45:41 d) 34:41

Q.15 How much quantity of wheat costing ` 24/kg must a person mix with 30 kg of wheat costing ` 40/kg such that on selling the mixture at ` 36/kg, there is a profit of 20%?

- a) 50 kg b) 20 kg
c) 10 kg d) 25 kg

Q.16 Two pipes can fill a tank in 8 hours and 12 hours respectively while a third pipe can empty the tank in 24 hours. If all the three pipes are opened when the tank is 50% full, in how much time will it get filled?

- a) 3 hours b) 6 hours
c) 15 hours d) None of these

Q.17 If the work done by two boys is equal to that done by three girls, find the total time taken by 12 boys and 15 girls to do a work which is done by 20 boys in 33 days.

- a) 24 days b) 30 days
c) 32 days d) 40 days

Directions for questions 18 and 19: A cube painted white or all the faces is cut into 125 cubes of equal sizes. Now answer the following questions.

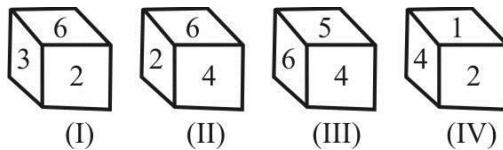
Q.18 How many cubes are painted on one face only?

- a) 54 b) 8
c) 16 d) 27

Q.19 How many cubes are painted on two sides only?

- a) 64 b) 12
c) 36 d) 48

Q.20 Consider the following picture of a dice:



What is the number opposite 3?

- a) 1
- b) 4
- c) 5
- d) Data Insufficient.

Q.21 In order to write effective emails:

- a) Do not use slangs.
- b) Avoid Abbreviations.
- c) Cover one topic per email.
- d) All of the above.

Q.22 Which of the following should be avoided in self- introduction?

- a) Anything that puts you in bad light.
- b) Very personal information.
- c) Your nick name.
- d) All of the above.

Q.23 Chronology of events in a CV is:

- a) Reverse Chronology.
- b) First to current.
- c) Both.
- d) None of the above.

Q.24 Group discussions are conducted to test the following:

- a) Knowledge.
- b) Communication.
- c) Leadership.
- d) All of the above.

Q.25 Which of the following is not a good question to be asked to the interviewer?

- a) About the job itself.
- b) Interviewer's contact number.
- c) Available learning opportunities.
- d) None of the Above.

Q.26 Your interviewer has asked you a question and you don't know the answer. You should...

- a) Beat about the bush and confuse the interviewer.
- b) Give any answer.
- c) Just say I'm SORRY.
- d) Say that you don't know the exact answer but would like to give it a try.

Q.27 You practise the philosophy of "You are ok, I am ok". Which of the following behaviours do you exhibit?

- a) Assertive.

- b) Aggressive.
 - c) Passive.
 - d) Passive aggressive.
- Q.28 KSS strategy post an interview helps in ...
- a) Self-Motivation.
 - b) Interviewer Analysis.
 - c) Self-Assessment and Feedback.
 - d) Organizational Analysis.
- Q.29 Tick the incorrect statement about Group Discussion:
- a) You should cut down your opponents.
 - b) Maintain a meaningful eye contact with all the participants.
 - c) Maintain a smiling and pleasant disposition.
 - d) Avoid looking at the floor or ceiling as it communicates disinterest.
- Q.30 Where do you see yourself 10 years from today? This is a question related to
- a) Career aspiration.
 - b) Group behaviour.
 - c) Leadership qualities.
 - c) Communication skills.
- Q.31 Being a limelight seeker in a GD...
- a) Helps you win.
 - b) Is a decent strategy.
 - c) Is a strict No-No.
 - d) None of the above.
- Q.32 KSS stands for:
- a) Keep it Short and Simple.
 - b) Keep, Stop, Start.
 - c) Keep Sure Short.
 - d) None of the above.
- Q.33 Timelines, assignments, projects, respect for teachers and attendance in college are important for professional life as:
- a) They habitually guide our behaviour in the corporate world.
 - b) They determine our grades in the college.
 - c) They are the foundation of our professional behaviour and attitude.
 - d) All of the above.
- Q.34 Your interviewer has asked you about your weakness, what you should do?
- a) Be honest and tell the truth.
 - b) Say that you have no weakness as you have worked upon all of them.
 - c) Talk about a genuine and obvious weakness which doesn't impact the job followed by the steps taken to improve.
 - d) Tell a weakness which is more likely strength.
- Q.35 The parameter on which you should be hired for in an engineering job.
- a) Coach-ability.
 - b) Physical strength and looks.
 - c) Contacts within the company.

- d) Family Background.
- Q.36 Cover letter should be.....
- a) Customized b) Standard
 - c) None of above d) Both
- Q.37 STAR technique in skill based interview is:
- a) Skill Task Action Result.
 - b) Situation Task Attitude Result.
 - c) Situation Target Action Result.
 - d) None of the above.
- Q.38 Verbal communication includes
- a) Speaking.
 - b) Writing.
 - c) Both A & B.
 - d) None of the above.
- Q.39 Which of the below are the qualities of an active listener?
- a) They paraphrase.
 - b) They ask and answer questions.
 - c) They delay Judgment.
 - c) All of the above.
- Q.40 Why is it important to do self-analysis in an interview?
- a) It helps you project your best self.
 - b) To be able to work on your weakness.
 - c) To help your interviewer with his/ her hiring decision.
 - d) All of the above.
- Q.41 Which of these is the most important characteristic of high performance team?
- a) Openness.
 - b) Worthiness.
 - c) Trust.
 - d) Commercial Orientation.
- Q.42 Which of the following is a Polychronic country?
- a) Japan b) The US
 - c) India d) The UK
- Q.43 What's the most important thing which an employer wants to find out about you in a job interview?
- a) Your best fitment for the role and the organizational culture.
 - b) Your educational institutions.
 - c) Your family background.
 - d) Your extra- curricular activities.
- Q.44 When you make a call the first step is to:
- a) Identify yourself.
 - b) Greet.
 - c) State the purpose of the call.

d) Paraphrase.

Q.45 We should pick up our phone ideally in ____ or less rings.

- a) 1
- b) 3
- c) 6
- d) 2

Q.46 Urgent and Important activities will find place in your Schedule as:

- a) Could
- b) Must
- c) Should
- d) None of these

Q.47 You are writing an email to your client Jolina Carter. Which of the following is the most appropriate salutation?

- a) Respected Madam
- b) Dear Ms. Carter
- c) Hi there!
- d) None of the above

Q.48 "After you", "May I", "Please allow me", "Thank you" are examples of:

- a) Punctuality
- b) Morality
- c) Courtesy
- d) Brutality

Q.49 Effective teams can:

- a) Be bought.
- b) Be faked.
- c) Be created through trust and competency.
- d) Exist without having a common goal.

Q.50 What is the tendency to postpone things called?

- a) Overreaching
- b) Procrastination
- c) Delegation
- d) Remuneration

End Semester Examination, May 2016

B. Tech. – Sixth Semester

QUANTITATIVE APTITUDE AND PERSONALITY DEVELOPMENT-III (HM-603)

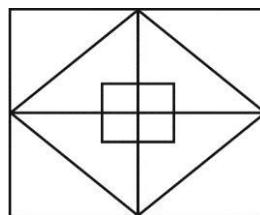
Time: 2 hrs

Max Marks: **50**

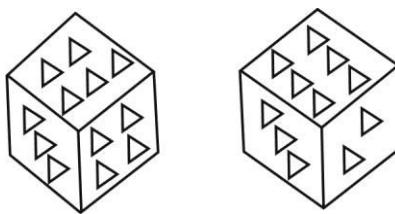
No. of pages: **5**

Note: *The paper consists of **FIFTY** multiple choice questions; Each question has **FOUR** options with **ONE** correct answer. Select the correct answer. Attempt all questions. All questions are of **ONE** mark each. There is no negative marking.*

- Q.1 A mixture of water and milk contains 80% milk. In 50 litres of such a mixture, how many litres of water is required to increase the percentage of water to, 50%?
 a) 20 b) 15
 c) 30 d) 45
- Q.2 In a zoo, there are Rabbits and Pigeons. If heads are counted, there are 200 and if legs are counted, there are 580. How many pigeons are there?
 a) 90 b) 100
 c) 110 d) 120
- Q.3 FRANK is coded as 93210, AFTER as 29463, MUFFET as 366. What is the code for "F"?
 a) 9 b) 3
 c) 6 d) 1
- Q.4 In certain military code, "SYSTEM" is written as "SYSMET", and "NEARER" as "AENRER", what will be code for "FRACTION"?
 a) CRAFNOIT b) FRCAITNO
 c) CARFNOIT d) FRACNOIT
- Q.5 How many squares are there in the following figure?



- a) 9 b) 11
 c) 10 d) 12
- Q.6 A cube is coloured in such a manner that its adjacent faces are not of the same colour. To do this how many minimum colours are required?
 a) 3 b) 4
 c) 6 d) 2
- Q.7 Two positions of a cubical block are given below, each face having small triangles. If there is triangle at the bottom how many triangles will be there on the top face?



- a) 4 b) 3
 c) 2 d) 5

Directions for questions 8 to 12: Study the following information carefully and answer the questions given below:

Eight persons A, B, C, D, E, F, G and H are sitting around a rectangular table in such a way that two persons sit on each of the four sides of the table facing the centre. Persons sitting on opposite sides are exactly opposite to each other. D faces North and sits exactly opposite to H. E is to the immediate left of H. A and G sit on the same side. G is exactly opposite of B who is to the immediate right

of C. A is next to the left of D.

- Q.8 Who is sitting opposite to A?
a) G b) D
c) E d) C
- Q.9 Who is next to E in clockwise direction?
a) G b) B
c) F d) A or F
- Q.10 Which of the following pairs of persons has both the persons sitting on the same side with first person sitting to the right of second person?
a) DF b) CB
c) EH d) AG
- Q.11 Who is sitting opposite to E?
a) D b) A
c) F d) A or D
- Q.12 Which of the following statements is definitely true?
a) A is facing North
b) E is sitting opposite of F
c) F is to the left of G
d) C is to the left of A
- Q.13 After deducting 10% from a certain sum, and then 20% from the remainder, `3600/- is left. Find the original sum.
a) 5000 b) 2592
c) 4500 d) 3960
- Q.14 In a mixture of 120 litres, the ratio of milk and water is 2:1. If the ratio of milk and water is 1:2, then the amount of water (in litres) is required to be added is:
a) 20 b) 40
c) 80 d) 120
- Q.15 What will be the amount when `10000/- is deposited in a bank at 10% per annum compounded annually for 3 years, when it is kept at compound interest?
a) 13310 b) 13300
c) 13000 d) 13200
- Q.16 A man, a woman and a boy can together complete a piece of work in 3 days. If a man alone can do it in 6 days and a boy alone in 18 days, how long will a woman take to complete the work?
a) 9 days b) 21 days
c) 24 days d) 27 days
- Q.17 A train approaches a tunnel AB. Inside the tunnel is a cat located at a point that is $\frac{3}{8}$ th of the distance AB measured from the entrance A. When the train whistles the cat runs. If the cat moves to the entrance of the tunnel, A, the train catches the cat exactly

at the entrance. If the cat moves to the exit, B, the train catches the cat at exactly the exit. What is the ratio of the speed of the train to the speed of the cat?

- a) 8:1
- b) 4:1
- c) 5:3
- d) 8:3

Q.18 A car covers four successive 3 km stretches at 10 km/hr, 20 km/hr, 30 km/hr and 60 km/hr respectively. Its average speed over this distance is:

- a) 10km/hr
- b) 20km/hr
- c) 25km/hr
- d) 30km/hr

Q.19 One local and another express train were proceeding in the same direction on parallel tracks

at 29 km/hour and 65 km/hour respectively. The driver of the former train notices that it took exactly 16 seconds for the faster train to pass by him. What is the length of the faster train?

- a) 60 m
- b) 120m
- c) 160 m
- d) 240 m

Q.20 Rohit can row 40 km upstream and 55 km downstream in 13 hours and 30 km upstream and 44 km downstream in 10 hours. What is the speed of Rohit in still water?

- a) 6 km/h
- b) 12 km/h
- c) 3km/h
- d) 8 km/h

Q.21 Which of the following is not one of the suggested strategies for preparing for your job interview?

- a) Conduct research on the company/industry.
- b) Prepare answers to possible interview questions.
- c) Gather key resources (extra resumes, reference list) to take with you.
- d) Research salaries so you can ask about salary and benefits at the beginning of the interview.

Q.22 How many pages should a resume have?

- a) 1
- b) 2
- c) 3
- d) Depends on the requirement.

Q.23 When you dress up for the interview the colour of your belt should match with?

- a) Trouzers
- b) Socks
- c) Shoes
- d) Watch

Q.24 What is the best way to respond to, "tell me something about yourself"?

- a) A 10-minute detailed story of your life, from birth to present.
- b) A concise narrative of your personal and professional background and goals and how they relate to the job at hand.
- c) A short narrative of your personal life, leaving nothing to the imagination.
- d) A long-winded account of what you want from the employer.

Q.25 Which of the following should be avoided in self- introduction?

- a) Anything that puts you in bad light.
- b) Very personal information.
- c) Your nick name.

- d) All of the above.
- Q.26 In order to write effective emails:
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 - d) None of the above.
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- a) Knowledge.
 - b) Communication.
 - c) Leadership.
 - d) All of the above
- Q.29 Where do you see yourself 10 years from today? This is a question related to.....
- a) Long term goals.
 - b) Group behaviour.
 - c) Leadership qualities.
 - d) Communication.
- Q.30 Which of the following is appropriate to be asked to the interviewer?
- a) About the job itself.
 - b) Your typical day at work.
 - c) Available learning opportunities.
 - d) All of the Above.
- Q.31 Your interviewer has asked you a question and you don't know the answer. You should...
- a) Beat about the bush and confuse the interviewer.
 - b) Give any answer.
 - c) Just say I'm SORRY.
 - d) Say that you don't know the exact answer but would like to give it a try.
- Q.32 You practise the philosophy of "You are ok, I am ok". Which of the following behaviors do you exhibit?
- a) Assertive.
 - b) Aggressive.
 - c) Passive.
 - d) Passive aggressive.
- Q.33 Tick the incorrect statement about Group Discussion:
- a) You should cut down your opponents
 - b) Maintain a meaningful eye contact with all the participants
 - c) Maintain a smiling and pleasant disposition
 - d) Avoid looking at the floor or ceiling as it communicates disinterest.
- Q.34 Being a confrontationist in a GD...
- a) Helps you win.
 - b) Is a decent strategy.
 - c) Is a strict No-No.
 - d) None of the above.

Q.35 Polychronic and monochronic are:

- a) Terms used to describe attitude towards money.
- b) Cultural concepts related to the attitude towards time.
- c) Terms related to body language.
- d) None of the above.

Q.36 Timelines, assignments, projects, respect for teachers and attendance in college are important for professional life as:

- a) They habitually guide our behaviour in the corporate world.
- b) They determine our grades in the college.
- c) They are the foundation of our professional behaviour and attitude.
- d) All of the above.

Q.37 Your interviewer has asked you about your weakness, what you should do?

- a) Be honest and tell the truth.
- b) Say that you have no weakness as you have worked upon all of them.
- c) Talk about a genuine and obvious weakness which doesn't impact the job followed by the steps taken to improve.
- d) Tell a weakness which is more likely strength.

Q.38 The best way to manage before an interview is by...

- a) Taking deep breath and smiling.
- b) Drinking a lot of water.
- c) Playing games on mobile.
- d) Using Facebook and WhatsApp.

Q.39 Cover letter should be.....

- a) Customized
- b) Standard
- c) None of these
- d) Both

Q.40 STAR technique in a skill-based interview is:

- a) Skill Task Action Result.
- b) Situation Task Attitude Result.
- c) Situation Target Action Result.
- d) None of the above.

Q.41 Verbal communication includes:

- a) Speaking.
- b) Writing.
- c) Both A and B.
- d) None of the above.

Q.42 Which of the below are the qualities of an active listener?

- a) They paraphrase.
- b) They ask and answer questions.
- c) They delay Judgment.
- d) All of the above.

Q.43 Why is it important to do self-analysis in an interview?

- a) It helps you project your best self.
- b) To be able to work on your weakness.
- c) To help your interviewer with his/ her hiring decision.
- d) All of the above.

- Q.44 How would you answer the question "Tell me about your weakness"?
- a) Say that you don't have any weakness.
 - b) Tell a weakness which is more likely to be strength in disguise.
 - c) Tell about an obvious weakness not deterrent to the role highlighting the actions being taken to overcome it.
 - d) Be honest and say it all even if it costs you the job.
- Q.45 Which of the following is a Polychronic country?
- a) Japan
 - b) Pakistan
 - c) Australia
 - d) UK
- Q.46 What's the most important thing which an employer wants to find out about you in a job interview?
- a) Your best fitment for the role and the organizational culture.
 - b) Your educational institutions.
 - c) Your family background.
 - d) Your extra-curricular activities.
- Q.47 When you make a call the first step is to:
- a) Identify yourself.
 - b) Greet.
 - c) State the purpose of the call.
 - d) Paraphrase.
- Q.48 We should pick up our phone ideally in _____ or less rings.
- a) 1
 - b) 3
 - c) 6
 - d) 2
- Q.49 You are writing an email to your client Josh Sanders. Which of the following is the most appropriate salutation?
- a) Hi Josh
 - b) Respected Josh Sanders
 - c) Dear Mr. Sanders
 - d) Dear Sanders
- Q.50 "After you", "May I", "Please allow me", "Thank you" are examples of:
- a) Punctuality
 - b) Morality
 - c) Courtesy
 - d) Brutality

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

TOTAL QUALITY MANAGEMENT (HM-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.** Each question carries equal marks.

Q.1 Explain in brief:

- a) 'Quality is fitness for use'.
- b) 'Determinants of quality'.
- c) 'Customer satisfaction depends on quality'.
- d) 'Quality circle'.
- e) 'Bench marking'.

4×5

PART-A

Q.2 What is principle of TQM and what are its elements? Explain in detail with TQM stresses? **20**

Q.3 For continuous process of improvement, how 'KAIZEN' try to improve the process? Explain with a sketch. **20**

Q.4 Explain 'process capability' and concept of 'Six Sigma' in detail. **20**

PART-B

Q.5 What is Failure Model and Effect Analysis (FMEA)? Describe its various stages in detail. **20**

Q.6 What is 'quality policy'? How can it be adopted with a proper 'leadership quality'? Explain. **20**

Q.7 Explain 'quality auditing' and its need in detail. **20**

End Semester Examination, May 2016

B. Tech. – Seventh / Eight Semester

TOTAL QUALITY MANAGEMENT (HM-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.** Each question carries equal marks.

Q.1 Explain:

- a) Total Quality Management.
- b) Customer Perception of Quality.
- c) How quality is built in the product.
- d) Seven Tools of Quality.
- e) What is 'Bench Marking'?

4×5

PART-A

Q.2 What are 'Objectives of Quality' and its dimensions? **20**

390/5

Q.3 Explain 'Theory of Continuous'. Improvement delivered by 'K A I Z E N'. **20**

Q.4 What is 'SPC' (Statistical Process Control) and discuss the steps taken in 'SPC'? **20**

PART-B

Q.5 How do you interpret 'Control Chart' what are its objectives? **20**

Q.6 Explain 'Quality Council'. Which designs the policy for making managerial action and achievement? **20**

Q.7 Write short notes on:

- a) ISO – 9000.
- b) Quality Auditing.
- c) Quality Planning Process.
- d) 4-Pillars of TQM.

5x4

End Semester Examination, May 2016

B. Tech. – Eight Semester

MARKETING MANAGEMENT (HM-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.** Each question carries equal marks.

- Q.1 a) What is marketing?
b) What is value delivery process?
c) Differentiate between Macro and Micro environment.
d) What is data warehousing?
e) Give salient features of “fraud motivation”.
f) What is segmentation?
g) What is defensive marketing?
h) What is product line analysis?
i) Why company needs to contribute in social marketing?
j) What are value networks?

2x10

PART-A

- Q.2 a) Explain the holistic marketing concept in detail. **10**
b) What is strategic business units? What are the resources to each SBU? **10**
- Q.3 Explain the marketing research process in detail. **20**
- Q.4 a) Explain the five stages model of a buying decision process. **10**
b) Differentiate between business market and consumer market. **10**

PART-B

- Q.5 a) What are various product life cycle marketing strategies? **12**
b) Differentiate between demographic and behavioral segmentation. **8**
- Q.6 a) What is a product? What are various product levels? How products can be classified? **12**
b) Write short notes on:
i) Promotional pricing.
ii) Differentiated pricing. **4x2**
- Q.7 a) Write short notes on:
i) Corporate social responsibility.
ii) Cause related marketing. **5x2**
b) What is the importance of marketing channels? Differentiate between hybrid and multi-channel marketing in brief. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

HUMAN RESOURCE MANAGEMENT (HM-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.** Each question carries equal marks.

Q.1 Answer in brief:

- a) Discuss the objectives of HRP.
- b) Discuss the purposes of recruitment process.
- c) Importance of succession planning.
- d) Importance of pay for performance.

5×4

PART-A

Q.2 Discuss the challenges faced by HRM and department in detail. **20**

Q.3 What is HRP? Discuss the process of HRP in detail. **20**

Q.4 Discuss the environmental influences on recruitment with suitable examples. **20**

PART-B

Q.5 What is training? How can one design and administer a training program? **20**

Q.6 What is compensation? How would you determine a compensation structure for a Public Ltd. Co.? **20**

Q.7 Write short notes on the following:

- a) Role of HR in virtual organization.
- b) Employee leasing.

10

10

End Semester Examination, May 2016

B. Tech. – Seventh Semester

PROJECT MANAGEMENT (HM-823)

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 explain the following:

- a) Project management vs general management.
- b) Project characteristics.
- c) Tendering process.
- d) Types of risks involved in projects.
- e) Project audit.

4×5

PART-A

- Q.2** a) What are different types of projects? Distinguish between expansion and diversification projects. **10**
 b) What is a project cycle? Explain in detail. **10**
- Q.3** a) How do you formulate or prepare the project? Explain. **10**
 b) What are project appraisal and its types? Discuss in detail. **10**
- Q.4** a) Explain different types of floats and their importance. **5**
 b) For a given project the data is given below:

Activity	A	B	C	D	E	F	G
Predecessor				A	B	C	D, E
t_o	1	1	2	1	2	2	3
t_m	1	4	2	1	5	5	6
t_p	7	7	8	1	14	8	15

- i) Draw the project network and find the expected duration. **10**
- ii) What is the probability that project will be completed in 20 weeks?

Note: The area under normal curve covered under $+1\sigma$ from mean is .3413. **5**

PART-B

- Q.5** a) Explain WBS and OBS and its integration with an example. **10**
 b) What is contract? Explain its types in detail. **10**
- Q.6** a) Define project inventory and its classification in detail. **10**
 b) Explain inventory control and methods to control inventory in detail. **10**
- Q.7** a) Why project termination is important? Explain the project termination process in detail. **10**
 b) Write down the qualities and responsibilities of a project manager. **10**

End Semester Examination, May 2016

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 Briefly answer:

- a) Define desktop virtual reality.
- b) Describe various elements of multimedia.
- c) What is sub-band coding?
- d) What is DVI technology?
- e) Explain colour dithering.
- f) Define the term 'anti-aliasing'.
- g) Differentiate between hypertext and hypermedia.
- h) Define terms: Shape tweening and motion tweening.
- i) Explain 41Q colour model.
- j) What is CLUT?

2×10

PART-A

Q.2 a) What are multimedia authoring tools? Describe their classifications. **10**
b) What are the design goals of ATM? Explain various layers of ATM along with their functioning. **10**

Q.3 a) What is colour palette? What is the problem of palette flashing? Explain the process of dithering. **6**
b) Differentiate between BMP and TIFF image file formats. **4**
c) Discuss various steps of JPEG compression technique and objectives of JPEG. **10**

Q.4 a) Discuss the role of multimedia in business, entertainment and education fields. **10**
b) Explain applications of virtual environment. What are the requirements of virtual coupled systems? **10**

PART-B

Q.5 a) What is digital audio? How it can be generated from analog audio? Explain in detail. **10**
b) Discuss the audio compression of MPEG layer 1 and layer 2 in detail. **10**

Q.6 a) Distinguish between lossy and lossless compression of sound. **5**
b) List and explain various image file formats. **5**
c) Differentiate between speech compression and speech synthesis? **10**

Q.7 a) Define the term animation. What is cell animation? **15**
b) Explain various animation techniques in detail. **5**

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1 a) What is data communication?
b) What are digital and analog signals?
c) What are the responsibilities of network layer in internet model?
d) Explain the terms: amplitude, frequency and phase?
e) What are the goals of multiplexing?
f) Why TCP is more reliable than UDP?
g) How does caching increases the efficiency of name resolution?
h) Find class of each address:
i) 14.23.120.8
ii) 00000001 00001011 **00001011** 11101111
i) What are the four fundamental characteristics required for an effective data communication system?
j) Differentiate between connection-less and connection-oriented services? **2x10**

PART-A

- Q.2 a) Identify the five components of a data communication system? Also explain various communication modes. **8**
b) What are the various categories of networks? Explain. **8**
c) Explain what are the two types of line configuration and also discuss their PROS and CONS? **4**
- Q.3 a) What are the advantages of optical-fiber over twisted-pair and co-axial cables? **10**
b) Differentiate between polar and unipolar encoding schemes? **10**
- Q.4 a) What are the various multiplexing techniques? **10**
b) Explain what are the various data encryption techniques. **10**

PART-B

- Q.5 a) What are the differences between classful and classless addressing in IPV4? **10**
b) Explain why collision is an issue in random access protocol but not in controlled access protocol? **10**
- Q.6 a) What are the various open loop and closed loop congestion control techniques?
b) Explain routing information protocol in detail. **5**

- Q.7** a) What are the various remote monitoring techniques? **10**
 b) Write short notes on:
 i) Firewalls.
 ii) Proxy servers. **5x2**

End Semester Examination, May 2016

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**. Each question carries equal marks.

- Q.1 a) What is the need for data communication?
b) List different data communication components.
c) Define digital and analog signals.
d) Define LAN, WAN and MAN.
e) What is frame relay?
f) Differentiate between Internet and Intranet.
g) Define IP address.
h) Define the term: token bus.
i) Define DNS.
j) What are advantages of internet?

2x10

PART-A

- Q.2 a) Explain different types of topologies used in a computer networks. **12**
b) Explain different communication modes applicable for a network. **8**
- Q.3 a) Differentiate between Manchester encoding and differential manchester encoding. **6**
b) Explain twisted pair, co-axial and fiber optic-cables. **6**
c) Briefly explain Nyquist theorem and Shannon limit. **8**
- Q.4 a) What do you mean by cryptography? Explain. **5**
b) What is multiplexing? Explain its different types with examples. **10**
c) Explain Huffman encoding. **5**

PART-B

- Q.5 a) Explain OSI reference model. **10**
b) What is IP addressing? Explain IP address classes in detail. **10**
- Q.6 a) What is routing? Differentiate between static routing and dynamic routing. **8**
b) Explain ATM reference model in detail. **12**
- Q.7 Write short notes on:
a) Firewall
b) VLANS
c) Proxy servers
d) Class of service **5x4**

End Semester Examination, May 2016
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.** Each question carries equal marks.

- Q.1

 - a) What is the use of "Final" Keyword in java?
 - b) Differentiate between Swings and AWT.
 - c) What is the role of JVM in java?
 - d) What is abstract class?
 - e) Define aggregation in java.
 - f) Why we use runnable interface in java for creation of thread?
 - g) Differentiate between radio buttons and checkboxes.
 - h) Explain logging in java.
 - i) Give the difference between checked and unchecked exceptions.
 - j) Explain how arrays are declared and initialized in java.

2x10

PART-A

- Q.2**

 - a) What is method overriding? Explain with an example.
 - b) Create a class named employee with the following details:
Data Members:
 - i) Name.
 - ii) Age.
 - iii) Gender.Method: - Display ()
Create another class full time employee that inherits the employee class:
Data Members:
 - i) Salary.
 - ii) Designation.Method: Display () to show salary and designation along with other employee details.

10×2

Q.3

 - a) State the different ways of executing an applet. **5**
 - b) Differentiate applets from application program. **5**
 - c) Write a program to embed an image inside the applets visible area. **10**

Q.4

 - a) How do the event objects register the event listener in java?
 - b) Explain control statements in java with a suitable example. **10×2**

PART-B

- Q.5 a) What is synchronization and why it is important?
b) What is thread priority? How can it be set for a thread, explain it with the help of an example? **10×2**

Q.6 Write short notes on:
a) RMI.
b) Soap. **10×2**

Q.7 a) What are the four types of JDBC drivers? **10**

- | | |
|---|----------|
| b) Why do we use prepared statement instead of statement? | 5 |
| c) How do you update a result set programmatically? | 5 |

End Semester Examination, May 2016

B. Tech. – Fifth Semester

INTERNET AND WEB TECHNOLOGY (IT-501)

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) Why e-mail client is required?
 b) What is World Wide Web (WWW)?
 c) State the purpose of HTTP.
 d) Write HTML code for following ordered list beginning with 5. The list is: Cake, Biscuit, Ice cream
 e) State the purpose of cascade style sheet (CSS) with an example.
 f) Write HTML syntax to insert an image on a web page with height and width =200 pixels.
 g) State difference between javascript and HTML.
 h) Explain languages used for CGI?
 i) Differentiate between ALERT and PROMPT dialog box.
 j) Why "Digital signatures" are required? **2x10**

PART-A

- Q.2 a) Explain working of TCP/IP protocol suite. Draw a neat diagram. **10**
 b) Explain the working of a 'bridge' using a diagram. **5**
 c) Differentiate between LAN, WAN and MAN. **5**
- Q.3 a) Explain working of search engine using a neat diagram. **10**
 b) Describe working of a web browser using a neat diagram. **10**
- Q.4 a) Write HTML code for the following table:

Mark Sheet

NAME	MARKS		
	WTCS	POS	CG
Guru	45	40	42
Aamir	39	45	40

10

- b) –State need of 'Meta tags' with supporting examples. **5**
 c) Write HTML code to create two web pages showing hyper linking between the pages. **5**

PART-B

- Q.5 a) Write a JavaScript code, which checks the contents entered in a form's text element. If text element is in lower case, convert it to upper case. **10**
 b) Write short note on cookies. **5**
 c) Write JavaScript using 'prompt dialog box' which displays the 'name'. Keyed in along with a greeting message. **5**
- Q.6 a) Write a short note on personal web server (PWS). State its advantages and disadvantages. **10**

- b) Explain the steps involved in execution of a servlet use a neat diagram. **5**
- c) Explain the various differences between classifications of 'Internet programming'. **5**
- Q.7 a) Explain the concept and working of 'digital signature' using an example. **10**
- b) Discuss the 'classification' of firewall in details with suitable example/diagram. **10**

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh / Eighth Semester

NETWORK PROGRAMMING AND ADMINISTRATION (IT-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**. Each question carries equal marks.

- Q.1 a) What is multiservice server?
b) Define routing.
c) Explain the role of select () and pole () functions.
d) Differentiate between TCP and UDP protocol.
e) Compare remote-procedure-call and local-procedure-call.
f) Differentiate between static and dynamic routing.
g) Write the difference between socket and TLI.
h) What is the role of network administrator?
i) Differentiate between ARP and RARP protocol.
j) Why IP is considered a best effort delivery protocol? **2x10**

PART-A

- Q.2 a) What is NAT? How it translate an address? **5**
b) Differentiate between default mask, subnet mask and supernet mask. **5**
c) A company is granted the site address 201.70.64.0 (class C). The company needs six subnets. Design the subnets. **10**
- Q.3 a) Give detailed architecture of TCP based client server communication system. Explain role of each socket call involved with a neat interaction diagram. **10**
b) Explain the elementary node and address conversions in the context of TCP and UDP socket. **10**
- Q.4 a) What is a multiprotocol server? What is the motivation behind multiprotocol server? Explain its working in brief. **5**
b) Define NFS and discuss its variants: SNFS and ANFS. **5**
c) Define concurrent connection oriented server. Compare it with iterative connection oriented server. Explain single process, concurrent connection oriented server algorithm with a neat process structure diagram. **10**

PART-B

- Q.5 a) Write down the paradigms for building distributed programs. **5**
b) What do you mean by dynamic port mapping? Write RPC port mapper algorithm. **10**
c) Write a short note on authentication in RPC. **5**
- Q.6 a) What do you mean by network administration? Discuss various approaches towards network administration. **10**
b) Write short notes on: i) PPP ii) RADIUS **5**

- c) What is the role of DNS? Give steps for configuring a DNS server. **5**
- Q.7 a) Define firewalls. How do they differ from wrappers? **10**
- b) What do you mean by security planning in a network security? **10**

End Semester Examination, May 2016

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) What are the phases of SDLC?
b) What is software metric?
c) Differentiate between product and process.
d) What is context diagram?
e) What is data dictionary?
f) Explain the meaning of abstraction in terms of software design.
g) What is regression testing?
h) What are defect tracking tools?
i) Differentiate between high level and low level design.
j) What do you understand by modularity? | 2x10 |
|-----|--|-------------|

PART-A

- | | | |
|-----|---|------------------------|
| Q.2 | a) Explain spiral model with its advantages and disadvantages.
b) Explain emergence of software engineering. | 15
5 |
| Q.3 | a) Draw DFD upto level 2 for library management system.
b) Give a brief note on requirement elicitation. | 15
5 |
| Q.4 | a) Explain the intermediate COCOMO model.
b) Write down the life cycle of risk management. | 10
10 |

PART-B

- | | | |
|-----|--|-------------------------|
| Q.5 | a) What is cohesion? Explain its types.
b) What are the objectives of system design? | 10
10 |
| Q.6 | a) Differentiate between white box and black box testing. Also explain their types.
b) Differentiate between validation and verification. | 15
5 |
| Q.7 | a) Explain the software metrics for reliability assessment.
b) Explain in brief:
i) Fault avoidance.
ii) Fault detection. | 10
5x2 |

End Semester Examination, May 2016

B. Tech. – Fifth / 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) What are the objectives of requirement analysis?
 b) What are the difficulties in elicitation?
 c) Differentiate between functional and data modeling.
 d) What is DFD? What does level 'O' DFD represent?
 e) Define software reliability.
 f) What are objectives of project planning process?
 g) What are the characteristics of a good SRS document?
 h) The modules in a good design should have low coupling, Why?
 i) What do you mean by risk assessment?
 j) What are the various testing activities?

2x10

PART-A

- Q.2 a) Explain RAD (Rapid Application Development) model. What are the advantages and disadvantages of RAD model? **10**
 b) Explain the various steps involved in software development process. **10**
- Q.3 a) Explain the prototyping approach in software development process. **10**
 b) What is DFD? Explain the DFD of library management system. **10**
- Q.4 a) Explain COCOMO model? How it is different from other techniques? **10**
 b) Let project was estimated to be 400 KLOC. Calculate effort, development, average staff size (ss) and productivity.
 (Refer table below Basic COCOMO Co-efficients)

Project	a _b	b _b	c _b	d _b
Organic	2.4	1.05	2.5	0.38
Semidetached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

10

PART-B

- Q.5 a) Explain boundary value analysis technique with a suitable example. **10**
 b) Explain design issues in designing a software. **10**
- Q.6 a) What is modularity? Explain cohesion and coupling with its types. **10**
 b) Explain the following tests:
 Unit testing, integration testing, stress and performance testing. **10**
- Q.7 Write short notes on **(any two):**
 a) Software quality assurance.
 b) Integrated case environment.
 c) Reliability and quality standards. **10x2**

End Semester Examination, May 2016
B. Tech. – Sixth / Seventh / Eighth 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.** Each question carries equal marks.

- Q.1 a) What is MIS? Discuss various components of MIS.
b) Why information is a quality product? Discuss its classification.
c) Explain reporting system and its specifications.
d) What is planning? Discuss strategic planning and its tools.
e) Explain and discuss applications of MIS to electronic business system. **4x5**

PART-A

- Q.2 a) Discuss several organizational sectors using MIS. Also, explain their various functional models in detail. **10**
b) What are the various software support available for MIS? Also discuss the role of DBMS in detail. **10**
- Q.3 What are the methods of data and information collection? Discuss general model of information processing. Also explain MIS software and MIS team in detail. **20**
- Q.4 Write short notes on:
a) Staff training and functional manuals of MIS. **10**
b) Scheduling of activities in MIS. **10**

PART-B

- Q.5 a) What is decision support system? What are its roles and applications? **10**
b) Discuss various DSS models with their working. **10**
- Q.6 What are the distinctive objectives of MIS in service sector? Why the service of MIS is distinctive? Also discuss various activities of service sector implemented in MIS. **20**
- Q.7 Write short notes on:
a) Security of management of information systems.
b) Privacy issues. **10x2**

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh 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) Define e-commerce.
b) Define ERP.
c) Differentiate between e-commerce and e-strategy.
d) Define e-marketing.
e) What do you mean by home-shopping?
f) What are advantages of e-commerce?
g) What are disadvantages of e-commerce?
h) Define e-mail.
i) Why there is need for e-commerce?
j) What do you mean by SAP? **2x10**

PART-A

- Q.2 a) Explain the role of internet with regards to the development of e-commerce. **10**
b) With the help of suitable examples explain the 4Cs of the e-commerce. **10**
- Q.3 a) Discuss the various on-line commerce options with suitable examples. **10**
b) Explain electronic payment system and digital payment system in brief. **10**
- Q.4 a) Explain various concepts, benefits and applications of EDI model. **10**
b) Write short notes on:
i) Fire-wall.
ii) Cryptography. **5x2**

PART-B

- Q.5 a) How can you relate re-engineering and business process redesign? **10**
b) Explain the role of ERP in SCM. **10**
- Q.6 a) What are the various modules of ERP system? Explain HRD and accounting modules in detail. **10**
b) Explain the relation between production planning, production scheduling and production control. **10**
- Q.7 a) Justify the term: "ERP as an integrated system". **10**
b) Write short notes on:
i) ERP life cycle model.
ii) Critical success factor of ERP. **5x2**

End Semester Examination, May 2016

B. Tech. – Sixth / Seventh / Eighth 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.** Each question carries equal marks.

- Q.1 a) Write AWT program to add two numbers.
b) Explain the features of Java beans?
c) Differentiate between URI and URL.
d) What do you understand by digital signatures?

5x4

PART-A

- Q.2 a) What items are required to write a database program? Explain in detail. **10**
b) Explain scrollable and updatable result set by giving suitable example. **10**
- Q.3 Describe client server implementation in detail. Also explain socket timeout. **20**
- Q.4 a) What is a table? Explain the process of adding and displaying the records of the table with the help of an example. **10**
b) What do you mean by progress monitors? Explain with the help of example. **10**

PART-B

- Q.5 a) Explain the concept of transparency and composition in AWT with the help of an example.
b) Write short notes on:
i) Clipboard.
ii) Renders and writers for images. **5x2**
- Q.6 Write in detail on:
a) Byte code verification. **10**
b) Class loaders. **10**
- Q.7 a) Explain the process of creating an application using beans by taking suitable example. **10**
b) What is property editor? Give an example for creating property editor. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth 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.** Each question carries equal marks.

- Q.1 a) What is process and product?
b) Write the equation for effort and development time for intermediate COCOMO model.
c) How SDLC can be selected?
d) What is resource planning?
e) What is bottom up approach for effort estimation?
f) What is risk management?
g) What is quality management planning?
h) What is scope management?
i) What is flexibility matrix?
j) What is project closer analysis? **2x10**

PART-A

- Q.2 a) What is process tailoring? Explain it with the help of a suitable example. **10**
b) What is requirement change management? Explain the change management process in detail. **10**
- Q.3 a) Difference between V-model and RAD model. Explain with a suitable example. **10**
b) Write short notes on:
i) Man-power planning.
ii) Financial planning. **5x2**
- Q.4 Explain the following terms:
a) CPM scheduling. **10**
b) Project planning. **10**

PART-B

- Q.5 a) Explain the concept of quality with the help of quality control and quality assurance. **10**
b) What is risk identification? Explain risk monitoring and tracking in detail. **10**
- Q.6 a) Explain the project tracking in context with activities, defect and issues tracking. **10**
b) Explain the project crashing and fast tracking along with crash process and network analysis. **10**
- Q.7 a) What is quality control tool? Explain it with the help of a suitable example. **10**
b) What is review plan? Explain defect analysis and prevention in detail. **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

DATA WAREHOUSING AND DATA MINING (IT-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.** Each question carries equal marks.

- Q.1 a) State advantages and disadvantages of data marts?
b) What is the importance of a concept hierarchy in data warehouse?
c) Define dimension and dimension table.
d) How to detect redundancies table?
e) What is min-max normalization?
f) Define base and apex cuboids.
g) What do you understand by an association rule?
h) What are outliers? How they can be detected?
i) What do you understand by multimedia databases?
j) What is clustering?

2x10

PART-A

- Q.2 a) Explain different OLAP operations using suitable examples. **10**
b) What do you understand by a measure? Explain different types of measures with the help of suitable examples. **10**
- Q.3 a) What are the responsibilities of a data warehouse manager? **5**
b) Explain distributed and virtual data warehouse. **5**
c) Explain three-tier architecture of a data warehouse in detail. **10**
- Q.4 a) How to index OLAP data? **5**
b) How OLAP queries can be processed efficiently? **5**
c) Explain the purpose of data transformation in data preprocessing. **10**

PART-B

- Q.5 a) Discuss various objective measures of pattern matching in data mining. **10**
b) Explain the kind of knowledge to be mined w.r.t. data mining primitives. **6**
c) Write DMQL syntax for concept hierarchy specification. **4**
- Q.6 a) What do you understand by market-basket analysis? Explain the basic concept and technology of association rules. **10**
b) Explain the process of classification using decision-tree-induction. **10**
- Q.7 a) Explain the important aspects of mining time series databases and sequence databases. **10**
b) What are the basic measures for text retrieval? Explain keyword based and similarity based retrieval. **10**

End Semester Examination, May 2016

B. Tech. – First / Second Semester

ELEMENTS OF MECHANICAL ENGINEERING (M-101C)

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 answer:

- a) Define state, path, process and cycle.
- b) Differentiate between helical gear and bevel gear.
- c) How many strokes are required to complete one revolution of wheel in a 4-stroke petrol engine?
- d) What are lifting machines? State with an example.
- e) Write down the similarities in Work and Heat.
- f) Define Poisson's ratio.
- g) How many types of loading can be subjected to a beam?
- h) Write down the classification of CAST IRON.
- i) Define yield point in stress-strain diagram.
- j) Define ductility and brittleness.

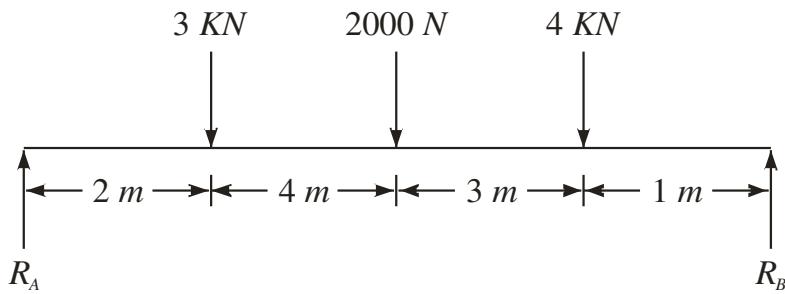
2×10

PART-A

- Q.2** a) Explain the second law of thermodynamics in detail. **10**
- b) The working fluid in an engine executes a cyclic process, and two work interactions are involved : 10 kJ to the working fluid and 30 kJ from the working fluid. The working cycle also involves three heat transfer, two of which are 75 kJ to the working fluid and 40 kJ from the working fluid. Determine the magnitude and direction of the 3rd heat interaction. **10**
- Q.3** a) Derive an expression for length of belt for a open-belt system. **10**
- b) Explain simple and compound gear trains. Also draw the diagrams. **10**
- Q.4** a) Write down the comparison of 4-stroke petrol and 4-stroke diesel engine. **10**
- b) What are applications of refrigeration? **10**

PART-B

- Q.5** a) Derive the relation between E, K and C. **12**
- b) A steel bar 1.5 m long, 50 mm wide and 20 mm thick is subjected to an axial tensile load of 120 KN. If the extension in the length of bar is 0.9 mm, make calculations for stress, strain and young's modulus of the bar material. **8**
- Q.6** Draw the shear force and bending moment diagram for the following system:



20

Q.7 a) Define the following mechanical properties (**any five**):

- i) Plasticity
- ii) Elasticity
- iii) Refractoriness
- iv) Malleability
- v) Strength
- vi) Hardness
- vii) Toughness

b) Explain gas welding process in detail with a diagram.

2×5
10

End Semester Examination, May 2016

B. Tech. – Second Semester
APPLIED MECHANICS (M-201)

Time: 3 hrs

Max Marks: **100**

No. of pages: **2**

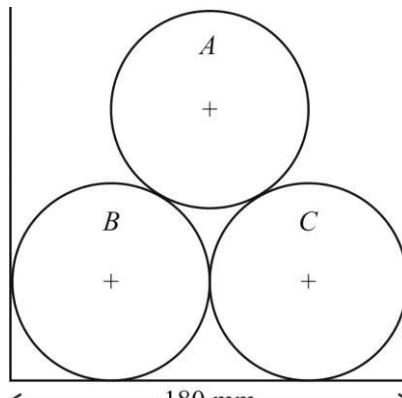
Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B**. Each question carries equal marks.

- Q.1 a) Write the statement for "Transmissibility law".
b) What is varignon's principle of moments?
c) Explain the "perpendicular axis theorem".
d) Derive J_{xx} of a circle with diameter 'd'.
e) Write down the steps being followed for solving a truss using method of section.
f) Differentiate between redundant and deficient trusses.
g) A stone is thrown vertically upwards with a velocity of 40m/s. find its position after 5 seconds.
h) Obtain an equation between the linear acceleration and angular acceleration of a rotating body.
i) Describe the phenomenon of combined motion of rotation and translation. Give few examples.
j) Explain the concept of virtual work.

2x10

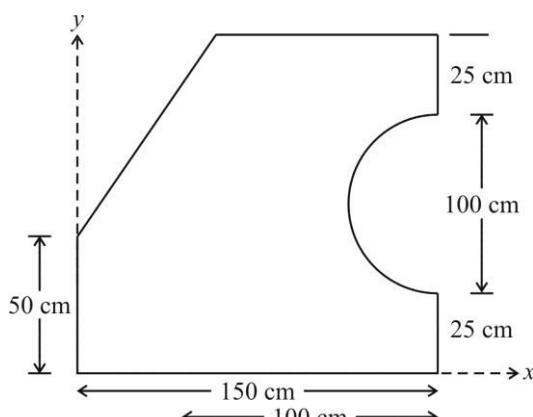
PART-A

- Q.2 a) State and prove Lami's theorem.
b) Three cylinders weighing 100 N each and of 80 mm diameter are placed in a channel of 180 mm width. Determine the pressure exerted by:
i) The cylinder A on B at the point of contact.
ii) The cylinder B on the base.
iii) The cylinder B on the wall.



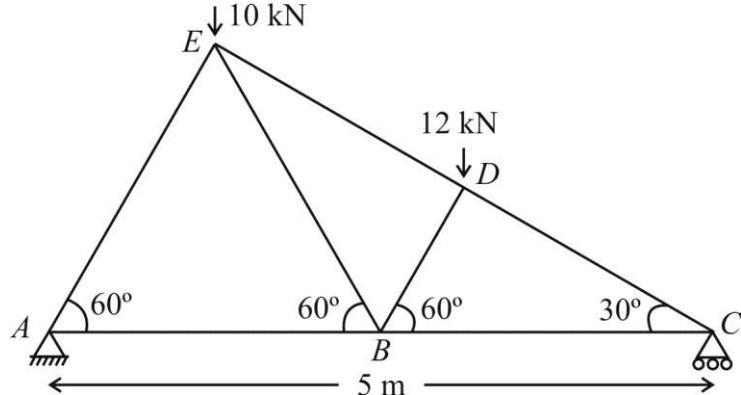
14

- Q.3 Find the moment of Inertia of the given axis about centroidal X and Y axes.



20
414/5

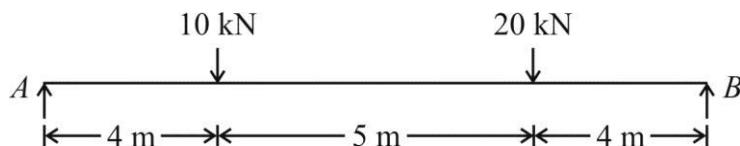
- Q.4 Determine the forces in all the members of the truss loaded and supported as shown in the figure.



20

PART-B

- Q.5 a) A particle starts from rest, moves in a straight line, whose acceleration is given by equation: $a = 10 - 0.006 S^2$ where 'a' is in m/s^2 and 'S' is in metres. Determine
 i) Velocity of the particle when it has travelled 50 metres.
 ii) Distance travelled by the particle when it comes to rest. 10
- b) A bullet shot is fired with a velocity of 30 m/s from a point 15 metres in front of a vertical wall 6 metres high. Find the angle of projection to the horizontal for the shot just to clear the top of the wall. 10
- Q.6 a) A 40 TON rail car travel at 4 km/h and collides with a 100 TON wagon on the same track, moving in the opposite direction at 1.2 km/hr. Find their velocities immediately after impact assuming no loss of energy. What is impulse between them? 10
- b) A weight 600 N lies on a smooth inclined plane. The plane is inclined at an angle of 45° with horizontal. The body is pulled up the plane for 5m distance. Calculate the work done in pulling the body. 10
- Q.7 a) By the principle of virtual work, find the values of reactions at A and B



14
6

- b) Explain the concept of work done by couple.

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1 a) Write down the use of white cast iron.
b) What is maraging steel?
c) Discuss about PMC material?
d) Draw creep curve neatly and label it.
e) What do you mean by hardenability?
f) What is allotropy?
g) What do you mean by dezincification?
h) What do you mean by uniform corrosion?
i) Write down the effect of grain size on austenite.
j) Define malleability and toughness.

2×10

PART-A

- Q.2 a) What is high speed steel? Give its properties, composition and applications in detail.
b) Discuss the bearing materials in detail. **10×2**
- Q.3 Write short notes on the following:
a) Rockwell hardness testing.
b) Ductile fracture.
c) Fatigue testing.
d) Granular corrosion. **5×4**
- Q.4 a) Discuss the mechanical behavior of ceramic materials.
b) What are abrasives? Classify the abrasive materials with examples. **10×2**

PART-B

- Q.5 a) Draw a neat sketch of Iron-Iron carbide equilibrium diagram and mark all the transition region, temperatures compositions and reactions in it. **15**
b) Write down the significance of T.T.T. curve. **5**
- Q.6 a) What is heat treatment? Why do we require heat treatment of materials? Classify it also.
b) Discuss the various heat treatment defects in detail. **10×2**
- Q.7 a) What is de-carburization? By which process it can be removed, discuss in detail.
b) Explain flame hardening with advantages and limitations with the help of a neat sketch. **10×2**

End Semester Examination, May 2016

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.

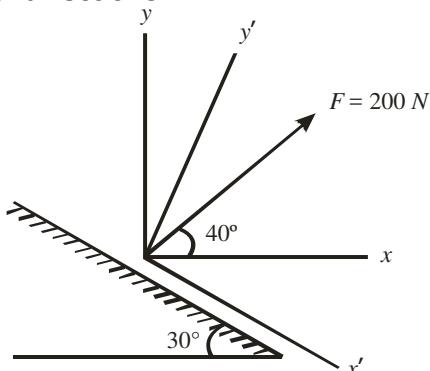
Q.1 Briefly answer:

- Define parallelogram law for the addition of forces.
- What do you understand by free body diagram?
- Explain Varignon's Theorem.
- Explain Parallel Axis Theorem.
- Define Principle of Virtual work.
- Define Unstable and Stable equilibrium.
- Explain law of Conservation of Energy.
- Explain D'Alembert's Principle.

2½×8

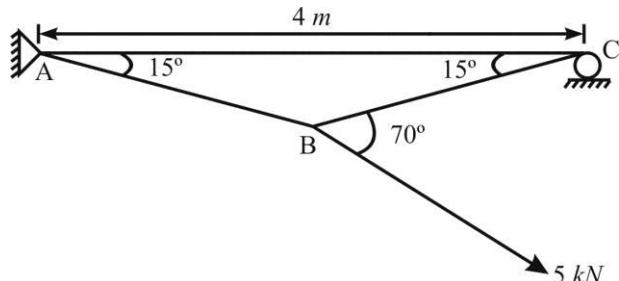
PART-A

Q.2 Resolve a 200 N force as shown in the figure in to components in the i) x and y direction and ii) x' and y' directions.



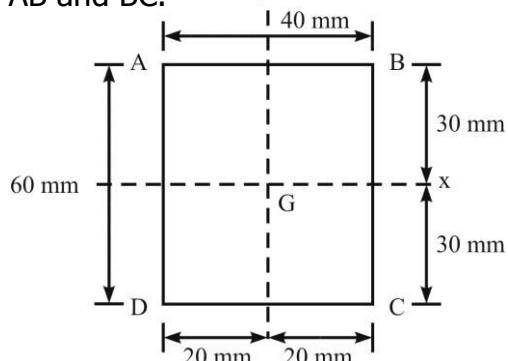
20

Q.3 Calculate the forces in each member of the truss as shown in the figure using method of sections.



20

Q.4 a) Find the moment of the inertia of the rectangular section as shown in the figure about the faces AB and BC.



15

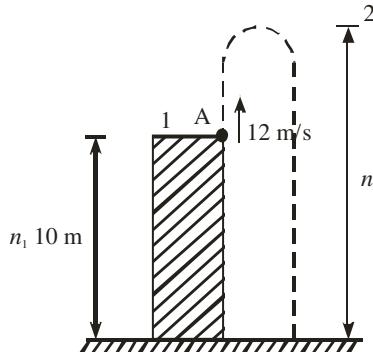
b) Define radius of gyration.

5

PART-B

Q.5 A body starts from rest with a velocity u and moves with retardation to K times the distance moved. Find the distance moved by the body before it comes to rest? **20**

Q.6 A particle is projected upward from location A with an initial velocity of 12 m/s. Find (see figure)



a) The maximum height above the ground that the particle attains. **10**

b) The velocity with which the particle strikes the ground. **10**

Q.7 a) Explain Hamilton principle and derive the expression for energy. **10**

b) How will you determine the force in a member of a framed structure with the help of principle of virtual work? **10**

End Semester Examination, May 2016

B. Tech. – Third Semester

THERMAL ENGINEERING-I (M-302)

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) Define the open system, closed system and isolated system.
b) Define the path, process and cycle.
c) How are coal, oil and natural gas formed?
d) Differentiate between the homogeneous and heterogeneous system.
e) Define the flash point and pour point for liquid fuel.
f) What is a steady flow process?
g) What are the laws of perfect gases?
h) What kind of steam is called dry saturated steam and superheated steam?
i) Write the statement of carnot theorem.
j) Define the internal energy and qualities of steam. **2x10**

PART-A

- Q.2 a) Distinguish between macroscopic approach and microscopic approach. Prove that the entropy is a property. **7**
b) What are the parameters needed to be specified to define a thermodynamic system? Write short note on the Molier chart. **6**
c) Define the first law of thermodynamics. What are the limitations of the first law of thermodynamics? What is the importance of second law of thermodynamics? **7**
- Q.3 a) i) What do you understand by the 'enthalpy' and an 'ideal gas'?
ii) Define the triple point and critical point.
iii) Define the adiabatic flame temperature.
iv) Define the mechanical, thermal and chemical equilibrium.
v) Define the fuels and characteristics of an ideal fuel. **2x5**
b) The pressure volume correlation for a non-flow reversible process is given by $P = (8 - 4V)$ bar, where V is in m^3 . If 150 kJ at work is supplied to the system, then determine the final pressure and volume of the system. Take the initial volume = $0.6m^3$. **10**
- Q.4 a) What are the processes involved in a carnot cycle? Derive an expression for the thermal efficiency of a carnot cycle. What are the demerits of the carnot cycle? **10**
b) Air flows steadily at a rate of $0.5kg/sec$ through an air compressor, entering at $7m/sec$ velocity, 100 kPa , and $0.95m^3/kg$ specific volume, and leaving at $5.0 m/sec$, 700 kPa and $0.19 m^3/kg$. The internal energy of air leaving is 90 kJ/kg greater than that of air entering. Cooling water in the compressor jacket absorbs heat from the air at the rate of 58 kW . i) Calculate the rate of shaft work input to the air in kW , ii) Find the ratio of the inlet pipe diameter to the outlet pipe diameter. **10**

PART-B

- Q.5 a) Describe with the sketch, the constructional and operational aspects of a Bomb calorimeter system used to experimentally determine the calorific value of a sample of coal. How is result calculated from the data obtained? **10**
- b) Write a brief note on the steam table. Determine the mass of 0.25 m^3 wet steam at 5 bar pressure and 0.85 dryness fraction. Calculate the heat content of 1 m^3 of this steam. (Data from steam table corresponding to 5 bar pressure, $v_g = 0.375\text{ m}^3/\text{kg}$, $h_f = 640.1\text{ kJ/kg}$ and $h_{fg} = 2107.4\text{ kJ/kg}$). **10**
- Q.6 a) A cyclic heat engine operates between a source temperature of 1000°C and a sink temperature of 40°C . Find the least rate of heat injection per kW net output of the engine. **10**
- b) Define the performance of heat engine, refrigerator and heat pump. Prove that a heat pump is more efficient than a refrigerator. What is the perpetual motion machine of the second kind? **10**
- Q.7 a) Derive an expression for the available energy referred to a cycle. Define and explain the zeroth law of thermodynamics. **8**
- b) Write a short note on the Vander Wals equation of state. Briefly enumerate the laws of perfect gases. **7**
- c) Define the following: reversible and irreversible process, quasi-static process, available energy and unavailable energy. **5**

End Semester Examination, May 2016

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**. Each question carries equal marks.

- Q.1 a) What do you mean by green sand and dry sand?
b) What is the purpose of gating system?
c) What are chaplets?
d) What are the functions of risers?
e) What is indirect extrusion?
f) What is embossing?
g) What are the different types of oxyacetylene flames?
h) Why is coating of electrode done?
i) What is submerged arc welding?
j) What is resistance welding?

2x10

PART-A

- Q.2 a) Explain in brief the various types of patterns used in foundry. **10**
b) What are different types of core? Explain any one core with the help of a neat sketch. **5**
c) Explain in brief the various additives commonly added to the moulding sand. **5**

- Q.3 Explain the following in brief:
a) Investment casting.
b) Continuous casting.

10x2

- Q.4 Write short notes on:
a) Different types of rolling mill.
b) Forging defects.

10x2

PART-B

- Q.5 a) Sketch and explain the following operations:
i) Deep drawing.
ii) Stretch forming. **5x2**
b) Differentiate between blanking and punching. **5**
c) Explain bending and coining. **5**

- Q.6 Write short notes on:
a) Selection of electrode.
b) Electric arc welding.

10x2

- Q.7 a) Explain electro-slag welding and its application. **10**
b) Explain thermit welding and its application. **10**

End Semester Examination, May 2016

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 a) Define surface tension.
b) Explain the term: 'meta-centre'.
c) Distinguish between uniform and non-uniform flow.
d) Define the term: 'circulation'.
e) What is a venturimeter?
f) Define the term: kinetic energy correction factor.
g) What do you mean by turbulent flow?
h) Explain major losses in pipes.
i) Define impulse momentum equation.
j) State Buckingham's π -theorem. **2x10**

PART-A

- Q.2 a) Two horizontal plates are placed 1.25 cm apart, the space between them being filled with oil of viscosity 14 poises. Calculate the shear stress in oil, if upper plate is moved with a velocity of 2.5 m/s. **5**
b) Calculate the capillary rise in a glass tube of 2.5 mm diameter when immersed vertically in water. Take surface tension $\sigma = 0.0725 \text{ N/m}$ for water. **5**
c) Derive an expression for the meta-centric height of a floating body. **10**
- Q.3 a) A 30 cm diameter pipe, conveying water, branches into two pipes of diameters 20 cm and 15 cm respectively. If the average velocity in the 30 cm diameter pipe is 2.5 m/s, find the discharge in this pipe. Also determine the velocity in 15 cm pipe if the average velocity in 20 cm diameter pipe is 2 m/s. **10**
b) The stream function for a two-dimensional flow is given by $\psi = 2xy$, calculate the velocity at the point P(2, 3). Find the velocity potential function ϕ . **10**
- Q.4 a) The horizontal venturimeter with inlet and throat diameters 30 cm and 15 cm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and the throat is 20 cm of mercury. Determine the rate of flow. Take $C_d = 0.98$. **10**
b) Derive Bernouli's equation from fundamentals. **10**

PART-B

- Q.5 a) A fluid of viscosity 0.7 Ns/m^2 and specific gravity 1.3 is flowing through a circular pipe of diameter 100 mm. The maximum shear stress at the pipe wall is given as 196.2 N/m^2 , find i) the pressure gradient ii) the average velocity and iii) Reynolds number of the flow. **15**
b) Describe Reynolds experiment to demonstrate the types of flow. **5**

- Q.6 a) A pipe-line carrying water has average height of irregularities projecting from the surface of the boundary of the pipe as 0.15 mm. What type of boundary is it? The shear stress developed is 4.9 N/m^2 . The kinematic viscosity of water is 0.01 stokes. **10**
- b) What do you mean by boundary layer separation? What is the effect of pressure gradient on boundary layer separation? **10**
- Q.7 a) Determine the rate of flow of water through a pipe of diameter 20 cm and length 50 m when one end of the pipe is connected to a tank and other end of the pipe is open to the atmosphere. The pipe is horizontal and the height of water in tank is 4 m above the centre of the pipe. Consider all minor losses and take $f = 0.009$ in the formula $h_f = \frac{4fLV^2}{d \times 2g}$. **10**
- b) State Buckingham's π -theorem. Why this theorem is considered superior over the Rayleigh's method for dimensional analysis? **10**

End Semester Examination, May 2016

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**. Each question carries equal marks.

Q.1 Answer in brief:

- a) Define unit cell.
- b) What do you mean by solid solution?
- c) Classify heat treatment process.
- d) What do you understand by elastic deformation of metal?
- e) What is corrosion phenomenon?
- f) Name two ceramic materials.
- g) What is work hardening?
- h) What is Gibb's phase rule?
- i) Write the effects of imperfections on metal.
- j) How polymer is formed?

2x10

PART-A

- Q.2** a) What do you understand by the term: 'crystal lattice' and how many types of this are found in metals? Explain. **10**
- b) What is meant by crystal imperfections? State the effect of their presence in materials. **10**
- Q.3** Sketch iron-carbon equilibrium diagram indicating phase changes as well as carbon composition and temperature phase change. Describe the working of iron-carbon equilibrium diagram. **20**
- Q.4** a) What is carburizing and how is it done? Explain. **10**
- b) Write down the properties of austenite, ferrite, pearlite and martensite. **10**

PART-B

- Q.5** a) State the difference between elastic and plastic deformation. Explain each in detail. **12**
- b) Explain Bouschinger effect as applied to the deformation of metals. **8**
- Q.6** a) Describe the mechanism of electrochemical corrosion. Name the factors which influence the corrosion of iron and steel. **12**
- b) Sketch creep curve and explain it in brief. **8**
- Q.7** a) What are advantages and disadvantages of polymeric materials? **7**
- b) What are fibrous composites? **6**
- c) What are the basic steps in the processing of ceramic products? **7**

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1 a) Distinguish between ferrous and non-ferrous materials.
b) What are advantages of composite materials?
c) What do you understand by fatigue failure?
d) How austenite is formed?
e) Define hardenability.
f) What is flame hardening?
g) Why chromium and nickel are added in steel?
h) What is piezoelectric ceramic?
i) What do you mean by sub-zero treatment?
j) How quenching is done?

2x10

PART-A

- Q.2 a) What are plain carbon steels? Give composition properties and uses of different types of plain carbon steels. **12**
b) What are non-ferrous metals? Write the names of alloys of Al and their applications. **8**
- Q.3 a) What are fibrous composites? How are they classified? Explain their properties. **10**
b) What are refractories? What are properties and uses of refractory materials? **10**
- Q.4 a) What is effect of corrosion on metals? **5**
b) What is hardness? How it is measured? What is its significance in engineering design? **15**

PART-B

- Q.5 a) Draw Iron-Carbon equilibrium diagram and label it. Explain its various phases in detail. **12**
b) What is meant by phase transformation? Explain in terms of nucleation and growth of crystal. **8**
- Q.6 a) What are the common defects observed during heat treatment? Describe a few precautions for their prevention. **15**
b) Why are metals heat treated? **5**
- Q.7 Write short notes on (**any four**):
a) Induction hardening.
b) Salt bath nitrocarburizing.
c) Nitriding.
d) Cyaniding.
e) Post heat treatment. **5x4**

End Semester Examination, May 2016

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.** Each question carries equal marks.

- Q.1 a) What are different grades of slip gauges?
b) What is hole basis system?
c) What is international prototype metre?
d) What is progressive type solid plug gauge?
e) Write the principle and use of sine bar.
f) What are the various types of pitch errors in a screw thread?
g) State the principle of auto collimator.
h) What is primary texture and secondary texture?
i) Name commonly used methods of measuring roundness.
j) Define circular pitch, diametral pitch and module of a gear. **2x10**

PART-A

- Q.2 a) Define the following:
i) Upper deviation.
ii) Lower deviation.
iii) Basic size.
iv) Allowance.
v) Tolerance. **1x5**
- b) Determine the dimensions, tolerances and allowances for a 25 mm hole and shaft pair designated as $H_7 f_8$.
Given: i) Upper deviation of 'f' shaft = $-5.5D^{0.41}$
ii) 25 mm lies in the diameter steps of 18 mm to 3 mm.
iii) $IT7 = 16i$
iv) $IT8 = 25i$ **15**

- Q.3 a) What is comparator? State the uses of comparator. **5**
b) Describe the working principle of an optical comparator with a neat sketch. **15**

- Q.4 a) Define the following terms with reference to surface roughness:
i) R_a -value ii) $RMSR_q$ value iii) R_z value
iv) Sampling length v) Lay **1x5**
- b) Describe the principle and operation of a Taylor-Hobson-Talysurf roughness instrument for the measurement of surface roughness. **15**

PART-B

- Q.5 a) Name the important elements of screw thread are required to be measured. **5**
b) Explain with a sketch the three-wire method for measuring effective diameter of an external screw thread. **15**
- Q.6 a) State the importance of geometrical accuracy of a manufactured component. **5**
b) Describe in detail the V-block and dial indicator method of testing roundness. **15**

- Q.7** a) Name the various elements of a spur gear which are checked for accuracy. **5**
b) Describe the working principle of Parkinson gear tester and state its limitations. **15**

End Semester Examination, May 2016

B. Tech. – Fourth Semester

THERMAL ENGINEERING-II (M-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 a) Draw the dual cycle on PV and TS diagram.
b) Draw the valve timing diagram for a 4-stroke petrol engine.
c) What is the difference between carburetion and petrol injection?
d) What is spray formation?
e) How the knock can be controlled?
f) What are the functions of a refrigeration system?
g) What is the difference between Brayton and Bell-Coleman cycle?
h) How the fog is formed?
i) What is the thermostatic expansion valve?
j) How the heat in air can be determined? **2x10**

PART-A

- Q.2 a) Explain the working of 4-stroke petrol and 4-stroke diesel engine. **10**
b) Differentiate between Otto and diesel cycle. **5**
c) Explain the valve timing diagram for 2-stroke petrol engine. **5**
- Q.3 a) Explain the working of simple carburetor with a neat and clean diagram. Also mention its demerits. **10**
b) Explain the requirements of diesel injection system. What are the advantages of this system? **10**
- Q.4 a) Discuss the effect of engine variables on knocking. **10**
b) Explain the stages of combustion in a CI engine. **10**

PART-B

- Q.5 A refrigerating plant is required to produce 2.5 tonnes of ice per day at - 4°C from water at 20°C. If the temperature range in the compressor is between 25°C and -6°C, calculate power required to drive the compressor. Latent heat of ice = 335 kJ/kg and specific heat of ice = 2.1 kJ/kg K. Also explain the refrigeration cycle used in this problem. **20**
- Q.6 a) Explain the working of a centrifugal compressor. What are its advantages and disadvantages? **10**
b) Explain the cooling and dehumidifying coils. **5**
c) What is the difference between the condenser and evaporator? **5**
- Q.7 A sling psychrometer reads 44°C DBT and 30°C WBT, calculate the following:
a) Specific humidity.
b) Relative humidity.
c) Dew-point temperature.
d) Enthalpy of mixture.
e) Specific volume of the mixture.
Assume pressure of atmosphere air to be 1.013 bar. Also define above terms. **20**

End Semester Examination, May 2016

B. Tech. – Fourth / Fifth Semester

FLUID MACHINES AND TURBOMACHINERY (M-402A)

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 is a draft tube?
b) Differentiate between radial and axial flow turbines.
c) Point out the significance of word 'free' in the subject of impact of free jets.
d) What is the hydraulic press?
e) What is an air vessel?
f) Define the term degree of reaction as applied to hydraulic turbines.
g) What is priming of a centrifugal pump?
h) Why pumps are generally less efficient than turbines?
i) What do you understand by the characteristics curves of a turbine?
j) What is negative slip in a reciprocating pump? **2x10**

PART-A

- Q.2 a) Obtain an expression for the force exerted by a jet of water on a flat vertical plate and inclined plate moving in the direction of the jet. **10**
b) A jet of water moving at 12 m/s impinges on vane shaped to deflect the jet through 120° when stationary. If the vane is moving at 5 m/s , find the angle of the jet so that there is no shock at inlet. What is the absolute velocity of the jet at exit in magnitude and direction and the work done per second per unit weight of water striking per second? Assume that the vane is smooth. **10**
- Q.3 a) Explain the different types of the efficiency of a turbine. **8**
b) The water available for a pelton wheel is $4\text{ m}^3/\text{s}$ and the total head from the reservoir to the nozzle is 250 metres. The turbine has two runners with two jets per runner. All the four jets have the same diameters. The pipe line is 3000 metres long. The efficiency of power transmission through the pipe line and the nozzle is 91% and efficiency of each runner is 90%. The velocity coefficient of each nozzle is 0.975 and coefficient of friction ' $4f$ ' for the pipe is 0.0045. Determine:
i) The power developed by the turbine.
ii) The diameter of the jet and
iii) The diameter of the pipe line. **12**
- Q.4 a) 233 litres of water per second are supplied to an inward flow reaction turbine. The head available is 11 m . The wheel vanes are radial at inlet and the inlet diameter is twice the outlet diameter. The velocity of flow is constant and equal to 1.83 m/s . The wheel makes 370 rpm . Find:
i) Guide vane angle ii) Inlet and outlet diameter of the wheel
iii) The width of the wheel at inlet and exit.
Neglect the thickness of the vanes. Assume that the discharge is radial and there are no losses in the wheel. Take speed ratio=0.7. **10**

- b) Define the unit quantities for a turbine. Obtain an expression for unit speed, unit discharge and unit power for a turbine. **10**

PART-B

- Q.5 a) Explain the different types of the efficiency of a centrifugal pump. **8**
- b) A centrifugal pump rotating at 1000 rpm delivers 160 litres/s of water against a head of 30m . The pump is installed at a place where atmospheric pressure is $1 \times 10^5 \text{ Pa}$ (abs) and vapour pressure of water is 3 kPa (abs). The head loss in suction pipe is equivalent to 0.2m of water. Calculate:
- i) Minimum NPSH and
 - ii) Maximum allowable height of the pump from free surface of water in the sump.
- 12**
- Q.6 a) A single acting reciprocating pump has the plunger diameter of 20cm and stroke of 30cm . The pump discharges 0.53m^3 of water per minute at 60rpm . Find the theoretical discharge, coefficient of discharge and percentage slip of pump. Further, if suction and delivery heads are 4m and 12m respectively workout power required to run the pump. **10**
- b) Obtain an expression for the pressure head due to acceleration in the suction and delivery pipes. **10**
- Q.7 a) Explain with the help of a neat sketch, the principle and working of a hydraulic accumulator. **8**
- b) The efficiency of a hydraulic crane, which is supplied water under a pressure of 70N/cm^2 for lifting a weight through a height of 10m , is 60% . If the diameter of the ram is 150mm and velocity ratio 6 , find:
- i) The weight lifted by the crane.
 - ii) The volume of water required in litres to lift the weight.
- 12**

End Semester Examination, May 2016

B. Tech. – Fourth / Fifth Semester

FLUID MACHINES AND TURBOMACHINERY (M-402A)

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 do you mean by Jet propulsion of ship?
b) Differentiate between impulse turbine and reaction turbine.
c) What is degree of reaction?
d) What is NPSH?
e) What is an air vessel? Write its one function.
f) Define cavitation.
g) What are slow, medium and fast moving runner in reaction turbine?
h) What is Thomas cavitation factor?
i) Define the following terms:
i) Slip ii) Discharge coefficient
j) What do you mean by positive displacement pump? Write its two examples. **2x10**

PART-A

- Q.2 a) Find an expression for work done/sec by the Jet of water strikes a moving inclined plate. **8**
b) A Jet of water coming out of a nozzle 5 cm diameter with a velocity of 20 m/s strikes a hinged plate at the centre:
i) Find the angle of swing of the plate from the vertical position. Take weight of plate=1500 N.
ii) If the Jet strikes at $\frac{2}{3}$ of height of the plate measured from the hinge, find the change in angle of swing. **12**
- Q.3 a) Explain the governing process of Impulse Turbine. **12**
b) Determine the power given by the Jet of water to the runner of a pelton wheel which is having tangential velocity as 20 m/s. The net head on the turbine is 50 m and the discharge through the jet water is $0.03 \text{ m}^3/\text{s}$. The vane angle at outlet tip is 15° and take $C_v = 0.97$. **8**
- Q.4 a) Find an expression for specific speed of turbine. **10**
b) An inward flow reaction turbine has external and internal diameter as 1.0 m and 0.6 m respectively. The hydraulic efficiency of the turbine is 90% when the head on the turbine is 36 m. The velocity of flow at outlet is 2.5 m/s and discharge at outlet is radial. If the vane angle at outlet is 15° and width of the wheel is 100 mm at inlet and outlet, determine:
i) The guide blade angle.
ii) Speed of the turbine.
iii) Vane angle at inlet.
iv) Power developed. **10**

PART-B

- Q.5 a) With a neat sketch, explain the types of casing of centrifugal pump. **10**
b) The outer diameter of an impeller of a centrifugal pump is 400 mm and outlet width 50 mm. The pump is running at 800 rpm and working against a total head of 15 m. The vane angle at outlet is 40^0 and manometric efficiency is 75%. Determine:
i) Velocity of flow at outlet.
ii) Velocity of water leaving the vane.
iii) Angle made by the absolute velocity at outlet with the direction of motion at outlet
iv) Discharge. **10**
- Q.6 a) What is indicator diagram and explain the effect of acceleration in suction and delivery pipe on indicator diagram. **10**
b) The piston area of a single acting reciprocating pump is 0.15 m^2 and stroke length is 30 cm. The water is lifted through a total head of 15 m. The area of delivery pipe is 0.03 m^2 . If the pump is running at 50 RPM, find the percentage slip, discharge coefficient and the power required to drive the pump. The actual discharge is 35 lt/sec. Take mechanical efficiency=0.85. **10**
- Q.7 a) Write short notes on **any two** of the following:
i) Gear wheel pump.
ii) Hydraulic press.
iii) Hydraulic accumulator. **10**
b) In a hydraulic press, the plunger has 4 cm diameter and ram diameter is 60 cm.
i) If the weight lifted is 4200 N then find the force applied at the plunger.
ii) If the plunger stroke is 12 cm, find the number of strokes required to raise the weight through 50 cm. If the lift of the weight is achieved in 10 min, find the power required to operate the plunger. **10**

End Semester Examination, May 2016

B. Tech. – Forth 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.

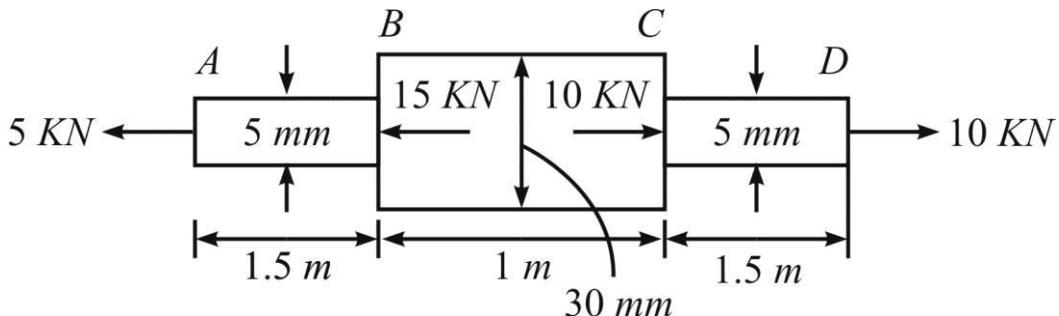
Q.1 Define following terms (**any ten**):

- a) Young's Modulus.
- b) Ductility.
- c) Upper yield point.
- d) Normal stress.
- e) Neutral axis.
- f) Angle of twist.
- g) Modulus of resilience.
- h) Thin cylinder.
- i) Difference between strut and column.
- j) Spring index.
- k) Radial stresses of a thick cylinder.

2×10

PART-A

Q.2 a) Calculate the stresses in the bar and total elongation shown in the figure.



12

b) Draw and define Mohr's Circle for Biaxial Stress taking σ_x as compressive. **8**

Q.3 a) A horizontal grider of steel having uniform section is 14 m long and is simply supported at its ends. It carries concentrated load of 120 KN and 80 KN at two points 3 m and 4.5 m from the two ends respectively. I for the section of the grider is $16 \times 10^4 \text{ cm}^4$ and E for steel is 210 GP_a. Calculate the deflection of the grider at points under the two loads. **12**
b) Derive the bending equation with neat sketches.

$$\frac{M}{I} = \frac{\sigma}{Y} = \frac{E}{R}$$

8

Q.4 a) A solid shaft is to transmit 300 KW at 100 RPM. If the shear stress is not to exceed 80 MP_a, find the diameter of the shaft. What present saving in weight would be obtained if this shaft was replaced by a hollow one whose internal diameter equals

0.6 of the external diameter, the length, material and maximum shear stress being the same? 15

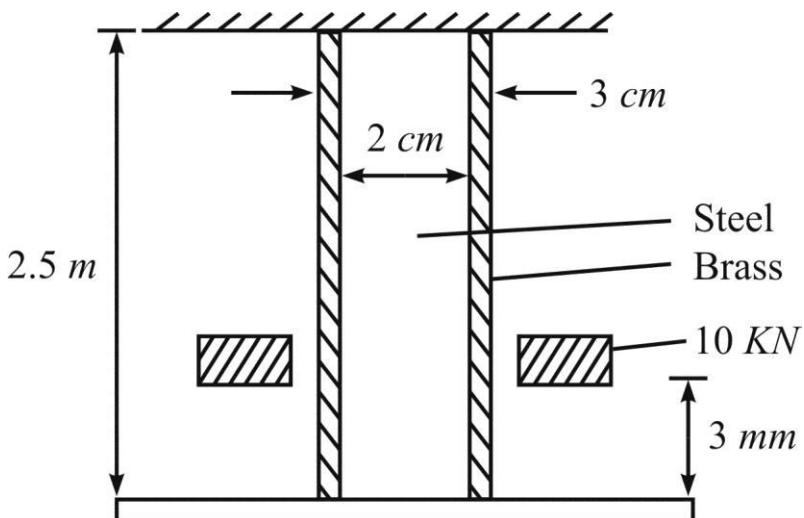
- b) Write assumption taken for study of torsion of circular shaft. 5

PART-B

- Q.5 a) Derive and explain strain energy formula for bending. 8

- b) A vertical tie rod rigidly fixed at the top end consisting of steel rod 2.5 m long and 20 mm diameter is encased throughout in a brass tube 20 mm internal diameter and 30 mm external diameter. The rod and the casing are fixed together at both ends. The compound is suddenly loaded in tension by a weight of 10 KN falling freely through 3 mm before being arrested by the tie. Calculate the maximum stresses in

Steel and brass take $E_s = 200 \text{ GP}_a$, $E_b = 100 \text{ GP}_a$

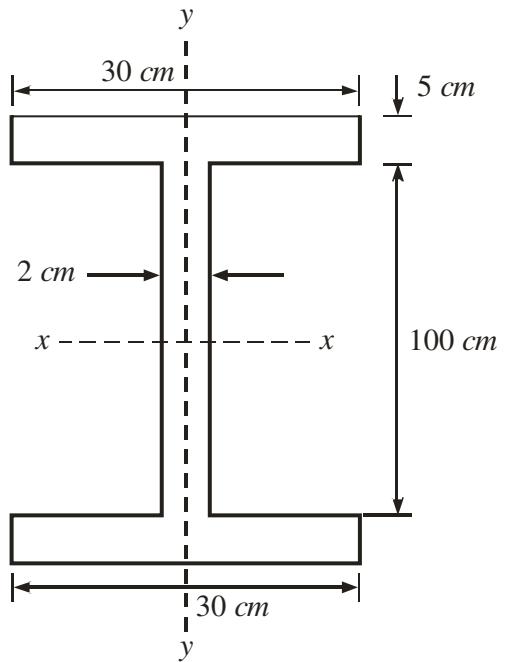


12

- Q.6 a) A thin spherical vessel 100 mm diameter and 12.5 mm thick is filled with water. More water is pumped in until pressure reaches 4.2 MP_a . Calculate, how much extra water was required to reach this pressure. 10

- b) Derive lame's equations to find stresses of a thick pressure vessel. 10

- Q.7 a) A built-up beam as shown in the figure is simply supported at ends. Compute its length given that when it is subjected to a load of 40 KN per meter length, it deflects by 1 cm. Find out the safe load if this beam is used in a column with both ends fixed. Assume factor of safety of 4. Use Euler's formula, $E = 210 \text{ GP}_a$.



b) Define helical spring with a neat sketch.

15
5

End Semester Examination, May 2016

B. Tech. – Third/Fourth 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 ten** terms:

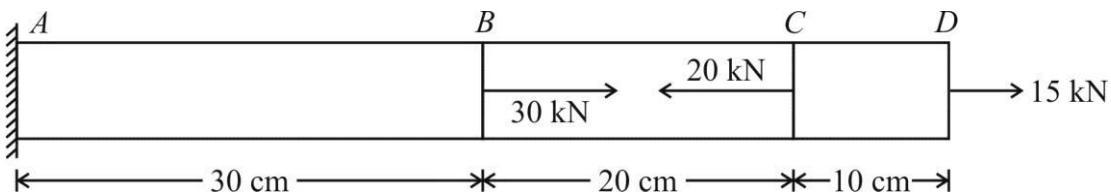
- a) Normal stresses.
- b) Bulk modulus.
- c) Proof stress.
- d) Mohr's circle.
- e) Thick cylindrical vessel.
- f) Pure bending.
- g) Neutral axis.
- h) Proof load.
- i) Polar moment of inertia.
- j) Columns.
- k) Slenderness ratio.
- l) Torsional rigidity.

2×10

PART-A

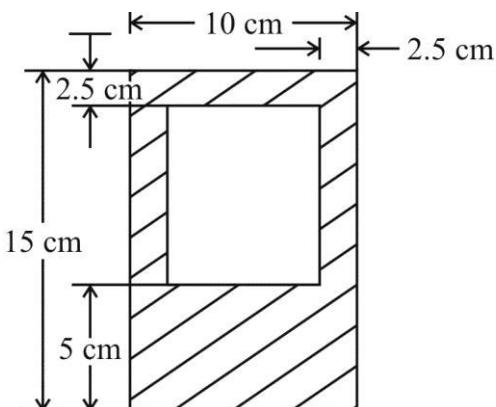
Q.2 A steel bar of 30 mm diameter is loaded as shown in figure. Determine the stress in each portion and the total Elongation.

take $E = 210 \text{ GPa}$



20

Q.3 The cross section of a cast Iron machine element used as a beam as shown in figure. The beam resists bending moments about the horizontal axis. The permissible stresses in tension and compression are to be 22 and 88 MPa respectively. Calculate the moment of resistance of the section about the horizontal neutral axis for both positive and negative bending moments.



20

Q.4 Define torsion of circular shafts and derive torsion formula for shaft circular C/S. **20**

PART-B

Q.5 a) Derive the formula for strain energy due to bending? **8**

b) A flat ribbon of spring steel 3.2 mm wide and 0.5 mm thick is wound around a cylinder 50 cm in diameter. Find the maximum stress in the steel ribbon and the energy in bending stored per meter length of the ribbon? Take $E=200$ GPa. **12**

Q.6 A cylinder is 3m long, 0.75 m in diameter and 12.5 mm thick at atmospheric pressure. Calculate the dimensions when subjected to an internal pressure of 1.5 MPa. What is then the maximum shear stress in the shell?

Assume $E = 210$ GPa, $r = 0.25$ **20**

Q.7 a) What are the assumptions made in Euler's Theory of Buckling of column? **5**

b) A straight length of steel bar, 1.5 m long and 2 cm \times 0.5 cm section is compressed longitudinally until it buckles. Assuming Euler's formula to apply to this case, estimate the maximum central deflection before the steel passes the yield point of 320 MPa.

Take $E = 210$ GPa; **15**

End Semester Examination, May 2016

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 a) Differentiate between orthogonal and oblique cutting. **4x5**
b) What are the desirable characteristics of a cutting tool materials?
c) Explain the terms: machinability and machinability index.
d) What are the various types of lathe accessories?
e) What are the different types of milling cutter used in milling?

PART-A

- Q.2 a) Derive the relationship between rake angle, sheer angle and friction angle according to Merchant's theory. Give assumptions also. **15**
b) Explain the sources of heat generation and its distribution among chip, tool and work piece. **5**
- Q.3 a) Explain the term: "Total cost of machining". **5**
b) Derive the relationship for maximum production rate cutting speed in a single point turning of cylindrical work piece. **15**
- Q.4 a) What are the main factors which influence the tool life? Explain. **14**
b) A bar of 75 mm diameter is reduced to 73 mm by a cutting tool while cutting orthogonally. If the mean length of cut chip is 73.5 mm, find the cutting ratio. If the rake angle is 15° , what is shear angle? **6**

PART-B

- Q.5 a) Make a neat sketch of a centre lathe and describe its main parts. **15**
b) Compare shaper and planer in terms of their operations and types of work piece. **5**
- Q.6 a) What machining operations can be performed on a centre lathe? Explain plain turning, eccentric turning, form turning and drilling operation. **14**
b) Discuss the effect of tool geometry on cutting. **6**
- Q.7 a) What are the various standard milling operations? Explain with suitable sketches. **10**
b) Draw a neat sketch of a broach tool and explain its parts. **10**

End Semester Examination, May 2016

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.

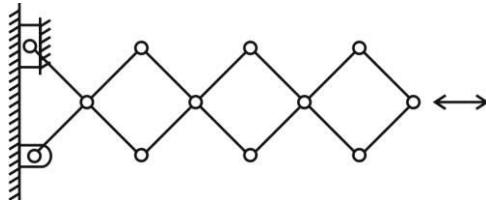
Q.1 Explain the following in briefly:

- a) Degrees of freedom of a mechanism.
- b) Higher pair and lower pair.
- c) Contact ratio in gears.
- d) Interference in involutes gears.
- e) Simple and compound gear trains.
- f) Pitch curve in a radial cam.
- g) Pressure angle in a cam and follower system.
- h) Epicyclic gear train.
- i) Precision points in function generation.
- j) Rubbing velocity at a pin joint.

2x10

PART-A

Q.2 a) Describe, with the help of a neat sketch, one inversion of a double slider crank chain. **6**
b) Derive the fundamental equation for a steering gear mechanism to avoid skidding. **7**
c) Calculate the degrees of freedom of the mechanism shown in the figure below:



7

Q.3 a) State and prove the law of gearing. **10**
b) Two 20° involute spur gears have a module of 10 mm. The addendum is equal to one module. The larger gear has 40 teeth while the pinion has 20 teeth. Will the gear interfere with the pinion? **10**

Q.4 a) Explain, with the help of a neat sketch, working of a reverted gear train. Derive the formula for its speed ratio. **6**
b) An epicyclic gear consists of a pinion, a wheel of 40 teeth and an annulus with 84 internal teeth concentric with the wheel. The pinion gears with the wheel and the annulus. The arm that carries the axis of the pinion rotates at 100 rpm clockwise. If the annulus is fixed, find the speed of the wheel.
If the wheel is fixed, find the speed of the annulus. **14**

PART-B

Q.5 A cam is to be designed with a roller follower which moves with constant acceleration and retardation.

The follower stroke is 40 mm. Its line of motion passes through the axis of the cam. Roller radius is 10 mm. Minimum radius of cam is 25 mm. The follower rises during 70° cam rotation, dwells during next 40° and returns during next 90° of cam rotation. After that, it dwells again.

Draw the cam profile.

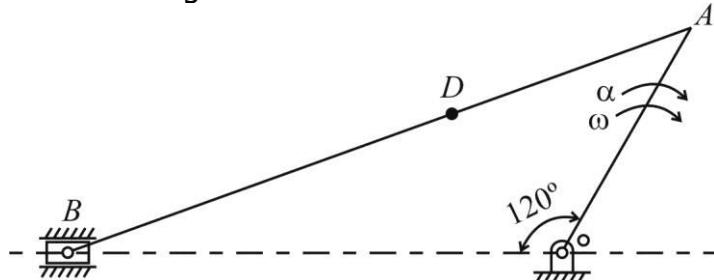
20

- Q.6 a) Briefly explain the classifications of synthesis problems. **6**
 b) Design a slider crank mechanism to coordinate three positions of the input link and the slider for the following angular and linear displacement of input link and slider. $\theta_{12} = 40^\circ$ $S_{12} = 180 \text{ mm}$
 $\theta_{13} = 120^\circ$ $S_{13} = 300 \text{ mm}$
 Take eccentricity of the slider as 20 mm. **14**

Take eccentricity of the slider as 20 mm.

14

- Q.7 The dimensions of an engine mechanism figure are as given below:
Crank OA=200 mm, Con Rod AB=600 mm, distance of centre of mass of Con Rod from
the crank end, AD=200 mm.
At the instant, the crank has angular velocity of 50 rad/s clockwise and an angular
acceleration of 800 rad/s². Calculate:
i) Velocity of D and angular velocity of AB.
ii) Acceleration of D and angular acceleration of AB.



20

End Semester Examination, May 2016

B. Tech. – Fifth / Eighth Semester

INDUSTRIAL ENGINEERING (M-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.** Each question carries equal marks.

- Q.1 a) Differentiate between total and partial productivity measures.
b) Distinguish between direct and indirect costs.
c) Explain briefly the term 'Inventory control'.
d) Explain 'Routing' as used in PCC.
e) What is 'Inspection' and types of inspection? **4×5**

PART-A

- Q.2 a) What is 'Motion Economy'? Write down the various principles involved. **10**
b) Explain THERBLIGS and PMTS techniques as used in work measurement. **10**
- Q.3 a) Derive Economic Batch Quantity (EBQ). **10**
b) A manufacturer requires bolts at the rate of 3000 kg per year. The cost of bolts is Rs. 40/- per kg. The company purchase manager estimate the carrying cost of 10% per year. Procurement cost is Rs. 200/- per order.
Calculate: a) EOQ
b) The frequency of orders **10**
- Q.4 a) What is the relationship between different elements of cost and how selling price is arrived at? **10**
b) Derive the Break Even Quantity (BEQ). Explain break even analysis. **10**

PART-B

- Q.5 a) What are the functions of production planning and control? Explain loading and scheduling techniques. **10**
b) There are seven jobs which are to be pressed on machines M1 and M2. Pressing time in hours are given:

JOB	A	B	C	D	E	F	G
M1	6	24	30	12	20	22	18
M2	16	20	20	13	24	2	6

Find the optimal sequence and total elapsed time. Also compute idle time on M2. **10**

- Q.6 a) Write down the functions and objectives of 'Quality Control'. **10**
b) Control charts of \bar{X} and R are maintained on certain dimensions of a manufactured part, measured in mm. The subgroup size is 4. The values of \bar{X} and R are computed for each subgroup. After 20 subgroups $\Sigma \bar{X} = 412.83$ and $\Sigma R = 3.39$. Compute the values of 3σ limits for the \bar{X} and R charts and estimate the value of σ' on the assumption that the process is in statistical control.
[for subgroup of 4 factor $d_2 = 2.059$
 $D_4 = 2.28$
 $D_3 = 0$] **10**

Q.7 Write short notes on (***any four***):

- a) ISO-9001:2008
- b) Kaizen
- c) Just in time technique
- d) Deming award
- e) Six sigma methodologies

5×4

End Semester Examination, May 2016

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 Explain the following:

- a) Dynamic balancing.
- b) Hammer blow.
- c) Angular velocity of precession.
- d) Effect of gyroscopic couple on a ship during rolling.
- e) Stability of a Governor
- f) Fluctuation of energy coefficient.
- g) D'Alembert's principle.
- h) Inertia Governor.
- i) Angle of heel.
- j) Direct and Reverse Crank Method.

2×10

PART-A

Q.2 a) A circular disc mounted on a shaft carries three attached masses 4 kg, 3 kg and 2.5 kg at radial distances 75 mm, 85mm and 50 mm and at the angular positions of 45° , 135° and 240° respectively counter clockwise from the reference line along x axis. Determine the amount of the counter mass at a radial distance of 75 mm required for static balance. **15**

b) Discuss static and dynamic balancing and state their equations. **5**

Q.3 a) Derive the expression of swaying couple in a two cylinder locomotive with cranks placed at right angles to each other. **5**

b) In a three cylinder radial engine connecting rods are 120° to each other. The length of each connecting rod is 240 mm and stroke is 160 mm and reciprocating parts have a mass of 2.4 kg/cylinder. Determine the primary and secondary forces if engine speed is 2000 r.p.m. **15**

Q.4 a) The moment of inertia of an aeroplane air screw is 20 kg/m^2 and the speed of rotor is 1000 r.p.m. clockwise looking from the front. The speed of the flight is 200 km/hour. Find the gyroscopic couple and its effect when it makes a left turn of radius 150 mm. **15**

b) Derive the expression of angle of heel in a two wheeler automobile while turning left. **5**

PART-B

Q.5 a) Derive the relation between height of a Watt Governor to it's r.p.m. **5**

b) Masses of each ball and sleeve of a Porter governor are 3 kg and 15 kg respectively. And each equal arms of 200 mm pivoted on the axis of rotation. When radius of rotation is 120 mm, the sleeve starts rising and 160 mm at the maximum speed? Find: i) Range of speed ii) Effort and power of the Governor. **15**

- Q.6 a) Explain the equilibrium of four force members. 5
 b) Find the torque required on the input link AB for static equilibrium by principle of virtual work for figure shown below:

$$AB = 500 \text{ mm}$$

$$BC = 660 \text{ mm}$$

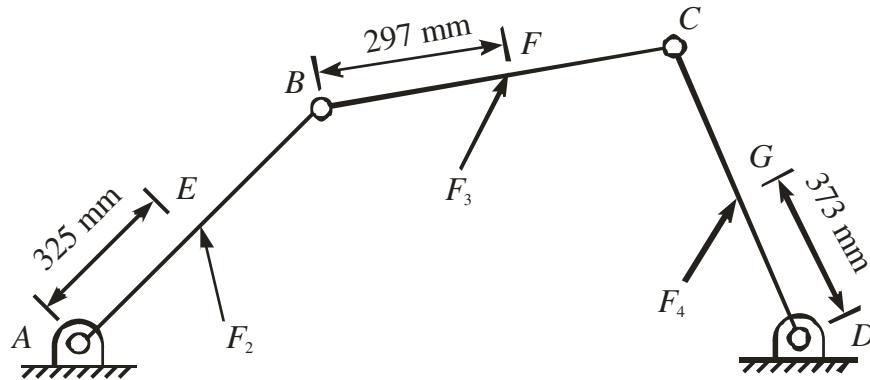
$$CD = 560 \text{ mm}$$

$$AD = 1000 \text{ mm}$$

$$F_2 = 80 \angle 73.5^\circ N$$

$$F_3 = 144 \angle 58^\circ N$$

$$F_4 = 60 \angle 42^\circ N$$



15

- Q.7 A punching machine carries out 6 holes per minute. Each hole of 40 mm diameter in 35 mm thick plate requires 8 N-m of energy/mm² of the sheared area. The punch has a stroke of 95 mm. Find the power of the motor required if the mean speed is 20 m/sec. Total fluctuation of speed not to exceed 3% of mean speed, determine mass of flywheel required. **20**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

MACHINE DESIGN (M-503)

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 is stress concentration?
b) What is Soderberg line?
c) Write advantages of hollow shaft over solid shaft.
d) Which theories of failure are applicable for shaft?
e) What are applications of spring?
f) What is stiffness of spring?
g) Name various types of ball bearings.
h) What are objectives of lubrication?
i) Where do you use worm gear drive?
j) What is role of processing in design? **2x10**

PART-A

- Q.2 a) A rod of linkage mechanism made of steel $40Cr1 (S_{ut} = 550 N/mm^2)$ is subjected to a completely reversed axial load of $100 kN$. The rod is machined on a lathe and expected reliability is 95%. There is no stress concentration. Determine the diameter of rod using factor of safety 2 for infinite life condition. **14**
b) What is difference between Gerber curve and Soderberg and Goodman lines? **6**
- Q.3 a) Explain equivalent torsional moment and equivalent bending moment. State when these two terms are used in design of shafts. **6**
b) A propeller shaft is required to transmit $50 kW$ power at $600 rpm$. It is a hollow shaft having inside diameter 0.8 times of outside diameter. It is made of steel ($S_{yt} = 380 N/mm^2$) and factor of safety is 4. Calculate the inside and outside diameter of shaft. **14**
- Q.4 a) What are graduated length and full length leaves in multi-leaf spring? **5**
b) A helical compression spring is subjected to axial force which varies from $2.5 kN$ to $3.5 kN$. Deflection of spring is approximately $5 mm$. Spring index is 5. $S_{ut} = 1050 N/mm^2$, Modulus of rigidity is $81370 N/mm^2$. Design spring and calculate:
i) Wire diameter ii) mean coil diameter iii) number of active coils
iv) total number of coils v) Solid length of spring vi) free length of spring **15**

PART-B

- Q.5 a) A cylindrical roller bearing with bore diameter of $40 mm$ is subjected to a radial force of $25 kN$. The coefficient of friction is 0.0012 and speed of rotation is 1440 rpm. Calculate the power lost in friction. **14**
b) Why is hydrodynamic journal bearing called self-acting bearing? **6**

- Q.6** a) A pair of spur gears consists of 20 teeth pinion meshing with 120 teeth gear. The module is 04 mm. Calculate:
i) Centre distance.
ii) Pitch circle diameters.
iii) Addendum and dedendum.
iv) Tooth thickness.
v) Gear ratio.
- b) Compare the contact between mating teeth of spur and helical gears.
- 3x5**
5
- Q.7** a) Define ergonomics. Explain ergonomics and value engineering considerations in design.
- b) Explain various design considerations in forging.
- 10**
10

End Semester Examination, May 2016

B. Tech. – Fifth Semester

PRODUCTION ENGINEERING (M-504B)

Time: 3 hrs

Max Marks: **100**

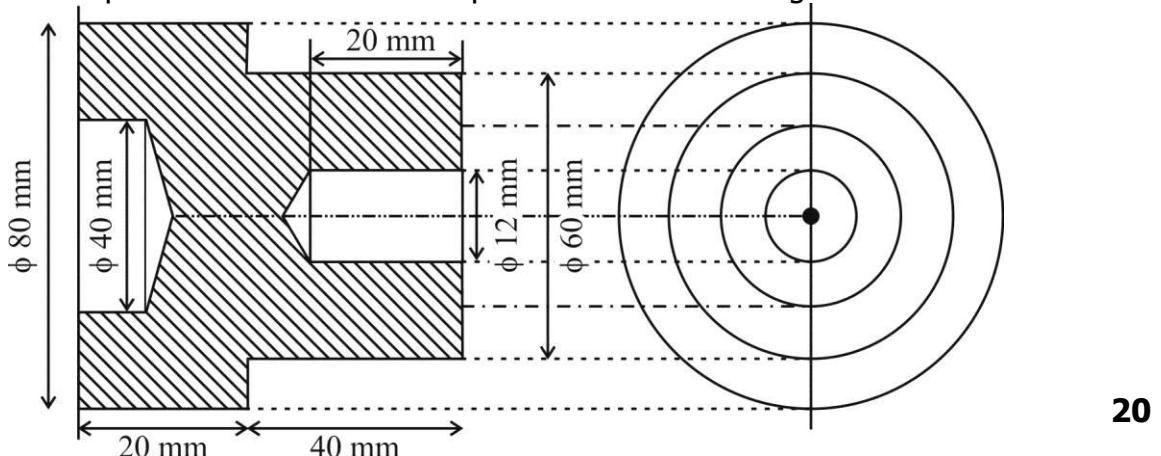
No. of pages: **1**

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

- Q.1 a) Explain the term tolerance stacking.
b) State the significance of process planning.
c) What is meant by 'grade' as applied to grinding process?
d) Differentiate between punching and blanking.
e) State the significance of clearance in sheet metal processes.
f) Name the cutting and non cutting press tool operations.
g) What is meant by ' friability' and 'attrition' for grinding process?
h) How many translational degrees of freedom are there for a component located in space?
i) What does $M16 \times 1.5$ stand for thread designation?
j) Enlist various methods to manufacture threads. **2x10**

PART-A

- Q.2 A batch of 800 components of mild steel is to be produced from a blank of $\phi 85 \times 70\text{mm}$. Generate the process sheet for the components as shown in figure below:



- Q.3 a) Explain the concept of redundant locator with help of neat sketch. **6**
b) Why is fool proofing done in fixtures? Explain with an example. **6**
c) What are different types of clamps used in jigs and fixtures? **8**
- Q.4 a) Sketch various methods of applying shear to punch and die. **5**
b) A cup without flanges and height of 10 cm and diameter of 5 cm is to be made from sheet metal 2.5 mm thick. Find the suitable number of draws. **15**

PART-B

- Q.5 a) Specify the grinding wheel 30A46M6V23. Explain each term in detail. **15**
b) Differentiate between truing and dressing. **5**
- Q.6 a) Explain the principle of gear hobbing. List the advantages and limitations of gear hobbing. **10**

- b) Explain any two thread manufacturing processes in detail. **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= 75 metre/minute and feed = 0.175 mm/revolution. **15**
- b) Explain the purpose of cost estimation. **5**

End Semester Examination, May 2016

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**. Each question carries equal marks.

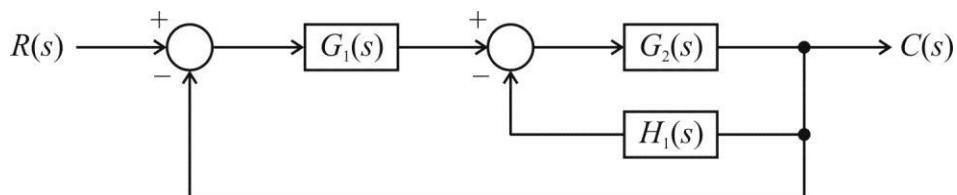
- Q.1 a) Name two linear measuring instruments.
b) What is dynamometer?
c) What is function of sensor in metrology?
d) Write the dynamic characteristics of instrument.
e) Define open loop and closed loop control system.
f) What is amplifier?
g) How is pressure measured?
h) What do you mean by first order system of instrument?
i) What is DAC converter?
j) Define transfer function. **2x10**

PART-A

- Q.2 a) Define comparator with the help of neat sketch. Also explain the working principle of a mechanical comparator. **15**
b) Name the instruments used for measuring internal and external threads. **5**
- Q.3 a) Write a note on vacuum measurement. **5**
b) How will you measure temperature? Explain thermistors with a neat sketch. **15**
- Q.4 a) Explain with neat sketch and circuit of a strain gauge for measuring load. **10**
b) Define variable resistance, inductance and capacitance. **10**

PART-B

- Q.5 a) What are various kinds of errors which may originate in an instrument and give reason and precautions to be taken for good working? **15**
b) Derive expression for second order system response when step input is provided. **5**
- Q.6 a) What do you mean by control system? Explain process control and regulators. **10**
b) Find the overall transfer function of a feedback control system given in the figure.



10

- Q.7 Write short notes on (**any four**):
a) Data acquisition.
b) Voltage indicating and recording device.
c) Signal analyzer.

- d) Bridge circuit.
- e) Noise problems.

5x4

End Semester Examination, May 2016

B. Tech. – Fifth Semester

MACHINE DESIGN-I (M-508)

Time: 3 hrs

Max Marks: **100**

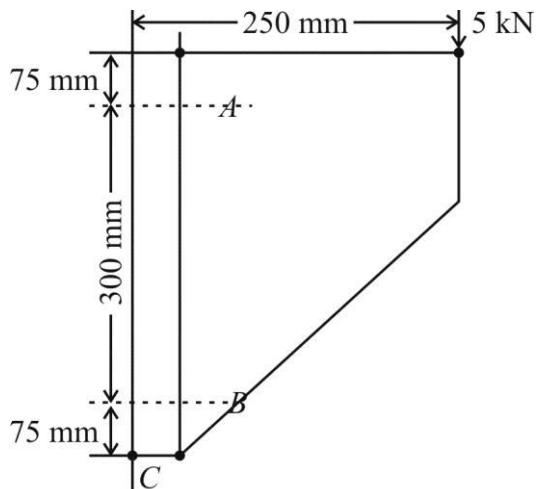
No. of pages: 2

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

- Q.1**
- a) What is fit?
 - b) What is allowable stress?
 - c) Why V-threads are not used in power screw?
 - d) How will you designate ISO metric fine threads?
 - e) Why are riveted joints replaced by welded joints?
 - f) What is the cause of residual stresses in welded joints?
 - g) Distinguish between open and cross belt drives.
 - h) Why are clutches usually designed on the basis of uniform wear?
 - i) Where do you use clutch?
 - j) What is function of brake?
- 2x10**

PART-A

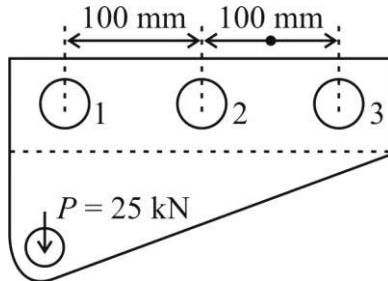
- Q.2**
- a) Define and explain different types of feasibility study in design philosophy. **10**
 - b) What is brain storming? Explain the procedure, advantages and disadvantages of brain storming. **10**
- Q.3**
- a) A bracket for supporting the travelling crane is fixed to the steel column by means of four identical bolts, two at A and two at B as shown in the figure. The maximum load acting vertically downward is at a distance of 250 mm from the face of the column. Bolts are made of steel ($Syt = 380 N/mm^2$) and factor of safety is 5. Determine the major diameter of the bolts on the basis of maximum principal stress theory.



14

- b) What is power screw? What types of threads are used in power screw? What are advantages of square threads over trapezoidal threads? **6**

- Q.4 a) What are the four basic elements of weld symbol? Define with a neat sketch transverse and parallel fillet weld. 6
 b) A bracket is attached to a horizontal column by means of three identical rivets as shown in the figure. Maximum permissible shear stress is 60 N/mm^2 .



- i) Which rivet is subjected to maximum shear stress?
 ii) What is magnitude of maximum force?
 iii) Determine the diameter of the rivet.

14

PART-B

- Q.5 a) What is coupling? Classify different couplings and explain any one in brief. 6
 b) A V-belt drive is required for a 15 kW , 1440 rpm electric motor, which drives a centrifugal pump running at 360 rpm for a service of 24 hrs per day. From space considerations, the centre distance should be approximately 1 m . Determine:
 i) Belt specifications.
 ii) Number of belts.
 iii) Correct centre distance.
 iv) Pulley diameter.

14

- Q.6 a) Why is heat dissipation necessary in clutches? 5
 b) A multi-disk clutch consists of steel and bronze plates. It transmits 15 kW power at 1400 rpm . The inner and outer diameters of the contacting surfaces are 100 and 200 mm respectively. The coefficient of friction is 0.15 and permissible intensity of pressure is 0.5 N/mm^2 . Assuming uniform wear theory, calculate the number of steel and bronze disks. 15

- Q.7 a) State different types of brakes and give at least one practical application of each. 6
 b) A solid cast iron disk 1 m in diameter and 0.2 m thick is used as a flywheel. It is rotating at 350 rpm . It is brought to rest in 1.5 sec by means of a brake. Calculate:
 i) The energy absorbed by brake.
 ii) Torque capacity of the brake.

14

End Semester Examination, May 2016

B. Tech. – Sixth Semester

OPERATIONS RESEARCH (M-601A)

Time: 3 hrs

Max Marks: **100**

No. of pages: 3

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 different types of decision making environment.
 - b) What are applications of operations research in industry?
 - c) What do you mean by non-negativity condition in linear programming?
 - d) What is sensitivity analysis and what does it signify?
 - e) Write the name of methods to find out initial basic feasible solution of a transportation problem.
 - f) How is assignment problem a special case of transportation problem?
 - g) Write Kendall and Lee notations for queuing systems.
 - h) Define “event” and “activity” used in project line models.
 - i) What does three time estimates signify in PERT?
 - j) What advantages does simulation process over other quantitative techniques?

2x10

PART-A

- Q.2** a) Discuss the role of operations research in decision making. **5**

b) A manufacturer of TV sets is faced with the problem of selecting one of the three models. The profit depends on market acceptability. Demand of the model which is uncertain at present, but it has been broadly classified into four categories: High, Moderate, Low or Nil.

The profit or losses expected by the management from the different levels of demands of the models are as follow:

Models	State of Nature (Product Demand)			
	High	Moderate	Low	Nil
Super	40,000	25,000	15,000	-40,000
Delux	60,000	30,000	10,000	-50,000
Janta	25,000	10,000	-2,000	-5,000

Indicate the decision under:

- Q.3 a) Convert the following primal into dual-

$$Z_{\min} = 3000x + 2400y$$

Subject to,

$$10x + 4y \geq 30$$

$$5x + 8y \geq 20$$

$$x, y \geq 0$$

5

- b) A factory is engaged in manufacturing three products A, B and C which involve lathe work, grinding and assembling. The cutting, grinding and assembling times required for one unit of A are 2, 1 and 1 hour respectively. Similarly, there are 3, 1 and 3

hours for one unit of B and 1, 3 and 1 hour for one unit of C. The profits on one unit of A, B and C are `2, `2 and `4 per unit respectively. Assuming that there are available 300 hours of lathe time, 300 hours of grinder time and 240 hours of assembly time, how many units of each product be produced to maximize profit? Formulate the problem of LP model and solve the same using simplex method. **15**

- Q.4** a) Solve the following transportation problem and test its optimality.

		Market				Supply
		I	II	III	IV	
Warehouse	A	5	2	4	3	22
	B	4	8	1	6	15
	C	4	6	7	5	08
		Demand	7	12	17	9

10

- b) A department has five employees with five jobs to be performed. The time (in hours) each man will take to perform each job is given in the cost matrix.

		Employees				
Jobs		I	II	III	IV	V
A	10	05	13	15	16	
B	03	09	18	13	06	
C	10	07	02	02	02	
D	07	11	09	07	12	
E	07	09	10	04	12	

How should the jobs be allocated, so as to minimize the total man hours.

10

PART-B

- Q.5** a) What do you mean by performance of a queuing system? Derive its expression. **10**
 b) The belt-snapping for conveyors in an open cast mine occurs at the rate of 2 per shift. There is only one plate for vulcanizing, and it can vulcanize on an average 5 belt snap per shift. Find:
 i) Fraction of time the system is empty.
 ii) Average number of belts in system.
 iii) Average number of belts in queue.
 iv) Waiting time in queue.
 v) Waiting time in system. **10**

- Q.6** a) What is significance of three time estimates in PERT? How and on what basis is a single time estimate derived from these three estimates? **8**
 b) Given the following information:

Activity :	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7	5-7	6-7
Duration (Days):	2	8	10	6	3	3	7	5	2	8

- i) Draw the network diagram.
 ii) Identify critical path.
 iii) Determine total, free and independent floats.

12

- Q.7 a) What are different steps involved in solving a problem by simulation? **10**
b) A confectioners' past data of demand per week (in hundred kg) with frequency is given below:

Demand/week :	0	5	10	15	20	25
Frequency :	2	11	8	21	5	3

Generate the demand for the next 10 weeks and also find average demand/week.
Use the following random numbers: 35, 52, 90, 13, 23, 73, 34, 57, 35, 83, 94, 56, 67, 66, 60. **10**

End Semester Examination, May 2016

B. Tech. – Fifth / Sixth Semester

CAD/CAM (M-602)

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

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 answer:

 - a) Define role of CAD in engineering analysis.
 - b) Define concatenated transformation.
 - c) Define analytic curves.
 - d) Give parametric equation of an ellipse.
 - e) Explain solid modeling.
 - f) What is interpolation?
 - g) What is manual part program?
 - h) Explain tool radius compensation in CNC machines.
 - i) What is a manufacturing cell?
 - j) What is group technology?

2×10

PART-A

- Q.2 a) Discuss the use of computers in the basic design process. How does computer simplify the design process? **10**

b) A triangle having vertices $(1,10)$, $(5,2)$ and $(8,4)$ is translated by 3 units in y -direction then it is rotated by 45° in counter-clockwise direction and then it is scaled by 3 units in x -direction. Find out final position of the triangle. **10**

Q.3 a) What do you understand by interpolation and approximation splines? Determine and plot the blending functions for Hermite spline. What are the limitations of Hermite spline? How they are removed? **10**

b) Draw a Bezier curve with following control points :
 $(1, 2)$, $(3, 4)$, $(6, - 6)$ and $(10, 8)$. **10**

Q.4 a) What is constructive solid geometry? Explain the basic operations done on primitives in solid modeling using CSG. **10**

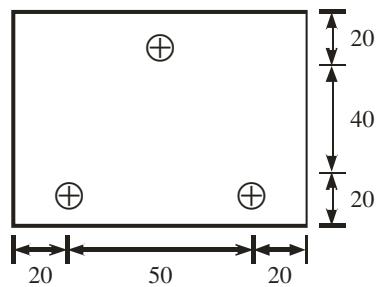
b) Explain the following :
i) Sweep Representation. **5**
ii) Cell Decomposition. **5**

PART-B

- Q.5 a) Differentiate between point-to-point, straight cut and contouring NC. **10**
b) What is adaptive control system? Mention its advantages to the manufacturing technology. **10**

Q.6 a) Write down the steps which are sequentially followed for writing CNC part program. **10**

- b) Write manual NC part program to drill holes in a palate of thickness 10 mm. Use appropriate speeds and feed rate.



10

- Q.7 a) What do you understand by GT machine cell and its various types? Also discuss the benefits of group technology. **10**
- b) Discuss the various inputs required for material requirement planning. Compare MRP-II with MRP. **10**

End Semester Examination, May 2016

B. Tech. – Fourth/Sixth Semester

HEAT TRANSFER (M-604)

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) Name and explain briefly the various modes of heat transfer.
b) How is thermal conductivity of a material defined?
c) What is meant by overall heat transfer coefficient?
d) State the difference between Fin efficiency and Fin effectiveness.
e) What is meant by transient heat conduction?
f) What are Heisler charts?
g) Define shape factor and state its physical significance.
h) Define Nusselt number.
i) How are heat exchangers classified?
j) What is radiation shield?

2x10

PART-A

- Q.2 a) What is 'Fourier's law of conduction'? State also the assumption on which this law is based. **5**
b) Derive expressions for temperature distribution under one dimensional steady state heat conduction for a plane wall. **7**
c) A thick walled tube of stainless steel with 20 mm inner diameter and 40 mm outer diameter is covered with a 30 mm layer of asbestos insulation ($K = 0.2 \text{ w/m}^\circ\text{C}$). If the inside wall temperature of the pipe is maintained at 600°C and the outside insulation at 1000°C , calculate the heat loss per metre of length. **8**
- Q.3 a) Derive expression for temperature distribution and heat dissipation in a straight fin of rectangular profile infinitely long Fin. **10**
b) A very long 25mm diameter copper rod ($K = 380 \text{ w/m}^\circ\text{C}$) extends horizontally from a plane heated wall at 120°C . The temperature of the surrounding air is 25°C and the convective heat transfer coefficient is $9.0 \text{ w/m}^\circ\text{C}$.
i) Determine the heat loss.
ii) How long the rod be in order to be considered infinite? **10**

- Q.4 a) What are the assumptions for lumped capacity analysis? **5**
b) What are Fourier and Biot numbers? What is the physical significance of these numbers? **5**
c) A solid copper sphere of 10 cm diameter (density (ρ) = 8954 kg/m^3). $C_p = 383 \text{ J/Kgk}$, $K = \text{Thermal conductivity} = 386 \text{ w/m k}$ initially at a uniform temperature $t_i = 250^\circ\text{C}$, is suddenly immersed in a well-stirred fluid which is maintained at a uniform temperature $t_a = 50^\circ\text{C}$. The heat transfer coefficient between the sphere and the fluid is $h=200 \text{ w/m}^2\text{k}$. Determine the temperature of the copper block at $\tau = 5 \text{ min}$ after the immersion. **10**

PART-B

- Q.5 a) Differentiate between mechanism of heat transfer by free and forced convection. **5**

- b) Derive energy equation for thermal boundary layer over a flat plate. **10**
- c) Air at 20°C flows over a flat plate maintained at 75°C. Measurements show that temperature at a distance of 0.5 mm from the surface of plate is 50°C. Presuming thermal conductivity of air as 0.0266 W/m-deg, estimate the value of local heat transfer coefficient. **5**
- Q.6** a) What is a 'black body'? How do real bodies differ from black bodies? **5**
- b) Derive a general relation for the radiation shape factor in case of radiation between two surfaces. **7**
- c) A Gray body ($\epsilon = 0.8$) emits the same amount of heat as a black body at 1075 K. Find out the required temperature of the gray body. **8**
- Q.7** a) How does film wise condensation differ from drop wise condensation? **5**
- b) Derive an expression for logarithmic mean temperature difference (LMTD) in case of parallel flow heat exchanges. **5**
- c) A hot fluid at 200°C enters a heat exchanger at a mass flow rate of 10^4 Kg/hr. Its specific heat is 2000 J/ kg k. It is to be cooled by another fluid entering at 25°C with a mass flow rate 2500 Kg/hr and speafic heat 400 J/kg k. The overall heat transfer coefficient based on outside area of 20 m² is 250 W/m² k. Find the exit temperature of the hot fluid when the fluids are in parallel flow. **10**

End Semester Examination, May 2016

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 a) Explain the following terms in connection with design of machine members subjected to variable loads:
- i) Endurance Limit.
 - ii) Size factor.
- b) Illustrate how the stress concentration in component can be reduced.
- c) What is a key? State its function.
- d) What type of stresses are induced in shaft?
- e) The extension springs are in considerably less use than the compression springs. Why?
- f) How do you express the life of bearing?
- g) What are the rolling contact bearings?
- h) How are the gears classified?
- i) What are the various forces acting on a bevel gear?
- j) Define 'Lead angle' used in worm gearing.
- 2x10**

PART-A

- Q.2 A simply supported beam has a concentrated load at the centre which fluctuates from a value of P to $4P$. The span of the beam is 500 mm and its cross section is circular with a diameter of 60 mm. Taking for the beam material an ultimate stress of 700 MPa, a yield stress of 500 MPa, endurance limit of 330 MPa for reversed bending, and a factor of safety of 1.3, calculate the maximum value of P . Take a size factor of 0.85 and a surface finish factor of 0.9. **20**
- Q.3 a) Design a clamp coupling to transmit 30 kW at 100 r.p.m. The allowable shear stress for the shaft and key is 40 MPa and the number of bolts connecting the two halves are six. The permissible tensile stress for the bolts is 70 MPa. The coefficient of friction between the muff and the shaft surface may be taken as 0.3. **15**
- b) What is the effect of keyway cut into the shaft? **5**

- Q.4 A hollow steel shaft is to transmit 20 kW at 300 r.p.m. The loading is such that the maximum bending moment is 1000 N-m, the maximum torsional moment is 500 N-m and axial compressive load is 15 kN. The shaft is supported on rigid bearings 1.5 m apart. The maximum permissible shear stress on the shaft is 40 MPa. The inside diameter is 0.8 times the outside diameter. The load is cyclic in nature and applied with shocks. The values for the shock factors are $K_t = 1.5$ and $K_m = 1.6$. **20**

PART-B

- Q.5 a) A helical spring is made from a wire of 6mm diameter and has outside diameter of 75 mm. If the permissible shear stress is 350 MPa and modulus of rigidity 84 kN/mm², find the axial load which the spring can carry and the deflection per active turn. **15**

- b) Explain one method of avoiding the tendency of a compression spring to buckle. **5**
- Q.6 Design a journal bearing for a centrifugal pump from the following data: Load on the journal = 20000 N; Speed of the journal = 900 r.p.m.; Type of oil is SAE 10, for which the absolute viscosity at 55°C = 0.017 kg/m-s; Ambient temperature of oil = 15.5°C; Maximum bearing pressure for the pump = 1.5 N/mm². Calculate also mass of the lubrication oil required for artificial cooling if rise of temperature of oil be limited to 10°C. Heat dissipation coefficient = 1232 W/m²/°C. **20**
- Q.7 a) Explain the various design considerations for casting and forging. **10**
b) Write a short note on ergonomic and value engineering considerations in design. **10**

End Semester Examination, May 2016

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.** Each question carries equal marks.

Q.1 Answer in brief:

- a) Give an example of EC and I.C. engine.
- b) Define specific fuel consumption and thermal efficiency.
- c) Draw P-V and T-S diagram of stirling cycle.
- d) Explain the following:
 - i) Rich mixture.
 - ii) Stoichiometric mixture.
 - iii) Lean mixture.
- e) What are various types of ignition systems that are commonly used?
- f) Define delay period in C.I. engine.
- g) What is flash and fire point?
- h) Define mean effective pressure.
- i) Write two advantages of gas turbine over I.C. engine.
- j) Write down various methods available for finding friction power of an engine.

2x10

PART-A

Q.2 a) Compare the efficiency of Otto, Diesel and Dual cycle for the:

- i) Same compression ratio and heat input.
 - ii) Same maximum pressure and heat input.
- b) For an engine working on ideal dual cycle, the compression ratio is 10 and maximum pressure is limited to 75 bar. If the heat supplied is 1700 kJ/kg, find the pressure and temperature at various salient points of the cycle and the cycle efficiency. The pressure and temperature of air at the commencement of compression are 1 bar and 100° C respectively. Assume $C_p = 1.0004 \text{ kJ/kgk}$ and $C_v = 0.717 \text{ kJ/kgk}$ of air.

5

15

Q.3 a) i) Describe briefly the MPFI system with a neat sketch.

ii) Explain D-MPFI and L-MPFI system.

10

b) Explain the battery ignition system with a neat sketch.

10

Q.4 a) What is meant by abnormal combustion? Explain the phenomena of knock in S.I. engine.

10

b) Explain stages of combustion in C.I. engine and what are the factors that affect delay period in C.I. engine.

10

PART-B

Q.5 a) Describe splash and pressure lubricating system with a neat sketch.

10

b) Explain the following:

- i) Thermosyphon system (Cooling system).
- ii) Forced circulation cooling system.

5x2

- Q.6 a) A six-cylinder, gasoline engine operates on the four-stroke cycle. The bore of each cylinder is 80 mm and the stroke is 100 mm. The clearance volume per cylinder is 70 cc. At a speed of 4000 rpm the fuel consumption is 20 kg/h and the torque developed is 150 Nm.

Calculate:

- i) The brake power.
- ii) The brake mean effective pressure.
- iii) Brake thermal efficiency if the calorific value of fuel is 43000 kJ/kg.
- iv) The relative efficiency on a brake power basis assuming the engine work on the constant volume cycle. $\gamma = 1.4$ for air. **15**

- b) Explain: i) Volumetric efficiency.

- ii) Indicated thermal efficiency. **5**

- Q.7 a) A gas turbine unit has a pressure ratio of 6:1 and maximum cycle temperature of $610^\circ C$. The isentropic efficiency of the compressor and turbine are 0.80 and 0.82 respectively. Calculate the power output in kilowatts of an electric generator geared to the turbine when the air enters the compressor at $15^\circ C$ at the rate of 16 kg/s.

Take $C_p = 1.005 \text{ kJ/kgk}$ and $\gamma = 1.4$ for the compression process and take $C_p = 1.11 \text{ kJ/kgk}$ and $\gamma = 1.333$ for expansion process. **12**

- b) Describe with a neat sketch the working of a simple constant pressure open cycle gas turbine. **8**

End Semester Examination, May 2016

B. Tech. – Sixth Semester

POWER PLANT ENGINEERING (M-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.** Each question carries equal marks.

- Q.1 a) What is economic load sharing?
b) What are input-output curves?
c) What is basic nuclear reaction?
d) Explain PWR type nuclear reactor.
e) What is PFBC system?
f) How energy sources can be classified?
g) Explain stirling cycle.
h) Discuss importance of draft tubes.
i) Explain the concept of De-aeration.
j) The requirements of ASH handling system.

2x10

PART-A

- Q.2 Explain in brief the following:
a) Rankine cycle.
b) Reheat cycle.
c) Regenerative cycle.
d) Topping cycle.
- Q.3 a) What are the essential elements of a hydroelectric plant? Describe the different types of dams used for such plants and also discuss the conditions under which each type can be used.
b) What are the functions of surge tank?
- Q.4 a) Explain in detail the setup and working principle of modern thermal power plants.
b) Why are the economizer tubes often finned and grilles on the gas side?

5x4

15

5

14

6

PART-B

- Q.5 a) Describe with the help of a suitable sketch the operation of a continuous combustion constant pressure gas turbine.
b) What are combination cycles and why have these been developed?
- Q.6 a) Discuss the advantages and disadvantages of nuclear power plants as compared with conventional power stations.
b) What is a nuclear reactor? Describe the various parts of a nuclear reactor.
- Q.7 Explain in brief:
a) Incremental rate theory.
b) Cost of electrical energy.
c) Power plant operating characteristics.
d) Heat rate.

12

8

10

10

5x4

End Semester Examination, May 2016

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** Write short answers of the following:

 - a) Enlist different types of car body styles.
 - b) Write main functions of frame.
 - c) What is the requirement of clutch in an automobile?
 - d) Enlist various components of driveline.
 - e) What is universal joint?
 - f) Explain the need of a suspension system.
 - g) Explain the term: understeer and oversteer.
 - h) What is meant by air bleeding of brakes?
 - i) What are the different types of wheels?
 - j) What is a catalytic converter?

PART-A

PART-B

- Q.5 a) Enlist different types of suspension systems used in automobiles. Explain MacPherson strut type suspension in detail. **10**

b) Explain the following terms:

 - i) Camber.
 - ii) Castor.
 - iii) Toe-in and Toe-out
 - iv) King pin inclination.
 - v) Combined angle and scrub radius. **2x5**

Q.6 a) Describe the construction and working of disc brakes. Mention its advantages over drum brakes. **10**

b) What are the different types of tyre wear? What are their possible causes and necessary measures used to prevent them? **10**

- 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 automobiles". Explain **10**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

SOLAR ENERGY AND ITS APPLICATION (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.** Each question carries equal marks.

- Q.1 a) Distinguish between global radiation and diffused radiation.
b) Why solar constant is not a constant?
c) What is air mass ratio?
d) Define Reynolds number.
e) Classify different types of solar collectors.
f) Define altitude angle.
g) Define thermal inertia.
h) List materials used in construction of flat plate collector.
i) What is meant by scattered radiation?
j) How much time earth takes to move through one degree? **2×10**

PART-A

- Q.2 a) Explain construction, working and limitations of instruments used for measurement of total solar radiation. **10**
b) What is spectrum? Differentiate between terrestrial and extraterrestrial spectrum of solar radiation. **10**
- Q.3 a) Name and explain different type of flat plate solar collectors. **10**
b) Explain with diagram the behaviour of solar radiation when it strikes solar surface. **10**
- Q.4 a) Calculate hour angle at 3:30 p.m. **5**
b) What are various losses in a distributed collector system? **5**
c) Derive the ratio of power generated by the collector to power expanded in pumping the heat transfer fluid through the collector pipe. **10**

PART-B

- Q.5 a) Explain constructional details of single window flat plate collector using water as heat transfer medium. **10**
b) Differentiate between solar pond and natural pond. **5**
c) Give applications of solar pond. **5**
- Q.6 a) Discuss in detail the process of sensible heat storage with water. **10**
b) Explain latent heat storage and its applications. **10**
- Q.7 Write short notes on:
a) Community heating and cooling system. **7**
b) Solar gas absorption refrigeration. **7**
c) Two stage evaporative cooling. **6**

End Semester Examination, May 2016

B. Tech. – Sixth/Seventh/Eighth Semester

REFRIGERATION AND AIR-CONDITIONING (M-821)

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 the following terms:

- a) One ton of refrigeration.
- b) Cooling versus refrigeration.
- c) Dew point temperature and wet bulb temperature.
- d) Enthalpy of moist air.
- e) Specific humidity and relative humidity.
- f) Sensible heat factor.
- g) By pass factor of cooling coil.
- h) Show 'Reverse Carnot Refrigeration System' in P-v and T-s coordinates and write its limitations.
- i) Draw the labelled schematic of a bootstrap air refrigeration system.
- j) When one adds sufficient amount of glucose to a glass of water, the water becomes cold. Is it an example of refrigeration? If it is, can this method be used for devising a refrigeration system?

2x10

PART-A

Q.2 Classify the refrigerants and explain the ideal properties of refrigerants. State briefly the impact of Freon (CFCs) on refrigeration and air conditioning. **20**

Q.3 An aircraft flying at an altitude of 2000 m employs a boot-strap air refrigeration system. The ambient condition is 0.8 bar and 0 °C, and the ram air pressure and temperature are 1.05 bar and 17 °C respectively. After isentropic compression to 4 bar the air is cooled to 27 °C using ram air. Subsequently the air is further compressed in auxiliary compressor which is driven by the cooling turbine. At this state, the air is again cooled to 27 °C in another heat exchanger. Finally the air expands to cabin pressure of 1.01 bar and 25 °C. Make calculations for the maximum pressure in the cycle, power input and COP of the system. **20**

Q.4 The operating temperatures of a single stage vapour absorption refrigeration system are: generator: 90 °C; condenser and absorber: 40 °C; evaporator: 0 °C. The system has a refrigeration capacity of 100 kW and the heat input to the system is 160 kW. The solution pump work is negligible.

- a) Find the COP of the system and the total heat rejection rate from the system. **10**
- b) An inventor claims that by improving the design of all the components of the system he could reduce the heat input to the system to 80 kW while keeping the refrigeration capacity and operating temperatures same as before. Examine the validity of the claim. **10**

PART-B

Q.5 Explain following psychrometric processes in detail with schematic diagrams with respect to psychrometric chart.

- a) Sensible cooling.

468/5

- b) Sensible heating.
- c) Cooling and dehumidification.
- d) Heating and humidification.
- e) Cooling and humidification.

20

- 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:
- a) Mass and volume flow rates of the air supplied.
 - b) Latent heat load in the room.
 - c) 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.
- Q.7 Explain the classification and working principle of:
- a) Compressors used in refrigeration and air conditioning.
 - b) Water cooled and evaporative condensers.

End Semester Examination, May 2016

B. Tech. – Seventh / Eight Semester

REFRIGERATION AND AIR-CONDITIONING (M-821)

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:

- Write the designation of following refrigerants:
 $C Cl_2F$, $C Cl_2F_2$, $C H Cl F_2$, $C_2Cl_3F_3$
- Define dry bulb temperature and dew point temperature.
- What do you understand by cascading?
- Draw psychrometric chart and show all the relevant parameters.
- Define the following:
 - Air-Conditioning.
 - Tonnage of Refrigeration
 - Pressure Enthalpy diagram of vapour compression system.
 - Sensible cooling.

4×5

PART-A

Q.2 a) Find the expression of COP of vapour absorption system. **10**
 b) Briefly explain 10 points from properties of refrigerants. **10**

Q.3 A boot strap cooling system of 10 TR capacities is used in an aeroplane. The ambient air temperature and pressure are $20^\circ C$ and 0.85 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 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 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 air leaving the cabin not more than $20^\circ C$, find:

- The power required to operate the system.
- The COP of the system.

Draw the schematic and temperature-entropy diagram of the system. Take $r = 1.4$ and $C_p = 1 \text{ KJ/kg K}$. **20**

Q.4 a) Derive the COP of reversed carnot cycle starting from P-V and T-S diagram. The terms have usual meaning. **15**
 b) Write the effects of foreign material on the performance of vapour compression refrigeration system. **5**

PART-B

Q.5 a) The air enters a duct at $10^\circ C$ and 80% relative humidity at the rate of $150 \text{ m}^3/\text{min}$ and is heated to $30^\circ C$ without adding or removing any moisture. The pressure remains constant at 1 atmosphere. Determine the relative humidity of air at exit from the duct and the rate of heat transfer. **15**
 b) What is bypass factor? Describe with a diagram. **5**

470/5

- Q.6** Describe briefly the following:
a) Condensers.
b) Evaporators. **10×2**
- Q.7** The following data refers to an air-conditioning system to be designed for an industrial process for hot and wet climate:
Outside conditions = 30°C DBT and 75% RH.
Required inside conditions = 20°C DBT and 60% RH.
The required condition is to be achieved first by cooling and dehumidifying and then by heating. If 20m^3 of air is absorbed by the plant every minute, find:
a) Capacity of the cooling coil in tonnes of refrigeration.
b) Capacity of the heating coil in KW.
c) Amount of water removed per hour. **20**

End Semester Examination, May 2016

B. Tech. – Seventh / Eighth Semester

MODERN MACHINING METHODS (M-835 / M-835A)

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) State the significance of unconventional machining methods.
- b) State the mechanism of material removal of AJM.
- c) Identify the process parameters of USM.
- d) What are the limitations of ECM?
- e) Comment on the “working life of electrolytes” used in ECM process.
- f) State the function of dielectric fluids used in EDM.
- g) State the disadvantage of a relaxation circuit used in EDM.
- h) What are thermal and non-thermal type EBM?
- i) What are plasmogens? Name them.
- j) State the basic principle of electro-chemical grinding (ECG) operation.

2×10

PART-A

Q.2 What are the various types of modern machining methods? Enumerate the differences between them in respect of type of energy, mechanism of material removal, transfer media, energy source. **20**

Q.3 a) Explain with a neat diagram, the working of USM. **10**
b) Explain the effect of various process parameters on MRR of abrasive jet machines:
i) Abrasive grain size. ii) Mixing ratio.
iii) Stand of distance. iv) Abrasive flow rate. **10**

Q.4 a) Explain the photo-chemical blanking. **4**
b) Explain the factors governing the accuracy of the parts produced by ECM:
i) Machining voltage. ii) Feed rate of electrode tool.
iii) Temperature of electrolyte. iv) Concentration of electrolyte. **4x4**

PART-B

Q.5 a) Explain with sketches the different feasible dielectric flushing techniques applicable in case of EDM. **12**
b) What are the different types of power supplies used in EDM? **8**

Q.6 Explain various effects of the process parameters of PAM process:
a) Plasma Arc current intensity.
b) Plasma Arc voltage.
c) Cutting speed.
d) Nature of Plasmogen gas. **5×4**

Q.7 Write short notes on:
a) Rotary Ultrasonic Machining.
b) Wire-Cut-EDM. **10×2**

End Semester Examination, May 2016

M. Tech.(Industrial Engineering) – Second Semester

FLEXIBLE MANUFACTURING SYSTEM(M-IE-203)

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) Explain FMS concepts:
i) Piece part mix.
ii) Machine allocation mix in detail. | 5x2 |
| | b) Define distributive numerical control. | 5 |
| Q.2 | a) Explain difference between centralized and decentralized computer environment.
b) Describe ring type network. | 10
5 |
| Q.3 | a) Give brief description of different tool strategies.
b) Define tool monitoring by sensors in brief. | 10
5 |
| Q.4 | a) Write down benefits of group technology affecting areas of a company:
i) Engineering design.
ii) Production control.
iii) Quality control.
iv) Purchasing.
b) Differentiate between mono code and ploy code. | 2½x4
5 |
| Q.5 | a) Define different components of a Robotic system.
b) Explain SCARA configuration in brief. | 10
5 |
| Q.6 | a) What do you understand by PLC? Explain with working of a PLC.
b) Write activities and functions to be performed by FMS software. | 8
7 |

End Semester Examination, May 2016

M. Tech. (Industrial Engineering) – Second Semester
QUALITY CONTROL TECHNIQUES (M-IE-205)

Time: 3 hrs

Max Marks: **75**
No. of pages: 3

Note: Attempt any **FIVE** questions in all. Each question carries equal marks.

- Q.1** Explain the following: **5x3**
 a) Internal and external failure costs.
 b) Process capability study.
 c) Full factorial and fractional factorial designs of experiments.
- Q.2** Describe the following: **5x3**
 a) Juran's Trilogy for implementation of quality program.
 b) Cause and effect diagram.
 c) Audits on Quality System (ISO9000)
- Q.3** Describe eight fundamental principles on which ISO9000 Quality System Standard is based. **15**
- Q.4** A lathe is used in turning a shaft to a diameter of 23.75 ± 0.1 mm. A sample of 6 consecutive pieces was taken each day for 8 days. The diameters of these shafts are given below:

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
23.77	23.80	23.77	23.79	23.75	23.78	23.76	23.76
23.80	23.78	23.78	23.76	23.78	23.76	23.78	23.79
23.78	23.76	23.77	23.79	23.78	23.73	23.75	23.77
23.73	23.70	23.77	23.74	23.77	23.76	23.76	23.72
23.76	23.81	23.80	23.82	23.76	23.74	23.81	23.78
23.75	23.77	23.74	23.76	23.79	23.78	23.80	23.78

Find control limits for \bar{X} and R charts and find out the process capability of the machine. **15**

- Q.5** Set up ANOVA table for the following information relating to three drugs testing to judge the effectiveness in reducing blood pressure for three different groups of people.

		Drug		
		X	Y	Z
Group of people	A	14	10	11
	A	15	9	11
	B	12	7	10
	B	11	8	11
	C	10	11	8
	C	11	11	7

Answer the following questions at a significance level of 5%:

- a) Do the drugs act differently?
 b) Are the different groups of people affected differently?
 c) Is the interaction term significant?

15

- Q.6 Describe the basic steps in application of six sigma (DMAIC). 15
- Q.7 Briefly describe:
 a) Control charts for variables. 4
 b) Control charts for attributes. 4
 c) Comparison between control charts for variables and attributes. 7

Table C : Factors for Determining from \bar{R} the 3-Sigma Control Limits for \bar{X} and \bar{R} Charts from \bar{R}

Number of observations in sub-group (n)	Factors for \bar{X} chart (A_2)	Factors for R chart	
		Lower control limit (D_3)	Upper control limit (D_4)
2	1.88	0	3.27
3	1.02	0	2.57
4	0.73	0	2.28
5	0.58	0	2.11
6	0.48	0	2.00
7	0.42	0.08	1.92
8	0.37	0.14	1.86
9	0.34	0.18	1.82
10	0.31	0.22	1.78
11	0.29	0.22	1.74
12	0.27	0.28	1.72
13	0.25	0.31	1.69
14	0.24	0.33	1.67
15	0.22	0.35	1.65
16	0.21	0.36	1.64
17	0.20	0.38	1.62
18	0.19	0.39	1.61
19	0.19	0.40	1.60
20	0.18	0.41	1.59

$$\text{Upper Control Limit for } \bar{X} = UCL_{\bar{X}} = \bar{X} + A_2 \bar{R}$$

$$\text{Lower Control Limit for } \bar{X} = LCL_{\bar{X}} = \bar{X} - A_2 \bar{R}$$

(If aimed-at or standard value \bar{X}' is used rather than \bar{X} as the central line on the control chart, \bar{X}' should be substituted for \bar{X} in the preceding formulas.)

$$\text{Upper Control Limit for } R = UCL_R = D_4 \bar{R}$$

$$\text{Lower Control Limit for } R = LCL_R = D_3 \bar{R}$$

All factors in Table C are based on the normal distribution.

Table 4(a): Critical Values of F -Distribution (at 5 per cent)

v_2 / v_1	1	2	3	4	5	6	8	12	24	∞
1	161.4	199.5	215.7	224.6	230.2	234.0	238.9	243.9	249.1	243.3
2	18.51	19.00	19.16	19.25	19.30	19.33	19.37	19.41	19.45	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.85	8.74	8.64	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.04	5.91	5.77	5.63
5	6.61	5.79	5.41	5.19	5.05	4.95	4.82	4.68	4.53	4.36
6	5.99	5.14	4.76	4.53	4.39	4.28	4.15	4.00	3.84	3.67

7	5.59	4.74	4.35	4.12	3.97	3.87	3.73	3.57	3.41	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.44	3.28	3.12	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.23	3.07	2.90	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.07	2.91	2.74	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	2.95	2.79	1.61	2.40
12	4.75	3.88	3.49	3.26	3.11	3.00	2.85	2.69	2.51	2.30
13	4.67	3.80	3.41	3.18	3.02	2.92	2.77	2.60	2.42	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.70	2.53	2.35	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.64	2.48	2.29	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.59	2.42	2.24	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.55	2.38	2.19	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.51	2.34	2.15	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.48	2.31	2.11	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.45	2.28	2.08	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.42	2.25	2.05	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.40	2.23	2.03	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.38	2.20	2.01	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.36	2.18	1.98	1.73
25	4.24	3.38	2.99	2.76	2.60	2.49	2.34	2.16	1.56	1.71
26	4.22	3.37	2.98	2.74	2.59	2.47	2.32	2.15	1.95	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.31	2.13	1.93	1.67
28	4.20	3.34	2.95	2.71	2.56	2.45	2.29	2.12	1.91	1.65
29	4.18	3.33	2.93	2.70	2.54	2.43	2.28	2.10	1.90	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.27	2.09	1.89	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.18	2.00	1.79	1.51
60	4.00	3.15	2.76	2.52	2.37	2.25	2.10	1.92	1.70	1.39
120	3.92	3.07	2.68	2.45	2.29	2.17	2.02	1.83	1.61	1.25
∞	3.84	2.99	2.60	2.37	2.21	2.10	1.94	1.75	1.52	1.00

v_1 = Degrees of freedom for greater variance.

v_2 = Degrees of freedom for smaller variance.

End Semester Examination, May 2016

M. Tech. (Industrial Engineering) – Second Semester

OPTIMIZATION TECHNIQUES (M-IE-206)

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) How can you solve an integer nonlinear programming problem? **5**
 b) Solve the following problem using Gomory's cutting plane algorithm.

$$\begin{aligned} \text{Maximize, } & z = 3x_1 + 12x_2 \\ \text{Subjected to: } & 2x_1 + 4x_2 \leq 7 \\ & 5x_1 + 3x_2 \leq 15 \end{aligned}$$

10

- Q.2** a) What do you understand by optimal decision policy? **5**
 b) Use Bellman's principle of optimality to solve:

$$\begin{aligned} \text{Minimize, } & z = y_1 + y_2 + y_3 + \dots + y_n \\ \text{Subjected to: } & y_1 \cdot y_2 \dots y_n = d \ (d \neq 0) \\ & y_i \geq 0 \text{ for all } j = 1, 2, \dots, n \end{aligned}$$

10

- Q.3** a) Explain Wolfe's modified simplex method. **7**
 b) Solve graphically the following NLP problem:

$$\begin{aligned} \text{Maximize, } & z = 2x_1 + 3x_2 \\ \text{Subjected to: } & x_1^2 + x_2^2 \leq 20 \\ & x_1 \cdot x_2 \leq 8 \\ & x_1, x_2 \geq 0 \end{aligned}$$

8

- Q.4** Use Wolfe's method to solve the quadratic programming problem:

$$\begin{aligned} \text{Maximize, } & z = 2x_1 + x_2 - x_1^2 \\ \text{Subjected to: } & 2x_1 + 3x_2 \leq 6 \\ & 2x_1 + x_2 \leq 4 \\ & x_1, x_2 \geq 0 \end{aligned}$$

15

- Q.5** a) Differentiate between PERT and CPM. **7**
 b) Define: Branch and Bond algorithm. **8**

- Q.6** Draw the network diagram and calculate the critical path and total float of all activities:

Activity	A	B	C	D	E	F	G	H	I	J	K	L	M
Immediate Predecessor	–	A	B	C	A	E	E	E	H, L	K	D, F, G	J	H, L
Duration (weeks)	14	4	2	1	2	3	2	4	3	12	4	2	2

15

- Q.7** a) Find an optimal sequence for the following sequencing problems of four jobs and five machines when passing is not allowed of which processing time [in hours] is given below:

Job	Machine				
	M ₁	M ₂	M ₃	M ₄	M ₅

A	7	5	2	3	9
B	6	6	4	5	10
C	5	4	5	6	8
D	8	3	3	2	6

b) Explain Johnson's rule of sequencing with a suitable example.

10
5

End Semester Examination, May 2016

M. Tech. (Industrial Engineering) – Second Semester

HUMAN RELATIONS (M-IE-222)

Time: 3 hrs

Max Marks: **75**

No. of pages: **1**

Note: Attempt **FIVE** questions in all. Each question carries equal marks.

- | | | |
|-----|---|----------------------|
| Q.1 | a) Define task, job, position, role and work.
b) Discuss the needs and priorities of an HRD process.
c) Discuss on Human Resource Development (HRD) system. | 5
5
5 |
| Q.2 | Explain the steps to be followed for a good potential appraisal system. How performance counseling and interpersonal feedback helpful to the effectiveness of appraisal system? | 15 |
| Q.3 | a) State the aims and objectives of the training program.
b) Explain various “on the job training” and “off the job training” methods. | 5
10 |
| Q.4 | What is “career planning”, “career development” and “career management”? Explain the needs and importance of career planning and development in detail. | 15 |
| Q.5 | a) State the methods by which organizational effectiveness can be achieved.
b) How can one achieve organization effectiveness taking the view of Indian organizational context? | 5
10 |
| Q.6 | Write notes on the following:
a) HRD in Indian organization: Current perspective.
b) HRD in Indian organization: Future Issues. | 7½×2 |
| Q.7 | Write short notes on the following (any three):
a) Total quality management.
b) Managing change through organizational development.
c) Training follow-up programmes.
d) Effective counseling.
e) Personal Management Vs Human Resource Management. | 3×5 |

End Semester Examination, May 2016
M. Tech. (Industrial Engineering) – Second Semester
MANAGEMENT INFORMATION SYSTEM (M-IE-301)

Time: 3 hrs

Max Marks: **75**

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 internet.
b) Define system analyst.
c) Explain data flow diagram.
d) What is meant by database?
e) What are technical feasibilities?
f) What are purposes of system development?
g) What do you mean by proper communication?
h) What is production system?
i) What is meant by wireless network?
j) Define the supper chain management. **1½×10**

PART-A

- Q.2 a) Explain the architecture of MIS and give detailed layout of its components and models. **7**
b) Explain the steps involved in design, development and implementation of an MIS. **8**
- Q.3 a) Discuss in detail the layers that consists information architecture. **3**
b) Write short notes on:
i) Data mining.
ii) Data warehousing.
iii) Mobile wireless standards
iv) Sensitivity analysis. **3×4**
- Q.4 a) Discuss roles and responsibilities of a system analyst. **5**
b) Discuss the function of any two types of information systems in detail. **10**

PART-B

- Q.5 a) Information in known as quality product, explain. **6**
b) Write short notes on:
i) Components of information system.
ii) Geographic information system.
iii) Decision support system. **3×3**
- Q.6 Elucidate the security measured to be followed in protecting the computer system. **15**
- Q.7 What do you understand by the strategic management of an organization? Explain the strategic planning and its tool used in MIS activities. **15**

End Semester Examination, May 2016
M. Tech. (Industrial Engineering) – Third Semester
SIMULATION AND MODELING (M-IE-303)

Time: 3 hrs

Max Marks: **75**

No. of pages: **1**

Note: Attempt any **FIVE** questions in all. Each question carries equal marks.

Q.1 Virat Kohli scored in 10 T-20 matches as follows:

Matches	Score
1	40
2	30
3	50
4	60
5	70
6	60
7	50
8	80
9	70
10	80

Compute $\bar{X}(10)$, $S^2(10)$ and an approximate 95% confidence interval for μ (mean). **15**

- Q.2 a) Explain continuous and discrete systems in simulation study with suitable examples. **10**
 b) Briefly explain about static and dynamic model. **5**
- Q.3 a) Explain numerical Computation Techniques in simulation study with example. **10**
 b) Explain Monte Carlo Method. **5**
- Q.4 a) Explain Growth and Decay model. **10**
 b) System Dynamic Diagrams. **5**
- Q.5 a) Discuss the variance reduction techniques. **10**
 b) Define stochastic variables. **5**
- Q.6 a) Explain simulation of translations and rotational mechanical system. **10**
 b) Simulation of waitress line system. **5**
- Q.7 Discuss a feedback system with suitable example. **15**

End Semester Examination, May 2016
M. Tech. (Industrial Engineering) – Third Semester
SUPPLY CHAIN MANAGEMENT (M-IE-322)

Time: 3 hrs

Max Marks: **75**

No. of pages: **1**

Note: Attempt any **FIVE** questions in all. Each question carries equal marks.

- Q.1 Explain how to manage supply and demand to improve synchronization in the supply chain in the face of predictable variability. **15**
- Q.2 Write short notes on the following:
a) Material Requirement Planning.
b) Enterprise Resource Planning.
c) Aggregate Planning. **5×3**
- Q.3 a) Discuss the different factors influencing network design decisions. **7**
b) What are the strengths and weaknesses of savings matrix method of routing and scheduling of vehicles? **8**
- Q.4 Explain the capacitated plant location network optimization model. **15**
- Q.5 a) What is bullwhip effect and how does it relate to lack of coordination in the supply chain. **10**
b) Write short notes on:
i) Managing International Supply Chain.
ii) Inventory reduction strategies. **2½×2**
- Q.6 a) Explain the different quantitative and qualitative performance measurement measures that can be used to evaluate a supply chain. **10**
b) What modes of transportation are best suited for large, low value shipments? Why? **5**
- Q.7 **Case Study**
An automotive ancillary unit supplier performs a milk run twice a day to five large manufacturers located within a radius of 30 kilometers. Two trucks had been leased so far. The rental per day per truck is ` 12,500. This includes all transportation costs. The unit is planning to buy two trucks to ensure timely delivery and reliability. Each mini truck is likely to cost ` 5,00,000 and will incur a daily running cost of ` 4,000 per truck. What will be your recommendation to the unit regarding the purchase of trucks? Justify your decision. You may make suitable assumptions but state them explicitly. **15**

End Semester Examination, May 2016

B. Tech. – First Semester

APPLIED PHYSICS-I (PH-101A)

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) Write two important characteristics of a laser beam.
b) What are the main components of a laser device?
c) What is black body radiation?
d) Define zero point energy for a quantum system.
e) What do you mean by an inertial frame of reference?
f) Is potential gradient a vector or scalar quantity?
g) Write Poisson's and Laplace's equation.
h) What are dielectrics? Give their types.
i) What is dielectric constant? How is it related to electric susceptibility?
j) What are secondary ionization and multiplication factors? **2x10**

PART-A

- Q.2 a) Explain with the help of a neat diagram the principle and working of a He-Ne laser. **10**
b) Explain the term acceptance angle and numerical aperture and deduce the expression for numerical aperture. **10**
- Q.3 a) Derive Schrodinger time independent and time-dependent wave equation for matter waves. **10**
b) Differentiate between Bose-Einstein and Fermi-Dirac statistics. **4**
c) What are matter waves? What voltage must be applied to an electron microscope to produce electrons of wavelength 0.50 Å? **6**
- Q.4 a) Deduce an expression for time dilation on the basis of Lorentz transformation equations. **6**
b) A moving body with velocity v has a mass m . Show that $m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$, where m_0 is the rest mass of the body and C is the speed of light. **10**
c) Calculate the rest energy of electron and protein in MeV. Given $m_e = 9.1 \times 10^{-31} \text{ kg}$, $m_p = 1.67 \times 10^{-27} \text{ kg}$. **4**

4

PART-B

- Q.5 a) Derive expression for divergence and curl of electrostatic fields. **10**
b) Derive an expression for work done in moving a charge in an electrostatic field. **7**
c) A point charge of 10^{-9} C is placed at the origin. Determine the potential difference between the points P(1, 2, 2) and Q(4, 4, 2). **3**

- Q.6** a) Derive an expression for the energy density of electric field established in a dielectric medium. **8**
b) Device Clausius-Mossotti relation. **7**
c) A parallel plate capacitor has a 2 cm thick dielectric slab of dielectric constant 3, inserted between its plates. If the field inside the dielectric is measured as 10^6 V/m , determine the polarization and displacement vector. **5**
- Q.7** a) Discuss the interaction of light charged particles with matter with the help of a suitable diagram. **8**
b) Describe principle, construction and working of a G.M. counter. Explain internal and external quenching. **12**

End Semester Examination, May 2016

B. Tech. – Second Semester
APPLIED PHYSICS-II (PH-201A)

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 interplaner spacing.
b) Draw sketches illustrating (020) and (110) planes.
c) Define the term: substrat.
d) What is the difference between direct and indirect band gap semiconductor?
e) What are traps?
f) What do you understand by ferromagnetic domains?
g) Write the expressions of curie law and curieweiss law.
h) What are cooper pairs?
i) What is super conductivity?
j) Give two reasons why the properties of a materials change at nanoscale. **2x10**

PART-A

- Q.2 a) Show that c/a ratio of HCP crystal is $(8/3)^{1/2}$. **6**
b) From the following data, calculate the wavelength of the neutron beam and speed of neutrons $Q = 30$, $d = 3.84 \text{ \AA}^0$ and $n = 1$. **4**
c) What do you understand by schottky defect? Derive an expression for concentration of schottky defect. **10**
- Q.3 a) What is hall effect? Derive an expression for hall coefficient. Discuss some important applications of hall effect. **10**
b) Discuss any two of the following process of crystal growth.
i) Czochralski method.
ii) Vapour phase epitaxy.
iii) Molecular beam epitaxy. **5x2**

- Q.4 a) What is photo conductivity? Discuss simple model of a photo conductor. **10**
b) State the principle of a photo conductive cell. Describe its construction, working and uses. **10**

PART-B

- Q.5 a) Derive the expression for the magnetic dipole moment of an atom. **6**
b) Plot the hysteresis curve for a magnetic material. Differentiate between hard and soft magnetic materials. **8**
c) Write short notes on:
i) Ferromagnetism **6**
ii) Anti ferromagnetism
- Q.6 a) Derive London equations and discuss how its solution explains meissner effect and flux penetration. **12**
b) What are type 1 and type 2 super conductors? Give some applications of superconducting materials. **8**

- Q.7** a) What are carbon nano tubes? Describe any two methods for fabrication of carbon nanotubes. **10**
b) What are nanomaterials? Discuss their physical and chemical properties. **10**

End Semester Examination, May 2016

B. Tech. – Fifth Semester
PRODUCT DESIGN (MII-501)

Time: 3 hrs

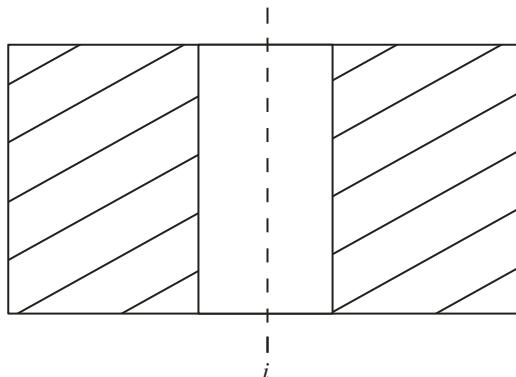
Max Marks: **100**

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 answer:

- a) Explain the economic considerations in a new product.
- b) Cite the examples of new product that were introduced by combining functionalities of several offer products.
- c) What is meant by reliability of a parallel system?
- d) Draw Bath Tub Curve.
- e) What is meant by parting line in a HPDC Die?
- f) What is meant by weld line in a casting?
- g) Draw the diagram of a HPDC Die (cold chamber) for following part.



- h) Why is draft given in aluminium parts made by HPDC Die?
- i) Name four processes that ensures precision accuracy in the range of 5 microns on a part.
- j) How do you ensure proper filling up the mould in HPDC Dies? **2x10**

PART-A

Q.2 What are the different creative methods that product designers use to invent new products? **20**

Q.3 a) How can you improve the reliability of a design of product? **10**
b) What is the trend between occurrence of failure of a Product and Time? **10**

Q.4 a) What is fixed cost? Why is it advisable to keep it low? **10**
b) A manufacturer makes electric fans. The annual fixed cost of the business is Rs. 24 lacs. The variable cost Rs. 800/- per fan. The selling price is Rs 1200/- per fan. At what volume, will the manufacturer break even? **10**

PART-B

Q.5 a) What are the design considerations in a forging? **10**
b) What is meant by drawability in sheet metal part? What is the general sequence of operations in the manufacturing of automotive panels e.g. Roof? **10**

- Q.6** a) What information is included in process sheets? How does it enhance the productivity of operations? **10**
b) What are the relative advantages and disadvantages of using thermoplastic and thermosetting plastics? **10**
- Q.7** a) Describe Just in Time system briefly. Write its merits and demerits. **10**
b) Describe two methods of sheet metal cutting without the use of cutting tools. **10**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

MEASURING TECHNIQUES AND COMPUTER AIDED INSPECTION (MII-502)

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) What do you mean by line standard and end standard?
- b) What is straightedge? What is the use of straightedge?
- c) What are go and no-go gauges?
- d) What is holes basis system?
- e) What do you mean by accuracy and precision?
- f) What is solar cell?
- g) What are the advantages of non-contact type instruments?
- h) What is tactile sensor?
- i) What are limit switches?
- j) What are the advantages of using laser in measurement?

2×10

PART-A

- Q.2** a) What is comparator? Mention the use of comparator in brief. **5**
b) Describe the working principle of an electrical comparator with a neat sketch. **15**
- Q.3** a) What do you mean by calibration process? Explain in brief. **5**
b) Describe with a neat sketch the two-wire method of measuring the effective diameter of an external screw thread. **15**

Q.4 Explain the acceptance test procedure for a lathe. **20**

PART-B

- Q.5** a) Explain data integration and evaluation using CMM in detail. **10**
b) Write a short note on 'non-contact sensor'. **10**
- Q.6** a) Explain bar code system and its applications in brief. **5**
b) Explain the different types of proximity sensors in detail. **15**
- Q.7** a) What are offline and online inspection procedures? Explain in brief. **10**
b) Explain the principle and application of optoelectronic devices. **10**

End Semester Examination, May 2016
B. Tech. – Fifth Semester
FACILITY PLANNING AND PLANT LAYOUT (MII-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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) Define single facility and multi-facility location problems.
- b) Define Minimax and Minisum location problem.
- c) Define fixed position layout.
- d) Define travel chart.
- e) Define chain type structure for part coding.
- f) Define production line.
- g) What is takt time P?
- h) What are the short comings of a belt conveyor?
- i) Define screw conveyors.
- j) Define Apron Chain Conveyors.

2×10

PART-A

- Q.2** a) Discuss the objectives of facility planning. **6**
b) A warehouse has to serve five outlets located at (0, 0), (3, 16), (18, 2), (8, 18) and (20, 2) are to be setup. The number of goods transported per-day between the new warehouse and the outlets are supposed to be 5, 22, 41, 60 and 34 respectively. What location for the warehouse will minimize the distance of goods transported per-day? **14**
- Q.3** Discuss a plant layout. Explain various types of plant layouts in detail. **20**
- Q.4** a) Describe group technology and its benefits in brief. **5**
b) Explain grouping techniques in detail. **15**

PART-B

- Q.5** a) Describe unit load concept. **5**
b) Classify various material handling equipments. **15**
- Q.6** a) Discuss the safety considerations in material handling. **10**
b) What are the principles of material handling? **10**
- Q.7** Explain automated storage and retrieval system and its types. Write down its advantages in detail. **20**

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Fifth Semester

COMPUTER AIDED DESIGN-I (M-II-504)

Time: 3 hrs

Max Marks: **100**

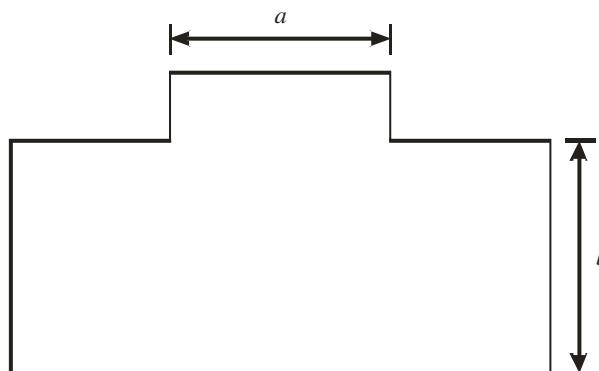
No. of pages: **2**

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.

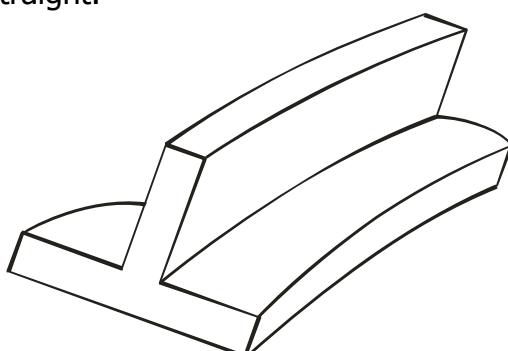
- Q.1 a) What is .igs format?
b) How can you mirror an ellipse about a line?
c) What do you understand by the term: 'CAE'?
d) What is surface modelling?
e) What is bottom up assembly modelling?
f) What is the function of sketcher?
g) How can you align an edge of a part with another edge of other part?
h) Write the full form of GKS and IGES.
i) What is 3-D curves?
j) What are software standards? **2x10**

PART-A

- Q.2 a) What is transformation? Explain the terms translation, rotation, scaling and reflection. **10**
b) How can you make $a=b$, so that they change together?

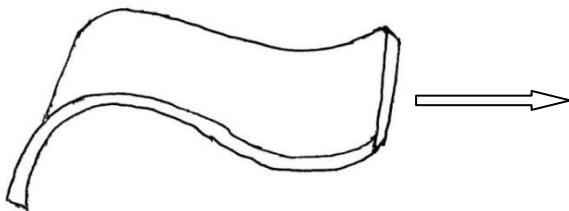


- Q.3 a) What is meant by a term associativity? How it is important for working? **10**
b) What is concurrent engineering? How is it helpful? **10**
- Q.4 How can you create the following part in modelling? The section of unequal M size and shape channel is not straight. **20**



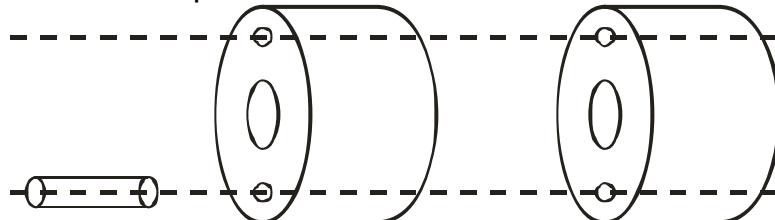
PART-B

- Q.5 How will you make the sheet metal part in surface modelling? Extend surface in the shown direction.



20

- Q.6 How will you create these part in assemble line?



20

- Q.7 How will you create three view and dimension them in CATIA. How will you create section in them?

20

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Fifth Semester

JIGS AND FIXTURE DESIGN (M-II-505)

Time: 3 hrs

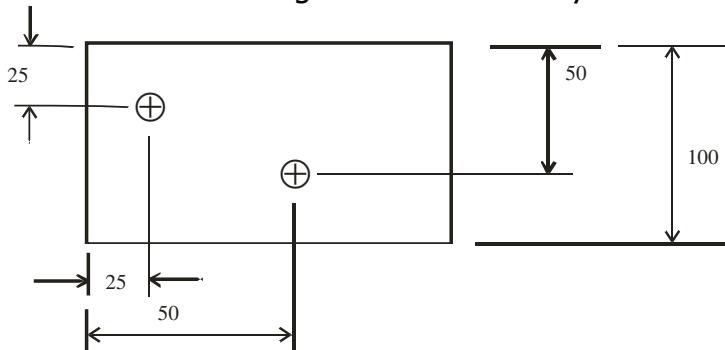
Max Marks: **100**

No. of pages: **2**

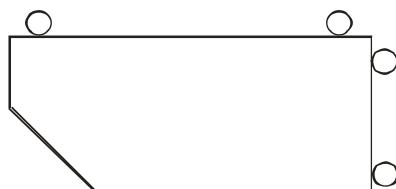
Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B.** Each question carries equal marks.

Q.1 Briefly explain the following:

- Draw the diagram of a round locating pin.
- Give one example of transition fit.
- Give the hole size in minimum material condition. Dia of hole= $\phi 20 \pm 0.2$.
- Draw the diagram of a threaded dowel.
- What is the material and hardness of a locating pin?
- If A JIG is to be designed. Please identify reference sides for the holes.



g) Provide fool proofing in the following case:

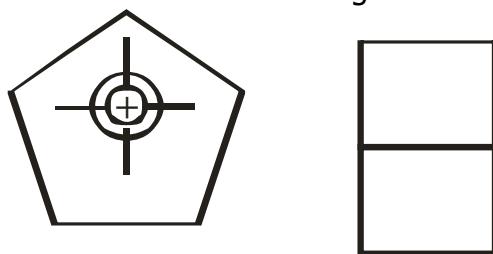


- Draw the diagram of a spring washer.
- Draw the diagram of a screw clamp.
- Draw the diagram of a stepped screw clamp.

2x10

PART-A

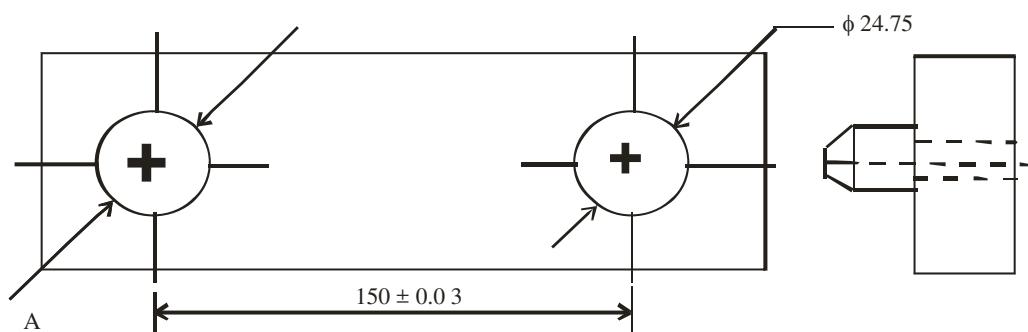
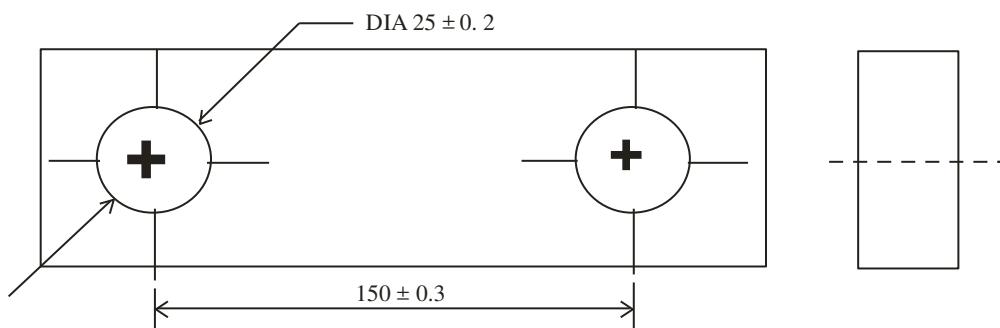
Q.2 a) What is process planning and what are the different considerations in process planning? **10**
b) Following block is to be made in through hardening steel. Give the process plan.



10

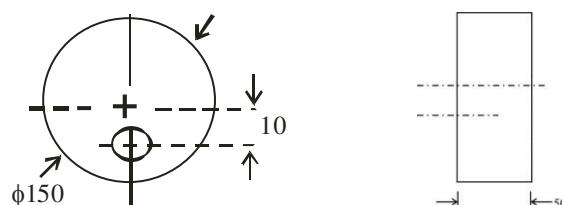
Q.3 a) What is the difference between diamond pin and round pin? Explain the purpose of diamond pin. 5

b) Calculate the dia of locating pin A. Pins are locating the holes.



15

Q.4 a) Draw a turning fixture to make an eccentric hole in a round part.



10

b) Draw the diagram of a toggle clamp.

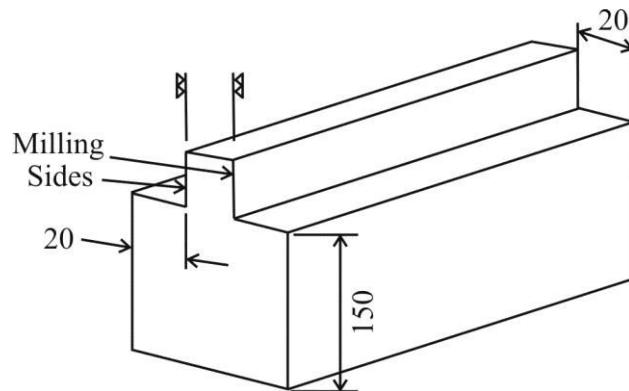
c) Draw the diagram of a swing clamp. 5

5

5

PART-B

Q.5 Draw the sketch of a horizontal milling fixture for following part.

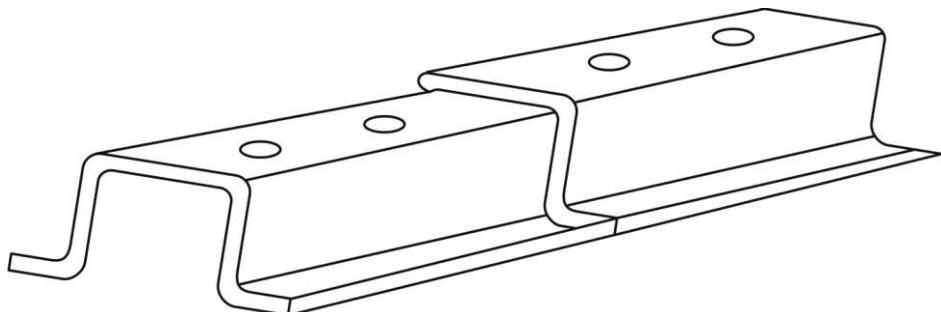


20

- Q.6 a) What are the different types of pneumatic cylinders? **5**
b) Draw the symbols of the following:
 5/2 valve.
 3/2 valve. **5**

- c) Draw the circuit diagram of pneumatic circuit where a single acting cylinder can be operated by either 'A' valve OR 'B' valve. **10**

- Q.7 Draw the diagram of inspection fixture for the following assembly:



- a) Checking the panel profile.
b) Check hole locations.
c) Check lower edge.

20

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Fifth Semester
VEHICLE ENGINEERING (M-II-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 a) Define frameless construction.
b) Define caster.
c) What are the requirements of a good steering system?
d) What is the function of a Tie rod?
e) Define over steer.
f) Define function of brake fluid.
g) What is ABS technology in braking system?
h) Define sprung and unsprung mass.
i) What is the function of torsion bar?
j) Define leaf spring. **2x10**

PART-A

- Q.2 a) Discuss advantages of full floating axle. **5**
b) Explain front wheel geometry. **15**
- Q.3 a) Describe Ackermann's steering system. **5**
b) Explain various types of steering gear box. **15**
- Q.4 a) What is the function of a propeller shaft? **5**
b) Explain the various forces acting on the rear axle. **15**

PART-B

- Q.5 a) Discuss the function of brakes. **5**
b) Explain working and construction of drum brakes. **15**
- Q.6 a) Define suspension system. What are the various functions it performs? **5**
b) Discuss the types of independent suspension system. **15**
- Q.7 a) Describe exhaust system. List the components of an exhaust system. **5**
b) Explain positive crank ventilation system with neat sketch. **15**

End Semester Examination, May 2016

B. Tech. – Sixth Semester

PRESS TOOLS-I (MII-601)

Time: 3 hrs

Max Marks: **100**

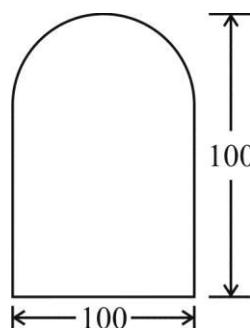
No. of pages: **2**

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) Explain the term TDC and BDC.
b) What is the function of light curtains in press?
c) What is the function of stoppers in progressive tools?
d) What is the function of crown in press?
e) What is the relation between "blank size" and "blank punching size"?"
f) What is the function of a "cam die"?"
g) What is the function of a "cam driver" in a cam die?
h) What is the role of guide posts and guide pillars in press tools?
i) What is press brake?
j) What is a shearing machine? **2×10**

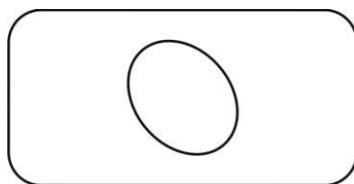
PART-A

- Q.2 a) What is the difference between H-frame and C-frame press? **5**
b) What is the difference between "die height" and "shut height"? **5**
c) Explain the working principle of mechanical press. **10**
- Q.3 a) What is the effect of "insufficient cutting clearance" and "excessive cutting clearance"? **5**
b) What is meant by "web thickness" in strip layout? How is it calculated? **5**
c) Calculate the cutting force required to blank the following part as shown in the figure.
(Thickness = 2.0 mm; shear strength = 35 kg/mm²)



10

- Q.4 a) What is the function of stripper in blanking tool? What are the two types of stripper? **10**
b) Make sketch of piercing die for the following part as shown in the figure.



10

PART-B

- Q.5 a) What is a progressive tool? Explain with a diagram. **10**

- b) What is meant by material utilization, pitch and grain direction? **10**
- Q.6 a) What is meant by side thrust? What are the effects of side thrust and how is this problem solved? **10**
 b) What is compound tool? Explain with a diagram. **10**
- Q.7 a) Calculate the blank size of the following part shown in the figure. **10**
-
- b) Make the design for a bending die for the above part shown in above figure. **10**

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Sixth Semester
COMPUTER AIDED DESIGN-II (M-II-602)

Time: 3 hrs

Max Marks: **100**

No. of pages: 2

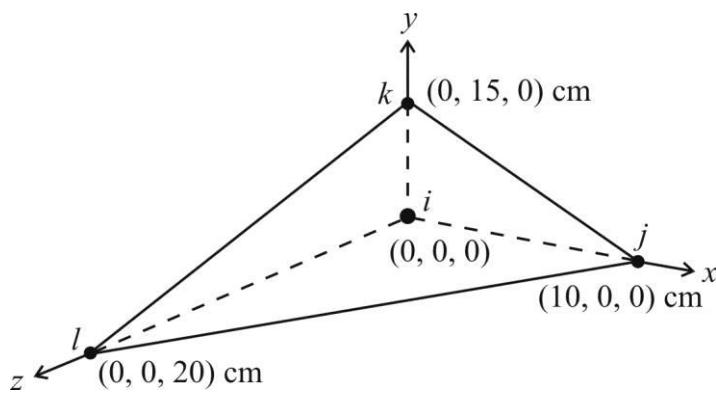
Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B.** Each question carries equal marks.

- Q.1 a) What is surface design?
b) Define FEM.
c) What is Mesh generation process?
d) Explain different FEM packages.
e) What are different types of production?
f) Differentiate between CNC and DNC.
g) What is part programming?
h) What is process planning in CNC?
i) What are cutting tool materials used in CNC?
j) Explain accuracy and surface finish in CNC.

2x10

PART-A

- Q.2 a) Discuss the importance of surface modeling in computer aided graphics and design. What are the various surface entities that are needed to construct a surface model? **10**
b) Explain the Coons and Bezier surfaces. What are the differences and applications for which they are used? **10**
- Q.3 a) What is the significance of boundary condition in FEM? Differentiate Dirichlet and Neumann boundary condition. **10**
b) What is weighted residual approach? Explain Galerkin method and least square method. **10**
- Q.4 a) Explain various steps involved in solving a non-linear problem through FEM. What is the significance of stiffness matrix and the principle used for its formation? **10**
b) Consider a tetrahedron element with the (x, y, z) coordinates as indicated in figure. If the Young's modulus (E) and Poisson's ratio (ν) are given by $E=207$ GPa and $\nu=0.3$. Find the stiffness matrix of element.



10

PART-B

- Q.5 a) Why is it necessary to assess convergence of any finite element and what are the requirements of convergence? Explain patch test for two dimensional element. **10**
 b) What are the sources of modeling error? Explain (with diagram) discretization and elemental errors. **10**
- Q.6 a) Explain life cycle of a product and how CAD/CAM technologies influence product life cycle. **10**
 b) What are various types of CNC systems? Discuss the merits and demerits of open loop and closed loop control system. **10**
- Q.7 a) What are the general requirements of CNC machine tool design? What are the design criteria to be considered for CNC machine tool design? **10**
 b) Why is feed back necessary in machine tools? Discuss the method used for position and velocity feed back in CNC machines. **10**

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Sixth Semester

WELDING TECHNOLOGY (M-II-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.** Each question carries equal marks.

- Q.1 a) What is shear spinning?
b) What is stretch forming?
c) What is the difference between punching and blanking?
d) What is the function of flux used in welding process?
e) What are the three flames used in gas welding?
f) What is the principle of resistance welding?
g) What is nick break test?
h) Why is surface cleaning important in welding?
i) What is the difference between soldering and brazing?
j) What is stud welding? **2x10**

PART-A

- Q.2 Write short notes on the following:
a) Manufacturing of honey comb structures.
b) Deep drawing. **10x2**
- Q.3 a) Explain in brief about various types of material handling equipments used in industry.
b) Explain roll bending operation. **15** **5**
- Q.4 Explain submerged arc welding with a neat sketch and discuss its advantages, limitations and applications. **20**

PART-B

- Q.5 Explain TIG welding with a neat sketch and discuss its advantages, limitations and applications. **20**
- Q.6 Explain various types of welding defects and its remedies in detail. **20**
- Q.7 Write short notes on:
a) Electron beam welding.
b) LASER beam welding. **10x2**

End Semester Examination, May 2016

B. Tech (Industry Integrated) – Sixth Semester
AUTOMATION (MII-604)

Time: 3 hrs.

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**. Each question carries equal marks.

- Q.1 a) Define automation. State two disadvantage of it.
b) Define CMM probe.
c) What do you understand by automated assembly?
d) Define production rate.
e) What is vision sensor?
f) What is carousel assembly system?
g) Name any four CMM machine types.
h) What do you understand by WIP?
i) What are fixed cost?
j) What is an automated flow line?

2×10

PART-A

- Q.2 a) Explain various automation strategies in detail. **15**
b) What do you understand by margin of safety? **5**
- Q.3 Describe the various methods of work part transport. **20**
- Q.4 a) Discuss selector and orientor in part feeding devices. **5**
b) Explain in detail the analysis of a single station assembly system. **15**

PART-B

- Q.5 Discuss contact and non-contact inspection techniques in detail. **20**
- Q.6 a) Explain the working of a CMM machine. What are the different applications of a CMM machine? **15**
b) Discuss about CMM probe and types of probe in brief. **5**
- Q.7 a) Write a short note on "Human workers in automated factory". **5**
b) Explain automated guided vehicle, its types, components and technologies used in it. **15**

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Sixth Semester

AUTOMATION (M-II-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 a) Describe various strategies of automation. **10**
 b) What are the merits and demerits of automation in India? Write five each. **10**

PART-A

- Q.2 a) How do you calculate total manufacturing time and production rate from automated flow lines? **10**
 b) Describe five automated transfer mechanism of components. **10**
- Q.3 What is the need of automated assembly systems? Describe the design for automated assembly for industrial applications. **20**
- Q.4 a) Describe various automatic inspection methods. **10**
 b) Sketch four sensors for automatic inspection of components. **10**

PART-B

- Q.5 a) What is modeling? Explain the role of performance modeling in automated manufacturing systems. **10**
 b) Describe any two optical inspection methods. **10**
- Q.6 a) Describe various types of material handling equipments. **10**
 b) What are various characteristics of automated guided vehicle system (AGVS)? Describe various types of AGVS. **10**
- Q.7 Write short notes on:
 a) Automated performance measurements. **7**
 b) Human workers in the future automated factory. **7**
 c) Unit cost of production. **6**

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Sixth Semester

VEHICLE BODY ENGINEERING (M-II-605)

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** Write short notes on of the following:

 - a) What are the various car body styles?
 - b) What is the effect of panoramic wind shield?
 - c) Define drag.
 - d) What is yawing?
 - e) What are the characteristics of a mini bus?
 - f) What is a split level bus?
 - g) Define integral type bus body.
 - h) Define commercial vehicle having drop side bodies.
 - i) Classify truck based upon the load carrying capacity.
 - j) Define tractor.

PART-A

PART-B

- Q.5 Explain the construction of a conventional type bus. Differentiate between conventional and integral type frame manufacturing. **20**

Q.6 a) Explain construction of a commercial vehicle body. **10**
b) What are the different parameters kept in mind while designing a driver seat? **10**

Q.7 a) Write down the various special features of a tractor. **10**
b) Explain the following (in case of tractor):
i) Wheel base
ii) Ground clearance
iii) Track
iv) Tuning space
v) Cage wheel **2x5**

End Semester Examination, May 2016

B.Tech. (Industry Integrated) – Sixth Semester

DIE DESIGN (M-II-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.** Each question carries equal marks.

- Q.1 a) What is injection moulding?
b) What is shrinkage?
c) What are the design guide lines for proper alignment of guide pillar and guide bush?
d) What is heat treatment?
e) What is preform? What is its main advantage?
f) Why the position of parting line is so important?
g) How are the sizes of various forging equipment selected?
h) What is draft with reference to cavity?
i) Name various equipment used in forging.
j) In what way the drop hammers are different from forging hammers? **2x10**

PART-A

- Q.2 a) What is mould? Name its parts. **5**
b) Discuss various types of plastics. **5**
c) Sketch and describe the following methods of moulding:
i) Compression moulding.
ii) Injection moulding. **5x2**
- Q.3 a) What is forging? Describe various types of forging dies. **5**
b) Discuss the formula for calculating forging force. **5**
c) Explain various steps for the design of forging dies. **5**
d) Discuss the advantages and limitations of forging process. **5**
- Q.4 a) Explain closed die forging. **5**
b) What are the calculation required for raw stock in die forging? **5**
c) What are advantages and limitations of closed die forging? **5**
d) Explain the basic rule for consideration for allowance and tolerance for closed die forging. **5**

PART-B

- Q.5 a) Sketch and describe:
i) Hot chamber die casting machine.
ii) Cold chamber die casting machine. **10**
- b) What are the main advantages and disadvantages of a die casting? **5**
- c) Explain the process and selection of material and heat treatment in die casting. **5**
- Q.6 a) Explain in brief the swaging tool. **10**
b) Write short notes on the coining die and horizontal forging machine. **10**
- Q.7 a) Explain the concept of upsetting dies. **10**
b) What are the calculations required for upsetting dies? **10**

End Semester Examination, May 2016

M. Tech. (Industrial Engineering) –Third Semester

SUPPLY CHAIN MANAGEMENT(M-IE-322)

Time: 3 hrs

Max Marks:**75**

No. of pages:**1**

Note: Attempt any**FIVE** questions in all. Each question carries equal marks.

- Q.1 Explain how to manage supply and demand to improve synchronization in the supply chain in the face of predictable variability. **15**
- Q.2 Write short notes on the following:
a) Material Requirement Planning.
b) Enterprise Resource Planning.
c) Aggregate Planning. **5×3**
- Q.3 a) Discuss the different factors influencing network design decisions. **7**
b) What are the strengths and weaknesses of savings matrix method of routing and scheduling of vehicles? **8**
- Q.4 Explain the capacitated plant location network optimization model. **15**
- Q.5 a) What is bullwhip effect and how does it relate to lack of coordination in the supply chain. **10**
b) Write short notes on:
i) Managing International Supply Chain.
ii) Inventory reduction strategies. **2½×2**
- Q.6 a) Explain the different quantitative and qualitative performance measurement measures that can be used to evaluate a supply chain. **10**
b) What modes of transportation are best suited for large, low value shipments?
Why? **5**
- Q.7 **Case Study**
An automotive ancillary unit supplier performs a milk run twice a day to five large manufacturers located within a radius of 30 kilometers. Two trucks had been leased so far. The rental per day per truck is ` 12,500. This includes all transportation costs. The unit is planning to buy two trucks to ensure timely delivery and reliability. Each mini truck is likely to cost ` 5,00,000 and will incur a daily running cost of ` 4,000 per truck. What will be your recommendation to the unit regarding the purchase of trucks? Justify your decision. You may make suitable assumptions but state them explicitly. **15**

End Semester Examination, May 2016

B. Tech. – Fifth Semester
PRODUCT DESIGN (MII-501)

Time: 3 hrs

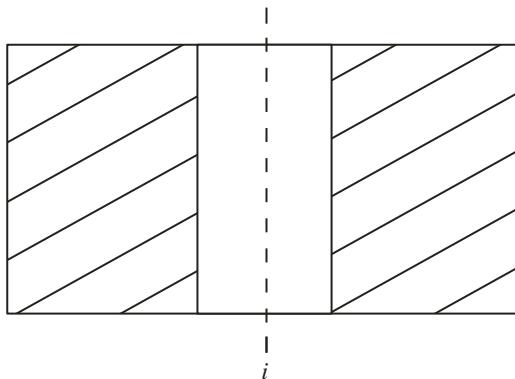
Max Marks:**100**

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 answer:

- a) Explain the economic considerations in a new product.
- b) Cite the examples of new product that were introduced by combining functionalities of several offer products.
- c) What is meant by reliability of a parallel system?
- d) Draw Bath Tub Curve.
- e) What is meant by parting line in a HPDC Die?
- f) What is meant by weld line in a casting?
- g) Draw the diagram of a HPDC Die (cold chamber) for following part.



- h) Why is draft given in aluminium parts made by HPDC Die?
- i) Name four processes that ensures precision accuracy in the range of 5 microns on a part.
- j) How do you ensure proper filling up the mould in HPDC Dies? **2x10**

PART-A

Q.2 What are the different creative methods that product designers use to invent new products? **20**

Q.3 a) How can you improve the reliability of a design of product? **10**
b) What is the trend between occurrence of failure of a Product and Time? **10**

Q.4 a) What is fixed cost? Why is it advisable to keep it low? **10**
b) A manufacturer makes electric fans. The annual fixed cost of the business is Rs. 24 lacs. The variable cost Rs. 800/- per fan. The selling price is Rs 1200/- per fan. At what volume, will the manufacturer break even? **10**

PART-B

Q.5 a) What are the design considerations in a forging? **10**
b) What is meant by drawability in sheet metal part? What is the general sequence of operations in the manufacturing of automotive panels e.g. Roof? **10**

- Q.6** a) What information is included in process sheets? How does it enhance the productivity of operations? **10**
b) What are the relative advantages and disadvantages of using thermoplastic and thermosetting plastics? **10**
- Q.7** a) Describe Just in Time system briefly. Write its merits and demerits. **10**
b) Describe two methods of sheet metal cutting without the use of cutting tools. **10**

End Semester Examination, May 2016

B. Tech. – Fifth Semester

MEASURING TECHNIQUES AND COMPUTER AIDED INSPECTION (MII-502)

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) What do you mean by line standard and end standard?
- b) What is straightedge? What is the use of straightedge?
- c) What are go and no-go gauges?
- d) What is holes basis system?
- e) What do you mean by accuracy and precision?
- f) What is solar cell?
- g) What are the advantages of non-contact type instruments?
- h) What is tactile sensor?
- i) What are limit switches?
- j) What are the advantages of using laser in measurement?

2×10

PART-A

- Q.2** a) What is comparator? Mention the use of comparator in brief. **5**
b) Describe the working principle of an electrical comparator with a neat sketch. **15**
- Q.3** a) What do you mean by calibration process? Explain in brief. **5**
b) Describe with a neat sketch the two-wire method of measuring the effective diameter of an external screw thread. **15**
- Q.4** Explain the acceptance test procedure for a lathe. **20**

PART-B

- Q.5** a) Explain data integration and evaluation using CMM in detail. **10**
b) Write a short note on 'non-contact sensor'. **10**
- Q.6** a) Explain bar code system and its applications in brief. **5**
b) Explain the different types of proximity sensors in detail. **15**
- Q.7** a) What are offline and online inspection procedures? Explain in brief. **10**
b) Explain the principle and application of optoelectronic devices. **10**

End Semester Examination, May 2016
B. Tech. – Fifth Semester
FACILITY PLANNING AND PLANT LAYOUT (MII-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.** Each question carries equal marks.

Q.1 Briefly answer:

- a) Define single facility and multi-facility location problems.
- b) Define Minimax and Minisum location problem.
- c) Define fixed position layout.
- d) Define travel chart.
- e) Define chain type structure for part coding.
- f) Define production line.
- g) What is takt time P?
- h) What are the short comings of a belt conveyor?
- i) Define screw conveyors.
- j) Define Apron Chain Conveyors.

2×10

PART-A

- Q.2** a) Discuss the objectives of facility planning. **6**
b) A warehouse has to serve five outlets located at (0, 0), (3, 16), (18, 2), (8, 18) and (20, 2) are to be setup. The number of goods transported per-day between the new warehouse and the outlets are supposed to be 5, 22, 41, 60 and 34 respectively. What location for the warehouse will minimize the distance of goods transported per-day? **14**
- Q.3** Discuss a plant layout. Explain various types of plant layouts in detail. **20**
- Q.4** a) Describe group technology and its benefits in brief. **5**
b) Explain grouping techniques in detail. **15**

PART-B

- Q.5** a) Describe unit load concept. **5**
b) Classify various material handling equipments. **15**
- Q.6** a) Discuss the safety considerations in material handling. **10**
b) What are the principles of material handling? **10**
- Q.7** Explain automated storage and retrieval system and its types. Write down its advantages in detail. **20**

End Semester Examination, May 2016

B. Tech. – Sixth Semester

PRESS TOOLS-I (MII-601)

Time: 3 hrs

Max Marks: **100**

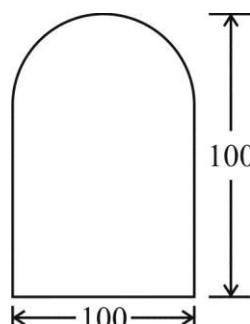
No. of pages: **2**

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) Explain the term TDC and BDC.
 b) What is the function of light curtains in press?
 c) What is the function of stoppers in progressive tools?
 d) What is the function of crown in press?
 e) What is the relation between "blank size" and "blank punching size"?
 f) What is the function of a "cam die"?
 g) What is the function of a "cam driver" in a cam die?
 h) What is the role of guide posts and guide pillars in press tools?
 i) What is press brake?
 j) What is a shearing machine? **2×10**

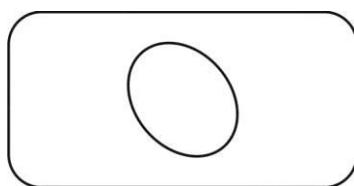
PART-A

- Q.2 a) What is the difference between H-frame and C-frame press? **5**
 b) What is the difference between "die height" and "shut height"? **5**
 c) Explain the working principle of mechanical press. **10**
- Q.3 a) What is the effect of "insufficient cutting clearance" and "excessive cutting clearance"? **5**
 b) What is meant by "web thickness" in strip layout? How is it calculated? **5**
 c) Calculate the cutting force required to blank the following part as shown in the figure.
 (Thickness = 2.0 mm; shear strength = 35 kg/mm²)



10

- Q.4 a) What is the function of stripper in blanking tool? What are the two types of stripper? **10**
 b) Make sketch of piercing die for the following part as shown in the figure.



10

PART-B

- Q.5 a) What is a progressive tool? Explain with a diagram. **10**

- b) What is meant by material utilization, pitch and grain direction? **10**
- Q.6 a) What is meant by side thrust? What are the effects of side thrust and how is this problem solved? **10**
 b) What is compound tool? Explain with a diagram. **10**
- Q.7 a) Calculate the blank size of the following part shown in the figure. **10**
-
- b) Make the design for a bending die for the above part shown in above figure. **10**

End Semester Examination, May 2016

B. Tech (Industry Integrated) – Sixth Semester
AUTOMATION (MII-604)

Time: 3 hrs.

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**. Each question carries equal marks.

- Q.1 a) Define automation. State two disadvantage of it.
b) Define CMM probe.
c) What do you understand by automated assembly?
d) Define production rate.
e) What is vision sensor?
f) What is carousel assembly system?
g) Name any four CMM machine types.
h) What do you understand by WIP?
i) What are fixed cost?
j) What is an automated flow line?

2×10

PART-A

- Q.2 a) Explain various automation strategies in detail. **15**
b) What do you understand by margin of safety? **5**
- Q.3 Describe the various methods of work part transport. **20**
- Q.4 a) Discuss selector and orientor in part feeding devices. **5**
b) Explain in detail the analysis of a single station assembly system. **15**

PART-B

- Q.5 Discuss contact and non-contact inspection techniques in detail. **20**
- Q.6 a) Explain the working of a CMM machine. What are the different applications of a CMM machine? **15**
b) Discuss about CMM probe and types of probe in brief. **5**
- Q.7 a) Write a short note on "Human workers in automated factory". **5**
b) Explain automated guided vehicle, its types, components and technologies used in it. **15**

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Fifth Semester

COMPUTER AIDED DESIGN-I (M-II-504)

Time: 3 hrs

Max Marks: **100**

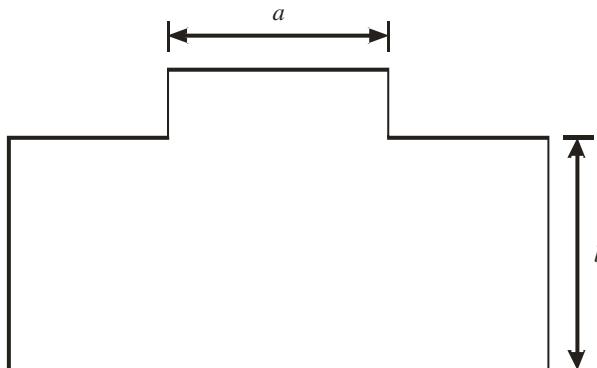
No. of pages: **2**

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.

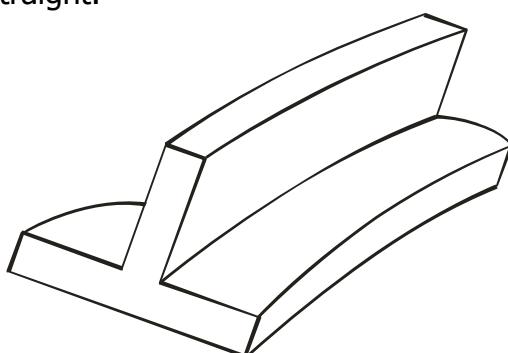
- Q.1 a) What is .igs format?
b) How can you mirror an ellipse about a line?
c) What do you understand by the term: 'CAE'?
d) What is surface modelling?
e) What is bottom up assembly modelling?
f) What is the function of sketcher?
g) How can you align an edge of a part with another edge of other part?
h) Write the full form of GKS and IGES.
i) What is 3-D curves?
j) What are software standards? **2x10**

PART-A

- Q.2 a) What is transformation? Explain the terms translation, rotation, scaling and reflection. **10**
b) How can you make $a=b$, so that they change together?



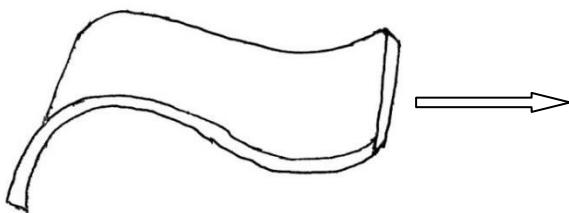
- Q.3 a) What is meant by a term associativity? How it is important for working? **10**
b) What is concurrent engineering? How is it helpful? **10**
- Q.4 How can you create the following part in modelling? The section of unequal M size and shape channel is not straight. **20**



20

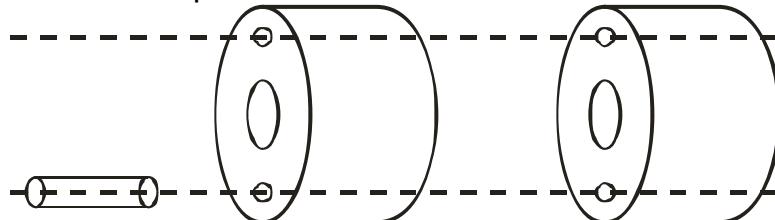
PART-B

- Q.5 How will you make the sheet metal part in surface modelling? Extend surface in the shown direction.



20

- Q.6 How will you create these part in assemble line?



20

- Q.7 How will you create three view and dimension them in CATIA. How will you create section in them?

20

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Fifth Semester

JIGS AND FIXTURE DESIGN (M-II-505)

Time: 3 hrs

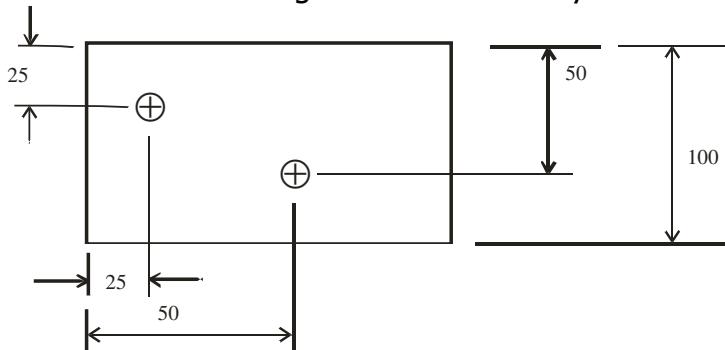
Max Marks: **100**

No. of pages: **2**

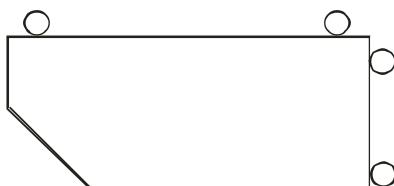
Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B.** Each question carries equal marks.

Q.1 Briefly explain the following:

- Draw the diagram of a round locating pin.
- Give one example of transition fit.
- Give the hole size in minimum material condition. Dia of hole= $\phi 20 \pm 0.2$.
- Draw the diagram of a threaded dowel.
- What is the material and hardness of a locating pin?
- If A JIG is to be designed. Please identify reference sides for the holes.



g) Provide fool proofing in the following case:



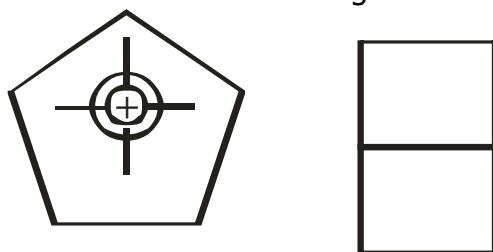
- Draw the diagram of a spring washer.
- Draw the diagram of a screw clamp.
- Draw the diagram of a stepped screw clamp.

2x10

PART-A

Q.2 a) What is process planning and what are the different considerations in process planning? **10**

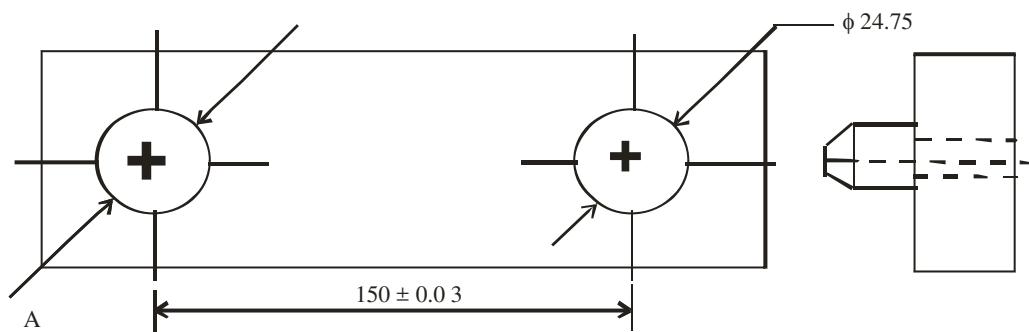
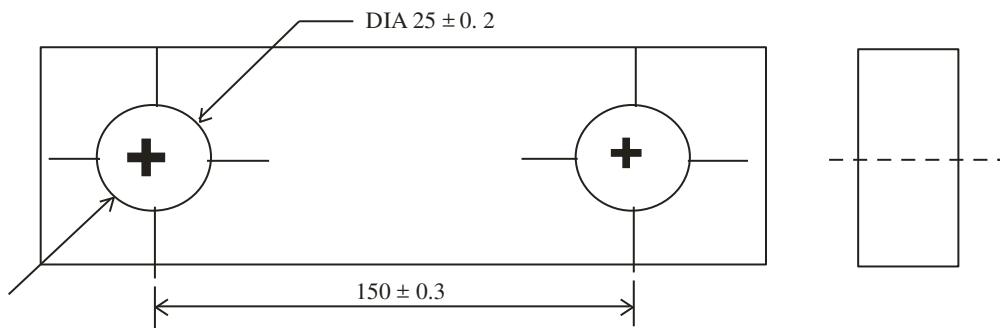
b) Following block is to be made in through hardening steel. Give the process plan.



10

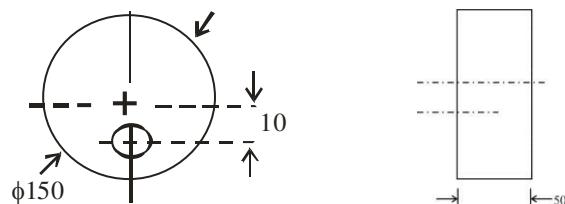
Q.3 a) What is the difference between diamond pin and round pin? Explain the purpose of diamond pin. 5

b) Calculate the dia of locating pin A. Pins are locating the holes.



15

Q.4 a) Draw a turning fixture to make an eccentric hole in a round part.



10

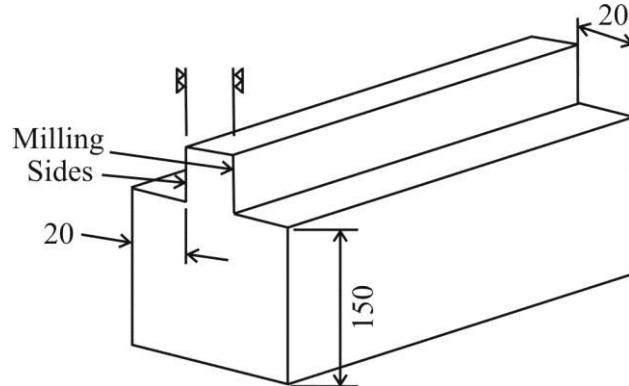
b) Draw the diagram of a toggle clamp.

c) Draw the diagram of a swing clamp. 5

c) Draw the diagram of a swing clamp. 5

PART-B

Q.5 Draw the sketch of a horizontal milling fixture for following part.



20

Q.6 a) What are the different types of pneumatic cylinders?

5

b) Draw the symbols of the following:

5/2 valve.

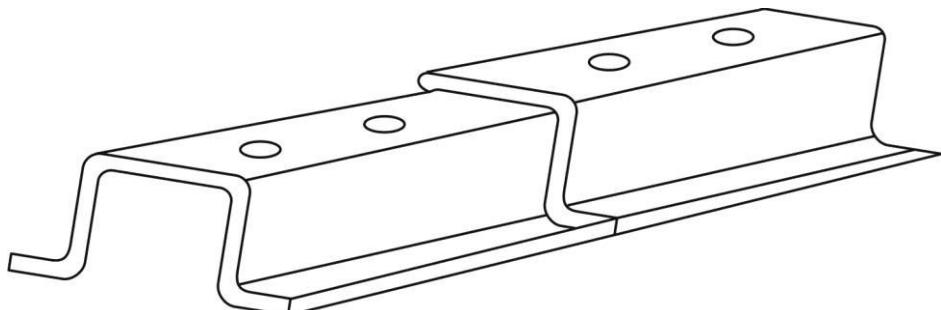
3/2 valve.

5

c) Draw the circuit diagram of pneumatic circuit where a single acting cylinder can be operated by either 'A' valve OR 'B' valve.

10

Q.7 Draw the diagram of inspection fixture for the following assembly:



d) Checking the panel profile.

e) Check hole locations.

f) Check lower edge.

20

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Fifth Semester
VEHICLE ENGINEERING (M-II-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 a) Define frameless construction.
b) Define caster.
c) What are the requirements of a good steering system?
d) What is the function of a Tie rod?
e) Define over steer.
f) Define function of brake fluid.
g) What is ABS technology in braking system?
h) Define sprung and unsprung mass.
i) What is the function of torsion bar?
j) Define leaf spring. **2x10**

PART-A

- Q.2 a) Discuss advantages of full floating axle. **5**
b) Explain front wheel geometry. **15**
- Q.3 a) Describe Ackermann's steering system. **5**
b) Explain various types of steering gear box. **15**
- Q.4 a) What is the function of a propeller shaft? **5**
b) Explain the various forces acting on the rear axle. **15**

PART-B

- Q.5 a) Discuss the function of brakes. **5**
b) Explain working and construction of drum brakes. **15**
- Q.6 a) Define suspension system. What are the various functions it performs? **5**
b) Discuss the types of independent suspension system. **15**
- Q.7 a) Describe exhaust system. List the components of an exhaust system. **5**
b) Explain positive crank ventilation system with neat sketch. **15**

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Sixth Semester

COMPUTER AIDED DESIGN-II (M-II-602)

Time: 3 hrs

Max Marks: **100**

No. of pages: **2**

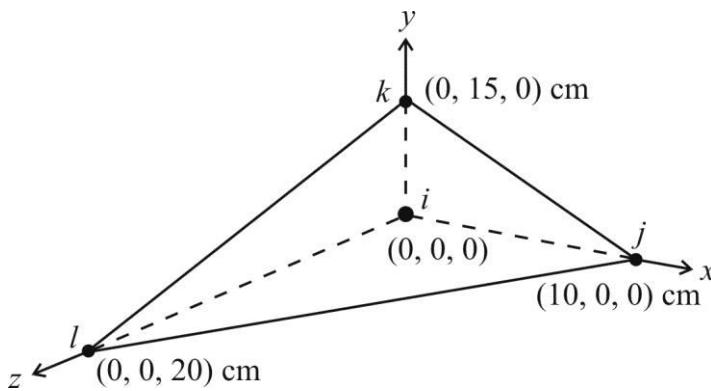
Note: Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **Part A** and **TWO** questions from **Part B.** Each question carries equal marks.

- Q.1 a) What is surface design?
b) Define FEM.
c) What is Mesh generation process?
d) Explain different FEM packages.
e) What are different types of production?
f) Differentiate between CNC and DNC.
g) What is part programming?
h) What is process planning in CNC?
i) What are cutting tool materials used in CNC?
j) Explain accuracy and surface finish in CNC.

2x10

PART-A

- Q.2 a) Discuss the importance of surface modeling in computer aided graphics and design.
What are the various surface entities that are needed to construct a surface model? **10**
- b) Explain the Coons and Bezier surfaces. What are the differences and applications for which they are used? **10**
- Q.3 a) What is the significance of boundary condition in FEM? Differentiate Dirichlet and Neumann boundary condition. **10**
b) What is weighted residual approach? Explain Galerkin method and least square method. **10**
- Q.4 a) Explain various steps involved in solving a non-linear problem through FEM. What is the significance of stiffness matrix and the principle used for its formation? **10**
b) Consider a tetrahedron element with the (x, y, z) coordinates as indicated in figure.
If the Young's modulus (E) and Poisson's ratio (ν) are given by $E=207$ GPa and $\nu=0.3$. Find the stiffness matrix of element.



10

PART-B

- Q.5 a) Why is it necessary to assess convergence of any finite element and what are the requirements of convergence? Explain patch test for two dimensional element. **10**
b) What are the sources of modeling error? Explain (with diagram) discretization and elemental errors. **10**
- Q.6 a) Explain life cycle of a product and how CAD/CAM technologies influence product life cycle. **10**
b) What are various types of CNC systems? Discuss the merits and demerits of open loop and closed loop control system. **10**
- Q.7 a) What are the general requirements of CNC machine tool design? What are the design criteria to be considered for CNC machine tool design? **10**
b) Why is feed back necessary in machine tools? Discuss the method used for position and velocity feed back in CNC machines. **10**

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Sixth Semester

WELDING TECHNOLOGY (M-II-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.** Each question carries equal marks.

- Q.1 a) What is shear spinning?
b) What is stretch forming?
c) What is the difference between punching and blanking?
d) What is the function of flux used in welding process?
e) What are the three flames used in gas welding?
f) What is the principle of resistance welding?
g) What is nick break test?
h) Why is surface cleaning important in welding?
i) What is the difference between soldering and brazing?
j) What is stud welding? **2x10**

PART-A

- Q.2 Write short notes on the following:
a) Manufacturing of honey comb structures.
b) Deep drawing. **10x2**
- Q.3 a) Explain in brief about various types of material handling equipments used in industry. **15**
b) Explain roll bending operation. **5**
- Q.4 Explain submerged arc welding with a neat sketch and discuss its advantages, limitations and applications. **20**

PART-B

- Q.5 Explain TIG welding with a neat sketch and discuss its advantages, limitations and applications. **20**
- Q.6 Explain various types of welding defects and its remedies in detail. **20**
- Q.7 Write short notes on:
a) Electron beam welding.
b) LASER beam welding. **10x2**

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Sixth Semester

AUTOMATION (M-II-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 a) Describe various strategies of automation. **10**
b) What are the merits and demerits of automation in India? Write five each. **10**

PART-A

- Q.2 a) How do you calculate total manufacturing time and production rate from automated flow lines? **10**
b) Describe five automated transfer mechanism of components. **10**
- Q.3 What is the need of automated assembly systems? Describe the design for automated assembly for industrial applications. **20**
- Q.4 a) Describe various automatic inspection methods. **10**
b) Sketch four sensors for automatic inspection of components. **10**

PART-B

- Q.5 a) What is modeling? Explain the role of performance modeling in automated manufacturing systems. **10**
b) Describe any two optical inspection methods. **10**
- Q.6 a) Describe various types of material handling equipments. **10**
b) What are various characteristics of automated guided vehicle system (AGVS)? Describe various types of AGVS. **10**
- Q.7 Write short notes on:
a) Automated performance measurements. **7**
b) Human workers in the future automated factory. **7**
c) Unit cost of production. **6**

End Semester Examination, May 2016

B. Tech. (Industry Integrated) – Sixth Semester

VEHICLE BODY ENGINEERING (M-II-605)

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 Write short notes on of the following:

- a) What are the various car body styles?
- b) What is the effect of panoramic wind shield?
- c) Define drag.
- d) What is yawing?
- e) What are the characteristics of a mini bus?
- f) What is a split level bus?
- g) Define integral type bus body.
- h) Define commercial vehicle having drop side bodies.
- i) Classify truck based upon the load carrying capacity.
- j) Define tractor.

2x10

PART-A

Q.2 a) What are the various methods to improve visibility? **10**

b) What are the safety consideration used in a car while designing? **10**

Q.3 a) What are the various forces and moments acts on a vehicle? **10**

b) Explain about sublimation in flow visualization techniques. **10**

Q.4 a) Discuss the various type of metals sections used in bus manufacturing. **10**

b) Explain the following:

- | | | |
|---------------------|-----------------------------|--------------------|
| i) Classic type | ii) Single Decker | iii) Double Decker |
| iv) Split level bus | v) Two level single Decker. | 2x5 |

PART-B

Q.5 Explain the construction of a conventional type bus. Differentiate between conventional and integral type frame manufacturing. **20**

Q.6 a) Explain construction of a commercial vehicle body. **10**

b) What are the different parameters kept in mind while designing a driver seat? **10**

Q.7 a) Write down the various special features of a tractor. **10**

b) Explain the following (in case of tractor):

- i) Wheel base
- ii) Ground clearance
- iii) Track
- iv) Tuning space
- v) Cage wheel

2x5

End Semester Examination, May 2016

B.Tech. (Industry Integrated) – Sixth Semester

DIE DESIGN (M-II-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.** Each question carries equal marks.

- Q.1 a) What is injection moulding?
b) What is shrinkage?
c) What are the design guide lines for proper alignment of guide pillar and guide bush?
d) What is heat treatment?
e) What is preform? What is its main advantage?
f) Why the position of parting line is so important?
g) How are the sizes of various forging equipment selected?
h) What is draft with reference to cavity?
i) Name various equipment used in forging.
j) In what way the drop hammers are different from forging hammers? **2x10**

PART-A

- Q.2 a) What is mould? Name its parts. **5**
b) Discuss various types of plastics. **5**
c) Sketch and describe the following methods of moulding:
i) Compression moulding.
ii) Injection moulding. **5x2**
- Q.3 a) What is forging? Describe various types of forging dies. **5**
b) Discuss the formula for calculating forging force. **5**
c) Explain various steps for the design of forging dies. **5**
d) Discuss the advantages and limitations of forging process. **5**
- Q.4 a) Explain closed die forging. **5**
b) What are the calculation required for raw stock in die forging? **5**
c) What are advantages and limitations of closed die forging? **5**
d) Explain the basic rule for consideration for allowance and tolerance for closed die forging. **5**

PART-B

- Q.5 a) Sketch and describe:
i) Hot chamber die casting machine.
ii) Cold chamber die casting machine. **10**
- b) What are the main advantages and disadvantages of a die casting? **5**
- c) Explain the process and selection of material and heat treatment in die casting. **5**
- Q.6 a) Explain in brief the swaging tool. **10**
b) Write short notes on the coining die and horizontal forging machine. **10**
- Q.7 a) Explain the concept of upsetting dies. **10**
b) What are the calculations required for upsetting dies? **10**

End Semester Examination, May 2016
M. Tech. (Biotechnology) - Second Semester
ADVANCE PLANT BIOTECHNOLOGY (BT-M-202A)

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 part. Each question carries equal marks.

Q.1 Briefly answer:

- a) What are the uses of callus culture?
- b) What are the natural secondary metabolites produced from plants?
- c) Discuss cellular totipotency.
- d) Name a few compounds used as cryoprotectants.
- e) Describe RNA interference.

3x5

PART-I

- Q.2** a) Explain the technique of embryo culture with a diagram. **8**
b) Describe triploid production in detail. **7**
- Q.3** a) Discuss somaclonal variations with a diagram. **8**
b) How one can produce virus free plants? Explain by taking a suitable example. **7**

PART-II

- Q.4** a) Explain techniques for selecting high yielding cell lines. **8**
b) Describe elicitor induced accumulation of secondary metabolites. **7**
- Q.5** a) Write a note on biotransformation using plant cell culture. **10**
b) Enlist advantages of secondary metabolite production. **5**

PART-III

- Q.6** a) What do you mean by *in-vivo* gene banks and *in-vitro* gene banks? Explain in detail. **8**
b) Explain amelioration of gene silencing. **7**
- Q.7** a) Describe different methods for insect resistance and virus resistance. **10**
b) Write a note on food safety assessment of GM crops. **5**

End Semester Examination, May 2016
M. Tech.(Biotechnology) – Second Semester
ENVIRONMENTAL BIOTECHNOLOGY(BT-M-203)

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 answer:

- a) Enumerate the advantages and disadvantages of trickling filters.
- b) How do we define resources according to CBD?
- c) What are the most common efflux systems in metal resistance?
- d) Why is the biological diversity rich in tropics?
- e) Write a brief note on oil zapper technology.

3×5

UNIT-I

- Q.2** a) Differentiate between primary and tertiary waste water treatment. **8**
b) Explain the concept of cleaner technology for removal of specific pollutant of paper and pulp industry. **7**
- Q.3** a) Describe the conventional and modified activated sludge processes, along with their flow diagrams. **9**
b) Write a short note on rotating biological contractor. **6**

UNIT-II

- Q.4** a) What are the most common ways microbes use or interact with metals? **7**
b) How metals can be toxic to cells? Illustrate the various mechanisms of microbes to prevent metal toxicity. **8**
- Q.5** a) What is bioremediation? What are the requirements, mechanism and types of bioremediation? **9**
b) Enumerate the advantages and disadvantages of different methods of phytoremediation. **6**

UNIT-III

- Q.6** a) The convention of biodiversity has brought together the concepts of benefit sharing, traditional knowledge and intellectual property. Comment and explain. **7**
b) What is sustainable development? Explain the different models and indicators of sustainable development. **8**
- Q.7** a) What is biological diversity? What are the major threats to biodiversity in India? **8**
b) Differentiate between in situ and ex-situ conservation of biodiversity. **7**

End Semester Examination, May 2016

M. Tech. (Biotechnology) - Second Semester

STEM CELL BIOLOGY (BT-M-221D)

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 part. Each question carries equal marks.

Q.1 Answer briefly:

- a) Define developmental biology.
- b) Name the three layers formed during cell differentiation.
- c) What are stem cell inches?
- d) Differentiate between mitosis and meiosis.
- e) What are cancer stem cells?
- f) Name any two stem cell markers.
- g) Explain the term: 'Epigenetics'.
- h) Differentiate between totipotency and pluripotency.
- i) Mention two properties of cells at the blastocyst stage.
- j) What is cellular commitment?

1½x10

PART-I

Q.2 What is stem cell biology? Discuss its scope and importance in detail.

15

Q.3 Differentiate between:

- a) Mitosis and Meiosis.
- b) Zygote and Embryo.
- c) Germ cells and somatic cells.

5x3

PART-II

Q.4 a) How do stem cells maintain their population?

7½

- b) Describe the role of stem cell niches in the sustenance of stem cells.

7½

Q.5 Discuss in detail the following pathways:

- a) Sonic.
- b) Hedgehog.
- c) Self-renewal.

5x3

PART-III

Q.6 Write notes on the following:

- a) Nuclear cloning.
- b) Epigenetic reprogramming.

7½x2

Q.7 a) What are stem cell markers?

7½

- b) Discuss in detail the markers of embryonic stem cells.

7½

End Semester Examination, May 2016

M. Tech. (Biotechnology) - Second Semester

STEM CELLS BASED TISSUE ENGINEERING (BT-M-222D)

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 part. Each question carries equal marks.

Q.1 Answer briefly:

- a) Define the term: 'regenerative medicine'.
- b) Name any two growth factors.
- c) What is a bioreactor?
- d) Differentiate between allogeneic and xenogeneic cells.
- e) What are smart biomaterials?
- f) Give an example of mural cells.
- g) Explain the term: 'biological packaging'.
- h) Differentiate between vasculogenesis and angiogenesis.
- i) Mention two properties that are required of engineered tissues.
- j) What is meant by native tissue?

1½x10

PART-I

Q.2 What is a scaffold? What are the different processes involved in their fabrication?

15

Q.3 Why there is a requirement of genetically engineered cells in tissue engineering? Explain the methods involved in genetic modulation.

15

PART-II

Q.4 How the growth factors are delivered in tissue engineering applications? Highlight the vehicles and processes involved in it.

15

Q.5 Give an account of various types of bioreactors used in tissue engineering with emphasis on their advantages and various applications.

15

PART-III

Q.6 What are the properties of native tissues that are considered in engineered tissues? Explain the mechanical signals that regulate the engineered tissues.

15

Q.7 Give a detailed account of the safety issues involved in engineered tissues. What factors are responsible for the efficacy of delivering engineered tissues and how they can be modulated for its enhancement?

15

End Semester Examination, May 2016

M. Tech. (Biotechnology) – Second Semester

STEM CELL BASED TISSUE DEVELOPMENT (BT-M-223D)

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. All questions carry equal marks.

Q.1 Briefly answer:

- a) What do you mean by stem cell niche?
- b) Explain the schematic of the actin cycle.
- c) Write a short note on bioartificial liver.
- d) Induced Pluripotent Stem (IPS) cell behaves like an embryonic stem cell. Comment.
- e) What is the role of pre-clinical trials in stem cell research? **3×5**

UNIT-I

Q.2 a) What are embryonic stem cells? Illustrate the importance of stem cells in tissue maintenance and regeneration. **8**

b) Explain the different types of skin substitutes in skin regeneration. **7**

Q.3 What are the two essential components of wound healing? Explain the events and processes associated with the repair of the wound. **15**

UNIT-II

Q.4 a) What is compensatory hyperplasia? Describe the mechanism of hepatic regeneration. **10**

b) What are the different types of materials used in bone transplantation? **5**

Q.5 a) What is the composition of extracellular matrix? Explain the functions of collagen and fibronectin in animal tissues. **8**

b) Give the functional classification of cell junctions in detail. **7**

UNIT-III

Q.6 a) Discuss the role of animals in stem cell research. **10**

b) What are CAM's? Describe the role of CAM's in cell adhesion in brief. **5**

Q.7 How tissue engineered products are regulated by FDA? **15**

End Semester Examination, May 2016
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; **taking at least ONE question from each UNIT.**
Q.1 is compulsory. All questions carry equal marks.

- Q.1 Briefly answer the following: **2×6**
- a) Distinguish between chemoautotrophs and chemoheterotrophs.
 - b) What is the significance of dipicolinic acid in bacteria?
 - c) How will you isolate antibiotic resistant bacteria from a soil sample?
 - d) How chemostat differs from turbidostat?
 - e) What do you mean by a competent cell? How competency can be achieved under lab conditions?
 - f) How antibiotics can be sterilized?

UNIT-I

- Q.2 a) Discuss the importance of 16 S ribosomal DNA in the bacterial classification. **8**
b) What is numerical taxonomy? **4**
- Q.3 a) List down the requirements to design a defined culture medium for an organism that can grow aerobically on acetate as carbon and energy source. **7**
b) How a pure culture can be preserved in a laboratory? **5**

UNIT-II

- Q.4 a) Describe the growth cycle of a population of bacterial cells from the time this population is first inoculated into the fresh medium. Also give the mathematical expression for the same. **8**
b) How synchronous culture can be obtained? **4**
- Q.5 What are the structural differences in the cell envelop of Gram positive and Gram negative bacteria? How these differences form the basis of Gram staining? **12**

UNIT-III

- Q.6 How F – X F+ and Hfr conjugation processes proceed? Distinguish between the two in terms of mechanism and the final results. **12**
- Q.7 How lytic life cycle is different from lysogenic life cycle? Under what conditions a virus can follow either of the two? **12**

End Semester Examination, May 2016

M. Sc. (Biotechnology) – First Semester

BIOMOLECULES (BT-S-103A)

Time: 3 hrs.

Max Marks: **60**

No. of pages: **1**

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

Q.1 Answer the following questions:

- a) Why is TCA cycle known to be amphibolic in nature?
- b) Where does Glycolysis, Glyoxylate cycle, TCA cycle and ETC occur in cell?
- c) What do you understand by glucose priming? Why does it occur in glycolysis?
- d) Define glycosidic linkage. With the help of an example show its formation.
- e) What is the role of SDS in SDS-PAGE?
- f) Does ketotriose exist in D or L form? State the reason of your answer.

2×6

UNIT-I

Q.2 a) Write about the different properties of water in detail.

- b) Write in detail about the classification of lipids on the basis of their functions.

6×2

Q.3 Write short notes on:

- a) Animal starch.
- b) Phosphate esters of nucleosides.
- c) Aromatic amino acids.

4×3

UNIT-II

Q.4 With the help of a diagram, explain the principle of various chromatographic techniques employed in protein purification.

12

Q.5 Write in detail about the end group analysis of protein. How does the sequence of amino acid determined in proteins?

12

UNIT-III

Q.6 a) Depending on the availability of oxygen what are the various fates of pyruvate?

- b) With the help of an example write down the transamination reaction in amino acid metabolism.

- c) What do you understand by acid base balance in body fluids? Write a note on bicarbonate buffer system existing in human body.

4×3

Q.7 Write in detail about the steps involved in oxidation of Palmitate.

12

End Semester Examination, May 2016

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) Differentiate census and sample data.
- b) What do you mean by skewness? State different kind of skewness.
- c) How many different committees of 5 people can be chosen from 10 people?
- d) Define one way ANOVA.
- e) What is Random Variable?
- f) Write formula for chi-square test as a test of goodness of fit.

2x6

UNIT-I

Q.2 a) Mention the different types of graphical representation of data. Draw a histogram from the following frequency distribution of the scores of 40 students:

Class interval	35-39	30-34	25-29	20-24	15-19	10-14
Frequency	4	8	11	8	6	3

8

- b) Oxygen consumption of 8 fishes was recorded as: 35, 44, 38, 36, 39, 40, 42 and 41 cc/100ml/hour. Find median from the given data. **4**

Q.3 a) The mean of 200 items was 50. Later on it was discovered that the two items were misread as 92 and 8 instead of 192 and 88. Find out the correct mean. **6**

- b) During war, 1 ship out of 9 was sunk on an average in making a certain voyage. What was the probability that exactly 3 out of a convoy of 6 ship would arrive safely? **6**

UNIT-II

Q.4 a) Explain types of sampling with examples of each. **6**

- b) A drug given to each of the 12 persons resulted in the following changes in the blood pressure from normal -3, 2, 8, -1, 3, 0, 7, -2, 1, 5, 0, 4. Then calculate by students 't' test whether changes is significant or not. **6**

Q.5 Three samples, each of size 5, were drawn from three un-correlated normal populations with equal variances. Test the hypothesis that the population means are equal at 5% level.

(Table value of $F_{0.05} = 3.88$)

Sample A	9	13	11	15	12
Sample B	7	10	11	13	9
Sample C	12	10	16	14	18

12

UNIT-III

Q.6 a) What do you mean correlation? **4**

- b) What is the regression analysis? Give a short note on linear regression analysis? **8**

Q.7 Find the co-efficient of correlation for the following table:

533/5

X	10	14	18	22	26	30
Y	18	12	24	6	30	36

12

End Semester Examination, May 2016
M.Sc. (Biotechnology) – Second Semester
GENETIC ENGINEERING AND APPLICATIONS (BT-S-201A)

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 Briefly answer the following:
- a) What is the role of phenol:chloroform:isoamylalchohol in nucleic acid purification?
 - b) What is S1 mapping?
 - c) Differentiate between knockdown and knockout mutant.
 - d) How does gene editing differ from gene correction?
 - e) Differentiate between Type II and Type III restriction enzymes.
 - f) Why does researcher prefer cloning of cDNA over gDNA in the expression vector system?
- 2x6**

UNIT-I

- Q.2 Write different types of molecular tools used in genetic engineering. Also write the details of PCR and its applications. **12**
- Q.3 What are the ethical and religious views which diminish the scope of patenting of life forms? **12**

UNIT-II

- Q.4 Summarize the importance of the following in genetic engineering:
- a) Yeast two hybrid system.
 - b) Yeast vectors.
 - c) Site-Directed mutagenesis.
- 4x3**
- Q.5 Write the procedure and purpose of library construction and screening of cDNA. **12**

UNIT-III

- Q.6 Write the details of gene therapy and their application. Give details of different strategies adopted for the delivery of gene of interest inside the body. **12**
- Q.7 Why is the expression of mammalian cell protein in other organisms still a difficult task? Write the criteria of selection of different vectors used for the expression mammalian proteins in different hosts. **12**

End Semester Examination, May 2016

M. Sc. (Biotechnology) – Second Semester

BIOPROCESS TECHNOLOGY (BT-S-202A)

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) Compare chemical process and biochemical process.
- b) How can lag phase be minimized in a batch culture?
- c) Define:
 - i) Specific product formation rate, q_p .
 - ii) Maintenance coefficient, m_s .
- d) What are the advantages of fluidized bed bioreactors over packed bed reactors?
- e) Explain the principle of depth filter sterilization.
- f) What are the factors that effects rate of convective mass transfer?

2×6

UNIT-I

- Q.2** a) Describe Monod's model for a microbial cell growth. **6**
b) Discuss the interdisciplinary nature of bioprocess technology. **6**
- Q.3** a) Explain general procedure for carrying out material balance studies. **6**
b) Differentiate between growth associated, non-growth associated and mixed growth associated product formation kinetics. **6**

UNIT-II

- Q.4** a) Show that $\mu = D$ for a chemostat at steady state with a sterile feed. **6**
b) What is D_{crit} ? **3**
c) What are the advantages and limitations of batch reactor? **3**
- Q.5** a) Explain the following terms:
 - i) Early and late mixing.
 - ii) Channeling.
 - iii) Bypassing.**2×3**
b) Explain the construction and working of:
 - i) Air lift reactor.
 - ii) Fluidized bed reactor.**3×2**

UNIT-III

- Q.6** a) Give examples of carbon sources suitable for the culture of microorganisms. Enlist factors influencing the choice of carbon sources in microbial media. **6**
b) Discuss the role of following components of microbial medium:
 - i) Inducer.
 - ii) Inhibitor.
 - iii) Precursor.**2×3**
- Q.7** Explain in detail:
 - a) Ficks law of diffusion.
 - b) Mass transfer in liquid - liquid systems.

536/5

c) Factors affecting cellular oxygen demand.

4×3

End Semester Examination, May 2016
M. Sc. (Biotechnology) – Second Semester
IMMUNOLOGY (BT-S-203A)

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 Briefly answers the following:

- a) What features of secondary immune response distinguishes it from primary immune response?
- b) What molecules are presented on MHC I and MHCII respectively? Which cells express these surface receptors?
- c) Into which main effector T cell subsets can naive CD4+ and CD8+ T differentiate upon activation?
- d) Penicillin can induce all the types of hypersensitivity reactions. Justify.
- e) How serum IgA differs from IgA present in external secretions?
- f) What are anaphylatoxins?

2×6

UNIT-I

- Q.2 a) Discuss the major leucocytes and their primary functions. **8**
b) What are the attributes of an adaptive immune response? **4**
- Q.3 Describe the series of reactions that lead to the formation of membrane attack complex via classical pathway of complement activation. **12**

UNIT-II

- Q.4 Discuss the signal transduction pathways that are activated by the encounter between the TCR and MHC-peptide complexes. **12**
- Q.5 a) Elaborate the pathways of target cell apoptosis stimulated by CTLs. **8**
b) How natural killer cells mediate ADCC? **4**

UNIT-III

- Q.6 a) Comment on the relative importance of the humoral and cell mediated responses in protective immunity to schistoasomiasis. **7**
b) What innate immune response is generated against the viral infections? **5**
- Q.7 What mechanisms are responsible for the induction of autoimmunity? Discuss the approaches that can be used for the treatment of autoimmune diseases. **12**

End Semester Examination, May 2016

M. Sc. (Biotechnology) – Second Semester

BIOINFORMATICS AND COMPUTATIONAL BIOLOGY (BT-S-204A)

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) What do ddNTPs does in DNA sequencing?
- b) In database searches what is the role of PSI Blast?
- c) Highlight the important tools used in sequence alignment.
- d) How Genbank file format is different NBRF format?
- e) How pseudogene is different from transposons?
- f) Illustrate steps used in gene finding.

2×6

UNIT-I

- Q.2 a) Discuss the history of sequence analysis program. **9**
b) Using appropriate example discuss how WAN is different from MAN. **3**
- Q.3 a) What do you mean by automated chain termination? **4**
b) Discuss any two DNA sequencing method. **8**

UNIT-II

- Q.4 Align the given sequence using Smith Waterman algorithm for the given sequences ACCGTT and AGCGAT upto trace back using +2, -1 and 0 for match, mismatch and gap penalty respectively. **12**
- Q.5 a) When a Global MSA is performed what are the observations one can make from these sequences? **4**
b) How multiple sequence alignment is related with phylogenetic prediction? Explain with a suitable example. **8**

UNIT-III

- Q.6 a) Discuss the different steps involved in genome analysis. **8**
b) How comparative genome analysis helps in information extraction? **4**
- Q.7 a) Describe the steps followed in homology modelling. **8**
b) What do you mean by "native state" of protein? **4**

End Semester Examination, May 2016
M. Sc. (Biotechnology) - Second Semester
BIOETHICS, BIOSAFETY AND IPR (BT-S-205D1)

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:

- a) What are the social issues in bioethics?
- b) Discuss ethical dimensions of IPR.
- c) Enlist different biosafety levels.
- d) Define bioterrorism with suitable examples.
- e) Differentiate between collaborative and competitive research.
- f) Name any four things that are non patentable.

2x6

UNIT-I

- Q.2** a) Explain the socioeconomic impacts of biotechnology. **6**
b) What is the public liability towards biodiversity and sustainable environment? **6**
- Q.3** a) Comment on "fear of unknown" in reference to biotechnology/bioethics. **6**
b) Write about technology transfer, international relations and globalization in biotechnology. **6**

UNIT-II

- Q.4** a) Give biosafety assessment for transgenic food crops. **6**
b) Explain relationship between exposure and safeguard. **6**
- Q.5** a) Write down note on Cartagena protocol on biosafety. **6**
b) Explain the perception of risks and benefits of biosafety. **6**

UNIT-III

- Q.6** Discuss the following:
a) Basic requirements and conditions for patentability.
b) Biological weapons. **6x2**
- Q.7** a) Comment on plant breeder's right. **6**
b) Discuss recent development on patent system. **6**

End Semester Examination, May 2016

M. Sc. (Biotechnology) – Third Semester

ANIMAL BIOTECHNOLOGY (BT-S-301A)

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) Explain the role of lysosomes in animal cell.
- b) Why are animal cells cultured in carbon dioxide incubator?
- c) Enlist the methods of animal cell characterization.
- d) Differentiate between normal and transformed animal cells.
- e) What is the need of three dimensional cell culture?
- f) Enlist two sources of stem cells.

2×6

UNIT-I

Q.2 a) What are balanced salt solutions? Give examples. **6**
b) Describe structure and organization of a typical animal cell. **6**

Q.3 a) Discuss the function of following components of animal cell medium:
i) Amino acids.
ii) Vitamins.
iii) Serum. **3×3**
b) What is the effect of deficiency of amino acids and vitamins in animal cell culture? **3**

UNIT-II

Q.4 a) Explain in detail the process of primary animal cell culture. **6**
b) Describe any one type of animal cell bioreactor with the help of a well labeled diagram. **6**

Q.5 a) Discuss the methods used for determination of cell toxicity. Compare the outcomes of cytotoxicity studies in animal models and animal cell cultures. **8**
b) Enlist and briefly explain the genes used for immortalization of animal cells. **4**

UNIT-III

Q.6 Describe in detail the different practical approaches used for tissue engineering? **12**

Q.7 Explain in detail:
a) Applications of stem cell culture.
b) Cell culture based vaccines.
c) Flow cytometry for measurement of cell death and apoptosis. **4×3**

End Semester Examination, May 2016
M.Sc. (Biotechnology) – Third Semester
PLANT BIOTECHNOLOGY (BT-S-302 / 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. All questions carry equal marks.

Q.1 Briefly answer:

- a) What is the basic technique in plant tissue culture?
- b) Define callus. Name the substance added to the culture medium to induce callus induction.
- c) Name a few compounds used as cryoprotectants.
- d) What is the name of the first genes available for genetic engineering of crop plants for pest resistance?
- e) What are the applications of RFLP markers?
- f) What are genetically modified plants?

2×6

UNIT-I

- Q.2** a) Describe different methods for protoplast fusion. **8**
b) Differentiate between hybrids and cybrids. **4**
- Q.3.** a) Explain chromosome elimination technique for haploid production. **6**
b) What do you mean by in vivo gene banks and in vitro gene banks? **6**

UNIT-II

- Q.4** a) "The Agrobacterium is considered as natural genetic engineer of plants". Comment. **10**
b) What are viral vectors? **2**
- Q.5** a) Describe any two methods for direct DNA transfer. **10**
b) What is chimeric DNA? **2**

UNIT-III

- Q.6** a) Explain different methods for herbicide resistance and disease resistance. **10**
b) Define microsatellites? **2**
- Q.7** Discuss the technique of RAPD along with its applications. **12**

End Semester Examination, May 2016
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; **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 answer:

- a) Write a brief note on oxidation ditches.
- b) Differentiate between sludge and scum.
- c) What do you mean by oligodynamic effect of metals?
- d) What are keystone species?

3×4

UNIT-I

- Q.2** a) Explain the current status of biotechnology in environment protection. **5**
b) What are the physical and chemical properties required for waste water analysis? **7**
- Q.3** What do you understand by suspended film systems in waste water treatment? Explain the five physical components of activated sludge treatment with the help of the flow chart and suitable diagrams. **12**

UNIT-II

- Q.4** a) What are the sources of heavy metal pollution? **5**
b) How do microbes interact with metals in the environment? **7**
- Q.5** a) What is Bioremediation? Discuss some of the examples where bioremediation has been utilized in environmental cleanup. **6**
b) What is Phytoremediation? How does it work? **6**

UNIT-III

- Q.6** a) Explain the definition, concept and scope of sustainable development. **6**
b) Differentiate between bioprospecting and biopiracy. **6**
- Q.7** a) What are the three levels of biodiversity? Explain the ex-situ conservation strategies to protect biodiversity. **7**
b) Write a short note on IUCN Red Data books. **5**

End Semester Examination, May 2016
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; taking at least **ONE question** from each **UNIT**.
Q.1 is compulsory. All questions carry equal marks.

- Q.1 a) What are the major approaches used in food preservation?
b) List some antimicrobial substances found in food. What is the mechanism of action of Lysozyme?
c) Differentiate between activity and specific activity of enzyme.
d) What is Michaelis-Menten constant?
e) Briefly mention the use of lactases in the dairy industry.
f) Which enzymes are used for the cellulose and starch hydrolysis? Write the reaction equation also. **2×6**

UNIT-I

- Q.2 a) Describe in general how food spoilage occurs? What factors influence the nature of the spoilage organism? **6**
b) How is the PCR used in pathogen detection? **6**
- Q.3 a) Explain the major types of milk fermentation. **6**
b) What are steps used to produce cheese? How does the Swiss cheese get its holes? **6**

UNIT-II

- Q.4 Describe the methods used for the extraction and purification of enzymes. **12**
- Q.5 Write short notes on the following:
a) Competitive and noncompetitive inhibition
b) Derive Lineweaver-Burk plot and explain mechanism of action of enzyme. **6×2**

UNIT-III

- Q.6 a) Describe the mechanism of action of enzyme in the production of maltose syrup. **6**
b) Write a note on the application of amylase in food industry. **6**
- Q.7 Write short notes on:
a) Dairy industry.
b) Use of proteases and catalase. **6×2**

End Semester Examination, May 2016

M.Sc. (Biotechnology) – Third Semester

STEM CELL AND REGENERATIVE MEDICINE

(BT-S-305B / BT-S-305B1)

Time: 3 hrs

Max Marks: **60**

No. of pages: **1**

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

Q.1 Answer briefly:

- a) Write a short note on 'fate mapping'.
- b) What do you mean by Lymphopoiesis?
- c) What are embryonic stem cells?
- d) What do you mean by stem cell niche?

3x4

UNIT-I

Q.2 a) What are the three properties of stem cells? **7**

- b) Which type of stem cell is capable of dividing and differentiating into any cell type? Explain. **5**

Q.3 Explain the signaling pathways for maintaining pluripotency and cell differentiation. **12**

UNIT-II

Q.4 a) What are hematopoiesis stem cells? **4**

- b) What is the alternative source of hematopoietic stem cells for treatment of leukemia and other blood disorders? **8**

Q.5 Discuss the role of hemangioblast cells in regenerative medicine. **12**

UNIT-III

Q.6 What is stem cell therapy (regenerative medicine), and how does it work? **12**

Q.7 Give the cause, types and symptoms of Parkinson's disease. Explain how Parkinson's disease can be cured by stem cells. **12**

End Semester Examination, May 2016
M. Tech.(Industrial Engineering) – Second Semester
FLEXIBLE MANUFACTURING SYSTEM(M-IE-203)

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) Explain FMS concepts:
i) Piece part mix.
ii) Machine allocation mix in detail. | 5x2 |
| | b) Define distributive numerical control. | 5 |
| Q.2 | a) Explain difference between centralized and decentralized computer environment.
b) Describe ring type network. | 10
5 |
| Q.3 | a) Give brief description of different tool strategies.
b) Define tool monitoring by sensors in brief. | 10
5 |
| Q.4 | a) Write down benefits of group technology affecting areas of a company:
i) Engineering design.
ii) Production control.
iii) Quality control.
iv) Purchasing.
b) Differentiate between mono code and ploy code. | 2½x4
5 |
| Q.5 | a) Define different components of a Robotic system.
b) Explain SCARA configuration in brief. | 10
5 |
| Q.6 | a) What do you understand by PLC? Explain with working of a PLC.
b) Write activities and functions to be performed by FMS software. | 8
7 |

End Semester Examination, May 2016
M. Tech. (Industrial Engineering) – Second Semester
QUALITY CONTROL TECHNIQUES (M-IE-205)

Time: 3 hrs

Max Marks: **75**
 No. of pages: **3**

Note: Attempt any **FIVE** questions in all. Each question carries equal marks.

- Q.1** Explain the following: **5×3**
 a) Internal and external failure costs.
 b) Process capability study.
 c) Full factorial and fractional factorial designs of experiments.
- Q.2** Describe the following: **5×3**
 a) Juran's Trilogy for implementation of quality program.
 b) Cause and effect diagram.
 c) Audits on Quality System (IS09000)
- Q.3** Describe eight fundamental principles on which IS09000 Quality System Standard is based. **15**
- Q.4** A lathe is used in turning a shaft to a diameter of 23.75 ± 0.1 mm. A sample of 6 consecutive pieces was taken each day for 8 days. The diameters of these shafts are given below:

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
23.77	23.80	23.77	23.79	23.75	23.78	23.76	23.76
23.80	23.78	23.78	23.76	23.78	23.76	23.78	23.79
23.78	23.76	23.77	23.79	23.78	23.73	23.75	23.77
23.73	23.70	23.77	23.74	23.77	23.76	23.76	23.72
23.76	23.81	23.80	23.82	23.76	23.74	23.81	23.78
23.75	23.77	23.74	23.76	23.79	23.78	23.80	23.78

Find control limits for \bar{X} and R charts and find out the process capability of the machine. **15**

- Q.5** Set up ANOVA table for the following information relating to three drugs testing to judge the effectiveness in reducing blood pressure for three different groups of people.

		Drug		
		X	Y	Z
Group of people	A	14 15	10 9	11 11
	B	12 11	7 8	10 11
	C	10 11	11 11	8 7

Answer the following questions at a significance level of 5%:

- d) Do the drugs act differently?
 e) Are the different groups of people affected differently?

	f) Is the interaction term significant?	15
Q.6	Describe the basic steps in application of six sigma (DMAIC).	15
Q.7	Briefly describe:	
	a) Control charts for variables.	4
	b) Control charts for attributes.	4
	c) Comparison between control charts for variables and attributes.	7

Table C : Factors for Determining from \bar{R} the 3-Sigma Control Limits for \bar{X} and \bar{R} Charts from \bar{R}

Number of observations in sub-group (n)	Factors for \bar{X} chart (A_2)	Factors for R chart	
		Lower control limit (D_3)	Upper control limit (D_4)
2	1.88	0	3.27
3	1.02	0	2.57
4	0.73	0	2.28
5	0.58	0	2.11
6	0.48	0	2.00
7	0.42	0.08	1.92
8	0.37	0.14	1.86
9	0.34	0.18	1.82
10	0.31	0.22	1.78
11	0.29	0.22	1.74
12	0.27	0.28	1.72
13	0.25	0.31	1.69
14	0.24	0.33	1.67
15	0.22	0.35	1.65
16	0.21	0.36	1.64
17	0.20	0.38	1.62
18	0.19	0.39	1.61
19	0.19	0.40	1.60
20	0.18	0.41	1.59

$$\text{Upper Control Limit for } \bar{X} = UCL_{\bar{X}} = \bar{X} + A_2 \bar{R}$$

$$\text{Lower Control Limit for } \bar{X} = LCL_{\bar{X}} = \bar{X} - A_2 \bar{R}$$

(If aimed-at or standard value \bar{X}' is used rather than \bar{X} as the central line on the control chart, \bar{X}' should be substituted for \bar{X} in the preceding formulas.)

$$\text{Upper Control Limit for } R = UCL_R = D_4 \bar{R}$$

$$\text{Lower Control Limit for } R = LCL_R = D_3 \bar{R}$$

All factors in Table C are based on the normal distribution.

Table 4(a): Critical Values of F-Distribution (at 5 per cent)

v_2 / v_1	1	2	3	4	5	6	8	12	24	∞
1	161.4	199.5	215.7	224.6	230.2	234.0	238.9	243.9	249.1	243.3
2	18.51	19.00	19.16	19.25	19.30	19.33	19.37	19.41	19.45	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.85	8.74	8.64	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.04	5.91	5.77	5.63

5	6.61	5.79	5.41	5.19	5.05	4.95	4.82	4.68	4.53	4.36
6	5.99	5.14	4.76	4.53	4.39	4.28	4.15	4.00	3.84	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.73	3.57	3.41	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.44	3.28	3.12	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.23	3.07	2.90	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.07	2.91	2.74	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	2.95	2.79	1.61	2.40
12	4.75	3.88	3.49	3.26	3.11	3.00	2.85	2.69	2.51	2.30
13	4.67	3.80	3.41	3.18	3.02	2.92	2.77	2.60	2.42	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.70	2.53	2.35	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.64	2.48	2.29	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.59	2.42	2.24	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.55	2.38	2.19	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.51	2.34	2.15	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.48	2.31	2.11	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.45	2.28	2.08	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.42	2.25	2.05	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.40	2.23	2.03	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.38	2.20	2.01	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.36	2.18	1.98	1.73
25	4.24	3.38	2.99	2.76	2.60	2.49	2.34	2.16	1.56	1.71
26	4.22	3.37	2.98	2.74	2.59	2.47	2.32	2.15	1.95	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.31	2.13	1.93	1.67
28	4.20	3.34	2.95	2.71	2.56	2.45	2.29	2.12	1.91	1.65
29	4.18	3.33	2.93	2.70	2.54	2.43	2.28	2.10	1.90	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.27	2.09	1.89	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.18	2.00	1.79	1.51
60	4.00	3.15	2.76	2.52	2.37	2.25	2.10	1.92	1.70	1.39
120	3.92	3.07	2.68	2.45	2.29	2.17	2.02	1.83	1.61	1.25
∞	3.84	2.99	2.60	2.37	2.21	2.10	1.94	1.75	1.52	1.00

v_1 = Degrees of freedom for greater variance.

v_2 = Degrees of freedom for smaller variance.

End Semester Examination, May 2016

M. Tech. (Industrial Engineering) – Second Semester
OPTIMIZATION TECHNIQUES (M-IE-206)

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) How can you solve an integer nonlinear programming problem?
b) Solve the following problem using Gomory's cutting plane algorithm. 5

$$\text{Maximize, } z = 3x_1 + 12x_2$$

Subjected to: $2x_1 + 4x_2 \leq 7$

$$5x_1 + 3x_2 \leq 15$$

10

- Q.2 a) What do you understand by optimal decision policy? **5**
b) Use Bellman's principle of optimality to solve:

Minimize,
$$z = y_1 + y_2 + y_3 + \dots + y_n$$

Subjected to: $y_1 \cdot y_2 \cdot \dots \cdot y_n = d$ ($d \neq 0$)

$y_j \geq 0$ for all $j = 1, 2, \dots, n$

10

- Q.3 a) Explain Wolfe's modified simplex method.
b) Solve graphically the following NLP problem: 7

$$\text{Maximize,} \quad z = 2x_1 + 3x_2$$

Subjected to: $x_1^2 + x_2^2 \leq 20$

$$x_1 \cdot x_2 \leq 8$$

1

$$x_1 - x_2 \geq 0$$

- #### 0.4 Use Wolfe's method to solve the quadratic programming problem:

$$\text{Maximize} \quad z = 2x_1 + x_2 - x_1^2$$

Subjected to: $2x_1 + 3x_2 \leq 6$

$$2x_1 + 3x_2 \leq$$

$$x_1, x_2 \geq 0$$

15

- Q.5 a) Differentiate between PERT and CPM.
b) Define: Branch and Bond algorithm

- Q.6 Draw the network diagram and calculate the critical path and total float of all activities:

Activity	A	B	C	D	E	F	G	H	I	J	K	L	M
Immediate Predecessor	-	A	B	C	A	E	E	E	H, L	K	D, F, G	J	H, L
Duration (weeks)	14	4	2	1	2	3	2	4	3	12	4	2	2

15

- Q.7 a) Find an optimal sequence for the following sequencing problems of four jobs and five machines when passing is not allowed of which processing time [in hours] is given below:

Job	Machine				
	M ₁	M ₂	M ₃	M ₄	M ₅
A	7	5	2	3	9
B	6	6	4	5	10

C	5	4	5	6	8
D	8	3	3	2	6

b) Explain Johnson's rule of sequencing with a suitable example.

10
5

End Semester Examination, May 2016
M. Tech. (Industrial Engineering) – Second Semester
HUMAN RELATIONS (M-IE-222)

Time: 3 hrs

Max Marks: **75**

No. of pages: **1**

Note: Attempt **FIVE** questions in all. Each question carries equal marks.

- | | | |
|-----|---|----------------------|
| Q.1 | a) Define task, job, position, role and work.
b) Discuss the needs and priorities of an HRD process.
c) Discuss on Human Resource Development (HRD) system. | 5
5
5 |
| Q.2 | Explain the steps to be followed for a good potential appraisal system. How performance counseling and interpersonal feedback helpful to the effectiveness of appraisal system? | 15 |
| Q.3 | a) State the aims and objectives of the training program.
b) Explain various “on the job training” and “off the job training” methods. | 5
10 |
| Q.4 | What is “career planning”, “career development” and “career management”? Explain the needs and importance of career planning and development in detail. | 15 |
| Q.5 | a) State the methods by which organizational effectiveness can be achieved.
b) How can one achieve organization effectiveness taking the view of Indian organizational context? | 5
10 |
| Q.6 | Write notes on the following:
a) HRD in Indian organization: Current perspective.
b) HRD in Indian organization: Future Issues. | 7½×2 |
| Q.7 | Write short notes on the following (any three):
a) Total quality management.
b) Managing change through organizational development.
c) Training follow-up programmes.
d) Effective counseling.
e) Personal Management Vs Human Resource Management. | 3×5 |

End Semester Examination, May 2016
M. Tech. (Industrial Engineering) – Second Semester
MANAGEMENT INFORMATION SYSTEM (M-IE-301)

Time: 3 hrs

Max Marks: **75**

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 internet.
b) Define system analyst.
c) Explain data flow diagram.
d) What is meant by database?
e) What are technical feasibilities?
f) What are purposes of system development?
g) What do you mean by proper communication?
h) What is production system?
i) What is meant by wireless network?
j) Define the supper chain management. **1½×10**

PART-A

- Q.2 a) Explain the architecture of MIS and give detailed layout of its components and models. **7**
b) Explain the steps involved in design, development and implementation of an MIS. **8**
- Q.3 a) Discuss in detail the layers that consists information architecture. **3**
b) Write short notes on:
i) Data mining.
ii) Data warehousing.
iii) Mobile wireless standards
iv) Sensitivity analysis. **3×4**
- Q.4 a) Discuss roles and responsibilities of a system analyst. **5**
b) Discuss the function of any two types of information systems in detail. **10**

PART-B

- Q.5 a) Information in known as quality product, explain. **6**
b) Write short notes on:
i) Components of information system.
ii) Geographic information system.
iii) Decision support system. **3×3**
- Q.6 Elucidate the security measured to be followed in protecting the computer system. **15**
- Q.7 What do you understand by the strategic management of an organization? Explain the strategic planning and its tool used in MIS activities. **15**

End Semester Examination, May 2016
M. Tech. (Industrial Engineering) –Third Semester
SIMULATION AND MODELING (M-IE-303)

Time: 3 hrs

Max Marks:**75**
 No. of pages:**1**

Note: Attempt any**FIVE** questions in all. Each question carries equal marks.

Q.1 ViratKohli scored in 10 T-20 matches as follows:

Matches	Score
1	40
2	30
3	50
4	60
5	70
6	60
7	50
8	80
9	70
10	80

Compute $\bar{X}(10)$, $S^2(10)$ and an approximate 95% confidence interval for μ (mean). **15**

- | | | |
|-----|--|-----------|
| Q.2 | a) Explain continuous and discrete systems in simulation study with suitable examples. | 10 |
| | b) Briefly explain about static and dynamic model. | 5 |
| Q.3 | a) Explain numerical Computation Techniques in simulation study with example. | 10 |
| | b) Explain Monte Carlo Method. | 5 |
| Q.4 | a) Explain Growth and Decay model. | 10 |
| | b) System Dynamic Diagrams. | 5 |
| Q.5 | a) Discuss the variance reduction techniques. | 10 |
| | b) Define stochastic variables. | 5 |
| Q.6 | a) Explain simulation of translations and rotational mechanical system. | 10 |
| | b) Simulation of waitress line system. | 5 |
| Q.7 | Discuss a feedback system with suitable example. | 15 |