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SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B. Tech. | Semester: VII
Stream: CE
PAPER TITLE: Hydraulic Structures | PAPER CODE: ECE44105
Maximum Marks: 40 | Time duration: 3 hours
Total No of questions: 9 | Total No of Pages: 2

(Any other information required for the student may be mentioned here)

Answer all the Groups

Group A

(Answer all the questions)

$1 \times 5 = 5$

1. **a)** Find out the value of 'α', for the weir having base length of 70 m, along with sheet pile embedded upto 8 m depth.

   b) A Gravity dam of 20 m height, subjected to Hydrodynamic pressure intensity of 1000 kN/m^2 on the base of upstream face. Find out the Hydrodynamic force according to Zanger.

   c) Calculate the Thickness of slope pitching over guide banks on river face in meters, if the discharge through the river is 5000 cumecs.

   d) If the unit cohesion of earth fill of Earthen dam is 15 kN/m^2, angle of internal friction is 30˚and σ = 10 kN/m^2. Then, what will be its Shear strength as per Coulomb's Law?

   e) Write down the equation for calculating the Silt pressure on Gravity dam.

Group B

(Answer any three questions)

$5 \times 3 = 15$

2. If the permissible bearing capacity of soil under a Gravity dam is 1000 kN/m^2, then assure that whether the structure is safe against Bearing capacity failure if its base width is 40 m., resultant vertical pressure is 15000 kN/m^2 with eccentricity of 12 m.

3. Describe various types of Canal Falls with diagrams. Also explain their functions.

4. Discuss about different types Earthen dams with diagrams.

5. Write the mode of failures and Criteria for structural stability of Gravity Dams.

6. Write short notes on the following (write any *two*): **(a)** Under sluice $2.5 \times 2 = 5$
   (b) Spillways
   (c) Wave pressure on Gravity Dam

Group C

(Answer any two questions)

$10 \times 2 = 20$

7. A gravity dam, retain 80 m high water body at its upstream and the depth of tail water is about 8 m at downstream, of base width of 60 m. Consider, the top width is 6m., the drainage gallery is at 8 m away from heel and the downstream face is sloped about 2 H : 3 V.

   Calculate (i) The maximum vertical stresses at the heel and toe of the Dam,
   (ii) The major principal stress at toe.

8. **a)** Describe the Elementary profile of a Gravity dam. **[6]**

   b) Differentiate the High and Low Gravity Dams with diagrams. **[4]**

9. Design the size and number of notches required for a canal drop with the following particulars:

   Full supply discharge = 4 cumecs

   Bed width = 6 m.

   Full Supply depth = 1.5 m.

   Half Supply depth = 1 m. Assume, any other data if required.

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester: Aug. 2019 – Dec. 2019)

Name of the Program: B.Tech
Semester: VII

Paper Title	**: Electrical Engineering Materials**		
Paper Code	**: EEE44109**		
Maximum Marks	: 40	Time duration	: 3 hours
Total No of questions	: 9	Total No of Pages	: 2

(Any missing or misprinted data may be suitably assumed)

Group A

(Answer all five questions)

[5X1]

1. a) Define dipole moment.

   b) In which band do the movement of electrons and holes takes place in a semiconductor?

   c) What is an extrinsic semiconductor?

   d) What do you mean by mobility of electron?

   e) What is the work of a dielectric?

Group B

(Answer any three questions)

[3X5]

2. A Uniform silver wire has a resistivity of 1.5×10^{-8} Ωm at room temperature for an electric field along the wire of 1Volt/cm. Compute the average drift velocity of electrons, assuming there are 5.8×10^{28} conduction electrons per meter cube. Also calculate the mobility of electrons.

3. Explain different types of magnetism.

4. Explain with proper graph, what is drift velocity.

5. Obtain a relationship between relative permittivity and electric susceptibility with proper explanation of derivation.

6. Derive the expression for minimum conductivity of n-type materials.

Group C

(Answer any two questions)

[2X10=10]

7. Explain the effect of temperature in intrinsic and extrinsic semiconductors with proper examples.

8. Explain the energy band gap model for conductors and semiconductors.

9. What are the different dielectric parameters? Explain.

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program:B.Tech — Semester: VII
Stream: ECE
PAPER TITLE:Elective IV (Object Oriented Programming) — PAPERCODE:ECS42106
Maximum Marks: 40 — Time duration: 3 hours
Total No of questions: 09 — Total No of Pages: 02

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1.
a) What is the conditional operator?
b) What is the significance of multi-threading?
c) When is the JDBC Type-4 driver used?
d) Define interface.
e) What is the try block used for?

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. a)What is the difference between object-based programming languages and object-oriented programming languages?
b) Write the general syntax of class definition 2+3

3.a) Elucidate : "Java is a strongly typed language."
b) What are the primitive types of data in Java? Define any two of them.
c) Write a program to print the names of students by creating a Student class. If no name is passed while creating an object of Student class, then the name should be "Unknown", otherwise the name should be equal to the String value passed while creating object of Student class.

1+2+2

4. a) What are the rules for creating a Java constructor?
b) Mention two types of Java constructor and define each of them along with suitable code.

1+(2+2)

5. a) How can you compare two strings in Java? Mention two different ways of comparison along with suitable code.
b) Differentiate between abstract class and interface. Mention two points of difference.
c) A shop will give discount of 10% if the cost of purchased quantity is more than 1000.
Ask user for quantity. Suppose, one unit will cost 100. Judge and print total cost for user using a Java program.

2+1+2

6. a) Write a Java program to create a new thread and start it running by extending the Thread class.
b) What is the importance of exception handling? 3+2

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. a) Write a Java program to demonstrate the use of static variable.

b) How will you create a String object in Java? Write suitable code. (Mention two different ways).

c) Depict the utility of method overriding using suitable code. 3+(2+2)+3

8. a) Differentiate between checked and unchecked exceptions in Java. Mention examples for both types of exceptions.

b)What is the significance of Java I/O?

c) Mention any two methods of OutputStream along with their use.

d) Create a class named 'Member' having the following members:
Data members
1 - Name
2 - Age
3 - Phone number
4 - Address
5 - Salary
It also has a method named 'printSalary' which prints the salary of the members.
Two classes 'Employee' and 'Manager' inherits the 'Member' class. The 'Employee' and 'Manager' classes have data members 'specialization' and 'department' respectively. Now, assign name, age, phone number, address and salary to an employee and a manager by making an object of both of these classes and print the same.

(3+1)+2+2+2

9. a) Write a Java program to illustrate multi-catch block exception handling.

b) What are the advantages and disadvantages of using an array?

c) Write a Java program to declare, instantiate, initialize and traverse an array.

d) Explain the concept of JDBC for database connectivity in Java application. 3+2+3+2

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B. Tech — Semester: VII
Stream: Electrical Engineering
PAPER TITLE: Elective-IV (Power System Analysis and Operation)
PAPER CODE: EEE44105
Maximum Marks: 40 — Time duration: 3 hours
Total No of questions: 09 — Total No of Pages: 02

(Any other information required for the student may be mentioned here)

Answer all the Groups

Group A

(Answer all the questions)

1. $5 \times 1 = 5$

i. What are the advantages of Gauss-Siedel method?
ii. What is defined by area under the daily load curve?
iii. Explain why the value of demand factor is less than 1.
iv. What is peak demand factor?
v. What is capacity factor?

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. What is the load curve? Explain different types of load curve.
3. Explain LL fault with fault currents, equivalent circuits and impedance value.
4. Write the flow chart for Gauss-Seidal method.
5. Explain the importance of thermo hydro scheduling?
6. What is equal area criterian? Explain swing equation for equal area criterian.

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. Determine Y_{bus} for a 3-bus system where the line impedances are as follows:

Line (bus to bus)	Impedance (pu)
1-2	0.06 + j0.18
1-3	0.03 + j0.09
2-3	0.08 + j0.24

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester: Aug. 2019 – Dec. 2019)

Name of the Program: B.Tech.		Semester: VII	
Paper Title	**: VLSI System Design**	**Paper Code**	**: EEC43102**
Maximum Marks	: 40	Time duration	: 3 Hours
Total No of questions	: 8	Total No of Pages	: 1

Part A

(*Answer all questions*)

1) Please answer in one or two words **Marks: 5×1=5**

i) In VLSI design, which process deals with the determination of resistance & capacitance of interconnections?

ii) Which check is used to confirm that desired modifications have been made and no undesired modifications have been made by accident?

iii) What does the register transfer level description specify?

iv) What causes gate leakage in a MOSFET?

v) With respect to the triggering edge of clock what is 'Setup Time'?

Part B

(*Answer any three questions*)

Marks: 3×5=15

2) Draw and explain the process of photolithography putting emphasis on the difference between positive and negative photoresists. 5

3) Derive analytical expression of threshold voltage in a MOSFET. 5

4) Explain the phenomenon of latch-up in details. 5

5) Explain the various domains of Y-chart in VLSI system design with diagrams. 5

Part C

(*Answer any two questions*)

Marks: 2×10=20

6) Derive the expression for current in a MOSFET both in and out of saturation. 10

7) Table the basic set of rules of stick diagrams in VLSI system design. 10

8) Describe the VLSI process flow twin well CMOS depicting all steps with relevant diagrams. 10

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech.
Stream: CE
Semester: VII

PAPER TITLE: Management
Maximum Marks: 40
Total No of questions: 9

PAPER CODE: ECE44107
Time duration: 3 hours
Total No of Pages:01

(Any other information required for the student may be mentioned here)

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. a) Define the term Management
   b) What is Selection?
   c) What is planning?
   d) What do you mean by Management by Objective?
   e) What is Decision Making?

Group B

(Answer any three questions)

3 x 5=15

2. Briefly describe the functions of management?
3. Describe recent trends and Challenges of management in global scenario?
4. Describe in details of selection process?
5. What are the characteristics of Organizing?
6. Differentiate between formal organization and Informal Organization

Group C

(Answer any two questions)

2 × 10 = 20

7. What are the elements of Scientific Management? Briefly discuss Henry Fayol's 14 Principles of Management.
8. What is controlling? What are the requirements of ideal system of control discuss in breif?
9. What is Recruitment? Distinguish between Internal and External Recruitment.

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech. Semester: VII
Stream: (Example: CSE/ME/ EE/ECE)
PAPER TITLE: Organizational Behaviour PAPER CODE: HPS44101

Maximum Marks: 40 Time duration: 3 hours
Total No of questions: 9 Total No of Pages: 1

(Your answer must be brief and to the point.)

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. a) Define the term 'Organization Behaviour'.
   b) What is the difference between the term 'personality' and 'attitude' of a person?
   c) Define the term organizational culture.
   d) What do you understand by formal communication?
   e) Define the term organizational effectiveness.

Group B

(Answer any three questions)

5 × 3 = 15

2. Discuss positive and negative work behavior in the organization.
3. Discuss 6S Principle of work place.
4. Discuss Maslow's Need Hierarchy Model of Motivation.
5. What is Grapevine communication? Elucidate your answer with suitable examples.
6. What is the various stage of group development process? Explain your answer.

Group C

(Answer any two questions)

2 × 10 = 20

7. Define the factors which can determine the personalities of individual? State Big 5 personality traits in detail. 5+5=10

8. Do you think employee motivation is a key factor for employee's performance in the workplace? In this context discuss Herzberg's Two Factor Theory of motivation. 4+6=10

9. Discuss 8 dimensions of quality. 10

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END-SEMESTER EXAMINATION: DECEMBER 2019
(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech.
Stream: ME
Semester: VII

PAPER TITLE: Non-Traditional Manufacturing (Elective-V)
PAPER CODE: EME44109

Maximum Marks: 40
Time duration: 3 hours

Total No of questions: 9
Total No of Pages:

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) Which of the following material cannot be machined by EDM (a) steel (b) WC (c) Titanium (d) Glass.
   b) Tool should not have (a) low thermal conductivity (b) high machinability (c) high melting point (d) high specific heat in EDM Process.
   c)Increasing volume concentration of abrasive in slurry would affect MRR in the following manner (i) increase MRR (ii) decrease MRR (iii) would not change MRR (iv) initially decrease and then increase MRR, in USM Process.
   d)PAM is ---------- types of NTM Process.
   e)What is LASER?

Group B

(Answer any three questions)

$5 \times 3 = 15$

2. What is the difference between the Traditional and Non-Traditional machining process? Derive the expression of MRR for Alloy in ECM Process. (2+3)
3. Application and limitation of USM Process. What is over cut and tapper cut for EDM process, how do you overcum this failure in this machining process. (2+3)
4. In Dynamics of ECM Process - if the tool is stationary and if the tool is feed to the workpiece what is the MRR is varying? (5)
5. Draw the basic electrical waveform and describe spark initiation and material removal mechanism in EDM. (5)
6. Describe the effect of machining parameters on MRR with the help of various diagram. (5)

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. i) Describe the working principle of Electron Beam Machining Process with proper sketch. (5)
   ii)Describe the characteristics of EDM Process and also describe the process parameter of EDM Process. (5)

8. i)Describe the working principle of LBM Process with proper sketch. (5)
   ii) Describe the Advantage, Limitation and Application of LBM Process. (5)

9. i) In ECM of pure iron an MRR of 600mm^3/min is required. Estimate current requirement. Take A=56, F=96500 coulomb, v=2, ρ=7.8gm/cc. (5)
   ii)Describe the process parameter of ECM and also describe the chemical reaction of ECM. (5)

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech. | Semester: VII
Stream: ECE
PAPER TITLE: Data Communication & Networking | PAPER CODE: EEC44105
Maximum Marks: 40 | Time duration: 3 hours
Total No. of questions: 09 | Total No of Pages: 02

Note:

1. Please follow all the Instructions given on the cover page of the Answer Booklet Strictly.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.
4. No Mobile Phones will be permitted in the Examination Hall.

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. **a)** Write down the full form of PSTN and explain which type of switching technique is used in PSTN.

   b) What kind (in context of directional properties) of links is used in Ring topology? What is the total number of directions in which data is transmitted?

   c) Write down the dotted decimal representation of the IP address 11011101 10001111 11111101 00001111.

   d) What is Hidden station problem? Explain in brief.

   e) Write down the full form of VPN. What is the full form of OSI?

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. Explain Exposed station problem with the help of a diagram. What are Intranet and Extranet? Also, explain VPN in this context. [3+2]
3. What is the need of flow control mechanism in computer networks? In what way selective-repeat is better than go-back-N ARQ technique? Explain with the aid of suitable diagrams and examples. [1+4]
4. Compare CSMA/CD and CSMA/CA protocols with proper flow chart. [5]
5. What is the purpose of a Firewall? What are the commonly used Firewall types? Explain the operation of the packet-filter firewall. [2+1+2]
6. State the advantages of IPv4 over IPv6. Explain Ring topology and Mesh topology with the aid of suitable diagrams. Also, explain their advantages and disadvantages. [2+2+1]

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. **a)** Compare static versus adaptive routing algorithms. Explain how most popular public key algorithm **RSA** works.

   b) Explain Token Bucket algorithm and its advantage over leaky bucket algorithm. [3+2+5]

8. **a)** Explain ASK, and FSK with the help of suitable diagram and compare them to analog modulation techniques (AM and FM). Explain the functions of the following layers of the OSI Model: i) Data Link Layer ii) Session Layer.

   b) Explain and compare Pure ALOHA to SLOTTED ALOHA using suitable diagram. Also explain 1-persistent CSMA and p-persistent CSMA random access techniques. [3+2+3+2]

9. **a)** Compare TCP and UDP protocols? What is the purpose of timer at the sender site in a system using ARQ?

   b) Explain fixed routing algorithm using a suitable example. Also, mention its advantages and disadvantages. [4+1+5]

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END-SEMESTER EXAMINATION (MAY 2019)
(Academic Session: 2019 – 20, Semester Term: Aug. 2019 – Dec 2019)

Name of the Program: B.Tech.
Stream: Civil Engineering
PAPER TITLE: Environmental Engineering-I
Maximum Marks: 40
Total No of questions: 9

Semester: VII
PAPER CODE: ECE 44101
Time duration: 3 hours
Total No of Pages: 1

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) State the purpose of aeration.
   b) What is the method adopted for removing organic matter from water?
   c) State the significance of break point chlorination?
   d) Give physical and chemical standards for a domestic water supply.
   e) What is the function of gate values?

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. What are the components of water supply system? Indicate a complete layout of water supply system?
3. What is per capita demand? Discuss the factors affecting per capita demand. Calculate the maximum demand of a town in cumnes for Population= 2 lakh, Per capita Water demand -200lpcd.
4. Explain with help of neat sketch the how infiltration galleries are used as subsurface source of water supply.
5. Define chlorination. Explain the action of chlorine in water .
6. Explain the working principle of sedimentation in water treatment plant.

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. a) Suggest suitable methods of predicting demand of water for planning water supply schemes. b) The population figures of a town during the last four consecutive decades (from 1980 to 2010) are-**20,000; 24500; 29500, 32,200** respectively. Predict the population in the next decade using incremental increase method. Calculate the total water requirement of a town in 2020, if population meets its water demand at the rate of 200 lpcd.
8. Draw a neat sketch of a river intake, on the straight each of a river for supplying water to a town. State the points for selecting a site for intakes and explain briefly the functions, components and working of river intake.
9. Compare rapid sand filters and slow sand filters.

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester: Aug. 2019 – Dec. 2019)

Name of the Program: B.Tech
Semester: VII

Paper Title	**: Power Electronics**	**Paper Code**	**: EEE44103**
Maximum Marks	: 40	Time duration	: 3 hours
Total No of questions	: 9	Total No of Pages	: 2

(Any missing or misprinted data may be suitably assumed)

Group A

(Answer all five questions)

[5X1]

1. a) Why snubber circuit is necessary?

   b) What is holding current of a thyristor?

   c) Classify different converters used for power modulation.

   d) Write the expression for average output voltage of a single phase half wave rectifier with R load.

   e) What are the methods of controlling output voltage of a chopper?

Group B

(Answer any three questions)

[3X5]

2. What are the different triggering methods of a thyristor? Explain.

3. Explain resonant commutation of a thyristor.

4. It is required to operate 200A SCR in parallel with 300A SCR with the respective on state drops of 1.4 Volt and 1.2 Volt. Calculate the value of resistance to be connected in series with each SCR so that they share the total load of 500A in proportion to their current ratings.

5. Derive the output voltage expression of a step down chopper.

6. Write a short note on phase angle control of AC voltage controller.

Group C

(Answer any two questions)

[2X10=10]

7. Discuss the series and parallel operation of a thyristor using proper circuit diagram.

8. Explain the operation of a full wave fully controlled single phase rectifier with the help of circuit diagram and output waveforms.

9. With proper circuit diagram and voltage waveforms, explain the operation of a single phase full bridge inverter with R load.

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech. Semester: VII
Stream: CSE/ECE
PAPER TITLE: Embedded Systems Design PAPER CODE: EEC44101
Maximum Marks: 40 Time duration: 3 hours
Total No of questions: 09 Total No of Pages:01

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) Why an embedded system is also called a dedicated system?
   b) Instead of RAM why EEPROM has been considered as Data Memory in PIC?
   c) Write basic two differences between PIC and ARM processor?
   d) 8051 and PIC which one is mostly suitable for industry and why?
   e) What is the difference between Eclipse IDE and Debugger Circuit?

Group B

(Answer any three questions)

$5 \times 3 = 15$

2. How many vectored interrupts are available in 8051 microcontrollers? Explain. Discuss about IE and IP special function registers. 2+3
3. Explain different external communication interfaces in brief. 5
4. Write at least 6 difference between 8051, PIC and ARM Processor. 5
5. What is the significance of Option Register in PIC microcontroller. Explain every bits of Option Register. 2+3
6. Write a short note on Arm Cortex-M3 processor. 5

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. Explain the INTCON SFR register of PIC microcontroller. Which Register will be responsible for USART transmitter module? Explain about the register. 5+5
8. Which register will be responsible for EEPROM Data Memory operation. Explain in brief. How Digital Camera can be called as Embedded System? Justify. 6+4
9. Explain the fundamental issues in hardware software co-design? Discuss different modes of ARM processor. 6+4

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech. Semester: VII
Stream: ME
PAPER TITLE: Fluid Machinery PAPER CODE: EME44101
Maximum Marks: 40 Time duration: 3 hours
Total No of questions: 9 Total No of Pages: 2

(Any other information required for the student may be mentioned here)

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. **a) What is cavitation?**
   b) What do you mean by specific speed?
   c) What is Net positive suction head (NPSH)?
   d) What is surge tank?
   e) What is the reason behind slip in a reciprocating pump?

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. **What do you mean by hydraulic machine? Classify and name different kinds of hydraulic machine.**
3. **A turbine develops 9000 KW when running at a speed of 140 rpm and under a head of 30 m. Determine the specific speed of turbine?**
4. **Explain Pelton wheel turbine, showing its major components?**
5. **Differentiate between impulse and reaction turbines in a tabular form.**
6. **Why is a draft tube used? Draw a conical draft tube and explain how net head is increased with use of draft tube.**

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. **Explain the working of a reciprocating pump with help of neat sketch?**

8. **A Pelton wheel is having a mean bucket diameter of 1 m and is running at 1000 rpm. The net head on the Pelton wheel is 700 m. If the side clearance angle is 15^0 and discharge through nozzle is 0.1 m^3/sec. Find (i) Power available at the nozzle and (ii) Hydraulic efficiency of the turbine. Take Cv = 1.**

9. **The internal and external diameters of the impeller of a centrifugal pump are 200 mm and 400 mm respectively. The pump is running at 1200 rpm. The vane angles of the impeller at inlet and outlet are 20^0 and 30^0 respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water.**

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech. Semester: VII
Stream: CSE
PAPER TITLE: Number Theory
PAPER CODE: SMA44101
Maximum Marks: 40 Time duration: 3 hours
Total No of questions: 9 Total No of Pages: 2

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) Define Group (G,*), * is the binary operation on G.
   b) Φ (17) =?
   c) Write down the Euler's theorem.
   d) What is Differential Cryptanalysis?
   e) What do you mean by Discrete Logarithm Problem?

Group B

(Answer any three questions)

$5 \times 3 = 15$

2. a) If gcd (a,b)=1, show that gcd (a+b, $a^2 - ab + b^2$)=1 or 3.
   b) Find the least positive residue in $2^{41} \pmod{23}$. [2.5+2.5]

3. a) Show that the numbers of primes are infinite.
   b) Find integers u & v such that 30u+72v=12. [2.5+2.5]

4. a) If n be an odd positive integer, prove that Φ (2n) = Φ (n). [2.5+2.5]
   b) Explain about One time pad cipher in details.

5. a) What is the difference between AES and DES? [3+2]

b) In a RSA cryptosystem a particular A uses two prime numbers p = 13 and q =17 to generate her public and private keys. If the public key of A is 35, then the private key of A is _____.

6. Explain about MD5 algorithm. [5]

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. a) Solve the system of linear congruences : [4+3+3]

   X≡1 mod(3), X≡2 mod(5), X≡3 mod(7).

b) If p & p^2 +8 are both primes then show that p=3.

c) Find the remainder when 1!+2!+….+50! is divided by 15.

8. a) Show that [a+b]≥[a]+[b] for all real number a & b & [.] is greatest integer function. [2.5+2.5+5]

   b) Verify: $(Z_n$-{0}, *) is a group, where * represents matrix multiplications.

   c) What is Elliptic Curve Cryptography? Explain about encryption and decryption algorithm of ECC.

9. a) Explain about Rabin cryptosystem with example. [6+4]

   b) Explain about the security of Rabin Cryptosystem in details.

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech. | Semester: VII
Stream: EE/ECE
PAPER TITLE: Control System | PAPER CODE: EEE44101
Maximum Marks: 40 | Time duration: 3 hours
Total No of questions: 9 | Total No of Pages: 2

(Any other information required for the student may be mentioned here)

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. **a)** Define rise time of a typical second order under damped system.
   b) When a system is called 'critically' stable system?
   c) Write down the mathematical expression for Mason's gain formula.
   d) What are the necessary and sufficient conditions for a characteristic equation to be suitable for applying Routh-Hurwitz stability criterion?
   e) How to calculate centre of asymptotes or centroid in a root locus?

Group B

(Answer any three questions)

$5 \times 3 = 15$

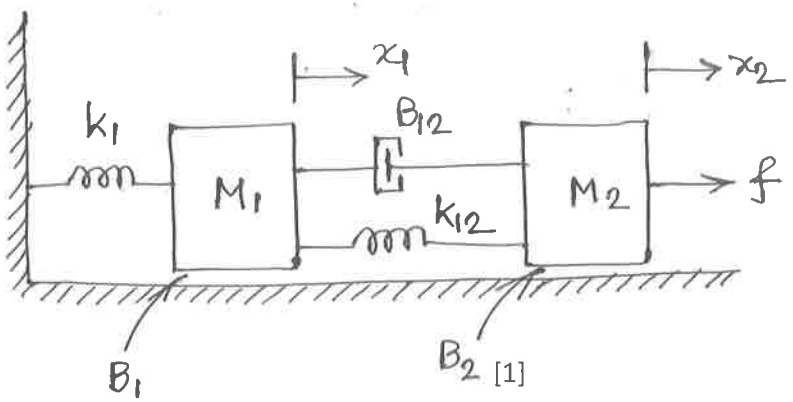
2. Derive the expression of peak time and peak overshoot for a step response of standard second order system.

3. (a) What is meant by Type of a system? How is the Type related to the steady state error in closed loop operation?

   (b) For a unity feedback system having open loop transfer function as $G(s) = \dfrac{K(s+2)}{s^2(s^2+7s+12)}$.

   Determine steady state error for parabolic input. **(1 + 2 + 2 = 5)**

4. Obtain force-voltage analogous circuit for following mechanical system.

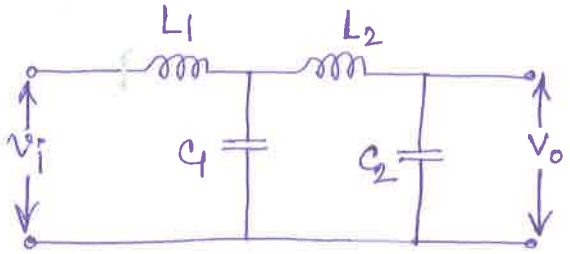


[1]

5. Determine the stability of a system whose characteristic equation is

$$s^5 + 2s^4 + 4s^3 + 4s^2 + 3s + 8 = 0$$

6. Determine the transfer function $\frac{V_0(s)}{V_i(s)}$ of following electrical network.



Group C

(Answer any two questions)

2 × 10 = 20

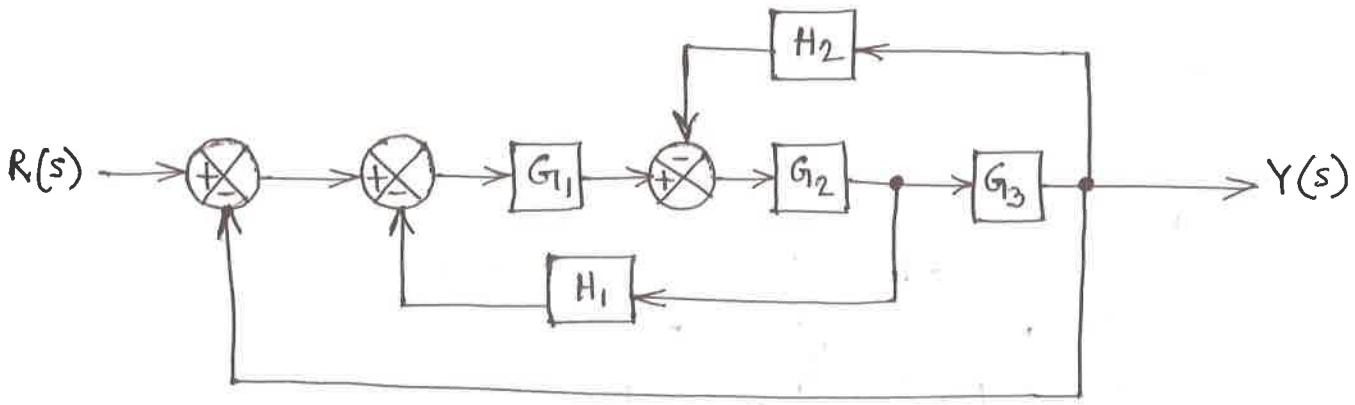
7. A unity feedback system has an open loop transfer function $G(s) = \frac{10}{s(s+2)}$. Find the rise time, percentage peak overshoot, peak time and settling time for a unit step input.

8. (a) Prove that the open-loop poles and open-loop zeros are the starting points and terminating points of the Root Locus.

(b) Sketch the root locus of a unity feedback system with forward path transfer function

$G(s) = \frac{K}{s(s+4)(s+5)}$, when K is varied from zero to infinity.

9. Determine the transfer function $\frac{Y(s)}{R(s)}$ from the following signal flow graph.



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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech.
Stream: CSE
PAPER TITLE: Mobile Computing
Maximum Marks: 40
Total No of questions: 09

Semester: VII

PAPER CODE: EEC44119
Time duration: 3 hours
Total No of Pages: 01

DO NOT SCATTER THE ANSWERS FOR DIFFERENT PARTS OF A QUESTION

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) What frequency band is used for WiFi?
   b) If GSM cells are made pentagonal, what will be the problem?
   c) Which subsystem does the VLR belong to in a GSM system?
   d) What is the theoretical data rate in GPRS technology?
   e) What is the advantage of ZigBee over Bluetooth?

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. What do you mean by multiplexing? Classify and explain different types of multiplexing techniques used in mobile communication. [2+3]

3. What do you mean by GSM channel? Classify GSM Channels along with brief description. [2+3]

4. Elaborate the challenges faced in designing MANET routing protocol using fixed routing protocols. [5]

5. Compare pro-active & reactive protocols. [5]

6. Explain the steps for maintaining consistency of a file system in a mobile network. Give some examples of protocols that cater to the need of consistency. [3+2]

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. What do you mean by co-channel cells in a GSM network? Pictorially explain the frequency reuse technique for hexagonal GSM cells. [5+5]

8. What is the limitation of flat Ad-Hoc routing in managing a network with large number of nodes? How the concept of clustering helps to provide solution to this problem? [6+4]

9. Write short notes on the following: (a) ZigBee (b) EDGE [5+5]

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester: Aug. 2019 – Dec. 2019)

Name of the Program: B.Tech — Semester: VII

Paper Title : **Water Resource Engineering II** — **Paper Code: ECE 44103**

Maximum Marks : 40 — Time duration: 3 Hrs

Total No of questions : 9 — Total No of Pages: 2

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1. Objective Type Questions: **Marks: 5 x 1 = 5**

(a) Define the terms 'Weir Pond' and 'Weir Crest'.

(b) Compute the discharge over an ogee spillway with coefficient of discharge c = 2.3 at a head of 3.8 m. The effective length of the spillway is 110 m. Neglect the velocity of approach.

(c) What is the function of Scouring Sluice in a diversion headwork?

(d) What are the advantages of 'Variable Radius Arch Dam'?

(e) What are the components of a "Chute Spillway"?

Short Answer Type Questions (*Answer any Three*): **(3 x 5) = 15**

(2) In how many ways seepage failure leads to the weir failure? Briefly discuss about them.

(3) What are differences between 'Weir' and 'Barrage'?

(4) Write a short note on 'Rock Fill Weir'.

(5) (a) What are the assumptions of Bligh's Creep Theory?

(b) The slope of a canal in alluvial soil is 1 in 3900. Find the maximum possible discharge if Lacey's silt factor is 0.9 and side slopes is 1(H): 2(V).

(6) Find an expression of the base of a gravity dam considering the dam is safe in sliding. Assume only the elementary profile of the gravity dam.

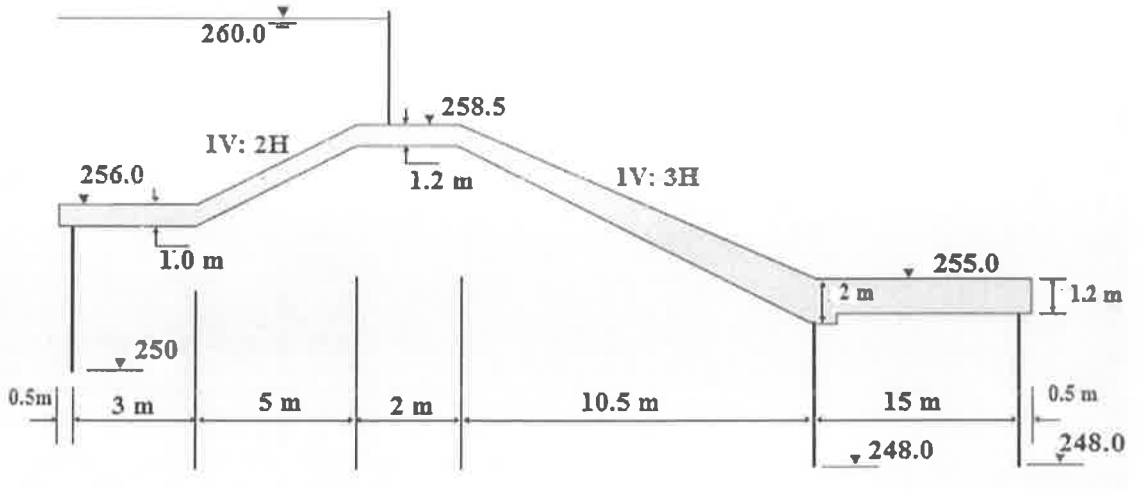
Long Answer Type Questions (*Answer any Two*): **(2 x 10) = 20**

(7) (a) Design a trapezoidal shaped concrete lined canal to carry a discharge of 200 m^3/s at a slope of 30 cm/km. The side slopes of the channel are 1.5(H):1(V) and. Assume Manning's n as 0.017 and limiting velocity as 2 m/s.

(b) The gross commanded area for a distributary is 6000 hectares, 80% of which is culturable irrigable. The intensity of irrigation for Rabi season is 50% and that for Kharif season is 25%. If the average duty at the head of the distributary is 2000 ha/cumec for

Rabi season and 900 ha/cumec for Kharif season, find out the discharge required at the head of the distributary from average demand considerations.

(8) Using Khosla's method, obtain the residual seepage pressures at the key points for the weir profile shown in the figure. Apply all the required corrections. Assume no flow condition. **(10)**



(9) Design a suitable section for the overflow portion of a concrete gravity dam having the downstream face sloping at a slope of 0.7 H: 1 V. The design discharge for the spillway is 8,000 cumecs. The height of the spillway crest is kept at RL 204.0 m. The average river bed level at the site is 100.0 m. The spillway length consists of 6 spans having a clear width of 10 m each. Thickness of each pier may be taken to be 2.5 m. **(10)**

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END SEMESTER EXAMINATION (DECEMBER 2019)

(Academic Session: 2019 – 20 Semester Terms: Aug 2019 – Dec 2019)

Name of the Program: B. Tech. **Semester: VII**
Paper Title: Waste Management **Paper Code: ECE-44113**
Maximum Marks: 40 **Time Duration: 3 hrs**
No. of Pages = 02 **No. of Questions = 11**

Note:

1. Please follow all the Instructions given on the cover page of the Answer Booklet Strictly.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.
4. No Mobile Phones will be permitted in the Examination Hall.

Answer all the Groups

PART– A

ANSWER ALL THE QUESTIONS **5 x 1= 5**

1. One word answer type question

i) Write the different types of waste management policies.

ii) What do you mean by environment protection act 1986?

iii) Name the different types of waste.

iv) Write the term "Bengal Famine".

v) Why the minimum dissolved oxygen is required for the survival of fish in a river stream.

PART– B

ANSWER QUESTION (any Three) **3 x 5 = 15**

2. (a) Draw a schematic diagram for the characteristics of industrial waste. 3
   (b) Write in tabular form the difference between ground water and surface water. 2

3. (a) Define environmental indicator. 1

(b) Draw in a tabular form for the five key global environmental indicators. 4

4. (a) What is Biodiversity? 1
(b) How many types of biodiversity exist in the environment? 1
(c) Describe the individual scale of biodiversity in details? 3

5. (a) The contaminants in wastewater are removed by different unit processes. What are these processes? 5

6. (a) Describe typical composition of solids in raw waste water as the total solids are divided. 3
(b) What are the reasons why DO depends on temperature and flow? 2

PART– C

ANSWER QUESTION (any Two) **2 x 10 = 20**

7. (a) What do mean by the term **CPA**? 2
(b) Describe the different milestones for the generic CPA process with the help of a process flow diagram. 8

8. Draw a neat & clean process flow diagram (PFD) for a Wet-textile Processing Factory. 10

9. (a) What is fishbone diagram? 2
(b) In what condition it is being used. 1
(c) Describe the screening of options during feasibility analysis. 7

10. (a) Differentiate between ETP, STP & CEPT in a tabular form. 5
(b) Describe schematically a typical unit operation in CETP. 5

11. Being a civil engineer, what would be your approach for setting-up a waste water treatment system? Discuss briefly with a schematic diagram. 10

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech.
Stream: CE
Semester: VII

PAPER TITLE: Pre-stressed Concrete Structure
PAPER CODE: ECE44109

Maximum Marks: 40
Time duration: 3 hours

Total No of questions: 09
Total No of Pages: 02

(**IS:1343** and **IS:456** are allowed in examination hall)

Answer all the Groups

Group A

(Answer all the questions)

5 × 1 = 5

1. a) What is bonded pre-stressed concrete ?
   b) What is transmission length ?
   c) Distinguish between uniaxial, biaxial and triaxial pre-stressing.
   d) Mention the type of flexural failure occurs in pre-stressed concrete members.
   e) What is composite section in pre-stressed concrete members ?

Group B

(Answer any three questions)

3 × 5 = 15

2. (a) Compare pre-tensioning and post-tensioning losses of pre-stressed concrete ? (3)
   (b) List out and explain the assumptions based on which design of limit state of collapse in flexure shall be done. (2)

3. (a) A concrete beam is post-tensioned by a cable carrying an initial stress of 1kN/mm^2. The slip at the jacking end was observed to be 5 mm. The modulus of elasticity of steel (E_s) = 210kN/mm^2. Find out the percentage loss of stress due to anchorage slip if the length of the beam is 30m and 3m. (3)
   (b) Explain loss due to friction in pre-stress concrete member. (2)

4. (a) Discuss about the deflections due to self weight and imposed loads in pre-stressed concrete. (2)
   (b) Draw and explain the stress distribution diagram of a pre-stressed concrete section with straight eccentric tendon profile through out the span of beam. (3)

5. A pre-tensioned concrete beam of 15 mm wide and 300 mm deep, is pre-stressed by 8 high tensile wires of 7 mm diameter located at 100 mm from the soffit of the beam. If the wires are tensioned to a stress of 1100 N/mm^2, calculate the percentage loss of stress due to elastic deformation assuming E_c = 31.5 kN/mm^2 and E_s = 210 kN/mm^2 for concrete and steel respectively. Use other suitable data if required. (5)

6. A pre-stressed girder of 150 mm wide and 300 mm deep is to be designed to support an ultimate shear force of 130 kN. The uniform pre-stress across the section is 5 N/mm^2. Given the characteristic cube strength of concrete as 40 N/mm^2 and Fe-415 HYSD bars of 8 mm diameter. Design the suitable shear reinforcement as per IS:1343. Assume 50 mm cover reinforcement. Use other suitable data if required. (5)

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. (a) A composite T section girder pre-stressed by a straight cable with eccentricity of 33.33 mm in web zone. Cable carrying an initial pre-stressing force of 150 kN. Find out the limit state of deflection of the section. For (a) un propped and (b) propped construction. Dimension of beam section are – Length of beam = 5m, width of rib = 100 mm, depth of rib = 200 mm, width of flange (cast in situ) = 400 mm, thickness of flange = 40 mm. Considering that beam is subjected to an imposed load of 3.2 kN/m. Assume E_c of precast and in situ cast elements is 35 kN/mm^2. Use other suitable data if required. (5)

   (b) A composite T- beam made up of pre-tensioned web of width 80 mm and 240 mm depth with 350 mm wide and 80 mm thick cast in situ slab. The web is reinforced with 8 wires of 5mm diameter with an ultimate tensile strength of 1600 N/mm^2. Pre-stressing force is located 60 mm above the soffit of the beam. The grade of concrete used for in situ slab and precast elements is M20 and M40 respectively. Assume sufficient reinforcements are provided to resist shear failure at the interface, calculate the flexural strength of the composite section. Use other data if required. (5)

8. (a) An I-section beam of 8m span, 300 mm top flange width, 60 mm flange thickness, bottom flange width 100 mm and 60 mm thick, web thickness is 80 mm and overall depth of beam is 400 mm subjected to an imposed load of 2kN/m. An effective pre-stressing force of 100kN is located at 50 mm from the bottom fibre of the beam throughout the beam span. Calculate the stresses at the mid span section of the beam under (a) pre-stress and self weight and (b) pre-stress ,self weight and live load. Use other data if required. Use other suitable data if required. (5)

   (b) A post tensioned pre-stressed member having an end block of 550 mm wide and 550 mm deep. 4 cables each made up of 7 wires of 12mm diameter strands and carrying a force 1000 kN, are anchored by plate anchorages, 150 mm by 150 mm, located with their centres at 125 mm from the edges of the end block. The cable duct is of 50 mm diameter. The 28 days cube strength of concrete (f_{cu}) is 45 N/mm^2. The cube strength of concrete at transfer (f_{ci}) is 25 N/mm^2. Permissible bearing stresses behind anchora ges should confirm with IS:1343. The characteristic yield stress in mild steel anchorage reinforce- ment is 260 N/mm^2. Design suitable anchorages for the end block. Use other suitable data if required. (5)

9. (a) A pre-stressed concrete beam of rectangular cross section,120 mm wide and 300 mm deep, spans over 6m. The beam is pre-stressed by a straight cable subjected to an effective force of 180 kN at an eccentric ity of 50 mm. If it is subjected to an imposed loads of 4 kN/m and E_c is 38 kN/mm^2, Determine the deflections for the below mentioned cases as per IS code.
   (i) upward deflection under pre-stress and self weight.
   (ii) final downward deflection under pre-stress, self weight, imposed load including the effects of creep and shrinkage. Take creep coefficient is 1.8. Use other suitable data if required. (6)

   (b) A pre-tensioned T-section has a flange 1200 mm wide and 150 mm thick. The width and depth of the web are 300 mm and 1500 mm respectively. The high tensile steel has an area of 4700 mm^2 and is located at an effective depth of 1600 mm. If the characteristic cube strength of concrete and tensile strength of steel are 40 and 1600 N/mm^2 respectively. Find out flexural strength of the section as per IS:1343. Use other suitable data if required. (4)

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B. Tech
Stream: Electrical Engineering
PAPER TITLE: Electrical Distribution System
Maximum Marks: 40
Total No of questions: 09

Semester: VII

PAPER CODE: EEE 44107
Time duration: 3 hours
Total No of Pages: 02

Note:

1. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
2. Assumptions made if any, should be stated clearly at the beginning of your answer.
3. No Mobile Phones will be permitted in the Examination Hall.

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. **a)** What is the major disadvantage of a phase advancer?
   b) When is the shunt inductor compensation required?
   c) What are the objectives of providing earth connection?
   d) What are the general methods of voltage control?
   e) Distinguish between fuse and circuit breaker?

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. What is the need for the booster transformer? With the help of circuit diagram explain the operation of booster transformer. [2+3]

3. Why is voltage control required? What are the disadvantages of tap changing transformers? Under what condition does a synchronous motor take a leading current? [1+3+1]

4. What are the advantages of using a static capacitor? Why is low lagging power factor undesireable? [3+2]

5. Derive an expression for the inductance of a Peterson coil in terms of the capacitance of the protected line. Why are isolators provided on either side of a circuit breaker? [4+1]

6. What is the major drawback of a main and transfer bus bar arrangement from the point of view of protection? What is the essential difference between a circuit breaker and an isolator? [2+3]

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. a) A single-phase motor connected to a 230 volt, 50 Hz supply takes 30 A at a power factor of 0.7 lag. A capacitor is shunted across the motor terminals to improve the power factor of 0.9 lag. Determine the capacitance of the capacitor to be shunted across the motor terminals.

   b) What are the disadvantages of synchronous condenser?

   c) What are the causes of low power factor? [6+2+2]

8. a) A 50 Hz overhead line has line to earth capacitance of 1.25 μF. It is used as an earth fault neutralizer. Calculate the reactance to be connected to neutralize the capacitance of 100% , 90% and 85% of the length of line.

   b) Define the terms: Bus bar, Feeder, Distributor and Service main. [6+4]

9. a) Describe the radial type and loop type primary feeder.

   b) What is symmetrical fault? [8+2]

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech. Semester: VII
Stream: CSE
PAPER TITLE: Computer Vision
PAPER CODE: ECS44103
Maximum Marks: 40 Time duration: 3 hours
Total No of questions: 9 Total No of Pages: 2

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) What is the main difference between Computer Vision and Computer Graphics?
   b) What do you mean by Good Detection in Edge Detection?
   c) Which detection algorithm can be used for 3D Object Reconstruction?
   d) Which process does remove color information from a color image?
   e) Define Edge of an image.

Group B

(Answer any three questions)

$5 \times 3 = 15$

2. a) Explain about Hough Transform algorithm for fitting Circle with a diagram. [3+2=5]
   b) How to fit a line using Least Squares Fit? Explain with an example.

3. a) Explain Optimal Thresholding in detail. [3+2=5]

   b) What are the different approaches Image segmentation has?

4. a) Define Morphological Filtering with an example. [2+3]

   b) Explain about Dilation and Erosion of Morphological Filtering in details.

5. a) Explain about any two image format in details. [4+1]

   b) Write the difference between Perspective Projection and Orthographic Projection.

6. Explain about any two Filtering in details. [5]

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. a) How to detect an object in Scene? [4+6]

   b) Explain about Various Algorithms used to detect object in Scene in details.

8. a) What is Image Segmentation? Why is it used in Computer Vision? [2+2+6]

   b) Explain about Generalized Hough Transform with example.

9. a) What is Image Noise? [2+8]

   b) Explain about Canny Edge Detection algorithm in details.

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END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: B.Tech. Semester: VII
Stream: MEPAPER TITLE: Design of Machine Elements PAPER CODE:EME44103
Maximum Marks: 40 Time duration: 3 hours
Total No of questions: 09 Total No of Pages: 02

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. **a)**What is endurance limit?
   b)How will you designate ISO metric fine threads?
   c)What is the Wahl factor?
   d)What are the drawbacks of cone clutch?
   e)What is autofrettage?

Group B

(Answer any three questions)

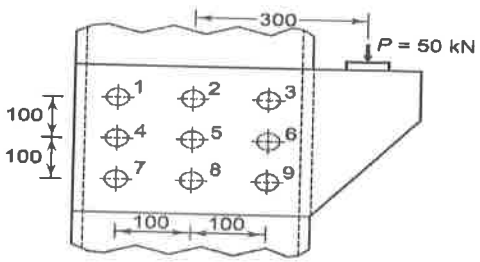
$5 \times 3 = 15$

2.Derive the expression of total operating force (P) and torque transmitted by the clutch (M_t) of a friction disk clutch using uniform pressure theory.**(5)**

3.Derive the expression for required torque by a power screw for lowering a load. **(5)**

4. a) Write down a short note on maximum shear stress theory. Show the safety of region. **(2+1)**
b) What is stress concentration? State the factors on which it is dependent? **(1+1)**

5. A bracket is attached to a steel channel by means of a nine identical rivets. Determine the diameter of the rivet if the permissible shear stress is 60 N/mm^2.**(5)**



6.The piston rod of a hydraulic cylinder exerts an operating force of 10 kN. The friction due to piston packing and stuffing box is equivalent to 10% of the operating force. The pressure in the cylinder is 10 MPa. The cylinder is made of cast iron FG 200 and the factor of safety is 5. Determine the diameter and thickness of the cylinder. (5)

Group C

(Answer any two questions)

$2 \times 10 = 20$

7.Show the distribution of tangential stress along the thickness of a thick cylinder.**(10)**

8.A plate clutch consists of one pair of contacting surfaces. The inner and outer diameter of the friction disk are 100 and 200 mm respectively. The coefficient of friction is 0.2 and the permissible intensity of pressure is 1 N/mm^2. Calculate the power transmitting capacity of the clutch at 750 rpm by using uniform pressure theory and uniform wear theory.**(5+5)**

9. **a)** Compute the deflection of a helical spring.**(7)**

b)What are the objectives of a spring?What are the major stresses in a helical spring?**(1+2)**