# AR20

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**
(AUTONOMOUS)
**IV B.Tech I Semester Regular Examinations, October -2023**
**PRESTRESSED CONCRETE**
**Professional Elective– V**
**(CIVIL ENGINEERING)**

Time: 3 Hours                                              Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

| | | | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT-I** | | | |
| 1. | a) | Explain with sketches 'Hoyer's long line system of pretensioning. | 6M | CO1 | 2 |
| | b) | Distinguish between pretensioned and post-tensioned members. | 4M | CO1 | 2 |
| | | **(OR)** | | | |
| 2. | | A rectangular prestressed beam 150 mm wide and 300 mm deep is used over an effective span of 10 m. The cable with zero eccentricity at the supports, and linearly varying to 50 mm at the centre, carries an effective prestressing force of 500 kN. Find the magnitude of the concentrated load Q located at the centre of the span for the following conditions at the centre of span section:<br>(a) If the load counteracts the bending effect of the prestressing force (neglecting self weight of beam,) and<br>(b) If the pressure line passes through the upper kern of the section under the action of the external load, self weight and prestress. | 10M | CO1 | 1 |
| | | **UNIT-II** | | | |
| 3. | | A prestressed concrete pile, 250 mm square, contains 60 pretensioned wires, each of 2 mm diameter, uniformly distributed over the section. The wires are initially tensioned on the prestressing bed with a total force of 300 kN. Calculate the final stress in concrete and the percentage loss of stress in steel after all losses, given the following data:<br>$E_s = 210$ kN/mm$^2$; $E_c = 32$ kN/mm$^2$; Shortening due to creep = 30 x 10-6 mm/mm per N/mm$^2$ of stress; Total shrinkage = 200 x $10^{-6}$; Relaxation of steel stress = 5% of initial stress. | 10M | CO2 | 4 |
| | | **(OR)** | | | |
| 4. | a) | A concrete beam is post-tensioned by a cable carrying an initial stress of 1000 N/mm$^2$. The slip at the jacking end was observed to be 5 mm. The modulus of elasticity of steel is 210 kN/mm$^2$. Estimate the percentage loss of stress due to anchorage slip if the length of the beam is (a) 30 m; and (b) 3 m. | 6M | CO2 | 4 |
| | b) | How do you compute the loss of stress due to shrinkage of concrete as per IS: 1343 code recommendations? | 4M | CO2 | 1 |
| | | **UNIT-III** | | | |
| 5. | a) | The cross section of a symmetrical I-section prestressed beam is 300 mm by 750 mm (overall), with flanges and web 100 mm thick. The beam is post-tensioned by cables containing 48 wires of 5 mm diameter high-tensile steel wires at an eccentricity of 250 mm. The 28-day strength of concrete in compression is 40 MPa and the ultimate tensile strength of wires is 1700 MPa. Assuming that the grouting of the tendons is 100% effective, determine the ultimate moment of the section. | 6M | CO3 | 4 |
| | b) | Define strain compatibility method and its assumptions. | 4M | CO3 | 1 |

**(OR)**

6. a) A double T-section having a flange 1200 mm wide and 150 mm thick is prestressed by 4700 $mm^2$ of high tensile steel located at an effective depth of 1600 mm. The ribs have a thickness of 150 mm each. If the cube strength of concrete is 40 MPa and tensile strength of steel is 1600 MPa, determine the flexural strength of the double T-girder using IS: 1343 provisions.    6M    CO3    4

   b) Explain with sketches the IS: 1343 code method of computing the moment of resistance of rectangular sections.    4M    CO3    1

## UNIT-IV

7. a) The horizontal prestress at the centroid of a concrete beam of rectangular cross section, 120 mm by 250 mm is 8.5 $N/mm^2$ and the maximum shearing force on the beam is 80 kN. Calculate the maximum principal tensile stress. What is the minimum vertical prestress required to eliminate this principal tensile stress?    6M    CO4    2

   b) How do you estimate the ultimate shear strength of prestressed concrete section with web shear cracks?    4M    CO4    1

### (OR)

8. The support section of a prestressed concrete beam, 100 mm wide by 250 mm deep, is required to support an ultimate shear force of 80 kN. The compressive prestress at the centroidal axis is 5 $N/mm^2$. The characteristic cube strength of concrete is 40 $N/mm^2$. The cover to the tension reinforcement is 50 mm. If the characteristic tensile strength of stirrups is 415 $N/mm^2$, design suitable shear reinforcements in the section using IS code recommendations.    10M    CO4    4

## UNIT-V

9. A prestressed concrete beam of rectangular section 120 mm wide by 300 mm deep, spans over 6 m. The beam is prestressed by a straight cable carrying an effective force of 200 kN at an eccentricity of 50 mm. The modulus of elasticity of concrete is 38 $kN/m^2$. Compute the deflection at centre of span for the following cases:
(a) deflection under (prestress + self weight)
(b) find the magnitude of the uniformly distributed live load which will nullify the deflection due to prestress and self weight.    10M    CO5    4

### (OR)

10. a) Explain the terms (a) End block (b) anchorage zone and (c ) bursting tension with reference to post tensioned prestressed members.    6M    CO5    1

    b) Sketch the typical tensile stress distribution in an end block of a post tensioned beam with a single anchorage.    4M    CO5    1

## UNIT-VI

11. A rectangular pretensioned concrete beam has a breadth of 100 mm and depth of 230 mm, and the prestress after all losses have occurred is 12 $N/mm^2$ at the soffit and zero at the top. The beam is incorporated in a composite T-beam by casting a top flange breadth 300 mm and depth 50 mm. Calculate the maximum uniformly distributed live load that can be supported on a simply supported span of 4.5 m, without any tensie stresses occurring, if (a) the slab is externally supported while casting, and (b) the pretensioned beam supports the weight of the slab while casting.    10M    CO6    4

### (OR)

12. Two simply supported beams, AB = BC = 10 m, of rectangular cross section, each post-tensioned by means of two parabolic cables (P = 300 kN each) with eccentricities of zero at the supports and 150 mm at mid-span, are converted into a continuous beam by tensioning a parabolic cap cable carrying a force of 300 kN. The ends of the cap cable are located at 3 m from the central support. The cable centre is 50 mm from the top of the beam over the central support B. The beam is 200 mm wide and 600 mm deep.
(a) Calculate the secondary moment induced at B.
(b) Locate the resultant line of thrust through the beam AB.
(C) Evaluate the resultant prestress along the top and bottom of the beam.    10M    CO6    4

# AR20

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**
(AUTONOMOUS)
**IV B.Tech I Semester Regular Examinations, October-2023**
**Ad-hoc and Sensor Networks**
(COMPUTER SCIENCE AND ENGINEERING)

Time: 3 Hours                                                      Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

|  |  |  | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT-I** | | | |
| 1. | a) | Draw the schematic diagram of an ad hoc wireless Internet and discuss the issues to be considered for the successful ad hoc wireless Internet. | 5M | 1 | L1 |
| | b) | Differentiate between cellular network and an ad hoc | 5M | 1 | L4 |
| | | **(OR)** | | | |
| 2. | a) | Describe the issues and challenges in Ad hoc wireless networks | 5M | 1 | L1 |
| | b) | Explain about the benefits of the commercial ad hoc wireless networks. | 5M | 1 | L2 |
| | | **UNIT-II** | | | |
| 3. | a) | Explain the issues in designing a MAC Protocols for Ad hoc Wireless Networks | 5M | 2 | L2,L3 |
| | b) | What are the advantages and disadvantages of MAC protocol | 5M | 2 | |
| | | **(OR)** | | | |
| 4. | a) | Design Goals of a MAC Protocol for Ad hoc Wireless Networks | 5M | 2 | |
| | b) | Explain Quality of Service Support in MAC protocol | 5M | 2 | |
| | | **UNIT-III** | | | |
| 5. | a) | What are the different contention based protocols, explain any one protocol | 5M | 3 | L3 |
| | b) | Explain how the scheduled based MAC protocol differs from the contention based MAC protocol | 5M | 3 | L2 |
| | | **(OR)** | | | |
| 6. | a) | Write in detail about Contention based protocols FAMA | 5M | 3 | L3 |
| | b) | Write in detail about Contention based protocols with Scheduling Mechanisms DPS | 5M | 3 | L2 |
| | | **UNIT-IV** | | | |
| 7. | a) | Explain AODV route establishment and route maintenance with proper diagram. | 5M | 4 | |
| | b) | Evaluate the pros and cons of the proactive routing protocol and reactive routing protocol. | 5M | 4 | L5 |
| | | **(OR)** | | | |
| 8. | a) | Design an ad hoc wireless network with nodes and demonstrate the process of route establishment and route maintenance using the on demand routing protocol | 5M | 4 | L5 |
| | b) | Explain ZRP Hybrid routing protocols | 5M | 4 | L2 |
| | | **UNIT-V** | | | |
| 9. | a) | What are the various applications of wireless sensor networks in different fields? Explain in detail | 5M | 5 | |
| | b) | Explain about Sensor Network Architecture | 5M | 5 | L3 |
| | | **(OR)** | | | |
| 10. | a) | Write about Sensor Network Clustered architecture | 5M | 5 | L3 |
| | b) | Summarize the challenges and the required mechanisms of a wireless sensor network. | 5M | 5 | L2 |
| | | **UNIT-VI** | | | |
| 11. | a) | Explain Location Discovery procedure in wireless sensor network | 5M | 6 | L3 |
| | b) | Write the Synchronization and security issues in sensor networks | 5M | 6 | L2,L3 |
| | | **(OR)** | | | |
| 12. | a) | Explain CSMA based MAC Protocols for sensor Networks | 5M | 6 | L3 |
| | b) | Explain Quality of Sensor Network | 5M | 6 | L2 |

**1 of 1**

# AR20

CODE: 20ECE451                                        SET-2

## ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
### (AUTONOMOUS)
### IV B.Tech I Semester Regular Examinations, October -2023
### CELLULAR AND MOBILE COMMUNICATIONS
### (ELECTRONICS AND COMMUNICATION ENGINEERING)

Time: 3 Hours                                        Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

| | | **UNIT-I** | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| 1. | a) | Derive an expression for co-channel interference reduction factor | 5 | 1 | Applying |
| | b) | Explain the operation of cellular systems. | 5 | 1 | Understanding |
| | | **(OR)** | | | |
| 2. | | Describe non-cellular mobile systems with necessary diagrams. | 10 | 1 | Understanding |
| | | **UNIT-II** | | | |
| 3. | a) | Explain the effect of propagation of mobile signals over water. | 5 | 1 | Understanding |
| | b) | Describe the concept of fading in propagation. | 5 | 1 | Understanding |
| | | **(OR)** | | | |
| 4. | a) | Elaborate any one outdoor propagation model. | 5 | 2 | Analysing |
| | b) | What is foliage loss? Explain | 5 | 2 | Understanding |
| | | **UNIT-III** | | | |
| 5. | | Describe cell site antennas in detail | 10 | 3 | Understanding |
| | | **(OR)** | | | |
| 6. | a) | Write short notes on (i) Space Diversity (ii) Time Diversity | 5 | 3 | Understanding |
| | b) | Explain the antennas used to reduce interference. | 5 | 3 | Understanding |
| | | **UNIT-IV** | | | |
| 7. | a) | Describe soft hand off and hard hand off with necessary diagrams. | 5 | 4 | Understanding |
| | b) | Explain the concept of dropped call rates in handoff. | 5 | 4 | Understanding |
| | | **(OR)** | | | |
| 8. | a) | Describe Mobile assigned handoff with necessary diagram | 5 | 4 | Understanding |
| | b) | What is vehicle locating methods? Explain. | 5 | 4 | Understanding |
| | | **UNIT-V** | | | |
| 9. | a) | Explain the concept of numbering in frequency management in cellular systems. | 5 | 5 | Applying |
| | b) | Describe Paging in channels | 5 | 5 | Understanding |
| | | **(OR)** | | | |
| 10. | a) | Explain Channel borrowing with a necessary diagram | 5 | 5 | Applying |
| | b) | Explain various types of non-fixed channel assignment algorithms | 5 | 5 | Understanding |
| | | **UNIT-VI** | | | |
| 11. | | Draw the GSM architecture and explain | 10 | 6 | Evaluating |
| | | **(OR)** | | | |
| 12. | a) | Describe CDMA with relevant diagrams. | 5 | 6 | Understanding |
| | b) | Describe CSMA with relevant diagrams. | 5 | 6 | Understanding |

CODE: 20ECE452                                                SET-2

## ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
### (AUTONOMOUS)
### IV B.Tech I Semester Regular Examinations, October -2023
### RADAR SYSTEMS
### (ELECTRONICS AND COMMUNICATION ENGINEERING)

Time: 3 Hours                                            **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

|   |   |   | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT-I** | | | |
| 1. | a) | Illustrate in detail about the basic form of radar block diagram and explain the function of each block? | 5M | CO1 | BL2 |
| | b) | Calculate maximum range of Radar for the following specifications: Transmitted power = 500 KW, Gain = 1500, Effective Area= 4 m$^2$, RCS = 15 m$^2$ and $S_{min}$= $10^{-11}$ W? | 5M | CO1 | BL5 |
| | | **(OR)** | | | |
| 2. | a) | Discuss in detail about the factors affecting the radar range equation? | 5M | CO1 | BL6 |
| | b) | Elaborate in detail about the radar frequencies and applications of radar? | 5M | CO1 | BL2 |
| | | **UNIT-II** | | | |
| 3. | a) | Derive radar range equation in terms of receiver noise and SNR? | 7M | CO2 | BL2 |
| | b) | Given Antenna Beam width is 4$^o$ scan rate is 32$^o$/sec PRF is 800Hz. How many pulses will be returned from a point target as antenna Scans through its beam width? | 3M | CO2 | BL5 |
| | | **(OR)** | | | |
| 4. | a) | Discuss in detail about threshold detection, false alarm and missed detection conditions? | 5M | CO2 | BL1 |
| | b) | Illustrate the different regions in the radar cross section of sphere? | 5M | CO2 | BL2 |
| | | **UNIT-III** | | | |
| 5. | a) | A target is closing on a radial of a radar site with a relative velocity of 400 Knots. The radar transmits continuous wave energy at a wavelength of 3.5 cm what will the Doppler shift of target be? What will be Doppler shift if target alters its course by 30$^o$? (1 knot=0.508 m/sec) | 5M | CO3 | BL5 |
| | b) | Illustrate in detail about the basic block diagram of CW radar and state its drawbacks? | 5M | CO3 | BL2 |
| | | **(OR)** | | | |
| 6. | a) | Discuss in detail about the operation of FMCW altimeter? | 5M | CO3 | BL2 |
| | b) | Elaborate in detail about the measurement errors that creep in while using CW and FMCW radars? | 5M | CO3 | BL4 |
| | | **UNIT-IV** | | | |
| 7. | a) | Illustrate in detail about the working principle of MTI radar with neat block diagram? | 7M | CO4 | BL2 |
| | b) | If an MTI Radar operates at 5 GHz with a PRF of 0.5 KHz Find three lowest Blind Speeds? | 3M | CO4 | BL5 |
| | | **(OR)** | | | |
| 8. | a) | Elaborate in detail about the range gated doppler filters? | 5M | CO4 | BL2 |
| | b) | Discuss in detail about effect of blind speed on MTI radar performance and how to overcome blind speeds? | 5M | CO4 | BL4 |
| | | **UNIT-V** | | | |
| 9. | a) | Define tracking and illustrate in detail about the working of conical scan tracking radar? | 5M | CO5 | BL2 |
| | b) | Illustrate the basic principle involved in different types of tracking angle radar systems? | 5M | CO5 | BL2 |
| | | **(OR)** | | | |
| 10. | a) | Discuss in detail about the working principle of phase comparison monopulse tracking radar? | 5M | CO5 | BL6 |
| | b) | Compare the different types of radar trackers? | 5M | CO5 | BL4 |
| | | **UNIT-VI** | | | |
| 11. | a) | Elaborate in detail about the working of cross correlation receiver? | 5M | CO6 | BL2 |
| | b) | Discuss in detail about working of balanced and circular type duplexers? | 5M | CO6 | BL2 |
| | | **(OR)** | | | |
| 12. | a) | Write short notes on noise figure and noise temperature? | 5M | CO6 | BL2 |
| | b) | Differentiate among the various types of radar display devices with respect to its type, advantages and drawbacks? | 5M | CO6 | BL4 |

**CODE: 20EEE453**                                                      **SET-2**

## ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
### (AUTONOMOUS)
### IV B.Tech I Semester Regular Examinations, October-2023
## NON CONVENTIONAL ENERGY SOURCES
### (ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours                                                           Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

| | | **UNIT-I** | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| 1. | a) | What are the prospects of non-conventional energy sources in India? | 5 | CO1 | 2 |
| | b) | State the potential of non-conventional sources in India | 5 | CO1 | 2 |
| | | **(OR)** | | | |
| 2. | | Explain with the help of neat sketches, about solar radiation measuring devices. | 10 | CO1 | 2 |

### UNIT-II

| | | | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| 3. | a) | List the advantages and disadvantages of concentrating collectors over flat plate collectors. | 5 | CO2 | 2 |
| | b) | List out the advantages and disadvantages of a PV system. | 5 | CO2 | 2 |
| | | **(OR)** | | | |
| 4. | | A cylindrical parabolic concentrator is 10 m long and 2.5 m wide. The diameter of absorber tube is 12 cm. Find the concentration ratio. | 10 | CO2 | 5 |

### UNIT-III

| | | | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| 5. | a) | Explain the factors considered for selecting a site of a wind generator. | 5 | CO3 | 2 |
| | b) | Discuss the potential availability of wind energy in India | 5 | CO3 | 6 |
| | | **(OR)** | | | |
| 6. | a) | Compare between horizontal and vertical axis wind mills. | 5 | CO3 | 5 |
| | b) | List out the advantages and disadvantages of a wind energy system | 5 | CO3 | 2 |

### UNIT-IV

| | | | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| 7. | | What are biomass conversion technologies? Draw a schematic diagram to explain various conversion technologies and products | 10 | CO4 | 2 |

| 8. | | List the advantages and disadvantages of geothermal energy over other energy sources in detailed analysis | 10 | CO4 | 2 |
|---|---|---|---|---|---|

## UNIT-V

| 9. | a) | List the advantages and disadvantages of OTEC plants. | 5 | CO5 | 2 |
|---|---|---|---|---|---|
| | b) | Explain with the help of neat sketches about single basin single effect tidal power generation. | 5 | CO5 | 3 |

**(OR)**

| 10. | a) | Explain with neat sketch about the tidal power generation. | 5 | CO5 | 2 |
|---|---|---|---|---|---|
| | b) | List the advantages and disadvantages of wave energy. | 5 | CO5 | 2 |

## UNIT-VI

| 11. | | Explain the open loop MHD with neat sketch | 10 | CO6 | 2 |
|---|---|---|---|---|---|

**(OR)**

| 12. | a) | Discuss the signification of DEC in brief. | 5 | CO6 | 6 |
|---|---|---|---|---|---|
| | b) | Discuss the terminologies Seebeck, Peltier and Joul Thomson Effects | 5 | CO6 | 6 |

**CODE: 20ITE451**                                              **SET-2**
**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**
(AUTONOMOUS)
**IV B.Tech I Semester Regular Examinations, October-2023**
**Mobile Computing**
**(INFORMATION TECHNOLOGY)**

Time: 3 Hours                                              Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

| | | | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT-I** | | | |
| 1. | a) | Explain in detail about various applications of Mobile Computing. | 5 | 1 | 1 |
| | b) | Describe briefly about New Data Services. | 5 | 1 | 1 |
| | | **(OR)** | | | |
| 2. | a) | Draw and explain the Mobile Computing Architectural layers. | 5 | 1 | 2 |
| | b) | List the applications of Mobile computing. | 5 | 1 | 1 |
| | | **UNIT-II** | | | |
| 3. | | Illustrate GPRS system architecture with a neat diagram. | 10 | 2 | 3 |
| | | **(OR)** | | | |
| 4. | | Draw and explain each subsystem of the GSM network architecture. | 10 | 2 | 3 |
| | | **UNIT-III** | | | |
| 5. | a) | Describe the need of DHCP and List the steps in the DHCP protocol for dynamically configuring the IP address and other networks. | 5 | 3 | 1 |
| | b) | Discuss about the tunneling and encapsulation in Mobile IP. | 5 | 3 | 2 |
| | | **(OR)** | | | |
| 6. | a) | Describe the process of registration of a mobile node at an agent. | 5 | 3 | 1 |
| | b) | Explain briefly about the Multicasting in Route Optimization | 5 | 3 | 2 |
| | | **UNIT-IV** | | | |
| 7. | a) | Describe how Slow Start method of TCP helps in controlling congestion. | 5 | 4 | 2 |
| | b) | Explain briefly about the Checkpoint-based data recovery procedure. | 5 | 4 | 2 |
| | | **(OR)** | | | |
| 8. | a) | List and explain the main features of Conventional TCP. | 5 | 4 | 1 |
| | b) | Draw and explain Query Processing architecture. | 5 | 4 | 2 |
| | | **UNIT-V** | | | |
| 9. | a) | What is Data Synchronization? List and explain different types of Synchronization in detail. | 5 | 5 | 1 |
| | b) | Explain in detail about the Fast retransmit/fast recovery in mobile transport layer. | 5 | 5 | 2 |
| | | **(OR)** | | | |
| 10. | a) | What are the advantages and disadvantages of Push-based Mechanism? | 5 | 5 | 1 |
| | b) | Describe briefly about the ActiveSync software used for Synchronization. | 5 | 5 | 2 |
| | | **UNIT-VI** | | | |
| 11. | a) | Explain in detail about the DSDV routing algorithm in MANETs. | 5 | 6 | 2 |
| | b) | Discuss briefly about J2ME and Java Card. | 5 | 6 | 2 |
| | | **(OR)** | | | |
| 12. | a) | Write the applications of MANET. | 5 | 6 | 2 |
| | b) | Write a short note on Windows CE operating system,. | 5 | 6 | 2 |

**CODE: 20MEE451**                                              **SET-1**

## ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
### (AUTONOMOUS)
### IV B.Tech I Semester Regular Examinations, October-2023
### INDUSTRIAL AUTOMATION
### (MECHANICAL ENGINEERING)

**Time: 3 Hours**                                              **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

| | | **UNIT-I** | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| 1. | a) | Draw the simple block diagram of hydraulic circuit and discuss it briefly. | 7 | 1 | 3 |
| | b) | Differentiate between flexible automation and fixed automation | 3 | 1 | 2 |
| | | **(OR)** | | | |
| 2. | a) | Discuss various types of automation strategies mentioning their importance | 7 | 1 | 3 |
| | b) | List out the various Reasons for automation. | 3 | 1 | 2 |
| | | **UNIT-II** | | | |
| 3. | a) | With neat diagrams explain the functioning of various types of Transfer Mechanisms | 5 | 2 | 2 |
| | b) | Explain the term partial automation with example | 5 | 2 | 2 |
| | | **(OR)** | | | |
| 4. | a) | Explain about the mechanical buffer storage control function. | 4 | 2 | 2 |
| | b) | A Geneva with eight slots is used to operate the worktable of a dial indexing machine. The slowest workstation on the dial indexing machine has an operation time of 2.5 seconds, so that the table must be in a dwell position for this length of time. (i) At what rotational speed must the driven member of the Geneva mechanism be turned to provide this dwell time? (ii) What is the indexing time each cycle? | 6 | 2 | 3 |
| | | **UNIT-III** | | | |
| 5. | a) | Explain the following terms in line balancing i) Total work content ii) Work station process time | 6 | 3 | 2 |
| | b) | Explain methods of line balancing Algorithms | 4 | 3 | 2 |
| | | **(OR)** | | | |
| 6. | a) | Discuss any four methods that should be considered by the designer of a flow line for improving the efficiency of the assembly line. | 6 | 3 | 3 |
| | b) | Explain any one manual assembly system | 4 | 3 | 2 |
| | | **UNIT-IV** | | | |
| 7. | a) | Discuss any four methods that should be considered by the designer of a flow line for improving the efficiency of the assembly line. | 5 | 4 | 3 |
| | b) | What are the principal groups of material handling equipment ? State and briefly discuss the essential characteristics of each group. | 5 | 4 | 2 |

**(OR)**

| | | | |
|---|---|---|---|
| 8. | Boxes of size 220mm × 180mm × 100mm have to be conveyed by a belt conveyor of sufficient belt strength, at the rate of 2500 boxes per hour. What is the belt size and speed of the conveyor? Place the boxes with a gap of 250 mm between boxes and calculate the side clearance. a)The power required at the driving pulley just for driving the belt is 120kW. The tension in the slack side is 50 N and $\mu$ = 0.4, $\alpha$ = 150 degrees. Calculate the belt speed in mm/sec. b) Calculate the conveying capacity of a troughed belt conveyor if B = belt width = 500m, V = 1200mm/sec, $\gamma$ = bulk density is 2000 tonnes/m3. $\emptyset$ = static angle of repose is 45 degrees. $\lambda$ = 60 degrees | 10 | 4 | 3 |

## UNIT-V

| | | | | | |
|---|---|---|---|---|---|
| 9. | a) | Explain the various of storage systems | 5 | 5 | 2 |
| | b) | Explain the various types of Identification Systems available | 5 | 5 | 2 |
| | | **(OR)** | | | |
| 10. | a) | Briefly Explain about tracking system and its advantages | 5 | 5 | 2 |
| | b) | Explain the bar code system in detail | 5 | 5 | 2 |

## UNIT-VI

| | | | | | |
|---|---|---|---|---|---|
| 11. | a) | Explain the role of CMM in computer aided quality control. What are different elements of CMM? | 5 | 6 | 2 |
| | b) | Briefly describe about Agile Manufacturing | 5 | 6 | 2 |
| | | **(OR)** | | | |
| 12. | a) | Briefly describe about Lean concepts in Manufacturing industry | 5 | 6 | 2 |
| | b) | Explain machine vision technique in inspection | 5 | 6 | 2 |

# AR20

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**
(AUTONOMOUS)
**IV B.Tech I Semester Regular Examinations, October-2023**
**ADDITIVE MANUFACTURING**
**(MECHANICAL ENGINEERING)**

Time: 3 Hours                                              **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

| | | | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT-I** | | | |
| 1. | a) | Briefly explain the classification of rapid prototyping process. | 5 | 1 | 2 |
| | b) | Describe the historical development of RP and related technologies. | 5 | 1 | 2 |
| | | **(OR)** | | | |
| 2. | a) | STL files are problematic. Is it fair to make this a statement? Discuss. | 5 | 1 | 2 |
| | b) | Distinguish between cleaning, post-curing and finishing which are the various tasks of postprocessing. Name two RP processes that do not require post-curing and one that does not require cleaning. | 5 | 1 | 2 |
| | | **UNIT-II** | | | |
| 3. | a) | Describe the process flow of the 3D System stereolithography apparatus. | 5 | 2 | 2 |
| | b) | Which liquid-based machine has the largest work volume? Which has the smallest? | 5 | 2 | 2 |
| | | **(OR)** | | | |
| 4. | a) | As opposed to many of the liquid-based RP systems which use a photosensitive polymer, water is used in RFP. What are the pros and cons of using water? | 5 | 2 | 2 |
| | b) | Writhe short notes on following a) Photo Polymers b) Photo polymerization c) Curing process d) Initial 3D printing process. | 5 | 2 | 2 |
| | | **UNIT-III** | | | |
| 5. | | Describe the process flow of Cubic's Laminated object Manufacturing along with its advantages and disadvantages. | 10 | 3 | 2 |
| | | **(OR)** | | | |
| 6. | a) | Compare and contrast the laser-based LOM process and the FDM systems. What are the advantages and disadvantages for each of the systems? | 5 | 3 | 2 |
| | b) | Compare and contrast 3D systems' MJM system with Solidscapes's Benchtop System. What are the advantages and disadvantages for each of the systems? | 5 | 3 | 2 |
| | | **UNIT-IV** | | | |
| 7. | a) | Using a sketch to illustrate your answer, describe the Selective Laser Sintering process. | 5 | 4 | 2 |
| | b) | Describe the types of materials used in SLS. | 5 | 4 | 2 |
| | | **(OR)** | | | |
| 8. | | Discuss the processes, strengths and limitations of the following RP processes:<br>(i) Direct Hell Pattern Casting,<br>(ii) Multijet Solidification<br>(iii) Lasform Technology | 10 | 4 | 2 |

## UNIT-V

9. What is the common format used by RP systems? Describe the format and illustrate with an example. What are the pros and cons of using this format?          10   5   2

**(OR)**

10. a) What are the three types of non-manifold conditions?          5   5   2
    b) Write the STL Format code for at least 3 faces of a cube          5   5   2

## UNIT-VI

11. How is application of RP models related to the purpose of prototyping?          10   6   2
    How does it also relate to the materials used for prototyping?

**(OR)**

12. a) Explain how RP systems can be applied to traditional industries like jewellery, coin and tableware.          5   6   2
    b) Explain whether RP technology is more suitable for "high technology" industries like aerospace than it is for consumer product industries like electronic appliances. Give examples to substantiate your answer.          5   6   2

# AR16(RA)

**CODE: 16CE4025**                                    **SET-1**

## ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
### (AUTONOMOUS)
**IV B.Tech I Semester Regular(RA)/Supplementary Examinations, October,2023**
**REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM**
**(CIVIL ENGINEERING)**

**Time: 3 Hours**                                         **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

### UNIT-I

| | | | |
|---|---|---|---|
| 1. | a) | Show and explains the various wave length regions of electromagnetic spectrum? | 7 |
| | b) | What is meant by atmospheric windows and explain it with a neat sketch? | 7 |

**(OR)**

| | | | |
|---|---|---|---|
| 2. | a) | Differentiate between Active Remote sensing and Passive Remote sensing. | 7 |
| | b) | Explain components of remote sensing. | 7 |

### UNIT-II

| | | | |
|---|---|---|---|
| 3. | a) | Classify sensors in remote sensing. | 7 |
| | b) | Report very briefly on " Black body radiation". | 7 |

**(OR)**

| | | | |
|---|---|---|---|
| 4. | a) | Brief note on Sun Synchronous satellites. | 7 |
| | b) | Explain about the digital data image formats. | 7 |

### UNIT-III

| | | | |
|---|---|---|---|
| 5. | | Review in detail about the various elements of image interpretation in remote sensing. | 14 |

**(OR)**

| | | | |
|---|---|---|---|
| 6. | | Define the term image enhancement and explain about the various methods of image enhancement? | 14 |

### UNIT-IV

| | | | |
|---|---|---|---|
| 7. | a) | Explain Azimuthal projection and its significance. | 7 |
| | b) | Describe the parameters of projection. | 7 |

**(OR)**

| | | | |
|---|---|---|---|
| 8. | a) | Describe the software and hardware components of GIS. | 7 |
| | b) | Illustrate GIS architecture with the help of neat sketches. | 7 |

### UNIT-V

| | | | |
|---|---|---|---|
| 9. | a) | Write about the logical operators in spatial analysis? | 7 |
| | b) | Discuss the role of RS urban planning? | 7 |

**(OR)**

| | | | |
|---|---|---|---|
| 10. | a) | Explain with the help of case study, the methodology for using satellite imagery and GIS to identify potential zones of ground water. | 7 |
| | b) | Analyse the applications of Remote Sensing in the land use and land cover. | 7 |

# AR16

### ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
**(AUTONOMOUS)**
**IV B.Tech I Semester Supplementary Examinations, October,2023**

**Mobile Computing**
**(COMMON TO CSE AND IT)**

Time: 3 Hours                                                     **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

## UNIT-I

| | | | |
|---|---|---|---|
| 1. | a) | Explain in detail Overview of some wireless communication systems. | 7 M |
| | b) | Discuss in detail simplified reference layered model with neat sketch. | 7 M |
| | | **(OR)** | |
| 2. | a) | Describe and discuss different mobile communication novel applications | 7 M |
| | b) | Explain mobile computing disadvantages. | 7 M |

## UNIT-II

| | | | |
|---|---|---|---|
| 3. | a) | Explain in detail GSM Bearer and tele services reference model with neat sketch. | 7 M |
| | b) | Discuss in detail about GSM System architecture. | 7 M |
| | | **(OR)** | |
| 4. | a) | Explain different possible handover scenarios in GSM. | 7 M |
| | b) | Write short notes on GSM Localization and calling. | 7 M |

## UNIT-III

| | | | |
|---|---|---|---|
| 5. | a) | Explain the Comparisons of SDMA, TDMA mechanisms. | 7 M |
| | b) | Discuss in detail about code division multiplexing (CDM) characteristics. | 7 M |
| | | **(OR)** | |
| 6. | a) | Write short notes on polling and Inhibit sense multiple access (ISMA). | 7 M |
| | b) | Explain in detail Spread Aloha multiple access (SAMA) with neat sketch. | 7 M |

## UNIT-IV

| | | | |
|---|---|---|---|
| 7. | a) | Describe and discuss Mobile IP Goals, assumptions and requirements. | 7 M |
| | b) | Explain the optimized mobile IP protocol four additional messages. | 7 M |
| | | **(OR)** | |
| 8. | a) | Discuss in detail basic Dynamic host configuration protocol(DHCP) | 7 M |
| | b) | Explain in detail mobile IP Tunnelling and encapsulation. | 7 M |

## UNIT-V

| | | | |
|---|---|---|---|
| 9. | a) | Explain Indirect TCP (ITCP) with advantages and disadvantages? | 7 M |
| | b) | Write short notes on Selective retransmission Classical TCP. | 7 M |
| | | **(OR)** | |
| 10. | a) | What is a MANET? Explain the properties of a MANET. | 7 M |
| | b) | Describe and discuss different spectrum of MANET applications | 7 M |

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# AR18

## ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
### (AUTONOMOUS)
### IV B.Tech I Semester Supplementary Examinations, October, 2023
### REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEM
### (CIVIL ENGINEERING)

**Time: 3 Hours**                                                **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

### UNIT-I

| | | | |
|---|---|---|---|
| 1. | a) | Define EMR and Draw a neat sketch depicting the EMR with their wavelength and applications | 6M |
| | b) | Briefly describe about the interaction of EMR with atmosphere | 6M |

**(OR)**

| | | | |
|---|---|---|---|
| 2. | a) | Define remote sensing and its significance with suitable examples | 6M |
| | b) | Discuss the principle of remote sensing with a neat sketches | 6M |

### UNIT-II

| | | | |
|---|---|---|---|
| 3. | a) | Define Resolution and mention all the types of resolution with examples | 6M |
| | b) | Briefly describe characteristics of Image data | 6M |

**(OR)**

| | | | |
|---|---|---|---|
| 4. | a) | Briefly describe about the band interleaved by pixel and band interleaved by line | 6M |
| | b) | What is the phenomenon of band sequential? Explain it with a neat sketch | 6M |

### UNIT-III

| | | | |
|---|---|---|---|
| 5. | a) | Define Image analysis and mention the elements of visual interpretations | 6M |
| | b) | Define Digital image processing and mention its importance in classifying images | 6M |

**(OR)**

| | | | |
|---|---|---|---|
| 6. | a) | What is the concept of Image in remote sensing and mention the importance | 6M |
| | b) | What is Image classification and mention its role in remote sensing | 6M |

### UNIT-IV

| | | | |
|---|---|---|---|
| 7. | a) | Define map projections and describe their types | 6M |
| | b) | Differentiate between vector data and raster data | 6M |

**(OR)**

| | | | |
|---|---|---|---|
| 8. | a) | Define GIS and briefly describe its components with neat sketch | 6M |
| | b) | Briefly describe about the Spatial and Non Spatial data in remote sensing | 6M |

### UNIT-V

| | | | |
|---|---|---|---|
| 9. | a) | Mention the various operators that are used in spatial data analysis | 6M |
| | b) | What is an overlay and mention its importance in remote sensing | 6M |

**(OR)**

| | | | |
|---|---|---|---|
| 10. | a) | Define flood zone delineation with a suitable example | 6M |
| | b) | Briefly describe about the applications of GIS in agriculture and forestry | 6M |

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# AR18(RA)

**CODE:** 18CSE442                                                   **SET-1**

## ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
### (AUTONOMOUS)
### IV B.Tech I Semester Regular(RA)/Supplementary Examinations, October, 2023

**Internet of Things**
**(COMPUTER SCIENCE AND ENGINEERING)**

Time: 3 Hours                                                   Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

### UNIT-I

| | | | |
|---|---|---|---|
| 1. | a) | What is the role of things and Internet in IOT? | 6M |
| | b) | IoT plays an important role in green house control and help in improving productivity. Justify | 6M |

**(OR)**

| | | | |
|---|---|---|---|
| 2. | a) | What is the function of communication functional block in IOT systems? | 6M |
| | b) | What type of analysis is required for forest fire detecting from the data collected? | 6M |

### UNIT-II

| | | | |
|---|---|---|---|
| 3. | | Illustrate conventional network architecture & SDN architecture in detail. | 12M |

**(OR)**

| | | | |
|---|---|---|---|
| 4. | a) | Show how to manage an IoT device using the Netopeer tools. | 6M |
| | b) | What is the function of data model manager. | 6M |

### UNIT-III

| | | | |
|---|---|---|---|
| 5. | a) | Show the domain model for weather reporting system. | 6M |
| | b) | Describe a use case of Python dictionary. | 6M |

**(OR)**

| | | | |
|---|---|---|---|
| 6. | a) | What are the various service types? | 6M |
| | b) | Show an example of a Twitter tweet object encoded as JSON. | 6M |

### UNIT-IV

| | | | |
|---|---|---|---|
| 7. | a) | Show how to turn the LED on/off from command line.(Raspberry Pi console) | 6M |
| | b) | Illustrate sequence count Reducer in Python. | 6M |

**(OR)**

| | | | |
|---|---|---|---|
| 8. | a) | What is the use of SPI and 12C interfaces on Raspberry Pi? | 6M |
| | b) | Show the commands to setup SkyNet on a Linux machine. | 6M |

### UNIT-V

| | | | |
|---|---|---|---|
| 9. | | Describe a concrete implementation of smart parking IoT system. | 12M |

**(OR)**

| | | | |
|---|---|---|---|
| 10. | a) | Show the deployment design of forest fire detection system | 6M |
| | b) | Discuss the various steps for IoT devices management with NETCONF-YANG. | 6M |

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# AR18(RA)

**CODE:** 18ECE432                                      **SET-1**

## ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
### (AUTONOMOUS)
**IV B.Tech I Semester Regular(RA)/Supplementary Examinations, October,2023**
**EMBEDDED AND REAL TIME OPERATING SYSTEMS**
**(ELECTRONICS AND COMMUNICATION ENGINEERING)**

Time: 3 Hours                                          Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

### UNIT-I

1. a) Discuss the trade-offs between optimizing for performance, power consumption, and cost in embedded system design. — 6M
   b) Provide examples of specific applications where microcontrollers and digital signal processors (DSPs) excel as ASIPs. — 6M

**(OR)**

2. a) Compare and contrast single-purpose processors with general-purpose processors in terms of their suitability for different applications. — 6M
   b) Discuss the advantages and disadvantages of using ASIPs compared to custom single-purpose processors in embedded systems. — 6M

### UNIT-II

3. a) Provide examples of scenarios where PSM is a preferred modelling approach. — 6M
   b) Compare and contrast the concurrent process model with the state machine model. — 6M

**(OR)**

4. a) Describe the Finite State Machine with Data Path (FSMD) model and its components. — 6M
   b) Evaluate different inter-process communication mechanisms in the context of concurrent processes. — 6M

### UNIT-III

5. a) Evaluate the role of Ethernet in enabling networked communication among embedded systems. What are the key components of an Ethernet-based network? — 6M
   b) Investigate the key differences between RS422 and RS485 communication standards. In what scenarios is one preferred over the other? — 6M

**(OR)**

6. a) Explain about Bluetooth interface. — 6M
   b) Explain about USB communication interface. — 6M

### UNIT-IV

7. a) Explain about the interrupt routine rules used in RTOS environment — 6M
   b) What is meant by a pipe? How does a pipe differ from a queue? — 6M

**(OR)**

8. a) Explain about Semaphores in contest of ERTS. — 6M
   b) Explain the architecture of Kernel. — 6M

### UNIT-V

9. a) Describe the challenges associated with memory management in embedded systems. How does it differ from memory management in traditional desktop operating systems? — 6M
   b) Define the priority inversion problem in the context of real-time systems. How can it affect system behaviour and response times? — 6M

**(OR)**

10. a) Explain about Priority Inheritance protocol. — 6M
    b) Explain about RT-Linux operating system. — 6M

1 of 1
***

**CODE:** 18EET417 <div align="right">**SET-1**</div>

# ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
## (AUTONOMOUS)
### IV B.Tech I Semester Supplementary Examinations, October, 2023
## ELECTRICAL DISTRIBUTION SYSTEMS
### (ELECTRICAL AND ELECTRONICS ENGINEERING)

**Time: 3 Hours** **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

## UNIT-I

1.  a) Explain various types of the load and draw their characteristics — 6M
    b) Derive the relation between load factor and loss factor — 6M

**(OR)**

2.  a) With neat diagram explain the radial and loop type primary feeders, also list two differences between them. — 6M
    b) Assume that annual peak load input to a primary feeder is 2000 kW. The total copper loss at the time of peak load is 100 kW. The total annual energy supplied to the sending end of the feeder is $5.61*10^6$ kWh. Then,(i) find the annual loss factor (ii) Calculate the total annual copper loss energy and its value at ₹1.5 kWh. — 6M

## UNIT-II

3.  a) Explain the various factors to be considered to decide the ideal location of substation. — 6M
    b) Explain the rating of distribution substation for square shaped distribution service area. — 6M

**(OR)**

4.  Analyse a substation service area with 'n' primary feeders — 12M

## UNIT-III

5.  a) Derive the expressions for voltage drop and power loss in non-uniformly distributed load — 6M
    b) Show the power loss due to load currents in the conductors of the two phase, three phase lateral with multi grounded neutral is approximately 1.64 times larger than the one in the equivalent three phase lateral — 6M

**(OR)**

6.  a) Show the power loss due to load currents in the conductors of the single phase two wire ungrounded neutral, with full capacity neutral is 6 times larger than the one in the equivalent three phase four wire lateral — 6M
    b) A 1-$\phi$ feeder circuit has total impedance (1+j3) ohms, receiving end voltage is 11 kV and current is $50\angle 30^0$ A. Determine i) Power factor of load. ii) Load power factor for which the drop is maximum — 6M

## UNIT-IV

7.  a) Illustrate the Principle of Operation of Fuses. — 6M
    b) Explain the principle of operation of the circuit breakers. — 6M

**(OR)**

8.  a) Explain fuse to Recloser coordination — 6M
    b) Explain fuse to circuit breaker coordination — 6M

## UNIT-V

9.  a) Explain shunt capacitor compensation. — 6M
    b) Explain any four disadvantages of low power factor. — 6M

**(OR)**

10. a) Explain series capacitor compensation. — 6M
    b) 3-phase, 500 H.P, 50Hz, 11kV star connected induction motor has a full load efficiency of 85% at lagging p.f of 0.75 and is connected to a feeder. If it is desired to correct the p.f. of 0.9 lagging load, determine (i) The size of the capacitor (ii)The capacitors of each unit if they are connected in delta — 6M

# AR18(RA)

**CODE: 18MEE431**                                  **SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**
**(AUTONOMOUS)**
**IV B.Tech I Semester Regular(RA)/Supplementary Examinations, October,2023**
**REFRIGERATION AND AIR CONDITIONING**
**(MECHANICAL ENGINEERING)**

**Time: 3 Hours**                                             **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

## UNIT-I

1. a) Write in detail about refrigeration needs of an aircraft.    5 M
   b) An air refrigerating machine maintains -12°C in refrigerator. The cold air is drawn    7 M
   by the compressor at 1.25 bar and compressed isentropically to 5.21 bar and then
   cooled to 29°C at that pressure. The air is then expanded to the original pressure
   and admitted subsequently to cold chamber. If the air flow through the system is
   780 kg/hr, Calculate
   i) Cooling capacity of the system in TOR
   ii) Power required to run the machine
   iii) COP of the system

**(OR)**

2. a) Illustrate Boot strap Air craft – Refrigeration system with neat sketch.    6 M
   b) An air refrigeration system working on Bell-Coleman cycle takes air into    6 M
   compressor at 1 bar and 268 K. It is compressed to 5 bar and cooled to 298K at the
   same pressure. It is further expanded in the expander to 1 bar and discharged to
   take cooling load. The isentropic efficiencies of the compressor and expander are
   80 % and 85 % respectively. Calculate
   i) Refrigeration Capacity of the system if the air circulated is 40Kg/min.
   ii) HP required to run the compressor. iii) COP of the system.

## UNIT-II

3. a) Explain the different method of improving the COP of simple compression    6 M
   refrigeration cycle.
   b) A vapour compression refrigerator uses R-12 as refrigerant and the liquid evaporates    6 M
   in the evaporator at -15°C. The temperature of this refrigerant at the delivery from the
   compressor is 15°C when the vapour is condensed at 10°C. Find the coefficient of
   performance if
   i) there is no under cooling ii) the liquid is cooled by 5°C before expansion by
   throttling. Take specific heat at constant pressure for the superheated vapour as
   0.64KJ/Kg K and that for liquid as 0.94 KJ/ Kg K.

**(OR)**

4. a) With necessary sketches and p-h & T-s diagrams explain working principle of    6 M
   vapour compression refrigeration system and find its COP.
   b) A vapour compression refrigerator works between the pressure limits of 60 bar and    6 M
   25 bar. The working fluid is just dry at the end of the compression and there is no
   under cooling of the liquid before the expansion valve. Determine: i. C O P of the
   cycle and ii. Capacity of the refrigerator if the fluid flow is at the rate of 5 kg/min.

| Data: P(bar) | T(k) | Enthalpy(kj/kg) | | Entropy(kj/kg.k) | |
|---|---|---|---|---|---|
| | | Liquid | Vapour | Liquid | vapour |
| 60 | 295 | 151.96 | 293.29 | 0.554 | 1.0332 |
| 25 | 261 | 56.32 | 322.58 | 0.226 | 1.2464 |

## UNIT-III

5. a) Describe the working principle of an Libr-$H_2O$ vapour absorption refrigeration system with a neat diagram.     7 M

   b) Derive the expression for COP of the Vapour absorption system.     5 M

**(OR)**

6. a) With aid of a neat line diagram showing all the component units, explain the working of three fluid vapour absorption system     7 M

   b) Differentiate between vapour compression and absorption Refrigeration systems.     5 M

## UNIT-IV

7. Explain the working principle of vortex tube with a neat sketch. List its merits and demerits     12 M

**(OR)**

8. Explain thermo-electric refrigeration. Specify advantages, disadvantages and applications     12 M

## UNIT-V

9. a) Explain the following i) Degree of saturation ii) Relative humidity iii) Dew point temperature     3 M

   b) 120 kg of moist air at $32^{\circ}$C DBT and $21^{\circ}$C DPT mixes adiabatically with 29 kg of moist air at $44^{\circ}$C DBT and 30% R.H. Determine
   i) Specific humidity of mixed stream  ii) Temperature of the mixture
   iii) Enthalpy of mixture     9 M

**(OR)**

10. a) Explain the process of Heating and dehumidification     6 M

    b) Air is cooled from 39°C DBT and 29% RH to 24° C at the rate of 5 m3/s. Calculate the capacity of the cooling coil if the surface of the coil is 20° C. Also, calculate bypass factor     6 M