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CODE: 13CE4024   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Regular & Supplementary Examinations, November-2018

ENVIRONMENTAL ENGINEERING
(Civil Engineering)

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

PART-A
ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1.
   a) Give example for a waterborne disease caused by a (i) Bacterium, (ii) Protozoan and the scientific name of the causing organism.
   b) State any two formulae for computing Fire Demand of water and name each term in the formula.
   c) Distinguish between 'Coagulation' and 'Flocculation'. Give an example for chemicals used in clarification of water using coagulation.
   d) Differentiate between 'Discrete' particles and 'Flocculent' particles of sedimentation.
   e) What is a 'Stand Pipe'? What purpose does it serve in a water supply system.
   f) What is the deference between conservancy and water garage system.
   g) Summarise the 'Rational' method for estimation of storm water runoff.
   h) Sketch an 'Imhoff Cone' and describe its function in the examination of sewage.
   i) Sketch the cross-section of an oil and grease trap and label its parts.
   j) Name the three stages in anaerobic digestion of sludge.

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2.
   a) What are the ten factors that affect the per capita demand for potable water in a serviced area? Which of them vary over the course of a year/   **[6 M]**
   b) Calculate the Fire Demand for a town of 1 million population using 'Kuichling's Formula. Explain the terms in the formula.   **[6 M]**

(OR)

3.
   a) The census record of town is shown in table below. Estimate the population for the year 2020 by decreasing growth rate method.   **[6 M]**

S.No.	Year	Population	% increase growth rate	Decrease in growth rate.
1	1960	55,500		
2	1970	63,700	14.77	+ 2.84 %
3	1980	71,300	11.93	+ 0.43%
4	1990	79,500	11.50	

   b) Draw neat sketches of (i) wet (ii) dry river raw water intakes. Explain their functioning and state the key difference between the two.   **[6 M]**

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UNIT-II

4. a) A water works has to purify the water for a town whose daily demand is 9 MLD. Design a suitable sedimentation tank. Assume the velocity of flow in the sedimentation tank as 22cm/min and detention period as 8 hours. **[6 M]**

   b) Explain how (i) dosage (ii) pH (iii) Temperature (iv) Mixing (v) Detention Time and (vi) Turbidity of raw water affect coagulation. State the optimum condition for each of the above for effective coagulation followed by flocculation. **[6 M]**

(OR)

5. a) State and explain any 6 troubles encountered in the operation of gravity filters. **[6 M]**

   b) Explain forms of chlorination which are used in disinfection of water. Briefly explain their reaction when dissolved in water. **[6 M]**

UNIT-III

6. a) With neat sketches, explain the 'Ring' Layout and 'Radial' Layout for the network of potable water distribution. State their respective merits and demerits. **[6 M]**

   b) Explain the 'Continuous' and 'Intermittent' system of water supply. Explain any 6 drawbacks of intermittent water supply. Which system is adopted in our country? Why? **[6 M]**

(OR)

7. Summarise the Equivalent Pipe method for analysis of complex water distribution pipe networks. **[12 M]**

UNIT-IV

8. List any 6 categories of contaminants found in wastewater, suggest probable sources of origin (type of human activity) and their Environmental Significance. **[12 M]**

(OR)

9. Explain three methods for the disposal of sewage on land, their applicability and limitations with neat illustrative sketches. **[12 M]**

UNIT-V

10. a) With the help of a neat sketch, describe a 'trickling filters'. (used in sewage treatment). Explain the working principle and what treatment objective is achieved by its operation. **[6 M]**

    b) What is surface loading rate of a sedimentation tank? How does it relate to settling of particles in a Sedimentation Tank? **[6 M]**

(OR)

11. Explain the working principle of a Septic Tank with a neat sketch and explain three methods of disposal of the Septic Tank effluent. **[12 M]**

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PART-A

ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) What is called continuous and discontinuous conduction?
   b) What are the three intervals present in discontinuous conduction mode of single phase full controlled rectifier?
   c) Define four quadrant operations.
   d) Define equivalent current method?
   e) What are the advantages in operating choppers at high frequency?
   f) Why self commutated devices are preferred over thyristors for chopper circuits?
   g) What are the advantages of stator voltage control method?
   h) What is meant by frequency control of induction motor?
   i) What is slip controlled drive?
   j) Which synchronous machine is said to be self controlled?

PART-B

Answer one question from each unit   [5x12=60M]

UNIT-I

2. Explain the operation of single phase half controlled rectifier control of dc series motor for continuous mode of operations with aid of diagrams and waveforms. Also obtain the expression for motor terminal voltage and speed.   **12M**

(OR)

3. a) Explain the operation of Three phase Full controlled rectifier control of dc separately excited for continuous mode of operations with aid of diagrams and waveforms. Also obtain the expression for motor terminal voltage and speed.   **12M**

UNIT-II

4. a) Describe the relative merits and demerits of the following types of braking for dc motors: mechanical braking, dynamic braking and regenerative braking with neat diagram.   **6M**

b) A 220V, 200A, 800 rpm dc separately excited motor has an armature resistance of 0.05 ohm. The motor armature is fed from a variable voltage source with an internal resistance of 0.03 ohm. Calculate internal voltage of the variable voltage source when the motor is operating in regenerative braking at 80% of the rated motor torque and 600 rpm. — 6M

(OR)

5. Explain in detail the operation of closed loop control DC drive using suitable block diagram. — 12M

UNIT-III

6. a) Explain With relevant circuit and waveforms, motoring control of DC chopper fed series motor drive. — 6M

b) A 230 V, 960 rpm and 200 A separately excited dc motor has an armature resistance of 0.02W. The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230 V. Assuming continuous conduction calculate the duty cycle ratio of chopper for motoring operations at 350 rpm. — 6M

(OR)

7. Explain the four quadrant operation of chopper fed dc separately excited motor with aid of diagrams and waveforms. — 12M

UNIT-IV

8. a) Explain how three phase induction motor control by stator frequency? — 6M

b) A three-phase, 440 V, 1000 rpm slip ring induction motor is operating with 4 % slip. Stator current is 30 A. Determine the stator current if the speed of the motor is reduced to 500 rpm using stator voltage control method. — 6M

(OR)

9. a) Explain the operation of CSI fed three phase induction motor drive. — 6M

b) An inverter feeds a 4-pole 3-phase squirrel cage induction motor rated for 400 V, 50 Hz supply. Determine the approximate output required for the inverter for the motor speeds of (i) 900 rpm (ii) 1800 rpm. — 6M

UNIT-V

10 Explain the closed loop operation of Static Kramer Drive and write the applications. — 12M

(OR)

11. a) Explain the closed loop operation of synchronous motor drive. — 6M

b) Explain the applications and advantages of closed loop synchronous motor? — 6M

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CODE: 13ME4026   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Regular & Supplementary Examinations, November-2018

REFRIGERATION AND AIR CONDITIONING
(Mechanical Engineering)

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

PART-A
ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1.
   a) What is the difference between refrigerator and heat pump?
   b) What is the difference between Gas cycle and Vapour cycle?
   c) A machine working on a carnot cycle operates between 305K and 260K. Determine COP when it operated as heat engine.
   d) What is the difference between wet compression and dry Compression?
   e) Give the chemical formula for the refrigerant R-114.
   f) What is the basic function of a compressor in a VCR system? How this function is achieved in VAR system?
   g) What is Seebeck effect?
   h) Give the advantages of pulse tube refrigeration system.
   i) Define room sensible heat factor.
   j) Why ducts are used in an air conditioning system?

PART-B
Answer one question from each unit   **[5x12=60M]**

UNIT-I
2.
   a) What is the necessity of cooling the aeroplane? Explain major heat sources.   5M
   b) A dense air refrigerator cycle operates between pressures of 4 bar and 16 bar. The air temperature after heat rejection to surroundings is 37^0C and air temperature at exit of refrigerator is 7^0C. The isentropic efficiency of turbine and compressor are 0.85 and 0.8 respectively. Determine   7M

      i) compressor and turbine work per TR;

      ii) C.O.P and power per TR Take $\gamma=1.4$ and $c_p=1.005$kJ/kg.

(OR)

3.
   a) With the help of P-v and T-s diagrams, explain the working of Bell-Coleman Cycle.   6M
   b) Describe with a diagram the reduced ambient air refrigeration cooling system.   6M

UNIT-II
4.
   a) Explain the function of various components of vapour compression refrigeration system and represent the cycle on T-s and p-h diagrams. Assume that the refrigerant is in wet condition at entry to the compressor and sub cooled before expansion.   6M
   b) Write short note on (a) Need of alternatives to CFC refrigerants (b) Classification of commercial refrigerants (c) primary versus secondary refrigerants.   6M

(OR)

5.
   a) Establish how an actual cycle differs from a theoretical vapour compression refrigeration cycle.   6M
   b) What is sub-cooling and superheating? Explain with the help of diagram. Why is superheating considered to be good in certain cases?   6M

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UNIT-III

6. a) Draw a neat diagram of 'Electrolux refrigerator' and explain its working principle. What is the important role of hydrogen in the refrigeration system? Give its advantages and disadvantages. **6M**

    b) What is the function of the following components in an absorption system: **6M**
        i) Absorber   (ii) Rectifier   (iii) Analyser and   (iv) Heat exchangers?

(OR)

7. a) Draw a neat diagram of Lithium Bromide - Water absorption system and explain its working. **6M**

    b) In an absorption type refrigerator, the heat is supplied to NH_3 generator by condensing steam at 3 bar and 85% dry. The temperature in the refrigerator is to be maintained at -10^0C. Find the Maximum COP possible. If the refrigeration load is 10 tonnes and actual COP is 40% 0f maximum COP. find the mass of steam required per hour. Take temperature of the atmosphere as 30^0C. At 3 bar Saturation temperature of steam is 143.8^0 C. and h_{fg}=2133.24kJ/kg. **6M**

UNIT-IV

8. a) Explain the working principle of thermoelectric refrigeration system. Give its advantages and disadvantages. **6M**

    b) With the help of neat sketch explain the working principle of vortex tube. **6M**

(OR)

9. a) What are the advantages of vortex-tube over other refrigeration systems? List out the field of its applications. **6M**

    b) List out the merits and demerits of thermoelectric refrigeration system over other refrigeration system? What are the major fields of its applications? **6M**

UNIT-V

10. a) What is effective temperature? How does it account for human comfort? What is comfort equation? **5M**

     b) 500m^3/min of fresh air at 30^0C DBT and 50% RH is adiabatically mixed with 1000m^3/min of recirculated air at 22^0C DBT and 10^0C DPT. Calculate the enthalpy, specific volume, humidity ratio, and final DBT of the mixture. **7M**

(OR)

11. a) Show the following processes on the skeleton psychrometric chart: **5M**
         (a) Heating and Dehumidification
         (b) Cooling with adiabatic Humidification

     b) The following data refer to air conditioning of a public hall: **7M**
         Outdoor conditions =40^0 C DBT,20^0 C WBT
         Required comfort conditions= 20^0C DBT ,50%RH
         Seating capacity of hall = 1000
         Amount of outdoor air supplied=0.3m^3/min/person
         If the required conditions is achieved first by adiabatic humidifying and then cooling, find: (i) The capacity of the cooling and surface temperature of the coil if the BPF is 0.25 (ii) The capacity of humidifier and its efficiency.

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CODE: 13EC4027   SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Regular & Supplementary Examinations, November-2018
DIGITAL IMAGE PROCESSING
(Electronics & Communication Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) What is meant by pixel?
    b) Define Digital image?
    c) What is the need for transform?
    d) Explain separability property in 2D fourier transform
    e) What is a Median filter?
    f) What is meant by masking?
    g) How a degradation process is modeled?
    h) What is inverse filtering?
    i) What is JPEG?
    j) Why edge detection is most common approach for detecting discontinuities?

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2. a) Explain various functional block of digital image processing   6M
    b) Describe the elements of visual perception with suitable diagram   6M

(OR)

3. a) Describe how the image is digitized by sampling and quantization   5M
    b) Consider the two image subsets, S_1 and S_2, shown in the following figure. For $V = \{1\}$, determine whether these subsets are (a) 4-adjaacent, (b) 8-adjacent or (c) m-adjacent.   7M
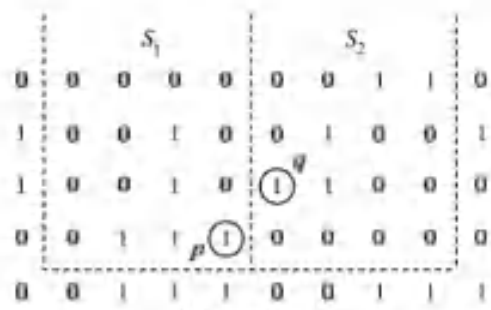
UNIT-II

4. a) Explain Fast Fourier Transform (FFT) in detail.   6M
   b) Explain the basic principle of Hotelling transform.   6M

(OR)

5. a) Explain about Haar transform and What are the properties of   6M
      Haar transform.
   b) Write a short notes on Hadamard transform.   6M

UNIT-III

6. a) What is histogram? Explain histogram equalization.   6M
   b) Discuss the image smoothing filter with its model in the   6M
      spatial domain

(OR)

7. a) Explain the types of gray level transformation used for image   8M
      enhancement.
   b) How are image subtraction and image averaging is used to   4M
      enhance the image?

UNIT-IV

8. a) What is the use of least mean square filter in image   7M
      restoration. Explain.
   b) Write in detail about the RGB colour model.   5M

(OR)

9. a) What are the two approaches for blind image restoration?   6M
      Explain in detail.
   b) Explain the method of Constrained Least Squares Filtering   6M
      for image restoration

UNIT-V

10. a) Explain about fidelity criterion   6M
    b) What is thresholding? Explain about global thresholding   6M

(OR)

11. a) Explain a method of generating variable length codes with   6M
       an example
    b) Explain about the Global processing via graph-theoretic   6M
       techniques for edge linking

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Regular & Supplementary Examinations, November-2018
UML AND DESIGNS PATTERNS
(Computer Science & Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) What are kinds of building blocks in UML?
    b) Define Aggregation.
    c) What is the difference between dependency and generalization?
    d) Define package.
    e) Define state and state transitions.
    f) What is the purpose of Deployment diagram?
    g) What is a 'PATTERN'?
    h) Define Inheritance.
    i) Define chain of responsibility.
    j) Define null object.

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2. a) What are the application areas of UML? Give any five?
    b) Explain about four standard stereo types that are applied to
        classes in UML in detail.

(OR)

3. a) Explain about class diagrams with example.
    b) Explain the following
        i) Inheritance ii) Visibility

UNIT-II

4. a) Write about the Common Modeling Techniques of Collaboration diagram.
   b) Explain about the various kinds of messages.

(OR)

5. Draw and explain interaction diagram and use case diagram for Bank ATM application

UNIT-III

6. a) Explain about Modeling the Lifetime of an Object
   b) Explain about Multiple Flows of Control.

(OR)

7. a) Write about the uses of component diagram.
   b) Write short note on common modelling techniques of deployment diagram.

UNIT-IV

8. a) Why design patterns are useful and explain about elements of design patterns?
   b) List out the categories of design patterns? Write short note on any two.

(OR)

9. a) Explain about the template of design pattern.
   b) Write the step-by-step approach to apply a design pattern effectively.

UNIT-V

10. The following are under which design pattern? Explain them
    (a)Abstract factory   b)Builder

(OR)

11. a) Briefly explain about any two structural patterns.
    b) Explain about chain of responsibility.

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Regular & Supplementary Examinations, November-2018
UNIX PROGRAMMING
(Information Technology)

Time: 3 hours   Max.Marks:70

PART –A

Answer All Questions   [10X1 =10M]

1. a. Define Kernel.
    b. Write about file system blocks.
    c. Define mount & umount
    d. List any two filters which are using regular expressions.
    e. What are different operators in shell programming?
    f. Give any few shell commands.
    g. Define open function.
    h. What are stream errors?
    i. Define fork & vfork.
    j. Define unidirectional pipe.

PART – B

Answer One Question from Each Unit   [5X12 =60M]
UNIT -1
2. a. Explain file handling utilities in UNIX.   4M
    b. Discuss the following commands   8M
          i) arp   ii) egrep   iii) comm   iv) tar
       (OR)
3. a. Discuss process utilities and disk utilities in UNIX.   6M
    b. Discuss Networking commands in UNIX.   6M
UNIT – II
4. Explain shell responsibilities, shell meta characters and shell variables in detail   12M
       (OR)
5. Explain pipes, input redirection & output redirection with example.   12M
UNIT – III
6. a. Discuss UNIX file structure and directories. `   6M
    b. Explain stat() and fstat() system calls with example.   6M
       (OR)
7. a. Explain in detail about the library functions in UNIX.   6M
    b. Explain about file access usage of open, read, lseek functions.   6M
UNIT – IV
8. a. What is a process? Explain the process structure. Write the procedure to start a new
       process.   7M
    b. Explain Zombie process.   5M
       (OR)
9. a. Explain in detail kill and raise functions.   5M
    b. Explain about signal functions.   7M
UNIT – V
10. a. What is a semaphore? How it is used in interprocess communication? 7M
    b. Give some applications of IPC.   5M
       (OR)
11. a. Define pipe. Explain process pipes and named pipes.   8M
    b. Write short notes on message queues.   4M

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