# AR13

**CODE: 13CE4024** **SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**

**(AUTONOMOUS)**

**IV B.Tech I Semester Supplementary Examinations, March-2017**

**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) Virus, (ii) Helminth and the scientific name of the causing organism.
   b) What is the basis (unit) for computing the water requirement in the following types of institutional buildings? (i) Hospital (ii) Restaurant (iii) Factory (iv) Cinema Hall
   c) When is 'Chlorination' recommended for disinfection of treated water for municipal water supply?
   d) Suggest two alternative methods of disinfection to Chlorination of water which is meant for human use and state their working principle.
   e) Sketch the cross-section of a check valve and state its function.
   f) Illustrate any 2 distribution systems for water supply with neat sketches.
   g) What is 'Conservancy' system of sanitation and what does 'night soil' mean?
   h) Explain what 'Sewage Sickness' means.
   i) What is a 'Barminutor'? How does it help in preliminary treatment of sewage?
   j) What are 'Psychoda' and what is their relevance to operating 'Trickling Filter'?

**PART-B**

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

**UNIT-I**

2. a) Explain MPN (Most Probable Number), CI (Coliform Index) and Membrane Filter Tests used for Bacteriological examination of water. **[6 M]**
   b) What are E-Coli? Are they harmful to human health? Why is their presence tested in waters to be supplied for human consumption? **[6 M]**

**(OR)**

3. a) What are the four forms of Nitrogen that could signal pollution of water by organic matter? What are the acceptable limits for these 4 forms? What form could lead to blue baby syndrome and how? **[6 M]**
   b) Sketch the cross-section of an infiltration gallery and explain its function. Also state the expression for the rate of flow under steady-state conditions explaining each term in the expression and its units. **[6 M]**

**UNIT-II**

4. a) What is the difference between an 'Unit Operation' and a 'Unit Process'? List 6 unit operations and give an example for each from water treatment. Explain any one example in brief. **[6 M]**
   b) A settling tank is designed for an overflow rate of 4000 litres / sq.m./hr. What percentage of particles of diameter (i) 0.05 mm (ii) 0.02 mm will be removed in this tank at $22^0$ C? State your assumptions clearly. **[6 M]**

**(OR)**

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5. a) Draw neat sketches of cross-sections of slow sand filter and rapid sand filter. Compare them on at least 4 design and 4 operational aspects. **[6 M]**
   b) Name three methods for disinfection of potable water. Explain under what circumstances you would recommend their application. **[6 M]**

**UNIT-III**

6. a) Explain Balancing Storage, Breakdown Storage and Fire Storage of a water supply service reservoir. How are their volumes decided in the design of a distribution system? **[6 M]**
   b) Give an example each for (i) Linear valve (ii) Rotary valve (iii) Special function valve. Explain their working with a sketch and application in water supply distribution system. **[6 M]**

**(OR)**

**7.** Summarise the Hardy-Cross method for analysis of complex pipe networks. **[12 M]**

**UNIT-IV**

8. Give three examples each for (i) Kinetic Energy Pump (ii) Positive Displacement Pump and comment on their use for wastewater pumping. **[12 M]**

**(OR)**

9. a) List any three commonly used sewer shapes (cross-sections). Explain with sketches, the hydraulic properties in relation to conveyance of sewage and storm water. **[6 M]**
   b) Name any 3 commonly used materials for the construction / fabrication of sewers. Explain their merits and demerits. What is crown corrosion in sewers? Which material (used in making sewers) is resistant to crown corrosion? **[6 M]**

**UNIT-V**

10. a) With the help of a neat sketch describe a 'Bar Screen'.(used in sewage treatment). Explain the working principle and what treatment objective is achieved. **[6 M]**
    b) A treatment unit is 1.5m wide, 20 m long and has a wastewater depth of 2.0 m in it. If the wastewater flow through the tank is 0.5 $m^3/s$, what is the detention time? **[6 M]**

**(OR)**

11. What is attached growth process in biological treatment of sewage? Explain with a neat sketch, the application of this system in a operating a Conventional Trickling Filter. What kind of wastes can be treated? **[12 M]**



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# AR13

**CODE: 13EE4022** **SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**

**(AUTONOMOUS)**

**IV B.Tech I Semester Supplementary Examinations, March-2017**

**POWER SEMI CONDUCTOR DRIVES**

**(Electrical & Electronics Engineering)**

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

## PART-A

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

1. a) State essential parts of electric drives.
   b) Write a brief note on the motors employed in variable speed drives.
   c) What is braking?
   d) What is plugging?
   e) What is dynamic braking in choppers?
   f) What is time ratio control?
   g) What are the applications of slip ring induction motor?
   h) Write torque equation of an induction motor.
   i) What are the advantages of Kramer system?
   j) What are the applications of static scherbius drive?

## PART-B

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

### UNIT-I

2. a) What are the assumptions made while doing the steady-state performance of the converter fed DC drives? Justify your answer
   b) Draw the power circuit diagram and explain the operation of a three phase full converter fed separately excited dc motor.

**(OR)**

3. a) Describe the operation of single phase semi controlled rectifier control of DC separately excited motor and obtain the expression for motor speed for continuous mode of operation
   b) Explain the operation of three phase full controlled rectifier fed dc series motor drives

### UNIT-II

4. a) What is a dual converter? Explain the principle of operation of a dual converter in a circulating current mode. How the same is used for speed control of DC drive
   b) Draw the circuit diagram and explain the operation of closed loop speed control with inner-current loop and field weakening.

**(OR)**

5. a) What is 4-quadrent operation and explain with converters.
   b) Distinguish between circulating current and non-circulating current mode of operation.

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### UNIT-III

6. a) Discuss with the suitable diagrams I quadrant and II quadrant choppers.
   b) List the advantages offered by DC chopper drives over line commutated converter controlled DC drives.

**(OR)**

**7.** a) Explain the different types of control strategies of DC chopper.
   b) Explain regenerative braking and dynamic braking of separately excited DC motor by chopper control.

### UNIT-IV

8. a) Why stator voltage control is an inefficient method of induction motor speed control
   b) Explain in detail the speed control scheme for a three phase induction motor using PWM inverter.

**(OR)**

9. a) What are different methods of speed control of induction motors.
   b) Sketch the mechanical characteristics of a three phase induction motor with V/f method.

### UNIT-V

10. a) Draw and explain closed loop operation for a static Kramer controlled drive.
    b) How is the output voltage of a VSI improved by PWM techniques? Explain how this converter is used for speed control of a synchronous motor.

**(OR)**

11. a) What are the disadvantages of static rotor resistance control
    b) Explain how three phase synchronous motor fed by a three phase inverter can be made to behave like a simple DC motor?



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# AR13

**CODE: 13ME4026** **SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**

**(AUTONOMOUS)**

**IV B.Tech I Semester Supplementary Examinations, March-2017**

**REFRIGERATION AND AIR CONDITIONING**

**(Mechanical Engineering)**

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

## PART-A

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

1. a) Why refrigeration is required in Air crafts?
   b) What is the difference between Gas cycle and Vapour cycle?
   c) Explain the term "tonne of refrigeration"
   d) What is purpose of expansion valve in vapour compression system?
   e) What are the possible ways to increase COP of compression system?
   f) What is Seeback effect?
   g) What is Apparatus Dew Point (ADP)?
   h) Define degree of saturation
   i) Define relative humidity
   j) What is cooling load?

## PART-B

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

### UNIT-I

2. a. Give a brief description of an ideal cycle of air refrigeration. [3M]
   b. For the cock-pit of an aircraft 10 tons of refrigeration is required. The compressed air is available at 4 bar and $37^0$C. Assuming the cooling turbine efficiency is at 80% and the air leaving the chamber is at $27^0$C, calculate the mass of air required for the refrigeration system. The cock pit is maintained at 1 bar. [9M]

**(OR)**

3. a. Derive an expression for COP of a Bell-Coleman cycle plotting the same on a P-V diagram. [3M]
   b. In a Bell Coleman refrigerating machine, the air is drawn from the cold chamber at a pressure of 1.03 bar and temperature of $-10^0$C and compressed isentropically to 6.18 bar. The same is cooled to $25^0$C. It is then expanded in the expansion cylinder following the law $PV^{1.3} = C$ and discharged back to the cold chamber. Assume Cp = 1.004 kJ/kgK and $C_v$ = 0.717 kJ/kgK for the air throughout the cycle. Determine, [9M]
   (i) work input to the cycle per kg of air,
   (ii) refrigeration produced in the cold chamber,
   (iii) COP of the cycle.

## UNIT-II

4. a. Mention at least six desirable properties to be exhibited by the refrigerants meant for use in a vapor compression refrigeration system. [3M]

   b. A simple saturation cycle using F12 is designed for taking a load of 10 tons. The refrigerator and ambient temperatures are $-10^0$C and $30^0$C respectively. A minimum temperature difference of $5^0$C is required in evaporator and condenser for heat transfer. Find: [9M]
   (a) mass flow rate through the system
   (b) power required in kw.
   (c) cylinder dimensions assuming L/D = 1.2 for single cylinder, single acting compressor if it runs at 300 r.p.m. with volumetric efficiency = 0.9.

**(OR)**

**5.** a. State the effects of suction pressure and discharge pressure on performance of vapour compression system? [3M]

   b. A F22 vapour compression refrigerator has evaporator and condenser pressures of 2 bar and 10 bar, respectively. The liquid refrigerant leaves the condenser at $10^0$C, while the vapour refrigerant leaves the evaporator at $-10^0$C. The refrigerator is designed to produce 30 tonnes of frozen meat at $-10^0$C by taking it at $30^0$C in 15 hours. The freezing point of meat is $-3^0$C and its specific heats above and below freezing point are, respectively, 4.1868 and 2.0934 kJ/kg K, while the latent heat of fusion of meat is 335 kJ/kg. Calculate the power input and the COP of the refrigerator. If one were to operate the refrigerator on simple cycle that does not have under cooling and super heating, what would be the percentage changes in the power input and the COP? [9M]

## UNIT-III

6. a. Distinguish the difference between a vapour absorption system and a compression system. [6M]

   b. Sketch and explain the working of LiBr-$H_2O$ system. List the major field of applications of this system. [6M]

**(OR)**

**7.** a. Explain with the help of neat sketches the various components and their functions for a vapour absorption refrigeration system. [6M]

   b. Sketch and explain the working of NH3-$H_2O$ system. List the major field of applications of this system. [6M]

## UNIT-IV

8. a. What is Peltier effect? Discuss how the Peltier effect forms the basis of thermoelectric refrigeration. [6M]

   b. What are the advantages and limitations of vortex tube refrigeration system? [6M]

**(OR)**

9. a. Draw the block diagram of a thermoelectric refrigerator and indicate how different components of this cycle correspond to those of vapour compression cycle? [6M]

   b. With the aid of neat sketch describe the working principle of vortex tube refrigerator. [6M]

## UNIT-V

10. a. Explain, with relevant sketches, the psychrometric processes (i) Cooling with Dehumidification and (ii) Heating with Humidification. [3M]

    b. The following data refer to summer air conditioning of a restaurant: [9M]
    Inside design conditions = $25^0$C DBT and $19^0$C WBT, outside design conditions = $36^0$C DBT and $25^0$C WBT, sensible heat load = 130 MJ/h, latent heat load= 50 MJ/h, the outside air is supplied at the rate of 23 $m^3$/min directly into the room through ventilators and by infiltration. The outside air to be conditioned is passed through a cooling coil which has an apparatus dew point of $10^0$C and 58% of the total air is recirculated from the conditioned space and mixed with conditioned air after the cooling coil. Find:
    (a) condition of air after the cooling coil before mixing with recirculated air
    (b) condition of air entering the restaurant
    (c) mass of fresh air entering the cooling coil
    (d) by-pass factor of the cooling coil
    (e) total refrigeration load of the cooling coil.

**(OR)**

11. a. Explain by-pass factor for cooling coils. [3M]

    b. Air at $30^o$C DBT and 60% RH is passed over a cooling cum dehumidifying coil in a summer air-conditioning application. The volume flow rate of fresh air is given to be 250 $m^3$/min. The air leaves the coil at a DBT of $14^o$C. If the bypass factor of the coil is 0.1, calculate (i) apparatus dew point temperature of the coil, (ii) relative humidity of the conditioned air leaving the coil, (iii) capacity of the cooling coil in tons of refrigeration and (iv) sensible heat factor of the coil. [9M]



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# AR13

**Code No: 13EC4027** **SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**
**(AUTONOMOUS)**
**IV B.Tech I Semester Supplementary Examinations, March-2017**

**DIGITAL IMAGE PROCESSING**
**(Electronics & Communication Engineering)**

**Time: 3 hours** **Max.Marks:70**

**PART A**

**Answer all Questions** **[1 x 10 = 10M]**

1. a) Distinguish between Binary Image and gray scale image.
   b) Explain the types of neighborhoods.
   c) What is Gray Level Slicing?
   d) Give the filter response function which performs smoothing in frequency domain.
   e) Explain the relationship between compression ratio and relative data redundancy.
   f) What is Bit plane coding?
   g) What are approximate and detail coefficients of wavelet transform?
   h) List the Sobel masks for Edge Detection
   i) What is mean by Edge Linking?
   j) What is Image Sensing?

**PART – B**

**Answer one question from each unit** **[5 x 12 = 60 M]**

**UNIT I**

2. Explain the fundamental steps involved in DIP with its applications. [12M]

**(OR)**

3. Consider the image shown below

| | | | | |
|---|---|---|---|---|
| | 3 | 1 | 2 | 1 (q) |
| | 2 | 2 | 0 | 2 |
| | 1 | 2 | 1 | 1 |
| (p) | 1 | 0 | 1 | 2 |

   By explaining the Path, Adjacency and Connectivity. Compute D4, D8 and Dm distances for V={0,1} and V={1,2} [12M]

**UNIT II**

4. Define Image transform and explain Walsh & Hadamard Transform. [12M]

**(OR)**

5. a. Derive the convolution property of 2D FFT. [6M]
   b. Explain Discrete Cosine Transform. [6M]

**UNIT III**

6. Explain Histogram Equalization with an example. [12M]

**(OR)**

7. a. What is spatial filtering? Explain various spatial smoothing masks? [7M]
   b. Explain in detail spatial sharpening filters? [5M]

**UNIT IV**

8. a. Explain any constrained restoration method. [6M]
   b. Write about image degradation model. [6M]

**(OR)**

9. Explain in detail different colour models. [12M]

**UNIT V**

10. a. Explain in detail about detection of Discontinuities. [8M]
    b. Explain the methods of removing the redundancy. [4M]

**(OR)**

11. Explain the Hough Transform for Edge Linking. [12M]

# AR13

**CODE: 13CS4020** **SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**

**(AUTONOMOUS)**

**IV B.Tech I Semester Supplementary Examinations, March-2017**

**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 is Importance of Modelling?
   b) Define Aggregation and Composition?
   c) What are Derived Objects?
   d) Logical Vs Physical Design?
   e) How will you identify the attributes of a class?
   f) Explain Dynamic model?
   g) Define Guard condition?
   h) What is Design pattern?
   i) Define Abstract factory?
   j) Define Singleton?

## PART-B

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

### UNIT-I

2. (a) Explain briefly the basic features of object orientation? **6M**
   (b) Explain Software development life cycle process? **6M**

**(OR)**

3. (a) Define Relationship? Explain the four adornments that apply to an association and dependency? **6M**
   (b) Draw and Explain Object diagram that contain a three level hierarchy of objects? **6M**

### UNIT-II

4. (a) Explain the steps to model flow of control by time ordering? **6M**
   (b) Draw and explain a Sequence Diagram that specifies the flow of control involved in initiating a simple ,two- party phone call? **6M**

**(OR)**

5. (a) Draw and explain briefly a use case diagram that depicts the context of a credit card validation system? **6M**
   (b) Draw and explain the activity diagram for bank ATM system? **6M**

### UNIT-III

6. (a) Explain States and Events and discuss the preparation of state chart diagram? **6M**
   (b) Draw a state chart diagram using sequential sub states and concurrent sub states? **6M**

**(OR)**

**7.** (a) Explain the steps to model executables and source code using component diagrams? **6M**
   (b) Explain in detail about deployment diagram with an example? **6M**

# AR13

## CODE: 13CS4020 SET-1

### UNIT-IV

| | | | |
|---|---|---|---|
| 8. | (a) | List and explain the four essentials elements of pattern? | **6M** |
| | (b) | Describe the sections and their use in design patterns? | **6M** |
| | | **(OR)** | |
| 9. | (a) | Describe the different approaches to find the design pattern? | **6M** |
| | (b) | Explain the steps involved in applying design pattern effectively? | **6M** |

### UNIT-V

| | | | |
|---|---|---|---|
| 10. | (a) | Explain the useful techniques for implementing abstract factory pattern? | **6M** |
| | (b) | List out the benefits of singleton pattern? Explain the implementation issues considered when using singleton pattern? | **6M** |
| | | **(OR)** | |
| 11. | (a) | Explain briefly about bridge pattern? | **6M** |
| | (b) | Explain briefly about composite pattern? | **6M** |



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