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PART-A

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

1. a) Detention time adopted for plain sedimentation tank is
    b) Name of Rod-shaped bacteria is
    c) What is the use of valves in distribution system?
    d) Permissible limits for TDS for drinking water as per IS:10500-2012
    e) Define crown corrosion in waste water distribution system.
    f) Method of cleaning for slow sand filter is
    g) Trickling filter is an example for
    h) The purpose of providing a balancing reservoir in a water supply distribution system is
    i) The rate of filtration of pressure filters is
    j) Particles of size around 1μm are best removed by

PART-B

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

UNIT-I

2. a. Give brief note on Objectives of water supply.   6M
    b. Describe briefly Waterborne diseases.   6M

(OR)

3. a. Explain briefly drinking water standards.   6M
    b. Describe briefly estimation of water demand.   6M

UNIT-II

4. a. Give brief note on troubles in operation comparison of filters.   6M
    b. Describe briefly design of water treatment filters.   6M

(OR)

5. a. Discuss briefly theory of chlorination.   6M
    b. Describe briefly working of slow and rapid gravity filters.   6M

UNIT-III

6. a. Explain briefly Design procedures of water treatment units.   6M
    b. Describe briefly laying and testing of pipe lines.   6M

(OR)

7. a. Describe briefly about hardy-cross method and equivalent pipe method.   6M
    b. Explain briefly about different types of joints and valves present in distribution system   6M

UNIT-IV

8. a. Explain briefly estimation of sewage and storm water.   6M
    b. Describe briefly characteristics of sewage.   6M

(OR)

9. a. Discuss briefly decomposition of sewage.   6M
    b. Give brief note on cycles of decay.   6M

UNIT-V

10. Explain briefly Layout and general outline of various units in a waste water treatment plant   12M

(OR)

11. Describe briefly septic tank's working principles and design.   12M

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CODE: 13EE4022   **SET-1**

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

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) Draw the speed torque characteristics of a separately excited dc motor connected to single phase controlled converter for two firing angles α_1 and α_2 where $\alpha_2 > \alpha_1$
   b) The average output voltage of a 3-ϕ semi converter for RLE load in continuous conduction mode is _____
   c) What are the braking methods used in a dc motor?
   d) Polarity of supply voltage is reversed in which type of braking?
   e) Draw the circuit diagram of four quadrant chopper?
   f) The rms value of output voltage of a basic chopper is _____
   g) What are the different methods of speed control of squirrel cage induction motor?
   h) If slip increases, what will happen to speed?
   i) What are the different types of slip power recovery schemes?
   j) What are the different speed control methods of synchronous motor?

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

UNIT-I

2. a) Discuss the operation of a separately excited dc motor fed by a single phase semi converter? Draw the speed torque characteristics of such a motor with variation of firing angle α.   (7M)
   b) A 5KW, 220V, 1500rpm separately excited dc motor speed is controlled using a single phase full converter. If the ac supply is 230V, 50Hz and the motor rated current is 20Amps at near full load, find for $\alpha=60^0$, the speed of the motor and its torque. Assume the armature resistance to be 0.5 Ω while the machine constant is 0.2V/rpm. Also assume continuous armature current   (5M)

(OR)

3. a) Discuss the operation of a three phase full converter fed DC drive(separately excited)   (8M)
   b) A three phase full converter is used to control the speed of a 100KW, 400V, 1000 rpm separately excited dc motor. The converter is fed from a three phase 400V, 50Hz power supply. If the machine constant is 0.35V/rpm and the armature resistance be 0.5Ω, for the rated current of 100A, find the firing angle for the machine when it is motoring at rated speed.   (4M)

UNIT-II

4. a) Describe counter current braking (plugging) in a separately excited dc motor with relevant circuit diagrams?   (7M)
   b) A 220V, 1000 rpm, 60A separately excited dc motor with armature resistance of 0.6Ω is fed from a circulating current dual converter with ac source voltage (line voltage) of 165V.Determine converter firing angles for the following?   (5M)
   (i)Motoring operation at rated motor torque and 900rpm
   (ii) Braking operation at rated motor torque and 900rpm

(OR)

5. a) Describe the operation of a dc drive in all four quadrants when fed by a single –   (8M)
        phase dual converter, with necessary waveforms and characteristics?
    b) A 220V DC motor has Armature resistance of 0.5Ω. it is drawing Armature current   (4M)
        of 15A. Motor is braked by Dynamic braking when it is running under full load.
        Find the Braking Resistance to be inserted to limit the Braking current to 10A.

UNIT-III

6. a) Analyze the basic operation of a Two quadrant chopper when connected to a   (7M)
        separately excited dc motor for continuous conduction mode and draw the speed
        torque characteristics of the drive?
    b) A 220V, 24A, 1000rpm separately excited motor has an armature resistance of   (5M)
        2Ω.The motor is controlled by a chopper with a frequency of 500Hz and a source
        voltage of 230V.Calculate the duty ratio for 1.2 times the rated torque and
        500rpm?
                                    (OR)
7. a) Describe the basic operation of a chopper drive for a separately excited dc motor   (7M)
        in regenerative braking mode and draw the speed torque characteristics of the
        drive?
    b) A 210V, 25A, 1500rpm dc motor has an armature resistance of 3Ω is controlled by   (5M)
        chopper. The chopping frequency is 500Hz and input voltage is 230V. Calculate
        the duty ratio for a torque of 1.5 times the rated torque at 800rpm?

UNIT-IV

8. a) Draw and explain the speed-torque curves with variable frequency control for two (7M)
        different modes (a) Operation at constant flux (b) Operation at constant (V/f) ratio.

    b) A 3-phase 50kw 1475rpm 420V 50HZ 4-pole star-connected induction motor has   (5M)
        the following data: R_s=0.4Ω, R_r=0.21Ω, X_s=0.95Ω, X_r=0.85Ω X_m=32Ω all
        quantities being referred to the stator side. If the frequency increased to 58HZ by
        frequency control, determine (a) The slip at maximum torque (b) The speed at
        maximum torque (c) The break down torque
                                    (OR)
9.   Describe the operation of closed loop control of induction motor drives.   (12M)

UNIT-V

10. a) Describe about different types of speed control methods of Induction motor from   (8M)
        Rotor side?
    b) Explain the difference between Rotor Resistance control methods and slip power   (4M)
        recovery schemes?
                                    (OR)
11. a) Describe the operation of static Kramer Drive?   (6M)
    b) Derive and draw the Speed- torque characteristics of Kramer drive?   (6M)

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PART-A

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

1. a) What is Refrigeration? What is the unit of refrigeration?
    b) What is the difference between a refrigerator and a heat pump?
    c) What are applications of the refrigeration?
    d) What is the difference between Gas cycle and Vapour cycle?
    e) What is sub-cooling and super heating in refrigeration system? Why these are used?
    f) Define Peltier effect.
    g) What is the difference between a cooler and an air conditioner?
    h) Efficiency of the heat engine operating on Carnot cycle is 80%, and then what is the COP of the refrigerator operating between same temperatures?
    i) Why the performance of the Absorption system low compare to compression system?
    j) Describe the classification of air-conditioning systems

PART-B

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

UNIT-I

2. a. Under what circumstances are the regenerative cooling systems used for Air cycle refrigeration? Explain the regenerative cooling system with a neat sketch and depict the processes on a T-S diagram.   [5]

    b. A simple air cooled system is used for aero plane having a load of 10 tons. The atmospheric pressure and temperature are 0.9 bar and 10^0C respectively. The pressure increases to 1 bar due to ramming. The temperature of the air is reduced by 50^0C in the heat exchanger. The pressure in the cabin is 1.013 bar and the temperature of the air leaving the cabin is 25^0C. The pressure of the compressed air is 3.5 bar. Determine
    (i) Power required to take the cooling load in the cabin and
    (ii) COP of the system.   [7]

(OR)

3. a. Explain the Reduced Ambient type cooling system with a neat sketch and depict the processes on a T-S diagram. [5]

b. A dense air refrigeration machine operates between 4 bar and 1 bar. The Temperature of this after the air cooler is 15^0C and after the refrigeration coil is 6^0C. Determine: [7]
i. Temperature of the air after compression and expansion
ii. Air circulated per ton of refrigeration
iii. The work of compressor and expander per ton of refrigeration.
iv. The theoretical C.O.P.

UNIT-II

4. a. Describe the mechanism of a simple vapour compression refrigeration system. [4]

b. A refrigerating machine using F12 as working fluid works between the temperatures 18^0C and 37^0C. The enthalpy of liquid at 37^0C is 78kJ/kg. The enthalpies of F12 entering and leaving the compressor are 200kJ/kg and 238 kJ/kg respectively. The rate of circulation of refrigerant is 2kg/min and efficiency of compression is 0.85. Determine. [8]
(i) Capacity of the plant in tons of refrigeration
(ii) Power required to run the plant
(iii) COP of the plant.

(OR)

5. a. Discuss the factors to be considered in the selection of a refrigerant. [4]

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 10^0C, while the vapour refrigerant leaves the evaporator at -10^0C. The refrigerator is designed to produce 30 tonnes of frozen meat at -10^0C by taking it at 30^0C in 15 hours. The freezing point of meat is -3^0C 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? [8]

UNIT-III

6. a. Derive the expression for COP of absorption system. [6]
   b. Sketch and explain the working of simple vapour-absorption system and name the various plants. [6]

(OR)

7. a. In an absorption system heating, cooling and refrigeration takes place at the temperatures of 100^0C, 27^0C, -8^0C find the COP of the system. [4]
   b. Sketch and explain the working of an Electrolux-refrigerator. [8]

UNIT-IV

8. a. How can you produce the cold with the vortex tube? [6]
   b. What are the advantages of pulse tube cooling and can it is used for cold storage? [6]

(OR)

9. a. Describe briefly the working principle of a pulse tube system [6]
   b. Explain the working principle of thermo-electric refrigeration systems. Explain the following [6]
      i. Seeback effect
      ii. Peltier effect

UNIT-V

10. a. Sketch comfort chart neatly and show on it the comfort zone. [4]
    b. A classroom is to be air-conditioned for the following given summer conditions. The data collected is given as follows: Size of classroom: $18 \times 12 \times 6$ m, out-door conditions: 42^0C DBT and 52% R.H., required comfort condition: 18^0C DBT and 58% R.H., seating capacity: 45, sensible heat in the room excluding infiltrated load: 40,000 kJ/hr, sensible heat load from other sources: 8000 kJ/hr, lighting load: l2 tubes of 80 watts, infiltrated air: 27 m^3/min. If 35% air is taken from outside and remaining is re-circulated then find the following: [8]
       (i) Capacity of the cooling coil in tons of refrigeration and its bypass factor
       (ii) Capacity of the blower in m^3/min. Assume DPT of the coil 6^0C.

(OR)

11. a. Define [4]
    i. Partial pressure of water vapour
    ii. DPT
    iii. RH
    iv. Degree of saturation

   b. Atmospheric air at 12^0C and 75% RH is to be conditioned to [8]
      22^0C and 60% RH. The amount of air supply is 200m^3/min.
      The required condition is achieved first by heating and then
      by adiabatic humidification. Find
      i. amount of steam required in kg/hr through the heating coil
         at pressure 2 bar and 0.96 dry. Assume only latent heat of
         steam is used for heating.
      ii.The quantity of water required per hour in the humidifier.

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CODE: 13EC4027   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Supplementary Examinations, January-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 do you meant by Gray level?
   b) Define Resolution
   c) What is geometric transformation?
   d) Give the Conditions for perfect transform
   e) Define histogram.
   f) What do you mean by Point processing?
   g) Write the applications of segmentation.
   h) What is edge?
   i) What is meant by Image Restoration?
   j) What do we mean by labelling an image?

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

UNIT-I

2. (a) Explain sampling and quantization.   [6M]
   (b) Explain the basic Elements of digital image processing   [6M]

(OR)

3. Describe the basic relationship between the pixels   [12M]

UNIT-II

4. (a) Write short notes on Hotelling transform   [5M]
   (b) Discuss Hadamard transform in detail   [7M]

(OR)

5. Explain the Properties of 2D discrete Fourier Transform   [12M]

UNIT-III

6. (a) Explain Histogram processing in detail   [8 M]
   (b) Describe homomorphic filtering in detail   [4 M]

(OR)

7.   Explain Spatial Filtering in detail   [12 M]

UNIT-IV

8. (a) Discuss about Wiener filter   [8 M]
    (b) What is meant by Inverse filtering? Explain.   [4 M]

(OR)

9. (a) Explain the concept of Pseudo colour image processing   [6 M]
         in detail
    (b) Explain image degradation model /restoration process   [6 M]
         in detail.

UNIT-V

10. (a) Write short notes on edge detection   [6 M]
    (b) Define Compression and explain data Redundancy in   [6 M]
         image compression

(OR)

11.   Discuss region oriented segmentation in detail   [12 M]

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech I Semester Supplementary Examinations, January-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) Write the principles of modelling
  b) Define class?
  c) Write the types of interaction diagrams.
  d) Write façade pattern.
  e) Define Signal?
  f) Define change Event?
  g) Define small talk MVC?
  h) Define Processes?
  i) Explain Bridge.
  j) Define Proxy?

PART-B

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

UNIT-I

2.
  a) Explain various phases of Software development Life cycle.   7M
  b) What is UML? What is the importance of modelling? Discuss   5M

(OR)

3.
  a) What are the common modelling techniques of object diagram? Explain.   6M
  b) Give the class diagram for ATM machine   6M

UNIT-II

4. Explain about interaction diagrams with example   12M

(OR)

5.
  a) Explain the Use Case Diagram for online railway reservation system.   6M
  b) Explain the FORK and JOIN of an activity diagrams?   6M

UNIT-III

6.
  a) Discuss about the component diagram with examples.   7M
  b) Give the deployment diagram for client server 2 tier, event registration System.   5M

(OR)

7.
  a) What is forward engineering? How to forward engineer a class diagram? Explain   7M
     with one example.
  b) What are different types of components that are used in component diagram? List   5M
     out different uses of component diagrams?

UNIT-IV

8.
  a) How to classify the Design pattern? Explain.   6M
  b) Discuss about Small Talk MVC?   6M

(OR)

9. Explain with a neat diagram the Design Pattern relationships   12M

UNIT-V

10.
  a) Explain Singleton Pattern   6M
  b) Write in detail about Strategy behavioural pattern   6M

(OR)

11.
  a) Explain chain of responsibility   6M
  b) Write in detail about mediator behavioural pattern.   6M

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