

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****IV B.Tech I Semester Supplementary Examinations, January-2020****MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS  
(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) Discuss the nature and scope of Managerial Economics. (7 M)  
b) Define the Law of Demand. What are its exceptions? Explain. (7 M)  
(OR)
2. a) What is meant Demand Schedule, Demand curve and Demand function? Explain (7 M)  
b) Differentiate extension in Demand and increase in Demand. Illustrate. (7 M)

**UNIT-II**

3. a) What is Elasticity of Demand? Explain the types of Price elasticity of Demand. (7 M)  
b) Explain the concept of income-elasticity of demand and explain its role in business decisions. (7 M)  
(OR)
4. a) Statistical and Mathematical techniques complicate the process of Demand Forecasting. Do you agree? Support your answer. (7 M)  
b) What is Demand Forecasting? Explain the factors governing Demand forecasting. (7 M)

**UNIT-III**

5. a) Explain the Law of returns with appropriate examples. (7 M)  
b) What is Production function? Explain the Cobb- Douglas production function. (7 M)  
(OR)
6. a) From the following information calculate (7 M)  
i). PV Ratio. ii) Break Even Point and iii) Margin of Safety.  
Total Sales – 25,000 units, Selling Price per unit – Rs 20/-,  
Variable cost per unit – Rs 12/- and Total Fixed Cost – Rs 1, 60,000/-.  
b) Explain the concept of Break Even Point and point out its usefulness. (7 M)

**UNIT-IV**

7. a) Differentiate between Perfect and Imperfect markets. (7 M)  
b) What are the features of Monopoly and Monopolistic competition? Explain the advantages of Monopolistic competition. (7 M)  
(OR)
8. a) Explain the different evaluation techniques in Capital Budgeting decision. (7 M)  
b) The initial cash outlay of a project is Rs 1,00,000/- and it generates net cash inflows of Rs 40,000/-, Rs 30,000/- Rs 50,000/- and Rs 20,000/- in one to four years. Calculate the NPV and Profitability index of the Project. The discounting factor is 10%. PV Factors  $Y_1 = 0.909$   $Y_2 = 0.826$   $Y_3 = 0.751$   $Y_4 = 0.683$ . (7 M)

### UNIT-V

9. a) What are the accounting concepts that governing accounting process? (7 M)  
b) From the following transactions write Journal entries into the books of Prasanth (7 M)

| 2016     | Particulars                           | Rs.    |
|----------|---------------------------------------|--------|
| April 1  | Started Business with Capital         | 10,000 |
| April 2  | Sold goods to Muthu on credit         | 4,300  |
| April 6  | Sold goods to Anand for cash          | 5,000  |
| April 8  | Goods returned by Muthu               | 100    |
| April 14 | Purchased goods from Murali on credit | 2,000  |
| April 21 | Goods returned to Murali              | 300    |
| April 22 | Paid cash to Murali                   | 1,700  |

**(OR)**

10. From the following Trail Balance of Lakshman prepare Trading Account, Profit and Loss Account for year ending 31<sup>st</sup> March 2012 and Balance Sheet as on date. (14M)

Trail Balance as on 31<sup>st</sup> March, 2012

| Particulars      | Dr. Rs | Cr. Rs |
|------------------|--------|--------|
| Capital          |        | 20,000 |
| Sundry Debtors   | 5,400  |        |
| Drawings         | 1,800  |        |
| Machinery        | 7,000  |        |
| Sundry Creditors |        | 2,800  |
| Wages            | 10,000 |        |
| Purchases        | 19,000 |        |
| Opening Stock    | 4,000  |        |
| Bank Balance     | 3,000  |        |
| Salaries         | 400    |        |
| Rent and Taxes   | 900    |        |
| Carriage charges | 300    |        |
| Sales            |        | 29,000 |
|                  | 51,800 | 51,800 |

**Adjustments:**

1. Closing stock valued at Rs. 1,200/-
2. Charge Depreciation on Machinery at 10%
3. Outstanding Rent and Taxes Rs.100/-

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) Derive the expression for optimum load distribution of a power system network with 'N' generating units in operation by including the transmission losses. 7M
- b) The incremental cost curves (ICs) of three units are given as 7M  
 $P_{G1} = -100 + 50 IC_1 - 2 IC_1^2$   $P_{G2} = -150 + 60 IC_2 - 2.5 IC_2^2$   $P_{G3} = -80 + 40 IC_3 - 1.8 IC_3^2$   
 Where ICs are in RS/MWh and  $P_G$ s are in MW. Find the optimum values of generation when the total load demand is 400MW. Neglect transmission loss.

**(OR)**

2. a) Derive the expression for power loss and loss coefficients of a power system network in terms of power output of the units. 8M
- b) Explain the following terms with reference to power plants. 6M  
 i) Heat rate curve. ii) Incremental fuel rate curve. iii) incremental production cost curve

**UNIT-II**

3. a) Write a short note on short range hydro scheduling problem 8M
- b) Explain the solution technique for solving hydro thermal scheduling problem 6M

**(OR)**

4. a) State the unit commitment problem. With the help of flow chart explain forward dynamic programming solution method. 8M
- b) Explain the need of unit commitment in power system network. 6M

**UNIT-III**

5. a) What is dynamic response? Derive the dynamic response of an isolated power system with suitable assumptions. 7M
- b) Two generators of rating 125 and 250MW are operated with a droop characteristics of 4% and 5% respectively from no load to full load. Find the load sharing by each generator if a load of 300MW is connected across the parallel combination of those generators. What is the frequency under this condition? 7M

**(OR)**

6. a) Derive the generator load model and represent it by a block diagram. 7M
- b) Draw the schematic diagram of a speed governing system and explain function of each component. Obtain the transfer function and block diagram for the same mechanism. 7M

**UNIT-IV**

7. Obtain the block diagram of load frequency control in two area control system. 14M

**(OR)**

8. Derive an expression for tie line power and frequency deviation of two area system. 14M

**UNIT-V**

9. a) Explain the static shunt capacitor method of reactive power compensation. State its advantages and disadvantages. 7M
- b) What is load compensation? Explain its objectives in power system. 7M

**(OR)**

10. a) What is line compensation? Explain different methods of line compensation. 8M
- b) Write a short note on FACTS devices. 6M

**HEAT TRANSFER  
(Mechanical 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) Derive general heat conduction equation in Cartesian coordinate system. 10M  
 b) A long Cu rod with thermal conductivity 300W/m K of diameter 3 cm is exposed to an environment at 20 °C with convective heat transfer coefficient of 10 W/m<sup>2</sup> K, if one end of the rod is maintained at 60 °C. Calculate heat lost from the rod. 4M
- (OR)**
2. a) Estimate heat lost through a red brick wall of length 5m and height 4m and thickness 0.25m. if the temperature of the wall surfaces are maintained at 45 °C and 25 °C respectively. Assume k for brick 0.7 W/m K. Also find the conduction resistance of the wall. 6M  
 b) A wall 30 cm thick of 5 m x 3 m is made of red bricks (k = 0.35 W/m K). It is covered on both sides by layers of plasters 2 cm thick (k = 0.65 W/m K). The wall has a window of 1 m x 2 m size. The window door is made of glass 12 mm thick having conductivity of 1.2 W/m K. Estimate the rate of heat flow through the wall and window. Inner and outer surface temperatures are 10 °C and 40 °C respectively. 8M

**UNIT-II**

3. a) Derive the expression for heat transfer rate in case of an infinitely long fin with base temperature T<sub>0</sub> and tip temperature T<sub>L</sub> 9M  
 b) A steel plate of 1 m<sup>2</sup> area is provided with 100 fins of diameter 1cm and length 20 cm made of Cu (300 W/m K). The base temperature is at 250 °C. Determine a) fin efficiency b) heat lost from the plate. 5M
- (OR)**
4. a) Discuss the Lumped system analysis validity and derive an expression for the same. 7M  
 b) In a quenching process, a copper plate of 3 mm thick is heated up to 350 °C and then suddenly it is dipped into a water bath and cooled to 25 °C. Calculate the time required for the plate to reach the temperature of 50 °C. The heat transfer coefficient on the surface of the plate is 28 W/m<sup>2</sup>K. The plate dimensions may be taken as length 40 cm and width 30 cm. Take properties of copper as C = 380 J/kgK, ρ = 8800 kg/m<sup>3</sup>, k = 385 W/mK. 7M

**UNIT-III**

5. a) Distinguish between forced convection external and internal flows. 6M  
 b) Air flows through a square duct of 2.5×2.5 cm<sup>2</sup> with a velocity of 0.8 m/s. The air is heated by maintaining constant wall temperature on the duct surface. Calculate the value of h for fully developed flow and assume the properties of air as ν = 20.76×10<sup>-6</sup> m<sup>2</sup> / s and k = 0.03 W/mK. 8M

**(OR)**

6. A fluid at  $T_\alpha = 40^\circ\text{C}$  flows with a velocity of  $U_\alpha = 8\text{m/s}$  along the flat plate of 3m long which is maintained at a uniform temperature of  $100^\circ\text{C}$ . Calculate the local heat transfer coefficient at the end of the plate and the average heat transfer coefficient over the entire length of the plate for air at atmospheric pressure. 14M

#### UNIT-IV

7. a) The glass door of a furnace is having dimensions of height 0.75 m and width 1.5 m is at a temperature of  $230^\circ\text{C}$ . If the outside air temperature is  $25^\circ\text{C}$ . Estimate the heat loss from the door to atmosphere. 8M  
 b) Differentiate drop wise and film wise condensation. 6M  
 (OR)  
 8. a) Derive the expression for effectiveness in terms of NTU for parallel flow heat exchanger. 10M  
 b) A double pipe heat exchanger is used to cool the lubricating oil from  $90^\circ\text{C}$  to  $40^\circ\text{C}$ . The mass flow rate of oil is 0.20 kg/s with specific heat 2.13 kJ/kg K and that of water is 0.3 kg/s. Determine the heat transfer area required if  $U = 50\text{ W/m}^2\text{ K}$  for Parallel and counter flow arrangement. 4M

#### UNIT-V

9. a) Show that the heat exchange between two infinite non-black parallel planes is 7M  

$$Q_{1-2} = \frac{\epsilon_1 \epsilon_2}{\epsilon_1 + \epsilon_2 - \epsilon_1 \epsilon_2} \sigma (T_1^4 - T_2^4)$$
  
 b) A 10 cm dia and 5 m long steam carrying pipe whose surface is at  $110^\circ\text{C}$  passes through a room whose walls are at  $10^\circ\text{C}$ . Assuming the emissivity of pipe  $\epsilon = 0.9$ . Determine the rate of heat loss from the pipe by radiation. 7M  
 (OR)  
 10. a) Show that by using electrical analogy the radiation heat exchange with N shields is equal to  $= \frac{1}{N+1}$  times without shield. State the assumption made. 7M  
 b) Two large parallel plates having emissivities 0.3 and 0.5 are maintained at temperatures of  $900^\circ\text{C}$  and  $500^\circ\text{C}$  respectively. (i) Calculate the heat exchange between them per  $\text{m}^2$  area. (ii) If a radiation shield of emissivity 0.05 is placed between them, what is the percentage of reduction in heat transfer? 7M

**DIGITAL IMAGE PROCESSING  
(Electronics and Communication 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) Explain the basic concept of image sampling and quantization with neat sketch. 7M  
b) Write short notes on imaging geometry. 7M  
(OR)
2. a) Explain about 4 adjacency, 8 adjacency and m – adjacency with examples 7M  
b) Explain the components of image processing systems.. 7M

**UNIT-II**

3. a) Define Haar Transform and explain its properties. 7M  
b) Find the kernel coefficients for N=8 of 1-D Hadamard Transform. 7M  
(OR)
4. a) Verify the spatial shift and frequency shift properties of 2D DFT. 7M  
b) Explain Hotelling transform in detail. 7M

**UNIT-III**

5. a) Define histogram. Briefly explain histogram specification. 7M  
b) Explain about various smoothing filters in the frequency domain. 7M  
(OR)
6. a) Explain the concept of Homomorphic filtering. 7M  
b) Briefly explain about various spatial filters for image smoothing and sharpening operations.. 7M

**UNIT-IV**

7. a) Write short notes on i) RGB Color model and ii) CMYK Color model. 7M  
b) What is meant by Restoration and explain about Image Degradation/Restoration model. 7M  
(OR)
8. a) Explain about the basics of Full Color Image Processing. 7M  
b) Explain the concept of constrained least squares filtering for restoring an image. 7M

**UNIT-V**

9. a) Discuss about the various redundancies in a digital image. 7M  
b) Explain how derivative operators are useful for edge detection. 7M  
(OR)
10. a) Define Compression and explain about the general compression system model. 7M  
b) Derive the Laplacian coefficients for 3\*3 mask? Explain how the Laplacian operator improves the quality of image. 7M

# AR16

**CODE: 16CS4025**

**SET-1**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**IV B.Tech I Semester Supplementary Examinations, January-2020**

**IMAGE PROCESSING**

**(Computer Science and 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) Describe the process of image acquisition using different types of sensors. 9M  
b) Write the expression to find the number of bits to store a digital image? Find the number of bits required to store a 256 X 256 image with 32 gray levels? 5M
- (OR)
2. a) What are the fundamental steps in Digital Image Processing? 9M  
b) Consider image segment shown here: 5M

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

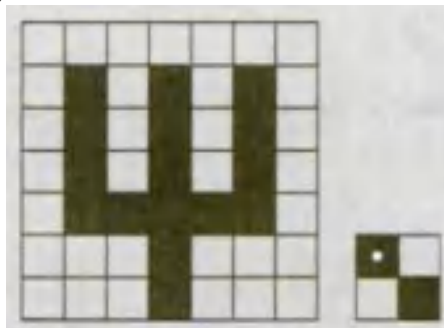
Let  $V = \{0, 1\}$  and compute the lengths of shortest 4, 8 and m-path between p and q. if a particular path does not exist between p and q, explain why?

## UNIT-II

3. a) Explain separable and spatial shift properties of 2D DFT. 7M  
b) What are the types of gray level transformation used for image enhancement? Explain any two of it. 7M
- (OR)
4. a) What is the advantage of histogram equalization? Describe the procedure to perform it. 7M  
b) Discuss the image smoothing filter with its model in the spatial domain. 7M

## UNIT-III

5. a) Using the input image and the structuring element as given below find the dilated version of the input image. 9M



- b) Explain RGB color model in detail. 5M

(OR)

6. a) Explain Hit-Miss morphological algorithm with an example. 7M  
b) Discuss procedure for conversion from HSI color model to RGB color model. 7M

#### **UNIT-IV**

7. a) Why are images compressed? Discuss the techniques for image compression? 7M  
b) Explain about Error free Compression. 7M

**(OR)**

8. a) Differentiate between lossless and lossy compression. 5M  
b) Explain about lossy predictive coding system with a neat diagram. 9M

#### **UNIT-V**

9. a) What is image segmentation? What are the applications of image segmentation? 7M  
b) Explain about region based segmentation splitting and merging algorithm. 7M

**(OR)**

10. One category of image segmentation is referred to as edge-based segmentation. 14M  
Describe how the first and second order derivatives can be used to detect edges, how they differ from each other, how they are affected by noise, and which filter masks can be used.



**MULTIMEDIA APPLICATION DEVELOPMENT  
(Information Technology)****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)       | Discuss in detail about GIF file format.           | 7M  |
| b)          | Differentiate Vector Graphics and Bitmap Graphics? | 7M  |
| <b>(OR)</b> |  |     |
| 2.          | Explain various color models, in detail.           | 14M |

**UNIT-II**

- |             |  |     |
|-------------|--|-----|
| 3.          | Explain about digital video standards in use for analogue broadcast colour television. | 14M |
| <b>(OR)</b> |  |     |
| 4.          | Explain about JPEG, MPEG.  | 14M |

**UNIT-III**

- |             |   |     |
|-------------|---|-----|
| 5. a)       | Explain how sound is produced by conversion of energy into vibrations in the air. | 5M  |
| b)          | Enumerate the process of recording and importing sound .                          | 9M  |
| <b>(OR)</b> |   |     |
| 6.          | Explain in detail about techniques used for digitizing sound?                     | 14M |

**UNIT-IV**

- |             |  |     |
|-------------|--|-----|
| 7.          | Explain the syntax of conditional statements in Action Script, with suitable example code. | 14M |
| <b>(OR)</b> |  |     |
| 8.          | Explain how movie clip events are handled in Action Script.                                | 14M |

**UNIT-V**

- |             |  |     |
|-------------|--|-----|
| 9.          | Explain about Real Time Streaming Protocol (RTSP), in detail.  | 14M |
| <b>(OR)</b> |  |     |
| 10. a)      | Write short notes on : (i) Delay (ii) Jitter (iii) Packet loss | 9M  |
| b)          | Discuss in detail about MBone.                                 | 5M  |

**Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) What is a well point?  
b) What is intrusion grouting?  
c) What are various techniques for compaction at larger depth?  
d) What are sand drains?  
e) What is soil bitumen?  
f) Mention the components of Reinforced Earth.  
g) What are the functions of Geo textiles?  
h) Mention the types of Geo textiles.  
i) What is Swelling Pressure?  
j) Sketch an under reamed pile.

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

2. Briefly explain the electro osmosis process for dewatering with suitable sketches 12  
(OR)
3. Explain the different methods of grouting with neat sketches 12

**UNIT-II**

4. What are the equipments available for compacting at surface? Brief out each with their working 12  
(OR)
5. a) Explain in detail about the vertical drains. 6  
b) Write a brief note on stone columns. 6

**UNIT-III**

6. What are the possible reactions of lime when used for soil stabilisation? Explain the effects of the lime stabilisation on soil properties. 12  
(OR)
7. a) Explain the Cement Stabilisation? 6  
b) What are the design principles of Reinforced earth? 6

**UNIT-IV**

8. a) What are Geo textiles? Explain different types of Geo textiles. 6  
b) What are Geo membranes? Explain the applications of Geo membrane 6  
(OR)
9. What are Geo grids? Explain in detail about the functions and application of Geo grids. 12

**UNIT-V**

10. a) What are the different modification techniques for improving expansive soils? 6  
b) Explain how load carrying capacity of under reamed piles is determined. 6  
(OR)
11. What are the different parameters available to identify expansive soils? Explain in brief 12

Time: 3 Hours

Max Marks: 70

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

1. a) What is meant by economic operation of power system
- b) Cost curves are expressed in which units
- c) Define incremental fuel cost
- d) What are the important methods of hydro – thermal coordination
- e) What is the need of solution methods for unit commitment problem
- f) What is meant by single area system?
- g) Advantages of a pool operation is
- h) The tie line power equation is  $\Delta P_{12} =$
- i) Give permissible voltage variation in P.U
- j) Objectives of shunt compensation are

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

2. a Explain the following terms with reference to power plants: 6M  
Heat input – power output curve, Heat rate input, Incremental input
  - b Explain the various factors to be considered in allocating generation to different power stations for optimum operation 6M
- (OR)**
3. 100 MW, 150 MW and 280 MW are the ratings of three units located in a thermal power station. Their respective incremental costs are given by the following equations: 12M  
 $dc_1/dp_1 = Rs(0.15p_1 + 12);$   
 $dc_3/dp_3 = Rs(0.21p_3 + 13)$   
 $dc_2/dp_2 = Rs(0.05p_2 + 14)$   
 Where  $P_1$ ,  $P_2$  and  $P_3$  are the loads in MW. Determine the economical load allocation between the three units, when the total load on the station is 300 MW.

**UNIT-II**

4. a Derive the coordination equation for the optimal scheduling of hydrothermal interconnected power plants 8M
  - b Explain the constraints in unit commitment problem 4M
- (OR)**
5. a Explain Short term hydrothermal scheduling problem. 6M
  - b Explain about unit commitment problem 6M

**UNIT-III**

6. Derive the model of a speed governing system and represent it by a block diagram 12M
- (OR)**
7. Obtain the dynamic response of a single area isolated power system 12M

**UNIT-IV**

8. Draw the block diagram for a two area LFC with integral controller blocks and explain each block 12M
- (OR)**
9. Obtain the mathematical modelling of the line power in an interconnected system and its block diagram. 12M

**UNIT-V**

10. Discuss advantages and disadvantages of different types of compensating equipment for transmission systems 12M
- (OR)**
11. a What is load compensation? Explain its objectives in power system. 6M
  - b Explain the importance of reactive power and its control in the operation of power system. 6M

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

1. a) What is the difference between Refrigeration & Air Conditioning?
- b) Name any two different types of systems used for cooling of aircraft cabin
- c) A machine working on a Carnot cycle operates between 310 K and 250 K. Determine COP when it is operated as: i. A refrigerating machine
- d) Draw P-H and T-S diagram of VCR Cycle with Superheated Vapour before Compression
- e) List any three good properties of a refrigerant.
- f) Mention which one is absorbent and which one is Refrigerant in Li-Br and Water absorption refrigeration system
- g) Write any two applications of Vortex tube refrigeration
- h) What is function of thermostat in refrigerator
- i) Define Defrosting.
- j) Draw sensible cooling and sensible heating processes on psychometric chart

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

2. a) Explain Difference Between a Heat Engine, Refrigerator and Heat Pump with block diagrams. 4M
- b) Derive the carnot Refrigerator COP if the operating temperature limits are  $T_1$  and  $T_2$  ( $T_1 > T_2$ ) 8M

**(OR)**

3. a) Explain Merits and Demerits of Air Refrigeration System 4M
- b) A simple air cooled system is used for an aeroplane having a load of 10 tonnes. The atmospheric pressure and temperature are 0.9 bar and  $10^\circ\text{C}$  respectively. The pressure increases to 1.013 bar due to ramming. The temperature of the air is reduced by  $50^\circ\text{C}$  in the heat exchanger. The pressure in the cabin is 1.01 bar and the temperature of air leaving the cabin is  $25^\circ\text{C}$ . Determine: 1 Power required to take the load of cooling in the cabin; and 2.C.O.P. of the system. Assume that all the expansions and compressions are isentropic. The pressure of the compressed air is 3.5 bar 8M

**UNIT-II**

4. a) Write down the parts of Vapour Compression refrigeration system. 4M
- b) A vapour compression refrigerator works between the pressure limits of 60 bar and 25 bar. The working fluid is just dry at the end of compression and there is no under cooling of the liquid before the expansion valve. Determine: 1. C.O.P. of the cycle ; and 2. Capacity of the refrigerator if the fluid flow is at the rate of 5 kg/min. 8M

**(OR)**

5. a) With a neat sketch, explain the working principle of vapour compression refrigeration system. 4M
- b) Find the theoretical C.O.P. for a CO<sub>2</sub> machine working between the temperature range of 25°C and -5°C. The dryness fraction of CO<sub>2</sub> gas during the suction stroke is 0.6. 8M
- Following properties of CO<sub>2</sub> are given:

| Temperature<br>°C | Liquid            |                    | Vapour            |                    | Latent heat<br>kJ/kg |
|-------------------|-------------------|--------------------|-------------------|--------------------|----------------------|
|                   | Enthalpy<br>kJ/kg | Entropy<br>kJ/kg K | Enthalpy<br>kJ/kg | Entropy<br>kJ/kg K |                      |
| 25                | 164.77            | 0.5978             | 282.23            | 0.9918             | 117.46               |
| -5                | 72.57             | 0.2862             | 321.33            | 1.2146             | 248.76               |

### UNIT-III

6. a) Explain About Analyser and Rectifier in VAR system. 4M
- b) Explain Lithium Bromide Absorption Refrigeration System. 8M
- (OR)
7. a) What is the basic function of a compressor in vapour compression refrigeration system? How this function is achieved in vapour absorption refrigeration system. 4M
- b) Explain working of a simple vapour absorption system. 8M

### UNIT-IV

8. a) What are the advantages of vortex-tube over other refrigeration systems? List out its applications. 4M
- b) Draw a neat sketch and explain working principle of vortex tube refrigeration 8M
- (OR)
9. a) Write down Applications of Pulse Tube refrigeration and demerits of PTR 4M
- b) Explain the working of Basic Pulse Tube Refrigerator. 8M

### UNIT-V

10. a) Define Specific Humidity, Relative humidity, Degree of saturation. 4M
- b) Atmospheric air at 101.325 kPa 35°C DBT and 20°C DPT. Without using the psychometric chart, using the property values from the table, Calculate Partial pressure of air and water vapour, Specific humidity, Relative humidity, enthalpy. (From table corresponding saturation vapour pressure is 0.042461 bar, vapour pressure is 0.017051 bar) 8M
- (OR)
11. a) Define Air conditioning and Write down factors effecting human comfort. 4M
- b) What are the types of Air filters –and explain about Dry type filter with sketch. 8M

**Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) Differentiate between uniform sampling & Non-uniform sampling?
- b) What is the difference between binary image and gray level image?
- c) Obtain the HADAMARD transform matrix for N=4.
- d) State any two properties of Fourier transforms
- e) What is meant by Histogram of an image?
- f) What are the equivalent filters for image smoothing and sharpening?
- g) Differentiate constrained and unconstrained restoration.
- h) What are different color models
- i) What is meant by image segmentation
- j) What is the difference between lossless and lossy compression

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

2. a) Define the terms sampling and quantization. What is their role in image quality and size? 6M
- b) Write a brief note about the components of image processing systems 6M

**(OR)**

3. a) Explain about 4-adjacency, 8-adjacency and m-adjacency with suitable examples 6M
- b) Describe the elements of visual perception. 6M

**UNIT-II**

4. a) Explain how Fourier transforms are useful in digital image processing? 6M
- b) explain in brief about hotelling transform 6M

**(OR)**

5. a) Discuss the salient features of Discrete Cosine transform? 6M
- b) Explain about discrete wavelet transform of one variable and two variables. 6M

**UNIT-III**

6. a) Explain spatial filtering in image enhancement. 6M
- b) What is meant by Enhancement by point processing? Explain. 6M

**(OR)**

7. a) Explain about homomorphic filtering 6M
- b) How is smoothing achieved in frequency domain? Explain 6M

**UNIT-IV**

8. a) What is meant by image degradation? Discuss various possibilities for image degradation. 6M
- b) Explain about RGB and CMY color models. 6M

**(OR)**

9. a) What is pseudo color image processing? Discuss various pseudo color techniques in detail. 6M
- b) What is the use of wiener filter in image restoration? Explain. 6M

**UNIT-V**

10. a) Discuss about point detection, line detection and edge detection. 6M
- b) Explain variable length coding using Huffman coding. 6M

**(OR)**

11. a) Explain the concept of region growing procedure with suitable example. 6M
- b) In digital Image Compression how the different types of redundancies are applicable. Explain. 6M