

Hall Ticket Number : 

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**R-17 (SS)**

**Code: 5G575**

IV B.Tech. I Semester Regular Examinations February 2021

**Advanced Manufacturing Systems**

( Mechanical Engineering )

Max. Marks: 70

Time: 3 Hours

Answer *all five* units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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**UNIT-I**

1. What are the strategies of a Manufacturing system? Explain in detail? 14M

**OR**

2. a) What are the components of manufacturing system? State its Limitations of traditional manufacturing systems. 7M  
b) Discuss various types of production systems. 7M

**UNIT-II**

3. a) What is aggregate production planning? State the elements associated with it. 7M  
b) Discuss the importance of master production schedule 7M

**OR**

4. a) What are Just-in-time production systems - Principles of JIT 7M  
b) Discuss pull system and push system of production control. 7M

**UNIT-III**

5. a) compare of mass production and lean production 7M  
b) What is agile manufacturing & state the principles of agile manufacturing 7M

**OR**

6. State the features for production system towards agility in areas of product design, marketing and production operations. 14M

**UNIT-IV**

7. a) What is an FMS? Discuss different types of layouts with neat sketches. 7M  
b) Discuss the aspects of Computer Control in FMS. 7M

**OR**

8. a) Discuss the various Automated Material Handling in FMS 7M  
b) Discuss AS/RS in manufacturing? 7M

**UNIT-V**

9. Compare Decision Support System – Knowledge based system in Manufacturing 14M

**OR**

10. a) Discuss the role of Machine Vision in Factory of the future 7M  
b) Discuss various aspects of computer assisted Inspection systems in FMS 7M

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Hall Ticket Number :										
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<b>R-17</b>
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**Code: 7G579**

IV B.Tech. I Semester Regular Examinations February 2021

**Automation and Robotics**

( Mechanical Engineering )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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Marks	CO	Blooms Level
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**UNIT-I**

- |    |  |     |     |    |
|----|--|-----|-----|----|
| 1. | Explain the various types of automation systems with respect to features and configurations. Also explain their relative position with respect to product variety and production volume. | 14M | CO1 | L2 |
|----|--|-----|-----|----|

**OR**

- |    |   |     |     |    |
|----|---|-----|-----|----|
| 2. | Outline the features of various types of flow lines and their advantages. | 14M | CO1 | L4 |
|----|---|-----|-----|----|

**UNIT-II**

- |    |   |     |     |    |
|----|---|-----|-----|----|
| 3. | What is need for line balancing in assembly processes? Explain the factors which may improve the line performance beyond that what the line balancing algorithms provide. | 14M | CO2 | L2 |
|----|---|-----|-----|----|

**OR**

- |    |  |     |     |    |
|----|--|-----|-----|----|
| 4. | Using an illustrative example, describe ANY ONE method of assembly line balancing. | 14M | CO2 | L2 |
|----|--|-----|-----|----|

**UNIT-III**

- |       |   |    |     |    |
|-------|---|----|-----|----|
| 5. a) | Explain the different types of grippers.      | 7M | CO3 | L2 |
| b)    | Explain the components of the robotic system. | 7M | CO3 | L2 |

**OR**

- |    |   |     |     |    |
|----|---|-----|-----|----|
| 6. | What is robotics? Explain different types of robot configurations. Explain the features of each type with applications. | 14M | CO3 | L2 |
|----|---|-----|-----|----|

**UNIT-IV**

- |       |   |    |     |    |
|-------|---|----|-----|----|
| 7. a) | With an example differentiate forward and inverse kinematics. | 7M | CO4 | L2 |
| b)    | Write down about Jacobians differential transformation.       | 7M | CO4 |    |

**OR**

- |    |  |     |     |    |
|----|--|-----|-----|----|
| 8. | Explain trajectory planning system with reference to robots. | 14M | CO4 | L2 |
|----|--|-----|-----|----|

**UNIT-V**

- |       |   |    |     |    |
|-------|---|----|-----|----|
| 9. a) | Explain the Inductive proximity sensors.                                | 7M | CO5 | L2 |
| b)    | Explain with neat sketch the application of robot in material handling. | 7M | CO5 | L2 |

**OR**

- |     |   |     |     |    |
|-----|---|-----|-----|----|
| 10. | Give the different applications of robot in manufacturing industries. | 14M | CO5 | L2 |
|-----|---|-----|-----|----|

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Hall Ticket Number :

**R-17**

**Code: 7G572**

IV B.Tech. I Semester Regular Examinations February 2021

**Automobile Engineering**  
( Mechanical Engineering )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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	Marks	CO	Blooms Level
<b>UNIT-I</b>			
1. a) Explain the concept of four wheel drive with a neat diagram.	7M	CO1	L2
b) Discuss in brief about the concepts of turbo charging and super charging.	7M	CO1	L2
<b>OR</b>			
2. a) Explain briefly the Bendix drive starting mechanism used in an automobile.	7M	CO1	L2
b) Describe the working of solenoid switch used for starter motor.	7M	CO1	L2
<b>UNIT-II</b>			
3. a) What are the different emission control systems used in SI engines and explain them.	10M	CO2	L2
b) Why CO emission is much less in CI engines compare to SI engines.	4M	CO2	L4
<b>OR</b>			
4. a) Explain the working of common rail diesel injection system with advantages and disadvantages	10M	CO2	L1
b) What is diesel odour?	4M	CO2	L2
<b>UNIT-III</b>			
5. a) With a neat sketch, explain working principle of constant mesh transmission system.	7M	CO3	L1
b) What is torque converter? How it differs from gear box.	7M	CO3	L2
<b>OR</b>			
6. a) Explain constructional features of Universal joint. Why is it used in the power transmission system?	7M	CO3	L1
b) Explain the different types of clutches used in automobile.	7M	CO3	L1
<b>UNIT-IV</b>			
7. a) Describe with neat diagram the working of Hydraulic brake system.	7M	CO4	L2
b) Discuss the working of Ackermann steering mechanism.	7M	CO4	L1
<b>OR</b>			
8. a) Describe with neat diagram the working of vacuum brake system.	7M	CO4	L2
b) What are the different types of independent suspension systems? Briefly explain them.	7M	CO4	L1
<b>UNIT-V</b>			
9. a) Explain the importance and working of ABS (Antilock Braking System) in automobile.	7M	CO5	L2
b) How road navigation system works for an automobile.	7M	CO5	L2
<b>OR</b>			
10. a) Explain voice warning system and anti-theft system in automobile.	7M	CO5	L2
b) Explain air bag restraint system and seat belt system for safety in automobile.	7M	CO5	L2

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**Code: 7G574**

IV B.Tech. I Semester Regular Examinations February 2021

**CAD/CAM**

( Mechanical Engineering )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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Marks CO

**UNIT-I**

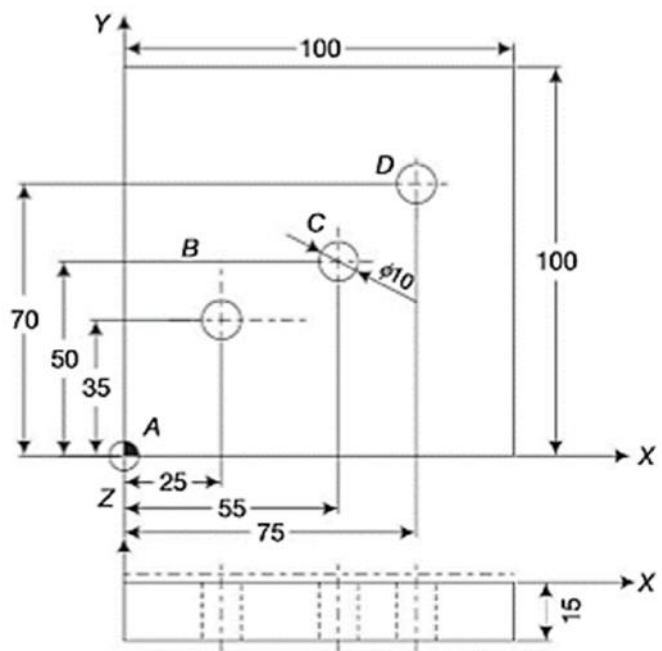
1. Discuss the product cycle overlaid with CAD/CAM. 14M CO1
- OR**
2. The two ends of a straight line have coordinates (1, 3) and (2, 5). It is to be reflected about a straight line that passes through the points (0, 0.5) and (4, 6). Write the necessary transformation matrix for the above operation and determine the new coordinates of the end points of the line. 14M CO1

**UNIT-II**

3. a) Derive the parametric equation of Bezier curve. 9M CO2  
 b) Compare IGES and STEP data exchange format. 5M CO2
- OR**
4. a) Differentiate between parametric and nonparametric representation of curve with one example. 8M CO2  
 b) Draw a 4 X 4 Bezier surface. 6M CO2

**UNIT-III**

5. a) Describe various coordinates systems and elements of NC 7M CO3  
 b) Give the advantages and disadvantages of Numerical control of machine tools. 7M CO3
- OR**
6. Write a manual part program for the following drilling operations at B, C and D. 14M CO3



**UNIT-IV**

7. a) Explain the various types of coding systems used in group technology. 7M CO4  
 b) What are the various types of layout used in FMS design? Explain about their applications. 7M CO4
- OR**
8. a) Explain the methodology to be followed for developing a retrieval type of computer aided processes planning system. 7M CO4  
 b) Discuss the various methods of forming machine cell design in group technology. 7M CO4

**UNIT-V**

9. a) What is MRP-II? How does it benefit the management of a factory? 7M CO5  
 b) In order to achieve the goals of JIT, discuss the approaches to be followed. 7M CO5
- OR**
10. a) Explain the working principle of machine vision. 7M CO5  
 b) Explain the various terminology used in quality control. 7M CO5

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Hall Ticket Number :

R-17

Code: 7G674

IV B.Tech. I Semester Regular Examinations February 2021

**Disaster Management**

( Common to All Branches )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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	Marks	CO	Blooms Level
<b>UNIT-I</b>			
1. a) Explain briefly about how hazards can become a disaster and Summarize the concept of disaster.	8M	CO1	L2
b) Illustrate the differences between hazard and disaster.	6M	CO1	L2
<b>OR</b>			
2. Explain the following terms in an uneducated person:			
a) Disaster			
b) Risk			
c) Vulnerability			
d) Hazard	14M	CO1	L1
<b>UNIT-II</b>			
3. a) Illustrate the effects of the volcanoes on the environment. List out various materials comes out from volcanic eruptions.	7M	CO2	L3
b) State epicenter and focus? Create with a neat diagram? Based on depth how many type types of earthquake are classified.	7M	CO2	L3
<b>OR</b>			
4. a) Write a short note on earthquakes. List out various materials comes out from volcanic eruptions	7M	CO2	L5
b) Demonstrate natural disaster and manmade disaster, what are the effects of disasters on environmental health facilities and services.	7M	CO2	L5
<b>UNIT-III</b>			
5. a) Discuss the role and functions of a Disaster Manager, health effects of global environmental change.	7M	CO3	L3
b) Explain urban disasters and climate change with suitable examples.	7M	CO3	L3
<b>OR</b>			
6. List different disaster impacts and explain any four with the help of a case study.	14M	CO3	L2
<b>UNIT-IV</b>			
7. a) What are the steps involved in risk communication?	7M	CO4	L4
b) What are the drought control measures adopted across the globe?	7M	CO4	L4
<b>OR</b>			
8. a) Illustrate various mitigation measures to be taken at the time of earthquakes.	7M	CO4	L3
b) Elaborate the activities of panchayat raj institutions during disaster.	7M	CO4	L3
<b>UNIT-V</b>			
9. a) Discuss the important steps in relief distribution.	5M	CO5	L3
b) Sustainability, comment on this term and generally write how you can apply sustainability in your daily life with at least 5 examples.	9M	CO5	L3
<b>OR</b>			
10. a) Identify the different types of rehabilitation post disaster.	6M	CO5	L5
b) Discuss about the positive and negative impacts of construction of dams.	8M	CO5	L5

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**R-17**

**Code: 7G573**

IV B.Tech. I Semester Regular Examinations February 2021

**Finite Element Methods**  
( Mechanical Engineering )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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Marks    CO    Blooms Level

**UNIT-I**

1. The displacement field at a point is specified by

$$u = 2x - 5y + 3z,$$

$$V = 3x + 8y - 5z$$

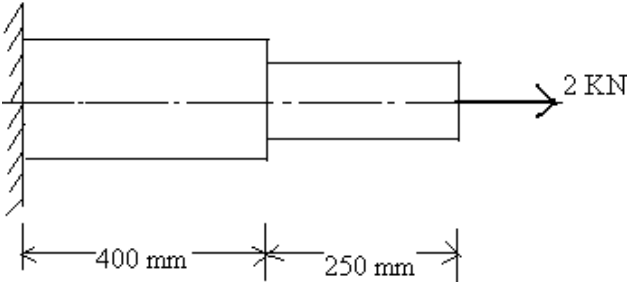
$$W = -x + 2y + 7z.$$

Compute,  $\epsilon_x, \epsilon_y, \epsilon_z, \gamma_{xy}, \gamma_{yz}, \gamma_{zx}$ , if  $E = 200 \times 10^3 \text{ MPa}, \mu = 0.3$

14M    1    L2

**OR**

2. For Stepped bar shown below, calculate the deflection at nodes, elemental stresses and reactions at supports, Take  $A_1 = 2000 \text{ mm}^2, E_1 = 2.1 \times 10^5 \text{ N/mm}^2, L_1 = 400 \text{ mm}, A_2 = 1200 \text{ mm}^2, L_2 = 250 \text{ mm}, E_2 = E_1$ . Use elimination approach to adopt Boundary conditions.



14M    2    L3

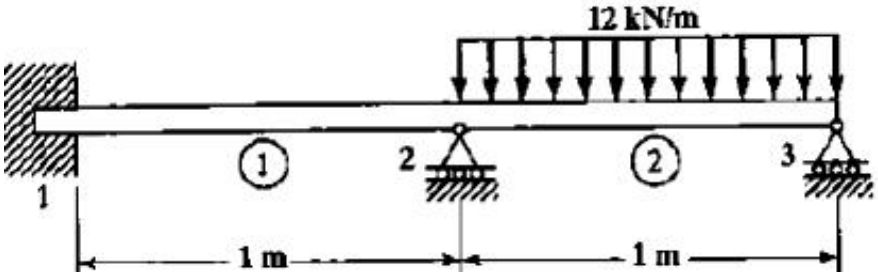
**UNIT-II**

3. Derive the stiffness matrix for a Truss Element

14M    3    L4

**OR**

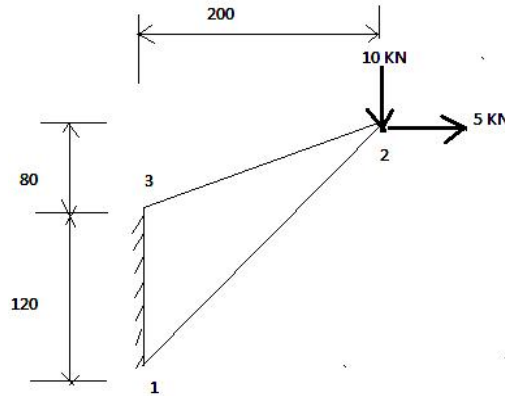
4. For the beam and loading shown in the Fig. Determine the slopes at nodes 2, 3 and vertical deflection at the mid point of the distributed load.  $E = 200 \text{ GPa}$  and  $I = 4 \times 10^6 \text{ mm}^4$



14M    3    L3

**UNIT-III**

5. For the configuration shown in Fig. determine deflection at node 2 using a 1 element model. Also calculate the stress in the element. Given thickness of plate is 1 mm, if  $E = 2 \times 10^5 \text{ N/mm}^2$ ,  $\mu = 0.3$ .



14M 4 L4

**OR**

6. Derive the strain displacement matrix and stiffness matrix for an axis-symmetric element

14M 4 L4

**UNIT-IV**

7. Derive the element stiffness matrix for a quadrilateral iso – parametric element.

14M 5 L4

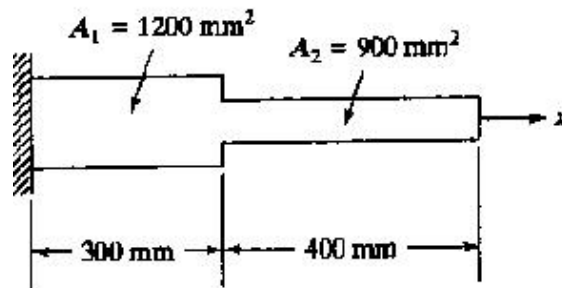
**OR**

8. Heat is generated in a large plate with  $k = 0.7 \text{ w/m}^0\text{c}$  at the rate of  $3000 \text{ w/m}^3$ , the plate is 20cm thickness, outside surface of plate is exposed to atmospheric air at  $35^0\text{c}$  with convective heat transfer coefficient,  $h=25\text{w/m}^2 \text{ }^0\text{c}$ . Determine the temperature distribution in plate by taking 2 elements.

14M 5 L3

**UNIT-V**

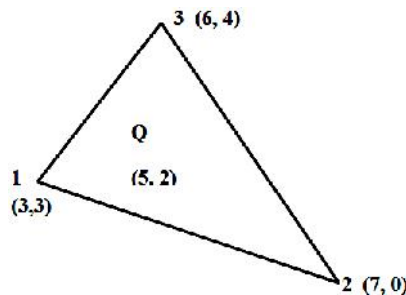
9. Determine the Eigen values and Eigen vectors for the stepped bar shown in the Fig. Take  $E = 200\text{GPa}$ ,  $\rho = 7840\text{kg/m}^3$



14M 6 L3

**OR**

10. A pump pumping fluid at  $Q=6500\text{m}^3/\text{hr}$  is located at coordinates (5, 2) in the element as shown in fig. Find the amount of Q allotted to each node. All nodal coordinates are in mm. Assume unit thickness of  $t=1\text{mm}$ .



14M 6 L3

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Hall Ticket Number :										
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<b>R-17</b>
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**Code: 7GA71**

IV B.Tech. I Semester Regular Examinations February 2021

**Human Resource Management**

( Common to All Branches )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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	Marks	CO	Blooms Level
<b>UNIT-I</b>			
1. a) Define the nature and scope of Human Resource Management	7M	1, 2	1
b) What are the different functions of HRM	7M	1, 2	4
<b>OR</b>			
2. a) What is HRM? Explain about Competitive Challenges influencing HRM.	7M	1, 2	4
b) Differentiate Personnel Management and HRM	7M	1, 2	5
<b>UNIT-II</b>			
3. a) Define HRP. Explain HRP need and importance in an organization.	7M	6, 7, 8	1
b) Explain about different Barriers to HRP.	7M	6, 7, 8	2
<b>OR</b>			
4. a) Define job analysis. Explain the different methods of JE and its process	7M	6, 7, 8	1
b) Define Job Design and its importance in an organization.	7M	6, 7, 8	1
<b>UNIT-III</b>			
5. a) If you are the HR Manager, what type of recruiting methods is using to recruit for Manufacturing and for services industry?	7M	1, 4,	2
b) Define process of recruitment.	7M	1, 4,	1
<b>OR</b>			
6. a) What is recruitment? List out the process of recruitment.	7M	1, 4,	4
b) "A well-thought-out orientation program is essential for all new employees, whether they have experience or not". Explain why you agree or disagree with the above statement.	7M	1, 4,	2
<b>UNIT-IV</b>			
7. a) List and briefly explain about Training Methods	7M	4, 5	1
b) What is the need of training an employee in an organization?	7M	4, 5	4
<b>OR</b>			
8. a) Is an employee should train. If yes list out the advantages and disadvantages of training.	7M	4, 5	4
b) Define different career stages.	7M	4, 5	1
<b>UNIT-V</b>			
9. a) Define what Employee Compensation is and list out the factors influencing Employee Compensation.	7M	3, 4, 5	1
b) Explain the need of IR with respect to HRM	7M	3, 4, 5	2
<b>OR</b>			
10. a) Describe the pros and cons of any four Performance Appraisal tools.	7M	3, 4, 5	2
b) Explain different methods of Performance Appraisal.	7M	3, 4, 5	2

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Code: 7G571

IV B.Tech. I Semester Regular Examinations February 2021

### Operations Research

( Mechanical Engineering )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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Marks	CO	Blooms Level
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## UNIT-I

1. Dimensions Ltd., makes two products, tables and chairs, which must be processed through assembly and finishing departments. Assembly has 60 hours available; finishing can handle up to 48 hours of work. Manufacturing one table requires 4 hours in assembly and 2 hours in finishing. Each chair requires 2 hours in assembly and 4 hours in finishing.

If profit is Rs.80/- table and Rs.60/- chair, the problem is to determine the best possible combination of tables and chairs to produce and sell in order to realize the maximum profit.

14M CO1 K3

OR

2. Solve the following LPP by Simplex method. Use the principle of duality.

$$\begin{aligned} \text{Minimize: } & Z = 2x_1 + 2x_2 \\ \text{Subject to: } & 2x_1 + 4x_2 = 1 \\ & x_1 + 2x_2 = 1 \\ & 2x_1 + x_2 = 1 \end{aligned}$$

$$\text{and } x_1, x_2 \geq 0$$

14M CO1 K3

## UNIT-II

3. There are 4 plants A, B, C and D where planned productions per week are respectively 8, 7, 9 and 4 units. There are four warehouses 1,2,3 and 4 whose forecast requirements are respectively 10, 8, 9 and 1 units. The transportation costs from plant to warehouses are given in table (figures in Rupees). Find the optimal distribution pattern to the transportation model.

		PLANTS			
		A	B	C	D
WARE HOUSES	1	10	8	10	8
	2	10	7	8	10
	3	11	9	9	7
	4	12	14	13	10

14M CO2 K3

OR

4. Four machines  $M_1, M_2, M_3$  and  $M_4$  are to be installed in a machine shop. There are 5 vacant places A, B, C, D and E available. Because of limited space, machine  $M_2$  cannot be placed at C and  $M_3$  cannot be placed at A. The assignment cost of machine – i to place – j ( $C_{ij}$ ) in rupees is shown below. Find the optimal assignment.

	A	B	C	D	E
$M_1$	4	6	10	5	6
$M_2$	7	4	X	5	4
$M_3$	X	6	9	6	2
$M_4$	9	3	7	2	3

14M CO2 K3

## UNIT-III

5. A decision has to be made for group replacement versus individual replacement policy for 500 electric bulbs of a particular make in a university campus. The cost of replacing an individual bulb is Rs.55/- and when replaced as group it is Rs.35/-. Find out an optimal replacement schedule. The Failure rate for the electric bulbs were recorded as follows:

Month	1	2	3	4	5	6
Prob. Of failure	0.11	0.30	0.25	0.20	0.09	0.05

14M CO3 K3

OR

6. The management of a corporation is in the process of deciding whether to agree to negotiate with the striking union now or to delay. The decision is difficult because the management does not know the union leadership's position. The union leaders may be adamant and insist on their original demands, they may be ready to compromise, or they may be ready to yield and accept the original management offer. The matrix of pay offs to management as management sees it, is (in millions of rupees):

		Union position		
		Adamant (B <sub>1</sub> )	Compromise (B <sub>2</sub> )	Yield (B <sub>3</sub> )
Management position	Negotiate(A <sub>1</sub> )	-2	1	3
	Delay (A <sub>2</sub> )	5	-2	-3

(a) Solve management's problem

(b) What should be union's strategy?

14M CO3 K3

<b>UNIT-IV</b>
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7. a) What are the characteristics of a queuing system?  
 b) Consider a self-store with one cashier. Assume Poisson arrivals and exponential service times. Suppose that 9 customers arrive on the average every 5 minutes and the cashier can serve 10 in 5 minutes. Find:  
 i. The average number of customers queuing for service.  
 ii. The probability of having more than 10 customers in the system.  
 iii. The probability that a customer has to queue for more than 2 minutes.  
 iv. Expected size of queue that forms from time to time.

6M CO4 K2

If the service can be speeded up to 12 in 5 minutes by using a different cash register, what will be the effect on the quantities of (i), (ii), (iii)&(iv).

8M CO4 K3

OR

8. a) What is simulation? What are different types of simulation models?  
 b) Explain the phases of simulation.

7M CO4 K2

7M CO4 K2

<b>UNIT-V</b>
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9. The annual usage of an item is 10,00,000 units and the order cost is Rs. 28.80. Assume the following quantity discount price – cost structure.

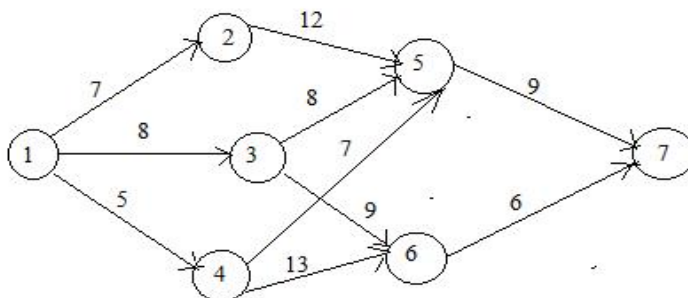
Quantity	Price (Rs.)	Carrying cost (Rs.)
0 – 9,999	2.00	0.40
10,000 – 19,999	1.60	0.32
20,000 and up	1.40	0.28

Find the optimum buying quantity.

14M CO5 K3

OR

10. Find the shortest highway route between cities 1 and 7, shown in the road network, by DP backward recursive approach.



14M CO5 K3

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