Hall Ticket Number :

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer **all** the following short answer questions   (5 X 2 = 10M)   CO   BL

 a) Show infeasibility in LPP using graphical method.   1   L2

 b) What is degeneracy in transportation model?   2   L1

 c) Explain minimax and maximin principles of Game theory.   3   L1

 d) Briefly explain Kendoll's notation for Queueing model.   4   L1

 e) What is the need of dynamic programming and how is it different from
    linear programming.   5   L1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks   CO   BL

UNIT–I

2.   The standard weight of a special purpose brick is 5 kg and it
     contains two basic ingredients B_1 and B_2. B_1 costs Rs 5/- per kg
     and B_2 costs Rs 8/- per kg. Strength considerations dictate that
     the brick contains not more than 4 kg of B_1 and a minimum of 2
     kg of B_2. Since the demand for the product is likely to be related
     to the price of the brick, find graphically the minimum cost of
     the brick satisfying the above conditions.   12M   1   L3

OR

3.   Solve following Linear Programming problem using Simplex
     method.

   Minimize $Z = X_1 - 3X_2 + 3X_3$,
   Subject to

   $3X_1 - X_2 + 2X_3 \quad 7$
   $2X_1 + 4X_2 \qquad -12$,
   $-4X_1 + 3X_2 + 8X_3 \quad 10$,
                           $X_1, X_2, X_3 \quad 0$.   12M   1   L3

UNIT–II

4. Solve the following transportation problem to find minimum transportation cost. Use Vogel's approximation method to find basic feasible solution.

Destination

		A	B	C	D	E	Availability
	X	3	5	8	9	11	20
Origin	Y	5	4	10	7	10	40
	Z	2	3	8	7	7	30
Demand		10	15	25	30	40	

12M 2 L3

OR

5. Five wagons are available at stations 1, 2, 3, 4, and 5. These are required at 5 stations I, II, III, IV and V. The mileages between various stations are given by the table below. How should the wagons be transported so as to minimize the total mileage covered.

	I	II	III	IV	V
1	10	5	9	18	11
2	13	9	6	12	14
3	3	2	4	4	5
4	18	9	12	17	15
5	11	6	14	19	10

12M 2 L3

UNIT–III

6. The cost of a new machine is Rs 5000/-. The maintenance cost during the nth year is given by $Mn = Rs\ 500(n-1)$, where n=1, 2, 3,…. If the discount rate per year is 0.05, after how many years will it be economical to replace the machine by a new one?

12M 3 L3

OR

7. Solve following game using dominance rule to reduce the size of matrix. Given matrix is pay off matrix of player A.

Player B

		1	2	3	4
	1	3	2	4	0
	2	3	4	2	4
Player A	3	4	2	4	0
	4	0	4	0	8

12M 3 L3

UNIT–IV

8. Customers arrive at the First-class ticket counter of a theatre at the rate of 12 per hour. There is one clerk serving the customers at the rate of 30 per hour.
   i. What is the probability that there is no customer at the counter (i.e. that the system is idle)
   ii. What is the probability that there are more than 2 customers at the counter?
   iii. What is the probability that there is no customer waiting to be served?
   iv. What is the probability that a customer is being served and nobody is waiting?   12M   4   L3

OR

9. The arrival of customers and service times of customers are having the following distribution. Simulate this queueing system for 10 periods by using the following random numbers and calculate mean waiting time and mean queue length.

Inter arrival time (min)	Probability	Service time (min)	Probability
6	0.12	7	0.11
7	0.40	8	0.44
8	0.35	9	0.33
9	0.13	10	0.12

Random numbers for arrival: 28, 57, 60, 17, 64, 20, 27, 58, 61, 30
Random numbers for service: 19, 07, 90, 02, 57, 28, 29, 83, 58, 41   12M   4   L3

UNIT–I

10. Find the optimal order quantity for a product for which the price breaks are as follows:

Quantity	Unit Cost
$0 < q < 500$	Rs 10/-
$500 \le q < 750$	Rs 9.25/-
$750 \le q$	Rs 8.75/-

The monthly demand for the product is 200 units, storage cost is 2% of the unit cost and cost of ordering is Rs 100/-   12M   5   L3

OR

11. Solve the following LPP by the method of dynamic programming: Maximize $Z = 2X_1 + 5X_2$
    Subject to $2X_1 + X_2 \le 430$
    $2X_2 \le 460$,
    $X_1, X_2 \ge 0$ 12M   5   L3

*** End ***

R-20

Code: 20A37IT

IV B.Tech. I Semester Supplementary Examinations May / June 2024
Power Plant Engineering
(Mechanical Engineering)

Max. Marks: 70   Time: 3 Hours
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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

		CO	BL
1. Answer *all* the following short answer questions (5 X 2 = 10M)			
a)	Write the different types of coals.	CO1	L2
b)	What are the advantages of Dust Collectors?	CO2	L2
c)	What do you mean by Super Charging?	CO3	L2
d)	Examine the necessity of developing the Hydroelectric Power Plant in context to our Nation	CO4	L4
e)	Explain Tidal Energy.	CO5	L2

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT–I			
2.	Explain Ash Handling System in Thermal Power Plant.	12M	CO1	L2
	OR			
3.	What are different circuits of Power Plant, explain with Diagram?	12M	CO1	L2
	UNIT–II			
4.	Illustrate the Travelling Grate Stokers with its functional parameters.	12M	CO2	L3
	OR			
5.	How do you treat the feed water keeping corrosion in to consideration?	12M	CO2	L3
	UNIT–III			
6.	Classify different types of Internal Combustion Engine.	12M	CO3	L2
	OR			
7.	Derive the Principles of working of Closed Cycle Gas Turbine with diagram.	12M	CO3	L4
	UNIT–IV			
8.	Describe the classification of dams in Hydro Electric Power Plant.	12M	CO4	L2
	OR			
9.	Classify Nuclear Reactor and explain any one Reactor.	12M	CO4	L2
	UNIT–V			
10.	Demonstrate the Solar collector's principal of working with neat diagram.	12M	CO5	L3
	OR			
11.	Examine and comments in your words necessity of controlling about Pollutants emitted by Power plants.	12M	CO5	L4

*** End ***

Code: 20A37QT

IV B.Tech. I Semester Supplementary Examinations May / June 2024

Total Quality Management
(Mechanical Engineering)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer *all* the following short answer questions   (5 X 2 = 10M)   CO   BL

   a) Define the term 'Total Quality'.   CO1   BL1

   b) How are quality statements prepared?   CO2   BL1

   c) What are Continuous Improvement processes in TQM?   CO3   BL2

   d) What is the significance of Quality control tools?   CO4   BL1

   e) What is the need of ISO 9000 system in TQM?   CO5   BL1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

                                                  Marks   CO   BL

UNIT–I

2. State the principles of TQM. List out the obstacles associated with TQM implementation   12M   CO1   BL4

OR

3. Define 'Quality costs'. Discuss in brief about the analysis techniques for 'Quality costs'.   12M   CO1   BL4

UNIT–II

4. Discuss in detail the contributions of Quality gurus in TQM.   12M   CO2   BL4

OR

5. Discuss the characteristics of a good Quality leader in Organizations.   12M   CO2   BL4

UNIT–III

6. Describe Juran's philosophy for Total Quality Management.   12M   CO3   BL4

OR

7. Explain the significance of PDSA cycle in Quality Management.   12M   CO3   BL4

UNIT–IV

8. How is Six sigma applied in Quality Management? Explain in brief.   12M   CO4   BL5

OR

9. Discuss about Taguchi Quality loss function.   12M   CO4   BL5

UNIT–V

10. What are quality systems? How are they implemented for quality management?   12M   CO5   BL4

OR

11. Discuss in brief about the benefits and requirements of ISO 14000 over ISO 9000 system.   12M   CO5   BL4

*** End ***

Code: 20A363T

IV B.Tech. I Semester Supplementary Examinations May/June 2024

CAD/CAM

(Mechanical Engineering)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

		CO	BL
1. Answer **all** the following short answer questions (5 X 2 = 10M)			
a) Define CAD and CAM.		CO1	L1
b) List the wireframe entities used in CAD modeling.		CO2	L1
c) State the use of G90 and M06 functions in CNC programming.		CO3	L2
d) Define CAPP.		CO4	L2
e) What is JIT?		CO5	L2

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL

UNIT–I

		Marks	CO	BL
2.	Describe lifecycle of a product with the help of a neat sketch.	12M	CO1	L2

OR

			Marks	CO	BL
3.	a)	Distinguish between CRT and DVST display devices.	6M	CO1	L2
	b)	Discuss the database structure used in computer graphics.	6M	CO1	L2

UNIT–II

			Marks	CO	BL
4.	a)	Explain the methods used for curve representation.	6M	CO2	L2
	b)	Discuss the characteristics of B-Spline curve.	6M	CO2	L2

OR

		Marks	CO	BL
5.	Derive the parametric equation of Hermite Cubic Spline curve	12M	CO2	L3

UNIT–III

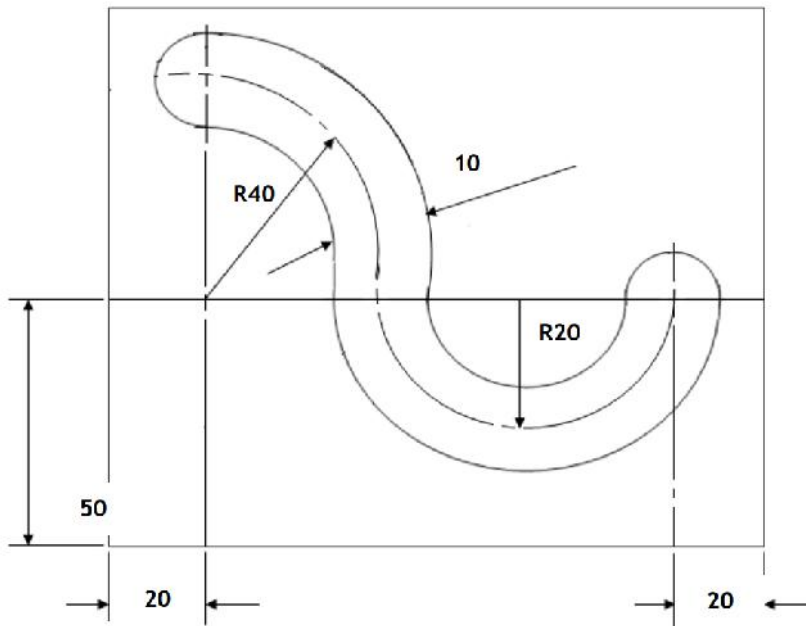|			Marks	CO	BL
6.	a)	Explain the difference between NC point-to-point and contouring systems.	6M	CO3	L2
	b)	Explain the concept of adaptive control of CNC machines.	6M	CO3	L2

OR

7. Write a part program for the square object (100mm x 100mm) shown in the figure below.
    (All dimensions are in mm).

12M CO3 L3

UNIT–IV

8. a) Describe production flow analysis.   6M CO4 L2
    b) Discuss retrieval-type process planning system.   6M CO4 L2

OR

9. a) Discuss the significance of human labour in manufacturing systems.   6M CO4 L2
    b) What do you mean by Group Technology? Explain the concept of parts coding and classification.   6M CO4 L2

UNIT–V

10. a) Explain the construction and working of a CMM.   6M CO5 L2
    b) What are benefits of CIMS?   6M CO5 L2

OR

11. a) Discuss the role of computers in quality systems.   6M CO5 L2
    b) Explain with the help of neat sketch a non-optical inspection method.   6M CO5 L2

*** End ***