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Total No. of Pages : 03

Total No. of Questions : 08

M.Tech.(ME) (Sem.-1)

OPTIMIZATION TECHNIQUES

Subject Code : MME-501

M.Code : 38202

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

- Q1. a) Explain the important characteristics of the industrial situation to which I.P. method can be successfully applied. Illustrate application of these technique with a suitable example.
- b) A company sells two different products A and B the company makes a profit of Rs. 40 and Rs. 30 on two products respectively. They are produced by a common production process and are sold in two different markets. The production process has a capacity of 30,000 man hours. It takes 3 hours to produce a unit of A and 1 hour to produce a unit of B. The maximum number of Units of A and B that can be sold in the market are 8000 and 12,000 respectively. Formulate the above as linear programming model.
- Q2. A person require 10, 12 and 12 units of chemical A, B and C respectively for his garden. A liquid product contains 5, 2 and 1 unit of A, B and C respectively per jar. A dry product contains 1, 2 and 4 units of A, B and C per carton. If the liquid product sells for Rs. 3 per jar and the dry product sells for Rs. 2 per carton. How many of these should be purchased to minimize the cost and meet the requirement.
- Q3. Obtain the initial solution by VAM and optimal solution by MODI method for the transportation problem shown below :

	A	B	C	Supply	
	W1	5	4	6	65
	W2	7	4	7	42
Demand	W3	8	6	7	43



- Q4. Five machine are to be located in the machine shop. There are five possible locations in which the machine can be located. C_{ij} the cost of placing i in place j is given in the table below.

		Place				
		1	2	3	4	5
Machine	1	15	10	25	25	10
	2	1	8	10	20	2
	3	8	9	17	20	10
	4	14	10	25	27	15
	5	10	8	25	27	12

It is required to place the machines at suitable place so as to minimize the total cost.

- Formulate an L.P. model to find an optimal assignment.
 - Solve the problem by assignment technique of L.P.
- Q5. Consider the following table :
- | Activity | Predecessor Activity | Times in Weeks | | |
|----------|----------------------|----------------|-------|-------|
| | | t_0 | t_m | t_p |
| A | - | 2 | 3 | 10 |
| B | - | 2 | 3 | 4 |
| C | A | 1 | 2 | 3 |
| D | A | 4 | 6 | 14 |
| E | B | 4 | 5 | 12 |
| F | C | 3 | 4 | 5 |
| G | D,E | 1 | 1 | 7 |
- Draw the network diagram path.
 - Find the critical path and variance of each event.
 - What is the probability that the project will be completed in 16 weeks?
- Q6.
 - What is dynamic programming? Write step by step procedure to solve a general problem by D.P.
 - Write the algorithm for Fibonacci search method.

Q7. Solve the following game by the principle of dominance :

		Player B					
		I	II	III	IV	V	VI
Player A	1	4	2	0	2	1	1
	2	4	3	1	3	2	2
	3	4	3	7	-1	1	2
	4	4	3	4	-5	2	2
	5	4	3	3	-2	2	2

Q8. Find the minimum of the function using the Newton-Raphson method with the starting point $\lambda_1 = 0.1$. Use $\epsilon = 0.01$ for checking the convergence.

$$f(\lambda) = 0.65 - \frac{0.75}{1+\lambda^2} - 0.65\lambda \tan^{-1} \frac{1}{\lambda}$$

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.