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Question Paper Code: 55704

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fifth Semester

Mechanical Engineering

15UME504 - OPERATIONS RESEARCH

(Regulation 2015)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

- Linear programming problem involving only two variable can be solved by CO1- R
 - Big M method
 - Simplex method
 - Graphical method
 - None of the these
- The linear function of the variables which is to be maximize or minimize is called CO1- R
 - Constraints
 - Objective function
 - Decision variable
 - None of them
- MODI method is also called as CO2- R
 - North west comer rule
 - Least cost method
 - U-V method
 - Stepping stone method
- Johnson's algorithm is used to find for _____ problem. CO2- R
 - Transportation
 - Travelling salesman
 - Sequencing
 - Assignment
- The critical path of a network is the CO3- R
 - Path with the fewest activities
 - Shortest time path through the network
 - Longest time path through the network
 - Path with the most activities

6. In a CPM / PERT network a dummy activity is necessary when CO3- R
- (a) Two activities have the same starting node
 - (b) Two activities have the same ending node
 - (c) A node does not actually connect to another nod
 - (d) When two activities share the same starting and ending node
7. One of the important basic objective of inventory management is CO4- R
- (a) To calculate EOQ for all materials in the organization
 - (b) To go in person to the market and purchase the materials
 - (c) To employ the available capital efficiently so as to yield maximum results
 - (d) Once materials are issued to the departments, personally check how they are used
8. Group replacement policy is most suitable for CO4- R
- (a) Trucks
 - (b) Infant machines
 - (c) Street light bulbs
 - (d) New cars
9. A mixed strategy game can be solved by CO5- R
- (a) Algebraic method
 - (b) Matrix method
 - (c) Graphical Number of players
 - (d) All of the above
10. This department is responsible for the development of queuing theory CO5- R
- (a) Railway station
 - (b) Municipal office
 - (c) Telephone department
 - (d) Health department

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Using graphical method, solve the following L.P.P. CO1- App (8)
 Maximize $Z = 2x_1 + 3x_2$
 Subject to $x_1 - x_2 \leq 2$
 $x_1 + x_2 \geq 4$ and $x_1, x_2 \geq 0$.
12. Solve the transportation problem CO2- App (8)

	To				
					Supply
	1	2	3	4	6
	4	3	2	0	8
	0	2	2	1	10
Demand	4	6	8	6	

13. Consider the details of a distance network as shown in below

CO3 Ana (8)

- (i) Construct a project network
- (ii) Determine the maximal flow from node 0 to 5

AVC (i-j)	Flow	
	fij	fji
0-1	11	-
0-2	12	-
1-3	12	-
2-1	1	-
2-4	11	-
3-4	7	-
3-5	19	-
4-5	4	-

14. A factory needs 36000units annually of a component that cost Rs 2 per unit. CO4- App (8)

Cost of each order placing is Rs 25 and inventory carrying cost is Rs 10 per year.

- (i) Find the economic lot size and the total inventory cost.
- (ii) What is the time between placing of order.
- (iii) The supplier offers 2% discount if a single order is placed. Should the company accept it.

15. Sunil Medicals is manned by three salesmen. Any salesman can provide CO5-App (8)

desired service to any customers. The customers arrive at the counter according to Poisson distribution at an average rate of 30 per hour. The service time is exponential with a mean rate of 3 min.

- (i) What fraction of time are all three attendants busy.
- (ii) What is the mean number of customers waiting to be attended.
- (iii) What average time does a customer spend at the shop.
- (iv) What is the probability that a customer has to wait.