Sub Code:MAM702

Paper Id: 293722 Roll No:

MAM
(SEM VII) THEORY EXAMINATION 2019-20
OPERATIONS RESEARCH

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. Define Operation Research.
b. What is Transportation Problem?
c. Write any two limitations of OR.
d. Define Uncertainty.
e. What is Duality in LPP?
f. Define Pure and Mixed Strategy of Game Theory.
g. Write any four roles of Project Management.
h. What do you mean by Infeasible Solution in LPP?
i. Describe Artificial Variable.
j. Define Crashing of Operations.

SECTION B

2. Attempt any *three* of the following: 10x3=30

a. "Operations Research is a bunch of mathematical techniques to break industrial problems".Critically comment
b. Explain the following:
   (i) Saddle Point
   (ii) M/M/I Queue Model
c. Explain the differences and similarities between Assignment problem and Transportationproblem.
d. Explain Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT).
e. What is a replacement problem? Describe various types of replacement problems. What are the situations which make the replacement of item necessary?

SECTION C

3. Attempt any *one* part of the following: 10x1=10

a. Define the term Decision theory. Describe decision models based on the criterion of degree of certainty.
b. Minimize

$$12.5x_1 + 14.5x_2$$

Subject to:

$$x_1 + x_2 \geq 2000$$
$$0.4x_1 + 0.75x_2 \geq 1000$$
$$0.075x_1 + 0.1x_2 \leq 200$$
$$x_1, x_2 \geq 0$$

4. Attempt any *one* part of the following: 10x1=10

a. Explain the procedure followed in simplex method of solving linear programming problem.
b. A company owns two flour mills viz. A and B, which have different production capacities for high, medium and low quality flour. The company has entered a contract to supply flour to a firm every month with at least 8, 12 and 24 quintals of high, medium and low quality respectively. It costs the company Rs.2000 and Rs.1500 per day to run mill A and B respectively. On a day, Mill A produces 6, 2 and 4 quintals of high, medium and low quality flour, Mill B produces 2, 4 and 12 quintals of high, medium and low quality flour respectively. How many days per month should each mill be operated in order to meet the contract order most economically.

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5. Attempt any *one* part of the following: 10x1=10

a. What is a game in game theory? What are the properties of a game? Explain the "beststrategy" on the basis of minimax criterion of optimality.

b. Solve the following unbalanced assignment problem of minimizing the total time for performing all the jobs.

		Jobs				
		1	**2**	**3**	**4**	**5**
Workers	**A**	5	2	4	2	5
	B	2	4	7	6	6
	C	6	7	5	8	7
	D	5	2	3	3	4
	E	8	3	7	8	6
	F	3	6	3	5	7

6. Attempt any *one* part of the following: 10x1=10

a. Explain the methodology of Johnson and Bellman method to solve sequencing problem.

b. Vehicles are passing through a toll gate at the rate of 70 per hour. The average time to pass through the gate is 45 seconds. The arrival rate and service rate follow Poisson Distribution. There is a complaint that the vehicles wait for a long duration. The authorities are willing to install one more gate to reduce the average time to pass through the toll gate to 35 seconds if the idle time of the toll gate is less than 9% and the average queue length at the gate is more than 8 vehicles, check whether the installation of the second gate is justified?

7. Attempt any *one* part of the following: 10x1=10

a. "Network analysis is the general name given to certain specific techniques which can be used for the planning, management and control of projects." Explain.

b. The following details are available regarding a project:

Activity	**Predecessor Activity**	**Duration (Weeks)**
A	-	3
B	A	5
C	A	7
D	B	10
E	C	5
F	D,E	4

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