PG – 598

II Semester M.B.A. Degree Examination, July 2018
(CBCS Scheme)
MANAGEMENT
2.6 : Quantitative Techniques and Operation Research

Time : 3 Hours Max. Marks :70

***Instruction** : Calculators and tables are **allowed**.*

SECTION – A

Answer **any five** of the following questions, **each** question carries **five** marks. **(5x5=25)**

1. Discuss the assumptions of Replacement Theory.

2. Explain the role and importance of operation research in managerial decisions.

3. Explain with examples how linear programming is useful for decision making.

4. Solve graphically

   Maximize $Z = 5x_1 + 4x_2$

   Subject to $4x_1 + x_2 \leq 40$

   $2x_1 + 3x_2 \leq 90$

   where $x_1, x_2 \geq 0$

5. A telephone repairman finds that the time spent on his job has an exponential distribution with a mean of 20 minutes. If he repairs sets in the order in which they came in and if the arrival of sets fallows a poisson distribution approximately with an average rate of 10 per hour day. What is the repairman's expected idle time each day ? How many Jobs are ahead of the average set just brought in ?

P.T.O.

6. Solve the assignment problem for minimum optimal cost

Persons \ Jobs	1	2	3	4	5
A	8	4	2	6	1
B	0	9	5	5	4
C	3	8	9	2	6
D	4	3	1	0	3
E	9	5	8	9	5

7. There are Four Jobs to be processed on each of the five Machines A, B, C, D and E in the order ACDBE. Find the total minimum elapsed time, if no passing jobs is permitted.

Jobs \ Machines	A	B	C	D	E
J_1	7	5	2	3	9
J_2	6	6	4	5	10
J_3	5	4	5	6	8
J_4	8	3	3	2	6

SECTION – B

Answer **any three** of the following, **each** question carries **ten** marks. **(3×10=30)**

8. What is game theory ? Explain the assumptions made in the game theory. How it is helpful for business ?

9. Solve the following LPP by Simplex Method.

Max $Z = 20x_1 + 6x_2 + 8x_3$

Subject to $8x_1 + 2x_2 + 3x_3 \leq 200$

$4x_1 + 3x_2 \leq 100$

$2x_2 + x_3 \leq 50$

where x_1, x_2 and $x_3 \geq 0$

10. A project consists of the following activities, whose time estimates are given against each as under :

Activity	Estimated duration (weeks)		
	Optimistic	Most likely	Pessimistic
1 – 2	3	6	15
1 – 3	2	5	14
1 – 4	6	12	30
2 – 5	2	5	8
2 – 6	5	11	17
3 – 6	3	6	15
4 – 7	3	9	27
5 – 7	1	4	7
6 – 7	4	19	28

Required :

1) Draw the project network.
2) Determine the critical path and the expected project duration.
3) What is the probability that the project will be completed in 40 weeks ?
4) What project duration will have 95% chance of completion ?

11. A computer has 2000 electronic tubes maximum life of which is 500 hours. The probability of failure at different periods of time is as follows :

Period (100 hours)	Age at failure (Hrs)	Probability of failure
1	0 – 100	0.10
2	101 – 200	0.26
3	201 – 300	0.35
4	301 – 400	0.22
5	401 – 500	0.07

Replacement of an individual tubelight failing during service costs ₹ 60 per tube, while in case of group replacement at fixed interval is ₹ 15 per tube.

i) How the replacement should be done
   a) Individually or b) in group

ii) When the tubes should be replaced.

SECTION – C

12. Case study (**compulsory**) : **(15x1=15)**

A company has 3 factories and 4 customers. The company furnishes the following schedule of profit per unit on transportation of its goods to the customers in rupees.

		Customers				
		A	B	C	D	Supply
Factory	P	40	25	22	33	100
	Q	44	35	30	30	30
	R	38	38	28	30	70
	Demand	40	20	60	30	

You are required to solve the transportation problem to maximize the profit and determine the resultant optimal profit.