(040940202/445921B)

M.Sc. DEGREE EXAMINATION, APRIL 2018.

FOURTH SEMESTER

Branch — Mathematics

Paper II — OPERATION RESEARCH

Time : 3 Hours *Max. Marks : 80*

PART – A

Answer any FIVE of the following.

(Marks : 5 × 4 marks = 20 marks)

1. Solve the following LPP using graphical method :

   Maximize : $Z = 2x_1 + 3x_2$

   Subject to $x_1 + x_2 \leq 2$

   $2x_1 + x_2 \leq 4$,

   $x_1 \geq 0, x_2 \geq 0$.

2. Explain Vogel's approximation method to find initial, basic feasible solution to the given transportation problem.
3. Explain different costs associated with inventory.
4. Explain (M / M / C) : (GD / ∞ / ∞) model.
5. What are the applications dynamic programming problem?
6. Write about recursive function.
7. Explain (a) pure strategy (b) mixed strategy (c) minimax principle.
8. What are the rules for network construction?

PART – B

Answer ONE question from each Unit.

(Marks : 4 × 15 marks = 60 marks)

UNIT – I

9. Use Big M method to solve the following LPA.

   Minimize : $Z = 2x_1 + x_2$

   Subject to the constraints

   $3x_1 + x_2 = 3$

   $4x_1 + 3x_2 \geq 6$

   $x_1 + 2x_2 \leq 3$

   $x_1 \geq 0,\ x_2 \geq 0$.

Or

[P.T.O]

10. Solve the following transportation problem for optimum solution :

Origins	Destinations D_1	D_2	D_3	Supply
O_1	2	7	4	5
O_2	3	3	1	8
O_3	5	4	7	7
O_4	1	6	2	14
Demand	7	9	18	

UNIT – II

11. An automobile factory manufactures a particular type of gear with in the factory. This gear based in the fixed assembly. The particulars of this gear are demand rate r = 14,0 units/year, Production rate k = 35,000 units/year setup cost, C_0 = Rs.500 per set up a carrying cost C_c = Rs.15 unit/year. Find the economic batch quantity and cycle time.

Or

12. The arrival rate of customers at a banking counter follows poission distribution with a me of 45 per hour. The service rate of the counter clerk also follows poisson distribution wit mean of 60 per hour.

(a) What is the probability of having 0 customer in the system?

(b) What is the probability having 5 customers in the system?

(c) What is the probability of having 10 customers in the system?

(d) Find Ls, Lq, Ws and Wq.

UNIT – III

13. Use dynamic programming to solve the following LPP :

Maximize : $Z = 10x_1 + 30x_2$

Subject to $3x_1 + 6x_2 \leq 168$

$12x_2 \leq 240$

$x_1, x_2 \geq 0.$

Or

14. Solve the following model of the optional subdividing of a cable of length 20 units into f parts such that the product of their lengths is maximized using dynamic programmi technique.

Maximize : $Z = P_1 P_2 P_3 P_4$

Subject to $P_1 + P_2 + P_3 + P_4 = 20$

$P_1, P_2, P_3, P_4 > 0.$

UNIT – IV

15. Use the concept of dominance to solve the following game :

		B			
		I	II	III	IV
A	I	3	2	4	0
	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

Or

16. The following table gives the activities in a construction project and time duration :

Activity	Preceding activity	Normal time (days)
1-2	–	20
1-3	–	25
2-3	1-2	10
2-4	1-2	12
3-4	1-3, 2-3	5
4-5	2-4, 3-4	10

(a) Draw the activity network of the project.

(b) Find the total float and free float for each activity.

(c) Determine the critical path and project duration.
