Q.P. Code – 56631

Sixth Semester B.B.M. Degree Examination, April/May 2019

(CBCS Scheme)

Management

OPERATIONAL RESEARCH

Time : 3 Hours] *[Max. Marks : 90*

Instructions to Candidates : Answer should be written only in English. Use of graphs is allowed.

SECTION – A

1. Answer any **TEN** sub questions. Each question carries **2** marks. **(10 × 2 = 20)**

   (a) What is crashing of projects?

   (b) Define operation research.

   (c) What is simulation?

   (d) What is float?

   (e) Distinguish between activity and event.

   (f) What is the objective of transportation problem?

   (g) What are the different inventory cost?

   (h) What do you mean by optimal solution?

   (i) State the meaning of pay-off.

   (j) What is expected value?

   (k) What is feasibility region?

   (l) State two advantages of operation research.

SECTION – B

Answer any **FIVE** questions. Each question carries **5** marks. **(5 × 5 = 25)**

2. Describe PERT as an effective planning and a controlling technique in managing a project.

3. Consider the problem and solve with graphical method.

   Maximise $Z = 20x_1 + 30x_2$ - profit function

   Subject to $2x_1 + 5x_2 \leq 50$ - material constraint

   $4x_1 + 3x_2 \leq 60$ - labour constraint

   $x_1\ x_2 + \geq 0$ - non-negatively

4. State the scope of operation research.

5. A Box has 5 white, 4 Red and 3 Green balls, two balls are drawn at random from the box find the probability that they are

   (a) of the same colour

   (b) of different colours.

6. Solve the following by North West Corner Method (NWCM)

	W_1	W_2	W_3	Supply
P_1	7	6	9	20
P_2	5	7	3	28
P_3	4	5	8	17
Demand	21	25	19	65

7. Annual consumption – 20,000 units

   Ordering and receiving of material cost – Rs. 20 per order

   Annual carrying cost or storage cost – 10% of inventory value

   Cost of material per unit – Rs. 50

   Find out :

   (a) EOQ in units

   (b) EOQ in rupees.

8. Draw the network and indentify the critical path from the following information :

Activity	1–2	2–3	2–4	2–5	3–5	4–5
Duration	3	5	7	8	6	9

SECTION – C

Answer any **THREE** questions. Each question carries 15 marks. **(3 × 15 = 45)**

9. Explain the types of operations research models.

10. A company has 3 factories ABC which supply to 4 warehouses at PQR & S. The monthly production capacity (tons) A,B, & C are 120, 80, & 200 respectively. The monthly requirement (tons) for the ware houses P Q R & S are 60, 50, 140 & 50 respectively the transportation cost (Rs. Per ton) matrix is given below :

	Factories		
	A	B	C
P	4	3	7
Q	5	8	4
R	2	4	7
S	5	8	4

Solve through VAM and LCM method.

11. A Product comprised of 10 activity whose normal time and cost are given as follows :

Normal Time :	1-2	2-3	2-4	2-5	3-5	4-5	5-6	6-7	6-8	7-8
Normal Cost :	50	5	70	120	42	0	54	67	130	166

(a) Draw the network and identify the critical path.

(b) What is the project duration?

(c) Find out the total float associated with each activity.

12. A company is faced with the problem of assigning five jobs to five machines, each job must be done on only one machine, the cost of processing each job on each machine is given below (in Rs.)

		Machine				
		M_1	M_2	M_3	M_4	M_5
Jobs	J_1	7	5	9	8	11
	J_2	9	12	7	11	10
	J_3	8	5	4	6	9
	J_4	7	3	6	9	5
	J_5	4	6	7	5	11

The problem is to determine the assignment of jobs to machines so that it will result in minimum cost.

13. Maruti Motor Company require 50000 units of a speed meter per year. The ordering, receiving and hauling cost is Rs. 3 per order, while inspection cost is Rs. 12 per order, further details are as follows :

    Interest cost Rs. 0.06 per unit per year

    Deterioration and obsolescence cost Rs. 0.004 per unit per year

    Storage cost Rs. 1,000 per year for 50,000 units.

    Calculate the :

    - EOQ
    - Recorder period
    - Number of orders per year
    - Total variable cost of inventory
