



K24P 1406

Reg. No. :

Name :

Second Semester M.C.A. Degree (CBSS – Reg./Supple./Imp.)
Examination, May 2024
(2020 Admission Onwards)
Stream 6 – Software Engineering
MCA 2E01 : OPERATIONS RESEARCH

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer **all** questions. **Each** question carries **2** marks.

1. Define degeneracy.
2. What is a feasible solution ?
3. What are travelling salesman problems ?
4. What are the basic assumptions in transportation technique ?
5. Define (i) State (ii) Return function.
6. What is the concept behind the branch and bound method of solving the integer programming problem ?
7. Distinguish between processing time and idle time in sequencing problem.
8. What are the advantages of network techniques ?
9. Explain Markov chains.
10. What are the applications of queuing theory ?

(2×10=20)

P.T.O.



SECTION – B

Answer **all** questions. **Each** question carries **8** marks.

11. a) Solve graphically

$$\text{Maximize } Z = 3x_1 + 2x_2$$

$$\text{Subject to } -2x_1 + x_2 \leq 1$$

$$x_1 \leq 2$$

$$x_1 + x_2 \leq 3$$

$$x_1, x_2 \geq 0$$

OR

b) Solve using two phase method

$$\text{Minimize } Z = x_1 + x_2$$

$$\text{Subject to } 2x_1 + x_2 \geq 4$$

$$x_1 + 7x_2 \geq 7$$

$$x_1, x_2 \geq 0$$

12. a) A manufacturer wants to ship 8 loads of his product as shown below. Shipping costs are Rs. 10 per load. Find the minimum cost for shipping.

	Destination			Supply
	I	II	III	
X	50	30	220	1
Y	90	45	170	3
Z	250	200	50	4
Demand	4	2	2	

OR

b) Find the optimum solution to the following assignment problem showing the cost (Rs.) for assigning workers to jobs.

	Job		
	x	y	z
A	18	17	16
B	15	13	14
C	19	20	21



13. a) Solve the following linear integer programming problem graphically.

$$\text{Maximize } Z = 14x_1 + 16x_2$$

$$\text{Subject to } 4x_1 + 3x_2 \leq 12$$

$$6x_1 + 8x_2 \leq 24$$

$$x_1, x_2 \geq 0 \text{ and are integers.}$$

OR

b) Solve the following problem

$$\text{Maximize } Z = u_1 \cdot u_2 \cdot u_3$$

$$\text{Subject to } u_1 + u_2 + u_3 = 10$$

$$u_1, u_2, u_3 \geq 0$$

14. a) A project has the following time schedule :

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

Construct the network diagram and compute total float for each activity.

OR

b) i) What are the steps involved in critical path method ?

ii) Define the terms EST, LFT, EFT and LST.

15. a) Explain (M/M/1) queuing model.

OR

b) Explain queuing system with the help of a diagram.

(8×5=40)