



K21P 3111

Reg. No. :

Name :

**II Semester M.C.A. Degree (C.B.S.S.-Regular) Examination, May 2021
(2020 Admission)
STREAM 6 – SOFTWARE ENGINEERING (Elective)
MCA2E01 : Operation Research**

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer all questions. Each question carries two marks.

1. Define surplus variables.
2. What do you mean by feasible solution ?
3. Explain the relationship between primal and its dual.
4. Explain assignment problem briefly.
5. List two applications of integer programming problem.
6. State 'Principle of optimality' in dynamic programming.
7. Distinguish between CPM and PERT.
8. Define free float and total float.
9. Explain 'birth and death' process.
10. What is jockeying in queuing theory ?

P.T.O.



SECTION – B

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

11. a) Solve graphically

$$\text{Minimise } z = 3x_1 + 2x_2$$

$$\text{Subject to } 2x_1 + x_2 \geq 24$$

$$x_1 + x_2 \geq 4$$

$$x_1, x_2 \geq 0$$

OR

b) Solve the following LPP by Big-M method

$$\text{Minimise } z = 4x_1 + x_2$$

$$\text{Subject to } 3x_1 + x_2 = 3$$

$$4x_1 + 3x_2 \geq 6$$

$$x_1 + 2x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

12. a) Solve the following LPP by dual simplex method

$$\text{Minimise } z = 4x_1 + x_2 + x_3$$

$$\text{Subject to } 3x_1 + x_2 + x_3 \geq 3$$

$$-3x_1 + 3x_2 + x_3 \geq 3$$

$$x_1 + x_2 + x_3 \leq 3$$

$$x_1, x_2, x_3 \geq 0$$

OR

b) Explain Travelling Sales person problem with example.

13. a) Solve the IPP

$$\text{Maximise } z = 7x_1 + 10x_2$$

$$\text{Subject to } -x_1 + 3x_2 \leq 6$$

$$7x_1 + x_2 \leq 35$$

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

OR

b) Briefly describe applications of dynamic programming.



14. a) Jobco uses a single machine to process three jobs. Both the processing time and the due date (in days) for each job are given in the following table. The due dates are measured from zero, the assumed start time of the first job.

Job	Processing time (day)	Due date (day)	Late penalty(\$ day)
1	5	25	19
2	20	22	12
3	15	35	34

Determine the job sequence that minimises the late penalty for processing all three jobs.

OR

- b) A plant manager has four subordinates and four tasks to be performed. The subordinates differ in efficiency and the tasks differ in their intrinsic difficulty. This estimate of the times each man would take to perform each task is given in the effectiveness matrix below.

	I	II	III	IV
A	8	26	17	11
B	13	28	4	26
C	38	19	18	15
D	19	26	24	10

How should the tasks be allocated, one to a man, so as to minimize the total man hours ?

15. a) Discuss about queueing model and its characteristics.

OR

- b) Write a note on Discrete Parameter Markov chain and Continuous Parameter Markov chain.
