K22P 0911

Reg. No. : .....

Name : .....

II Semester M.C.A. Degree (CBSS – Reg./Supple./Imp.) Examination, May 2022
(2020 Admission Onwards)
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 slack variables.
2. Explain degeneracy.
3. Explain the relationship between primal and its duel.
4. Explain transportation problem briefly.
5. What is integer programming problem ?
6. List basic elements of a DP model.
7. What is PERT ?
8. Define float and free float.
9. Explain 'birth and death' process.
10. What is reneging in queuing theory ?

P.T.O.

SECTION – B

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

11. a) Solve by simplex method

Minimise $z = 3x_1 + 2x_2$

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

Minimise $z = 2x_1 + x_2$

Subject to $x_1 + x_2 \leq 6$

$x_1 \leq 4$

$x_1, x_2 \geq 0.$

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

Minimise $z = 3x_1 + 5x_2 + 2x_3$

Subject to $-x_1 + 2x_2 + 2x_3 \geq 3$

$x_1 + 2x_2 + x_3 \geq 2$

$-2x_1 - x_2 + 2x_3 \geq -4$

$x_1, x_2, x_3 \geq 0.$

OR

b) Write the algorithm for Vogal's Approximation method.

13. a) Solve the IPP

Maximise $z = 5x_1 + 4x_2$

Subject to $x_1 + x_2 \leq 5$

$10x_1 + 6x_2 \leq 45$

$x_1, x_2 \geq 0$ and integer.

OR

b) What is dynamic programming problem ? Explain its characteristics.

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	16	52	34	22
B	26	56	8	52
C	78	38	36	30
D	38	52	48	20

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) Explain the pure death model in queuing theory.