(8 Pages) **Reg. No. :** .....

Code No. : 20693 E **Sub. Code : SMCA 43**

B.C.A. (CBCS) DEGREE EXAMINATION, APRIL 2021.

Fourth Semester

Computer Application — Core

RESOURCE MANAGEMENT TECHNIQUES

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following of the feasible solution space provide basic feasible solution of LPP?

   (a) extreme points (b) origin

   (c) interior points (d) multiple points

2. The number of basic variables in a linear system of m equations with n unknowns is _____

   (a) n (b) m

   (c) $n - m$ (d) $n + m$

3. If the number of tasks is not equal to the number of persons, then the AP is called _____

(a) maxinlisation (b) unbalanced

(c) balanced (d) prohibited

4. In an assignment problem, the supply amount and the demand amount are _____

(a) n (b) $n - 1$

(c) 1 (d) –1

5. Which of the following algorithm is used to find the minimum spanning tree?

(a) Prim's (b) Dijkstra's

(c) Gauss (d) Stepping stone

6. The dual of the maximum flow problem is called

(a) minimum cut (b) transportation

(c) assignment (d) minimum flow

7. If two or more parallel activities have the same head and tail events, we must introduce _____

(a) predecessor activity

(b) dummy activity

(c) successor activity

(d) arrow

8. Which of the following is a good measure oldie variability of an activity?

(a) mode (b) mean deviation

(c) mean (d) standard deviation

9. The course of action adopted by each player is called _____

(a) strategy (b) dominance

(c) maximin value (d) minimax value

10. The time interval between placing an order and its actual arrival is called _____

(a) demand (b) lead time

(c) order cycle (d) holding charge

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Write the advantages and disadvantages of the linear programming problem.

Or

(b) Define :

(i) Basic solution

(ii) Feasible solution.

(iii) Degenerate and non-degenatate solution.

12. (a) Write short note on the travelling salesman problem.

Or

(b) A depariment head has three subordinates and four tasks to be completed. The subordinates differ in efficiency. The estimate of the time each subordinates takes is given below. How should the head allocate the tasks in order to minimise the time?

	1	2	3
I	9	26	15
II	3	27	6
III	35	20	15
IV	18	30	20

13. (a) Two jobs are to be performed on five machines A, B. C, D, E. Processing times are given in the following table.

Machine sequence	A	B	C	D	E
Job 1 Duration	3	4	2	6	2
Machine sequence	B	C	A	D	E
Job 2 Duration	5	4	3	2	6

Find the total elapsed time and idle time for job-1 and job-2.

Or

(b) Define the minimum spanning tree and write the Prim's algorithm for finding the minimum spanning tree.

14. (a) List all the rules for the network construction and labelling the events.

Or

(b) Write all the steps in time-cost optimisation algorithm.

15. (a) Explain the maximin principle and the minimax principle.

Or

(b) Define inventory and list the costs associated with inventory.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Solve the following LPP using the simplex method

Maximise $z = x_1 + x_2 + 3x_3$

Subject to $3x_1 + 2x_2 + x_3 \leq 3$

$2x_1 + x_2 + 2x_3 \leq 2$

$x_1, x_2, x_3 \geq 0.$

Or

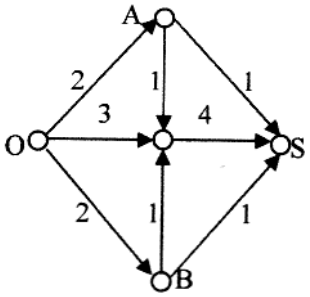
(b) Write all the steps in the simplex algorithm.

17. (a) A salesman has to visit five cities A, B, C, D, E starting from a A and returning to A, with the condition that he has to visit each city only once. The time matrix given below shows the time in hours. Find the minimum time required.

	A	B	C	D	E
A	∞	4	7	3	4
B	4	∞	6	3	4
C	7	6	∞	7	5
D	3	3	7	∞	7
E	4	4	5	7	∞

Or

(b) In the network shown below, find the maximum flow and verify the Max flow-Mm cut theorem.



18. (a) Write the procedure for processing two jobs through m – machines problem.

Or

(b) Find the sequence that minimises the total elapsed time for performing the following jobs on three machines A, B and C in the order A-B-C. Processing times are in the following table

Jobs	1	2	3	4	5
A	8	10	6	7	11
B	5	6	2	3	4
C	4	9	8	6	5

19. (a) A project has the following time schedule :

Activity	1-2	1-3	2-4	3-4	3-5	4-9	5-6
Duration (weeks)	4	1	1	1	6	5	4

Activity	5-7	6-8	7-8	8-9	8-10	9-10
Duration (weeks)	8	1	2	1	8	7

Construct PERT network and find

(i) T_E and T_L for each event.

(ii) Critical path and its duration.

Or

(b) Mention all the steps in the PERT planning process.

20. (a) Solve the following game graphically

	Player – B	
Player – A	B_1	B_2
A_1	–6	7
A_2	4	–5
A_3	–1	–2
A_4	–2	5
A_5	7	–6

Or

(b) Find the optimum order quantity for a product for which the price breaks are as follows

Quantity	Unit Cost(in ₹)
$0 \leq Q < 500$	10.00
$500 \leq Q$	9.25

The monthly demand for the product is 200 units, the cost for storage is 2% of the unit cost and the cost of ordering is ₹ 350.00.
