

Reg. No. :

Code No. : 30695 E Sub. Code : SMCA 43

B.C.A (CBCS) DEGREE EXAMINATION,
NOVEMBER 2020.

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. The collection of variables not set equal to zero to obtain feasible solution is called _____.
(a) Divisibility (b) Basis
(c) BFS (d) None of these
2. _____ = current pivot row ÷ pivot element
(a) New pivot row (b) New row
(c) New column (d) New element

3. A BFS must have _____ allocations.
- (a) $M + n$ (b) m
(c) n (d) $m + n - 1$
4. An assignment problem is obtained by _____.
- (a) Hungarian (b) TP method
(c) LPP method (d) Simplex method
5. A gantt chart is a type of bar chart developed by _____.
- (a) Gantt (b) Hentry Gantt
(c) Jordan (d) Hentry
6. A spanning tree of a weighted graph having minimum weight is called _____.
- (a) Maximum spanning tree
(b) Minimum spanning tree
(c) Shortest route
(d) None of these
7. Latest completion times of all nodes called the _____.
- (a) Backward pass (b) CPM
(c) PERT (d) Forward pass

8. _____ is an activity that must be completed before one or more activities start.
- (a) Predecessor (b) Successor
- (c) Dummy (d) Event
9. The value of the game $\begin{bmatrix} 5 & 0 \\ 0 & 2 \end{bmatrix}$ is _____.
- (a) 0 (b) 2
- (c) 5 (d) None
10. The economic lot size is given by,
- (a) $q_0 = \sqrt{\frac{2C_3R}{C_1}}$ (b) $q^* = \sqrt{2C_1C_3R}$
- (c) $q^* = \sqrt{\frac{2C_1R}{C_3}}$ (d) None

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Write the mathematical formulation of LPP
- Or
- (b) Use simplex method to solve the LPP

Maximize $z = 3x_1 + 2x_2$

Subject to $x_1 + x_2 \leq 4$

$x_1 - x_2 \leq 2$

$x_1, x_2 \geq 0$

12. (a) Write the steps on Hungarian method of solving AP.

Or

- (b) A travelling salesman has to visit 5 cities. He wishes to start from a particular city, visit each city once and then return to this starting point. Cost of going from one city to another is shown below. It is required to find the least cost route.

		To City				
From city		A	B	C	D	E
	A	∞	4	10	14	2
	B	12	∞	6	10	4
	C	16	14	∞	8	14
	D	24	8	12	∞	10
	E	2	6	4	16	∞

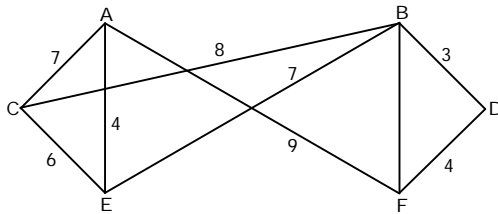
13. (a)

Job		1	2	3	4	5
Machine	A	5	1	9	4	10
Machine	B	2	6	7	8	4

Determine the optimal schedule.

Or

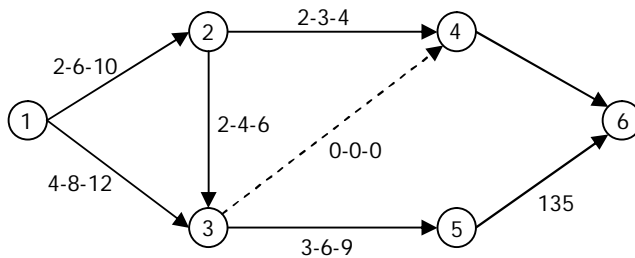
- (b) Apply prim's algorithm to find the weight of the MST, for the network shown below.



14. (a) Write the steps in the critical path method (CPM) project planning.

Or

- (b) For the following network, calculate the probability of completion of the project in 22 days.



15. (a) For the game with the following payoff matrix determine the optimal strategies and value of the game.

$$A \begin{matrix} & B \\ \begin{bmatrix} 5 & 1 \\ 3 & 4 \end{bmatrix} \end{matrix}$$

Or

- (b) Write the advantages and disadvantages of Inventory.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Using the Simplex method solve the LPP

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

$$\text{Subject to } X_1 + x_2 \leq 4$$

$$X_1 - x_2 \leq 2$$

$$X_1, x_2 \geq 0$$

Or

- (b) Using the Simplex method solve the LPP

$$\text{Maximize } z = x_1 + 2x_2 + 3x_3$$

$$\text{Subject to } X_1 + 2x_2 + 3x_3 \leq 10$$

$$X_1 + x_2 \leq 5$$

$$X_1, x_2, x_3 \geq 0$$

17. (a) Five jobs are offered with expected profit for each the four persons available as follows.

		Jobs				
Persons		A	B	C	D	E
	1	62	78	50	101	82
	2	71	84	61	73	59
	3	87	92	111	71	91
	4	48	64	87	77	80

Find by using the assignment method, the assignment of persons to the job that will result in maximum profit which job should be declined.

Or

- (b) A company has four territories open, and four salesman available for an assignment. The territories are not equally rich in their sales potential. It is estimated that a typical salesman operating in each territory would bring in the following annual sales.

Territory	I	II	III	IV
Annual sales	12600	105000	84000	63000

The four salesman also differ in their ability. It is estimated that working under the same condition their yearly sales would be proportionally as follows.

Salesman	A	B	C	D
Proportion	7	5	5	4

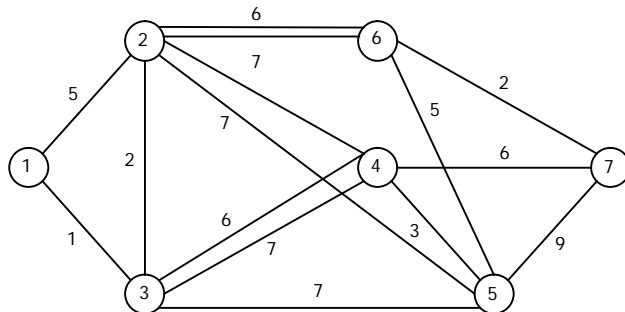
If the criterion is maximum expected total sales then the intuitive answer is to assign the best salesman to the richest territory the next best salesman to the second richest and so on. Verify this answer by the assignment technique.

18. (a) (i) Explain terms and notations used in sequencing.

(ii) Write the priority sequencing rules.

Or

- (b) Use Dijkstra's algorithm to find the shortest route between node 1 and every other node in the network shown below.



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

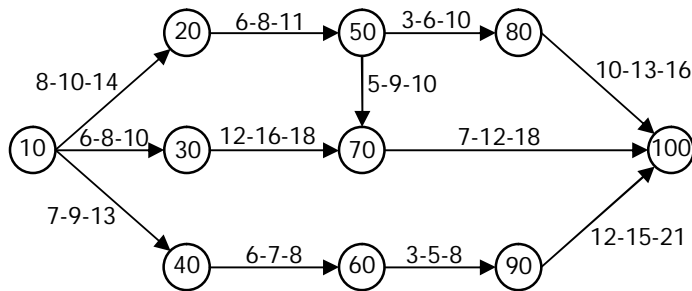
Activity	Time in weeks	Activity	Time in weeks
1-2	4	5-7	8
1-3	1	6-8	1
2-4	1	7-8	2
3-4	1	8-9	1
3-5	6	8-10	8
4-9	5	9-10	7
5-9	4		

Construct PERT network and complete the following

- (i) T_E and T_L for each event
- (ii) Total tree and independent float times for each activity.
- (iii) Critical path and its duration.

Or

- (b) In the following network there are 4 paths and for each path the three time estimate. (t_0, t_L, t_P) are given, Find the critical path and variance.



20. (a) Solve the following game using the graphical method.

	B_1	B_2
A_1	-7	6
A_2	7	-4
A_3	-4	-2
A_4	8	-6

Or

- (b) A particular item has a demand of 9000 units/year. The cost of one procurement is ₹100 and the holding cost per unit is ₹ 2.40 per year. The replacement is instantaneous and no shortages are allowed. Determine.
- Economic lot size,
 - The number of order per year
 - The time between orders and the total cost per year if the cost of one unit is ₹1.
