A–8983

Sub. Code
4BCESA3

U.G. DEGREE EXAMINATION, NOVEMBER 2019

Computer Science

Allied — RESOURCE MANAGEMENT TECHNIQUES

(CBCS – 2014 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. Write down any two features of Operations Research.

2. What is an Operations Research?

3. Define: Linear Programming Problem.

4. What is the use of artificial variable in LPP?

5. What is an assignment problem?

6. State the traveling salesman problem.

7. What are the methods for finding the initial basic feasible solution in transportation problem?

8. What is degeneracy in a transportation problem?

9. Define the following terms:

   (a) Activity

   (b) Event.

10. Differentiate between CPM and PERT.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What is a model? Explain the main characteristics of good model.

Or

(b) Briefly describe the scope of operations Research.

12. (a) Write down the procedure for mathematical formulation of an LPP.

Or

(b) Solve the following by graphical method.

Minimize $Z = 20x_1 + 10x_2$

Subject to

$x_1 + 2x_2 <= 40$

$3x_1 + x_2 >= 30$

$4x_1 + 3x_2 >= 60$

$and\, x_1, x_2 >= 0.$

13. (a) Write the Hungarian method procedure to solve the assignment problem.

Or

(b) Solve the following assignment problem in order to minimize the total cost. The cost matrix given below gives the assignment cost when different operators are assigned to various machines.

		Operators				
		I	II	III	IV	V
	A	30	25	33	35	36
	B	23	29	38	23	26
Machines	C	30	27	22	22	22
	D	25	31	29	27	32
	E	27	29	30	24	32

14. (a) Distinguish between transportation problem and assignment problem.

Or

(b) Determine an initial basic feasible solution to the following transportation problem using row-minima method.

	A	B	C	D	Supply
E	13	11	15	20	2000
F	17	14	12	13	6000
G	18	18	15	12	7000
Demand	3000	3000	4000	5000	

15. (a) Write the down the rules for network construction.

Or

(b) Construct a network for the project whose activities and precedence relationships are as given below:

Activities Immediate :	A	B	C	D	E	F	G	H	I
Predecessor :	–	A	A	–	D	B,C,E	F	D	G,H

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Describe the different phases of Operations Research.

17. Solve the following the LPP using simplex method.

Max $Z = 15x_1 + 6x_2 + 9x_3 + 2x_4$

Subject to

$2x_1 + x_2 + 5x_3 + 6x_4 <= 20$

$3x_1 + x_2 + 3x_3 + 25x_4 <= 24$

$7x_1 + x_4 <= 70$ *and*

$x_1, x_2, x_3, x_4 >= 0$

18. A salesman has to visit five cities A, B, C, D and E. The distance (in hundred miles) between the five cities is as follows :

		To city				
		A	B	C	D	E
	A	–	7	6	8	4
	B	7	–	8	5	6
From city	C	6	8	–	9	7
	D	8	5	9	–	8
	E	4	6	7	8	–

If the salesman starts from city A and has to come back to his starting point, which route should he select so that the total distance traveled is minimum?

19. Determine an optimum basic feasible solution to the following transportation problem and find the initial solution using Vogel's Approximation method.

	P	Q	R	S	Supply
X	6	4	1	5	14
Y	8	9	2	7	16
Z	4	3	6	2	5
Demand	6	10	15	4	35

20. A project schedule has the following characteristic.

Activity :	1-2	1-3	2-4	3-4	3-5	4-9	5-6
Time (days) :	4	1	1	1	6	5	4
Activity :	5-7	6-8	7-8	8-10	9-10		
Time (days) :	8	1	2	5	7		

From the above information, you are required to:

(a) Construct a network diagram

(b) Determine the critical path and total project duration.