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B – 1631

Reg. No. : .....

Name : .....

**Fifth Semester B.B.A. Degree Examination, November 2016  
(Career Related First Degree Programme under CBCSS)**

**Group 2(b)**

**Core Course**

**BM 1541 – OPERATIONS RESEARCH  
(2013 Admn.)**

Time : 3 Hours

Max. Marks : 80

**SECTION – A**

Write short answers to ten questions in one or two sentences each. Each question carries a mark of 1.

1. What is a network ?
2. What is meant by unbalanced assignment problem ?
3. What is operations research ?
4. What is the value of game ?
5. What is float in a network ?

6. Find the trace of  $M = \begin{bmatrix} 5 & 2 & 7 \\ -1 & 3 & 2 \\ 0 & 7 & 1 \end{bmatrix}$ .

7. What is Linear Programming ?
8. What is meant by transportation problems ?
9. What is meant by sequencing problems ?
10. What do you mean by zero sum game ?

**SECTION – B**

Answer any eight questions in not exceeding one paragraph. Each question carries 2 marks.

11. Explain modeling in OR.
12. List the replacement situations.

P.T.O.



13. What is the value of the game for the following pay off matrix ? Who will win and why ?

$$\begin{array}{c}
 Y \\
 X \begin{bmatrix} -2 & 1 \\ -1 & 2 \end{bmatrix}
 \end{array}$$

14. Compare between slack and float.  
 15. Differentiate between slack and surplus variable in LPP.  
 16. List the limitations of CPM.  
 17. Solve the following game by applying the principle of dominance.

$$\begin{array}{c}
 Y_1 \quad Y_2 \quad Y_3 \\
 X_1 \begin{bmatrix} 1 & 3 & 1 \\ 0 & -4 & -3 \\ 1 & 5 & -1 \end{bmatrix} \\
 X_2 \\
 X_3
 \end{array}$$

18. Vitamin A & B are available in two different products X & Y. One unit of X contain 2 unit of Vitamin A and 3 unit of Vitamin B. One unit of Y contain 10 units of Vitamin A and 8 unit of Vitamin B. The minimum daily consumption of Vitamin A and Vitamin B should be 1000 and 1500 respectively. One unit of X costs Rs. 6/- and one unit of Y costs Rs. 7/-. What should be the intake of P & Q in order to minimise cost:

19. Find the determinant  $\begin{bmatrix} 2 & 1 & 5 \\ 1 & 2 & 0 \\ 2 & 1 & 3 \end{bmatrix}$ .

20. Solve the following TP using least cost entry method.

Sources	Destination			Supply
	P	Q	R	
X	5	4	1	2
Y	0	6	2	4
Z	1	3	4	6
Demand	1	8	3	

21. Construct a network diagram from the following data :

<b>Activity</b>	: 1-2	1-3	1-4	2-6	4-5	3-6	5-6
<b>Duration</b>	: 5	2	1	7	3	2	4

22. What are maximin and minimax ?



SECTION - C

Answer any six questions in not exceeding one page each. Each question carries 4 marks.

23. Solve graphically

Maximise  $z = 10x + 20y$   
 subject to  $3x + 2y \leq 36$   
 $x + 2y \leq 20$   
 $3x + 4y \leq 42$   
 $x, y \geq 0$

24. Explain basic assumptions of LPP.

25. Find the inverse of  $A = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & 3 \\ 3 & -2 & 4 \end{bmatrix}$ .

26. Solve the following game problem graphically.

		Player B	
		B <sub>1</sub>	B <sub>2</sub>
Player A	A <sub>1</sub>	-2	5
	A <sub>2</sub>	-5	3
	A <sub>3</sub>	0	-2
	A <sub>4</sub>	-3	0
	A <sub>5</sub>	1	4

27. From the following table construct a network diagram and find the critical path and project duration.

<b>Jobs</b>	:	1-2	1-6	2-3	2-4	3-5	4-5	5-8	6-7	7-8
<b>Most likely</b>	:	6	5	12	5	11	6	4	9	19
<b>Optimistic</b>	:	3	2	6	2	5	3	1	3	4
<b>Pessimistic</b>	:	15	14	30	8	17	15	7	27	28

28. Solve the minimal assignment problem

		Job			
		1	2	3	4
Man	A	11	29	20	14
	B	17	32	8	30
	C	43	24	20	20
	D	13	29	28	13



29. Explain the sequencing problem with its assumptions.
30. Briefly explain VAM in transportation problem.
31. Find the initial basic feasible solution of the transportation problem using North West Corner Rule.

Sources	Destination			Supply
	A	B	C	
1	2	7	4	5
2	3	3	1	8
3	5	4	7	7
4	1	6	2	14
Demand	7	9	18	

## SECTION – D

Answer any two questions in not exceeding four page each. Each question carries 15 marks.

32. Solve LPP using simplex method

$$\begin{aligned} \text{Maximise } z &= 10x_1 + 6x_2 \\ \text{subject to } &2x_1 + 2x_2 \leq 4 \\ &10x_1 + 4x_2 \leq 20 \\ &6x_1 + 16x_2 \leq 24 \\ &x_1, x_2 \geq 0 \end{aligned}$$

33. Solve the following assignment problem.

	I	II	III	IV	V
A	2	4	3	4	7
B	3	5	4	2	6
C	6	7	4	5	7
D	4	2	5	3	3
E	2	6	7	6	5

34. What are transportation problem ? Explain MODI method of solution to TP.
35. What is meant by replacement problem ? What should be the replacement policy when money value doesnot change with time ?