(i) Printed Pages: 4

: 14

Roll No.

(ii) Questions

Sub. Code: 0 8 3 9

Exam. Code:  $\boxed{0}$ 

0 0 1 6

## Bachelor of Commerce 6th Semester

1048

## OPERATIONAL RESEARCH

Paper-BCM-605

Time Allowed: Three Hours]

Maximum Marks: 80

- Note:—(1) Attempt any FOUR questions of 5 marks each from Section-A.
  - (2) Attempt any **TWO** questions of 15 marks each from Section-B and Section-C.

## SECTION—A

- 1. Explain application of Operations Research in business and management. 5
- 2. Use graphical method to solve the following L.P.P.

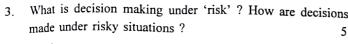
$$Maximize Z = 6x_1 + x_2$$

subject to 
$$2x_1 + x_2 \ge 3$$

$$x_1 + x_2 \ge 2$$

$$\mathbf{x}_1, \ \mathbf{x}_2 \ge 0$$

5



4. Solve the following game matrix:

$$\begin{array}{c}
Y \\
X \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix} \\
5
\end{array}$$

5. Obtain the dual of following LPP:

Maximize 
$$Z = 3x_1 + 5x_2 + 7x_3$$

subject to 
$$x_1 + x_2 + 3x_3 \le 10$$

$$4x_1 - x_2 + 2x_3 \ge 15$$

$$x_1, x_2 \ge 0, x_3$$
 is unrestricted in sign.

6. Solve the following travelling salesman problem so as to minimise the cost per cycle:

From	A	В	C	D	Е	1
Α	_	3	6	2	3	
В	3	_	5	2	3	
C	6	5	-	6	4	
D	2	2	6	_	6	
E	3	3	4	6	7-	5
		SEC	TION-	В		

 Define Operations Research. Explain the scope and significance of Operations Research. Describe some methods of O.R. 15

<sup>0839/LSL-39209</sup>

8. A firm manufactures two types of products A and B and sells them at a profit of Rs. 12 on type A and Rs. 13 on type B. Each product is processed on two machines G and H. Type A requires one minute of processing on G and two minutes on H; Type B requires one minute on G and one minute on H. The machine G is available for not more than 6 while machine H is available for 10 minutes during any working day. Formulate and solve the problem as a linear programming problem for optimization.

9. Use Simplex method to maximise

$$Max. Z = 20x_1 + 6x_2 + 8x_3$$

subject to constrains

$$8x_1 + 2x_2 + 3x_3 \le 250$$

$$4x_1 + 3x_2 \le 150$$

$$2x_1 + x_3 \le 50$$

where as 
$$x_1$$
,  $x_2$ ,  $x_3 \ge 0$ 

 Solve the transportation problem to maximise profits and give criterion for optimality.

DICAL.	I	П	III	IV	Capacity
A	40	25	22	33	100
. В	44	35	30	30	30
С	38	38	28	30	70
Requirement	40	20	20 60 30		200
					150

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3

Turn over

15

## SECTION—C

11. Solve the following game:

		В			
		I	П		
	I	2	4		
A	II	2	3		
	III	3	2		
	IV	-1	6		

- 12. What do you understand by Decision Tree Analysis? How is a Decision Tree drawn and is such an analysis useful in decision making? Explain taking an example.
- 13. Explain the process of simulation. What are its applications?Also discuss its significance.
- of dumper A and B. A has a pay load of 25 tonnes and is priced at Rs. 4,00,000 while B also with a payload of 25 tonnes, is priced at Rs. 3,60,000. The operating costs over the estimated life of 5 years for both the types of dumpers are as follows:

Year	1	2	3	4	5
Type A (in Rs.)	8,000	9,000	10,000	11,000	12,000
Type B (in Rs.)	14,000	16,000	18,000	20,000	22,000

Which type of dumper is to be preferred?

15

Mr. C

15