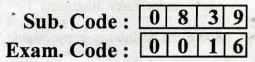
(i) Printed Pages: 4

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(ii) Questions : 14 Sul



# **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

 Explain application of Operations Research in business and management.

2. Use graphical method to solve the following L.P.P.

Maximize  $Z = 6x_1 + x_2$ 

subject to  $2x_1 + x_2 \ge 3$ 

$$\mathbf{x}_1 + \mathbf{x}_2 \ge 2$$

 $x_1, x_2 \ge 0$ 

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- What is decision making under 'risk' ? How are decisions made under risky situations ?
- 4. Solve the following game matrix :

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

5

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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	Α	В	С	D	Е
Α	-	3	6	2	3
В	3	9 . E. 90	5	2	3
С	6	5	14-14	6	4
D	2	2	6	or <u>b</u> ase	6
Е	3	3	4	6	- -
		SEC	TION	-B	

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

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### 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  $x_1, x_2, x_3 \ge 0$ 

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

oho a vale	I	II	III	IV	Capacity
Α	40	25	22	33	100
В	44	35	30	30	30
С	38	38	28	30	70
Requirement	40	20	60	30	200
					150

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#### SECTION-C

11. Solve the following game :

		Ben B Company				
	Cont of		II			
	Ι	2	4			
A	п	2	3			
	ш	3	2			
	IV	-1	6			

- 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.
- Explain the process of simulation. What are its applications ? Also discuss its significance.
   15
- 14. Mineral Processing Company has received offers for two types 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 ?

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