(i) Printed Pages: 4

Roll No.

(ii) Questions

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Exam. Code : $\boxed{0}$

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

$$Maximize Z = 6x_1 + x_2$$

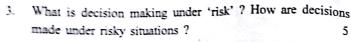
subject to
$$2x_1 + x_2 \ge 3$$

$$x_1 + x_2 \ge 2$$

$$x_1, x_2 \ge 0$$

5

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Solve the following game matrix:

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

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:

		SEC	CTION	—В		
E	3	3	4	6	6	5
D	2	2	6		6	
C	6	5	-	6	4	
В	3	<u> </u>	5	2	3	
A	_	3	6	2	3	
From	Α	В	C	D	E	

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

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- 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.
- 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 $x_1, x_2, x_3 \ge 0$

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15

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

	I	п	III	IV	Capacity
A	40	25	22	33	100
В	44	35	30	30	30
C	38	38	28	30	70
Requirement	40	20	60	30	200
					150

[Turn over

Solve the following game:

		В			
		I ''	II		
	I	2	4		
A	II	2	3		
y .	Ш	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. 15
- 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?