



VII Semester M.M.S./M.B.S. (Integrated Course) Degree  
Examination, January 2018  
(2014 – 15 : CBCS Scheme)

**BS 7.2 : OPERATIONS RESEARCH AND QUANTITATIVE TECHNIQUES**

Time : 3 Hours

Max. Marks : 70

**Instruction :** Scientific calculators are **allowed**.

SECTION – A

Answer **any ten** sub-questions.

**(10×2=20)**

1. a) Mention the major limitations of linear programming.
- b) Enlist the application aspects of linear programming in managerial functions.
- c) Define 'duality' in linear programming.
- d) What is EOQ ?
- e) How do you ascertain a critical activity ?
- f) What is degeneracy in transportation ?
- g) Distinguish between ROL and ROQ.
- h) What are 'slack variables' ?
- i) Distinguish between ARR and IRR.
- j) Write a note on minimax principle.
- k) Find out the expected cash flow from the following :

Year	Normal (P)		Abnormal (P)	
1	5000	60%	8000	40%
2	15000	80%	20000	20%

- l) Enumerate the utility of statistical tools for decision making process.



SECTION – B

Answer **any four** questions.

**(4×5=20)**

2. A dealer supplies you the following information with regard to an item of inventory.

- Annual demand : 5000 units
- Odering costs : Rs. 250 per order
- Holding costs : 30% of the value of the inventory per year
- Inventory stock out costs : Rs. 10/- per unit per year
- Price : Rs. 100/- per unit

Find out EOQ.

3. Find out an optimal solution for the following :

$$\text{Max } z = 10x_A + 20x_B$$

Subject to,

$$6x_A + 12x_B \leq 1200$$

$$4x_A + 8x_B \leq 4000$$

$$x_A \ \& \ x_B \geq 0$$

4. A random value is normally distributed with  $\mu = 5,00,000$  and  $\sigma = 2,00,000$ . Determine the probability that random value would be between 6,00,000 and 8,00,000.

5. Solve the following by using transportation algorithm.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	
W <sub>1</sub>	40	22	06	12	10
W <sub>2</sub>	10	18	20	4	20
W <sub>3</sub>	36	14	08	01	30
	6	6	24	24	

6. Explain the meaning of “Statistical Decision Theory”.

7. Briefly explain the mechanism of post optimality analysis of a simplex linear programming solution.



SECTION – C

Answer **any two** questions.

**(2×10=20)**

8. Assume that on an average one telephone number out of 15 is busy. Find the probability that if 6 randomly selected telephone numbers are picked up :
- a) not more than 3 are busy
  - b) atleast 3 of them are busy.
9. The management of a company has two alternative proposals under consideration. Project 'A' requires a capital outlay of ₹ 12,00,000/- and project 'B' requires ₹ 18,00,000/-. Both generate the cashflows for 5 years. Project 'A' generates Rs. 4,00,000 and Project 'B' generates Rs. 5,80,000 per year.

The cost of capital is 10%. Show which project is preferable under

- i) NPV
- ii) PI and
- iii) IRR

(Assume cashflows are after taxes).

10. Explain the importance of operations research for decision making.

SECTION – D

Case study (**compulsory**) :

**(1×10=10)**

11. The following information relates to 6 sub activities involved in a project.

Activity	Immediate predecessor	Estimated time in days
A	NIL	2
B	A	3
C	A	4
D	B & C	6
E	–	2
F	E	8

You are required to prepare a PERT chart to determine the minimum time required to complete the project.

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