



VI Semester B.Sc. Examination, August/September 2023

(CBCS) (F+R) (2019-20 and Onwards)

STATISTICS – VIII

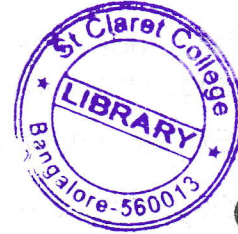
Operations Research

Time : 3 Hours

Max. Marks : 70

Instructions : i) Answer **any five** questions from Section – A and **any five** questions from Section – B.

ii) Scientific calculators are **permitted**.



SECTION – A

I. Answer **any five** questions :

(5×5=25)

- 1) Write a brief note on various types of models used in OR.
- 2) Explain decision variables, objective function, linear restrictions and non-negative restrictions of LPP.
- 3) Define a transportation problem. When a basic feasible solution of TP is said to be degenerate ?
- 4) For a game define the terms, payoff, payoff matrix, maximin, minimax and value of the game.
- 5) What do you mean by inventory ? Define holding cost, ordering cost and shortage cost of inventory management.
- 6) Distinguish between individual replacement and group replacement.
- 7) Explain (M|M|1) queues.
- 8) Derive steady state probability of a queuing system.

SECTION – B

II. Answer **any five** questions :

(5×9=45)

9) a) Describe various methods of solving OR models.

b) Write down the dual of the following LPP. (4+5)

$$\text{Max } Z = 5x_1 + 6x_2$$

$$\text{S.t. } 5x_1 + 7x_2 \leq 9$$

$$8x_1 + 2x_2 \leq 12$$

$$x_1 \geq 0, x_2 \geq 0$$

P.T.O.



- 10) a) Define basic variables, non basic variables and basic solution of a system of equations.
b) For the following system of equations find all possible basic solutions.
$$5x_1 + 8x_2 + 2x_3 = 50$$
$$4x_1 + 2x_2 + 8x_3 = 40$$
 (4+5)
- 11) a) When an LPP is said to be in standard form and canonical form ?
b) Explain simplex method of solving an LPP. (4+5)
- 12) a) Write down the TP as LPP. Distinguish between balanced and unbalanced TP.
b) Explain a method of finding initial basic feasible solution of TP. (4+5)
- 13) a) Describe the method of finding optimal solution of TP.
b) Explain the method of solving assignment problem. (5+4)
- 14) a) Explain dominance method of finding a saddle point of a game.
b) Derive an expression for value of 2x2 game without saddle point. (4+5)
- 15) a) Stating the assumptions derive an expression for EOQ for an inventory model with shortage.
b) What do you mean by replacement policy ? Find an optimal replacement policy when time is discrete. (4+5)
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