CB – 180

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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)**

Max $Z = 5x_1 + 6x_2$

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 2×2 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)**