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VI Semester B.Sc. Examination, September/October 2022
(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) Define Operations Research (OR). Mention its scope.

2) What is Linear Programming Problem (LPP) ? State the characteristics of LPP.

3) Explain Vogel's Approximation Method (VAM) of finding IBFS of a TP.

4) What is a game ? Explain Maximin-Minimax principle of solving a game problem.

5) Define the following terms with respect to an inventory :

   i) Demand

   ii) Lead time

   iii) Stoch replenishment

   iv) Re-order level

   v) Purchase or production cost

6) Derive an optimum replacement policy when time is a discrete variable.

7) Define a queueing problem. Distinguish between steady state and transient state of queueing system.

8) Explain the queueing model (M/M/1) : (∞/FIFO). Also write down the expressions for average expected waiting time of a customer in the system and in the queue.

P.T.O.

SECTION – B

II. Answer **any five** questions. **(5×9=45)**

9) a) What is operations research model ? Describe various types of OR models.

b) Explain the graphical method of solving a LPP. **(4+5)**

10) a) Explain basic variable, non-basic variable and unbasic variable.

b) Explain the criteria for the following : **(3+6)**

i) Optimality test
ii) Entering variable
iii) Leaving variable
iv) Unbounded solution
v) Multiple solution
vi) Infeasible solution.

11) a) Explain the Big-M method of finding solution to a LPP.

b) Write the dual for the following LPP : **(5+4)**

Maximize $z = 10x + 12y$

Subject to the constraints :

$2x + 3y \leq 7$

$x + 10y \geq 8$

and $(x, y) \geq 0$.

12) a) Give the mathematical formulation of Assignment Problem (AP).

b) Explain the MODI method of finding an optimal solution to a TP. **(3+6)**

13) a) Explain North-West Corner method of finding IBFS to a TP.

b) Explain Hungarian's method of solving an Assignment Problem (AP). **(4+5)**

14) a) Derive expressions for an optimal mixed strategies of a (2×2) game problem without a saddle point.

b) Explain dominance rule in a game problem. **(5+4)**

15) a) Obtain the expression for EOQ in an inventory model without shortages.

b) Explain individual and group replacement policies. **(5+4)**
