12629

Reg. No. | | | | | | | | | |

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

STATISTICS

Applied Statistics

(CBCS 2020 Freshers Scheme)

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates :

i) Answer any **Five** questions from Section A and **Five** questions from Section B.

ii) Scientific calculators are allowed.

SECTION - A

I. Answer any **FIVE** questions from the following. **(5×5=25)**

1. What is Time series ? Explain its components.

2. Describe the method of measuring trend by fitting a straight line.

3. Define Index numbers. Explain the steps involved in the construction of Index numbers.

4. What are time reversal and factor reversal tests? Show that fisher's index numbers satisfies both these tests.

5. Explain the following terms.

i) CDR

ii) ASDR

iii) Standardised death rate (STDR)

iv) IMR

v) MMR

6. What is a life table? Mention its components.

[P.T.O.

7. Write a note on central statisfies office [CSO] and its activities.

8. What is national income? Write the main features of the concept of national income.

SECTION - B

II. Answer any **FIVE** questions from the following. **(5×9=45)**

9. a) Explain the method of measuring trend by moving average.

   b) Explain the method of measuring seasonal variation by ratio to moving averages.

(4+5)

10. a) Prove that Marshall-Edgeworth and Fisher's price index numbers lies between laspeyre's and Paasche's index numbers.

    b) What is cost of living index numbers? Explain the methods of obtaining them.

(6+3)

11. a) What are vital statistics? Explain their sources.

    b) Define and compare various measured of fertility.

    c) Define 'Reproduction Rates'

    In what way do Total Fertility Rate (TFR), Gross Reproduction Rate (GRR) and Net Reproduction Rate (NRR) differ from one another as measures of reproduction rates?

(3+3+3)

12. a) Define central mortality rate and force of mortality.

    b) Show that with usual notations.

    i) $m_x = \frac{2q_x}{2 - q_x}$

    ii) $e_x^{\circ} = \frac{T_x}{l_x}$

    c) Mention the uses of life table.

(2+5+2)

13. a) What are clinical trials? State the four phases of a clinical trial.

b) Write a note on cross sectional studies.

(5+4)

14. a) What is meant by odds ratio? Interpret it and write 95% confidence interval for odds ratio.

b) Describe the construction of Receiver Operating Characteristic (ROC) curve.

c) Define Body Mass Index

(4+3+2)

15. a) Explain briefly NSSO and its activities.

b) Define Gross National Product (GNP), Gross Domestic Product (GDP), per capita income. Net National Product (NNP), Net Domestic Product (NDP).

(4+5)

12630

Reg. No. | | | | | | | | |

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

STATISTICS

Operations Research

(CBCS Scheme 2020 Freshers)

Paper - VIII

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates :

i) Answer Five questions from Section A and Five questions from Section B.

ii) Calculators are permitted.

SECTION - A

I. Answer any **FIVE** questions from the following. **(5×5=25)**

1. What is operations Research (OR) ? Describe various types of OR models.

2. State the characteristics of a Linear Programming Problem (LPP). Distinguish between canonical and standard forms.

3. Define the following with respect to Transportation problem.

i) Feasible solution

ii) Basic feasible solution

iii) Optimum solution

4. Define the following with respect to Transportation problem:

i) Strategy

ii) Saddle point

iii) Pay-off

iv) Pure and mixed strategy.

[P.T.O.

5. What is meant by inventory? State its objectives and its limitations.

6. What is a replacement problem? Obtain an optimum replacement policy for replacing of items when the value of money remains same over a period of time.

7. a) Define Traffic intensity.

   b) Distinguish between steady and Transient states of a queuing system.

8. For a (M/M-I) : (FIFO/∞/∞) queuing model, obtain the expression for

   i) Expected number of customers in the system

   ii) Average waiting time.

SECTION - B

II. Answer any **FIVE** questions from the following. **(5×9=45)**

9. a) Obtain all basic solutions to the system of equations $x_1 + x_2 + 2x_3 = 4$ and $2x_1 - x_2 + x_3 = 2$. And identify which of the feasible solution maximizes $z = 2x_1 + 5x_2 - 4x_3$

   b) Explain graphical method of solving a LPP. How do you identify the situation of multiple optimum solutions?

(5+4)

10. a) Write down the steps involved in the simplex method of solving a LPP.

    b) What are artificial variables?

(7+2)

11. a) State the conditions under which LPP has Pseudo optimal solution.

    b) Define dual of a LPP. Explain the procedure of formulation of dual problem.

(3+6)

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

    b) Explain various steps involved in finding on optimal solution to a Transportation Problem (TP)

(3+6)

13. a) State and Prove the necessary and sufficient condition for the existence of a feasible solution to a (m×n) transportation problem.

b) Explain Hungarian algorithm of solving an Assignment Problem.

(4+5)

14. a) Explain the properties of a game problem.

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

(3+6)

15. a) Explain the following costs with respect to an inventory.

i) Set up cost

ii) Carrying cost

iii) Shortage cost

b) Derive an expression for the minimum cost of maintaining an inventory with shortage under EOQ model

(3+6)
