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VI Semester B.Sc. Degree Examination, September - 2021

STATISTICS

Applied Statistics

(CBCS Scheme Freshers 2020-21 Batch)

Paper VII

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

1. Answer any FIVE questions from Section-A and FIVE questions from Section-B
2. Scientific Calculators are allowed.

SECTION - A

I. Answer any FIVE of the following questions.

(5×5=25)

- ✓ 1. What is Time Series? Explain the components of a Time Series.
2. Describe the method of measuring trend by moving averages.
3. Define Index numbers. Explain the uses and limitations of Index numbers.
4. Explain the Steps in the construction of cost of living Index numbers.
5. ✓ What are Vital Statistics? Explain their Sources and uses.
- ✓ 6. a) Define Central and Force of Mortality Rates.
b) Show that

i)
$$P_x = \frac{2 - m_x}{2 + m_x}$$

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

7. Explain Organization and functions of NSSO.
8. Write Short notes about the following;
 - i) Gross National Product [GNP]
 - ii) Gross Domestic Product [GDP]
 - iii) Per Capita Income.

[P.T.O.]

SECTION - B

II. Answer any FIVE of the following questions.

(5×9=45)

9. a) Explain the method of finding trend by fitting a straight line.
b) Describe the method of measuring seasonal variation by a simple average method.
(6+3)
10. a) Show that Marshall-Edgeworth index number lies between Laspeyre's and Paasche's Index numbers.
b) What are time reversal and factor reversal tests? Show that Fisher's Index number satisfies both these tests.
(3+6)
11. a) Explain Various Mortality rates.
b) Define
i) Crude Birth Rate.
ii) General Fertility Rate.
iii) Total Fertility Rate.
iv) Gross Reproduction Rate.
v) Net Reproduction Rate.
(4+5)
12. a) What is a Life Table? Mention its components.
b) With Usual notations, Prove that $L_x = l_x - \frac{1}{2} dx$
(6+3)
13. a) What are clinical trials? State its Phases.
b) Write a note on cross sectional Studies.
(5+4)
14. a) Define Relative Risk and interpret it. Write 95% confidence limits for relative risk.
b) Explain the Construction of Receiver Operating Characteristic (Roc) curve.
c) Define Body Mass Index.
(4+3+2)
15. a) Describe the development of Statistical system in India during Pre-independent era.
b) Write a note on Central Statistics Office (CSO) and its activities.
(5+4)



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VI Semester B.Sc. Degree Examination, September - 2021

STATISTICS**Operations Research**

(CBCS Scheme Fresh 2020-21)

Paper : VIII**Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

1. Answer **FIVE** questions from Section - A and **FIVE** questions from Section - B.
2. Scientific calculators are allowed.

SECTION - A**I. Answer any FIVE questions.****(5×5=25)**

1. Define Operations Research (OR). State the characteristics of OR.
2. Explain the graphical method of solving a Linear Programming Problem (LPP) and sketch the graphs for the cases of infeasible and unbounded solutions.
3. What is Assignment Problem (AP)? Explain Hungarian's method of solving an AP.
4. What two person zero sum game? Explain Maximin, Minimax principle.
5. What is inventory? State the advantages and disadvantages of having inventory.
6. What is meant by replacement policy? Explain the need for replacement.
7. Explain the concept of 'Queue discipline' with reference to Queueing theory.
8. Describe the queueing model (M/M/1): (∞ , FCFS). Also derive expressions for average expected waiting time of a customer in the system (W_s) and in the queue (W_q).

SECTION - B**II. Answer any FIVE questions.****(5×9=45)**

9. a) Mention the areas of applications of OR. **(4+5)**
b) Define Basic solution and find all the basic solutions of the equations.

$$x + 2y + 5z = 5 \text{ and}$$

$$2x + y + z = 4$$

[P.T.O.]



10. a) State the characteristics of an LPP. (3+6)
b) Explain the terms in an LPP.
i. Slack and Surplus variables.
ii. Solution and optimal solution.
iii. Degenerate and Non-degenerate basic solutions.
11. a) Convert the following LPP in to Canonical and standard forms Max. (4+5)
 $z = 2x_1 + 5x_3$
S.C. $x_1 + x_2 \geq 2$
 $2x_1 + x_2 + 6x_3 \leq 6$
 $x_1, x_2, x_3 \geq 0$.
b) Describe charne's Big-M method of finding a solution to an LPP.
12. a) Explain Vogel's approximation method of finding Initial Basic Feasible Solution (IBFS) to a Transportation Problem (TP). (4+5)
b) Explain various steps involved in finding an optional solution to a TP.
13. a) State and prove necessary and sufficient conditions for the existence of a feasible solution to a TP. (5+4)
b) What is unbalanced AP? Explain the method of Solving Such Problems.
14. a) Explain the properties of a game problem. (3+6)
b) Derive expressions for optional mixed strategies of a (2×2) game problem without a Saddle point.
15. a) Explain various costs associated with inventory problem. (4+5)
b) Obtain optimum replacement policy for replacing items which deteriorate with time, assuming time is discrete and value of money not taken into account.
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