

**GS-333**

VI Semester B.Sc. Examination, May/June - 2019
(CBCS - Fresh+Repeaters) (2016-17 & onwards)

STATISTICS - VII
Applied Statistics - 2

Time : 3 Hours

Max. Marks : 70

- Instructions :** 1. Answer five questions from Section A and five questions from Section B.
2. Scientific calculators are permitted.

SECTION - A

Answer any five questions from the following :

5x5=25

1. What is the hazard rate ? If $h(t)$ is hazard rate of a component at time t , show that the reliability at time t is , $R(t) = \exp(-\int h(s) ds)$.
2. Define system reliability and obtain the reliability of a system of 'n' independent components connected in parallel.
3. Explain the different scaling procedures used in psychological tests.
4. What is meant by odds ratio ? Interpret it and write 95% Confidence Interval for odds ratio.
5. What is Receiver Operating Characteristics (R.O.C) curve ? Explain.
6. Define utility, utility function, total utility and marginal utility .
7. Explain the construction of Lorenz curve .
8. Describe the development of statistical system in India during :
 - (i) pre-independent era.
 - (ii) post-independent era.

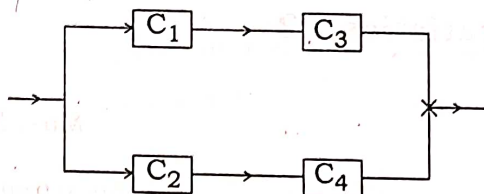


SECTION - B

5x9=45

Answer any five questions from the following :

9. (a) Prove that the hazard rate of component is constant if and only if its life distribution is exponential. 4+5
 (b) Write the structural function of the following system of four components working independently and calculate system reliability.



10. (a) Explain the construction of T-scores for a given frequency distribution. 5+4
 (b) Explain the method of scaling of ranking in terms of Normal Probability Curve.
11. (a) Distinguish between prospective and retrospective studies. 4+5
 (b) Define the following measurements of potential impact :
 (i) Attributable Risk
 (ii) Population attributable risk
 (iii) Attributable fraction in exposed
12. (a) What is equilibrium price ? How do you determine it graphically ? 5+4
 (b) Define pareto distribution and state its applications.
13. (a) Define price elasticity of demand and supply. If the price elasticity is constant, find demand function. 4+5
 (b) Find equilibrium price and quantity exchanged if demand and supply curves are; $D = 14 + 5p - p^2$ and $S = 3p - 1$ respectively.
14. (a) Write a note on Central Statistical Office (C.S.O.) and it's activities. 4+5
 (b) Discuss the organisation of National Sample Survey Office (N.S.S.O) and it's functions.
15. (a) Define National Income . Explain the uses of national income estimates. 5+4
 (b) Explain the terms :
 GNP, GDP, per capita income, NNP and NDP in respect of national income.

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VI Semester B.Sc. Examination, May/June - 2019
(CBCS) (F+R) (2016-17 & Onwards)

STATISTICS - VIII
Operations Research

Time : 3 Hours

Max. Marks : 70

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

SECTION - A

- I. Answer any five sub-divisions from the following : 5x5=25**
1. Define Operations Research (OR). Mention various models used in OR and explain two of them.
 2. What is Linear Programming Problem (LPP) ? Express the mathematical form of general LPP.
 3. Explain the terms : (i) Pay-off (ii) Zero sum game
(iii) Saddle point (iv) Pure Strategy
 4. What is Inventory ? Explain the reasons for maintaining Inventory.
 5. What is meant by a Queue ? Explain the terms :
(i) Queue disciplines (ii) Traffic intensity
 6. For M/M/I (∞ /FCFS) Queue discipline, obtain the expressions for :
(i) Probability that there are n customers in the Queue (P_n).
(ii) Expected member of persons in the system (L_s).
 7. Distinguish between CPM and PERT. Also mention the rules for drawing a project network diagram.
 8. Explain Forward Pass and Backward Pass computations in determining the earliest and latest event times in network analysis.

P.T.O.



SECTION - B

II. Answer any five questions from the following :

5x9=45

9. (a) Obtain all basic solutions to the system of equations :

4+5

$$X_1 + X_2 + 2X_3 = 4 \text{ and } 2X_1 - X_2 + X_3 = 2.$$

Which of these solutions maximizes $Z = 2X_1 + 5X_2 - 4X_3$

- (b) Distinguish between (i) Slack and Surplus variables

(ii) Canonical and Standard forms of LPP

10. (a) Define : (i) Feasible solution

4+5

(ii) Basic Feasible solution

(iii) Non-degenerate solution and

(iv) Optimal solution in Transportation Problem

- (b) Explain Hungarian's method of solving an Assignment Problem.

11. (a) State and prove necessary and sufficient conditions for the existence of Feasible Solution in T.P.

5+4

- (b) Explain Vogel's Approximation Method of finding IBFS to a Transportation Problem.

12. (a) Derive the optimal mixed strategies and the value of a (2×2) game without saddle point.

5+4

- (b) Explain the graphical method of reducing a $(2 \times n)$ game to a (2×2) game.

13. (a) Discuss various types of costs involved in inventory theory.

4+5

- (b) Derive the condition for arriving at the optimum period of replacement of items deteriorating in efficiency over a period of time, assuming time to be a discrete variable and value of money remains same.



14. (a) Stating the assumptions involved, derive EOQ formula when shortages are not permitted. **5+4**
- (b) Explain individual and group replacement policies.
15. (a) Distinguish between Float and Slack. Discuss the three types of floats in a network analysis. **4+5**
- (b) Explain :
- (i) Various time estimates used in PERT.
 - (ii) Probability of completing the project within the schedule time.