

Fifth Semester B.Sc. Examination, November/December 2018
(CBCS) (F + R) (2016 – 17 and Onwards)

STATISTICS – V
Applied Statistics – I



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

(25 Marks)

I. Answer **any five** questions from the following.

(5×5=25)

1) Define the terms :

- | | |
|------------------------------|-----------------------------|
| i) Crude Death Rate | ii) Standardised Death Rate |
| iii) Age-specific Death Rate | iv) Maternal Mortality Rate |
| v) Infant Mortality Rate. | |

2) What is a life table ? Discuss its components.

3) What is Time series ? Explain the various components of time series with examples.

4) Explain the problems involved in the construction of Index Numbers.

5) a) What is statistical quality control ?

b) Distinguish between :

- | |
|---------------------------------------|
| i) Defect and defectives |
| ii) Action limits and warning limits. |

6) Explain the construction of Mean (\bar{X}) Chart.

7) Define producer's risk and consumer's risk. Derive the expression for these risks in Single Sampling Plan (S.S.P.).

8) Explain Double Sampling Plan (D.S.P.) and state its advantages.

(45 Marks)

(5×9=45)

- Also show that $G.R.R \geq N.R.R$.

(4+5)

- With usual notations, prove that :

$$e_x = \frac{\sum_{n=1}^8 lx + n}{lx}$$

- $$q_x = \frac{2mx}{2+mx}$$

(5+4)

- b) Explain the method of measuring seasonal indices by ratio to moving average method.

(3+6)

- b) What are Consumer Price Index numbers ? Discuss their uses.

(5+4)

- b) Explain the construction of S-chart (σ -chart).

(5+4)

- b) Write down the consequences of the following situations in process capability study.

- ii)
- $U.S.L. - L.S.L. > 6\sigma$

- iii) U.S.L. - L.S.L. =
- 6σ
- .

(6+3)

- i) A.Q.L.

- ii) A.S.N.

- iii) A.T.I.

- iv) L.T.P.D.

- b) Define Average Outgoing Quality (A.O.Q) and derive its expression for double sampling plan.

(4+5)

Fifth Semester B.Sc. Examination, November/December 2018
(CBCS (F+R)) (2016-17 and Onwards)
STATISTICS – VI
Design and Analysis of Experiments



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

- I. Answer **any five** questions : (5×5=25)
- 1) Explain the meaning of 'Analysis of variance' and mention its applications. Also, give the basic assumptions of ANOVA.
 - 2) Obtain the expectation of TVSS in ANOVA for one way classified data.
 - 3) Explain the three basic principles of Experimental designs.
 - 4) What is Randomized Block Design (RBD) ? Discuss the advantages and drawbacks of RBD.
 - 5) Obtain the expression for estimating the missing observation in LSD.
 - 6) Describe the factorial method of experimentation. Explain the situations where it could be used.
 - 7) Obtain the expression for the main effects and the interaction effect in 2^2 factorial experiment.
 - 8) Explain partial confounding and complete confounding in factorial experiments.

SECTION – B

- II. Answer **any five** questions from the following : (5×9=45)
- 9) a) Estimate the parameters involved in the model and setup the ANOVA table of one-way classified data.
 - b) Write a note on Least significant difference and its usefulness. (6+3)



- 10) a) Obtain the expectation of block sum of squares in ANOVA of two way classified data.
b) What is interaction effect ? How is it carried out in the ANOVA of two way classified data with multiple but equal number of observations per cell. (4+5)
- 11) Explain the method of analysing a Randomized Block Design. Also, setup the ANOVA table. 9
- 12) What is Latin Square Design (LSD) ? Explain the role of randomization in LSD. Estimate the parameters of LSD model and setup the ANOVA table. 9
- 13) a) Obtain the expression to estimate the missing observation in RBD.
b) How is the efficiency of a design measured ? Obtain the expression for the same to measure the efficiency of LSD as compared to RBD. (4+5)
- 14) a) Discuss the advantages of factorial experiments over simple design of experiments.
b) Explain Yates method of finding factorial effect totals in 2^3 factorial experiments. Also write the ANOVA table. (4+5)
- 15) Explain the procedure for analysing a 2^3 factorial experiment with three replications wherein the third order interaction ABC is confounded in all the replicates. 9
-