

Seat No. : \_\_\_\_\_

**BD-101**

May-2015

**B.Sc., Sem.-IV**

**Statistics : STA-205**

**“Statistical Tests, Official Statistics and Sampling”**

**Time : 3 Hours]**

**[Max. Marks : 70**

**Instructions : All questions carry equal marks.**

1. (a) Explain Fisher's Z-transformation and also discuss all its applications. **7**

**OR**

Give the procedure for testing. **7**

(i) The significance of single proportion based on a large sample.

(ii) The significance of the difference between the two proportions based on large sample.

(b) In a year there are 956 births in town A of which 52.5 % were male while in town A and B combined, this proportion in a total of 1406 births was 0.496. Is there any significance difference in the proportion of male births in the two towns ? **7**

**OR**

Define the following terms : **7**

(i) Null hypothesis

(ii) Simple hypothesis

(iii) Composite hypothesis

(iv) Alternative hypothesis

(v) Level of significance

(vi) Critical Region

(vii) Degrees of Freedom

2. (a) Explain the concept of multiple correlation. Also define its coefficient. In usual notations, show that  $R^2_{1.23} = 1 - \frac{\Delta}{\Delta_{11}}$ . **7**

**OR**

Obtain an expression for variance of the residual  $X_{1.23}$  in terms of  $r_{12}$ ,  $r_{23}$  and  $r_{31}$  and deduce that  $R_{1.23} > r_{12}$  and  $r_{13}$ .

- (b) Define partial correlation and derive the formula for its coefficient. Also show that the correlation coefficient between the residuals  $X_{1.23}$  and  $X_{2.13}$  is equal and opposite to that between  $X_{1.3}$  and  $X_{2.3}$ . 7
- OR**
- Explain all the properties of residual and also derive the multiple correlation coefficient in terms of total and partial correlation coefficient.
3. (a) Explain Indian Census Operations, its origin and its functions in detail. 7
- OR**
- What is the role of Indian Census Operations in planning and development process ? Explain in detail.
- (b) Explain the meaning, origin, purpose and function of the following : 7  
ICMR and NSSO.
- OR**
- Explain the meaning, origin, purpose and function of the following : 7  
ISI and ISO.
4. (a) Discuss in detail all the principal steps of sample survey. 7
- OR**
- Distinguish between complete enumeration and sample survey.
- (b) Explain : Judgement sampling, Probability sampling and mixed sampling. 7
- OR**
- Write short note on Sampling and non-sampling errors.
5. Write answers in brief : 14
- (1) What do you mean by sampling frame ?
  - (2) Give two objectives of sampling.
  - (3) Why multiple correlation coefficient is non-negative ?
  - (4) Give two properties of partial correlation coefficient.
  - (5) What is the logo and motto of ISI ?
  - (6) What is the responsibility of SDRD and FOD ?
  - (7) A correlation coefficient of 0.7 is discovered in a sample of 28 pairs, apply Z-transformation to find out if this differ significantly from 0.5.
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