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HPAS (Main)—2012

STATISTICS

Paper II

Time : 3 *Hours* *Maximum Marks :* 150

Note :— Attempt Question No. **1** which is compulsory and any *four* questions from the rest, *five* in all. *All* questions carry equal marks.

1. (*a*) In a testing of hypothesis problem, explain simple and composite hypotheses, two types of errors and the power of a test, giving examples of each.

(*b*) Obtain the test of significance of correlation coefficient in a random sample from a bivariate normal distribution.

(*c*) Discuss the advantages of sampling over complete enumeration.

P.T.O.

2. (*a*) Describe the method for constructing best tests for a simple hypothesis, involving one parameter.

(*b*) Derive a most powerful test $H_0 : \mu = 0$ against $H_1 : \mu = 1$, where μ is the mean of a normal distribution when variance is known.

3. (*a*) Describe the F-test for the equality of variances of two independent normal distributions.

(*b*) Explain large sample tests.

4. (*a*) What are non-parametric tests ? When are these more advantageous than the parametric tests ?

(*b*) Explain the median test in one and two sample problems.

5. (*a*) Explain 'sampling unit', 'sampling frame' and 'sampling design' in a sample survey.

(*b*) In simple random sampling without replacement (SRSWOR), obtain the variance of the sample mean and its unbiased estimator.

6. (*a*) In stratified random sampling, ignoring fpc, show that :

$$\text{Var}(\bar{y}_{\text{opt.}}) \leq \text{Var}(\bar{y}_{\text{prp.}}) \leq \text{V}(\bar{y}_{\text{ran.}}).$$

(*b*) Write a note on ratio method of estimation.

7. (*a*) Describe the model for one-way analysis of variance and obtain the ANOVA table.

(*b*) Write a note on factorial experiments.

8. (*a*) Give the layout and analysis of a randomised blocks design with '*t*' treatments and '*b*' blocks.

(*b*) Write a note on missing plot analysis.