This question paper contains **3** printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **1390**

Unique Paper Code : **2372503** **F-7**

Name of the Paper : **Applied Statistics—II**

Name of the Course : **B.Sc. (Hons.) Statistics Erstwhile FYUP**

Semester : **V**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *six* questions in all, selecting at least *one* question from each Section.

Section A

1. (*a*) Describe different components of a time series. Give suitable examples for each. Mention any *four* uses of time series.

   (*b*) Why is the method of least squares not used to fit a modified exponential curve ? Describe the method of partial sums to fit a modified exponential curve. 6.5,6

2. (*a*) What do you mean by de-seasonalisation of data ? Describe ratio to trend method for determining seasonal fluctuations of a given times series.

   (*b*) Describe a method for estimating the variance of the random component of a time series, stating clearly the assumptions under which it is applicable. 6.5,6

3. (*a*) Explain how will you decide about the type of trend curve to be fitted to a given time series data. Discuss the fitting of an exponential curve by the principle of least squares.

   (*b*) Name the characteristic movement of the time series with which you will mainly associate :

   (*i*) an increase in employment for sales during the summer months,

P.T.O.

(*ii*) an era of prosperity,

(*iii*) price rise of vegetables due to transport strike.

(*iv*) a need for increased wheat production due to a constant increase in population.

(*v*) increase of sale of sugar during festival season, and

(*vi*) rise of pollution level due to increase in motor vehicles. 6.5,6

Section B

4. (*a*) What do you understand by the term 'Statistical Quality Control' ? Distinguish between process and product control. What are different dimensions of quality ?

(*b*) Distinguish between a defect and defective. Give *two* examples of defects for which the c-chart is applicable. How do you construct control limits for a c-chart ? 6.5,6

5. (*a*) What do you understand by 'Process capability ratio' ? For a quality characteristic X following normal distribution with mean 74.001 and s.d. 0.0099 and having the specification limits 74.00 ± 0.05, estimate fraction non-conforming and capability of the process to produce items within specifications.

(*b*) Describe single sampling plan. Obtain OC and AOQ curve for this plan. 6,6.5

6. (*a*) Write short notes on the following :

(*i*) Quality system and standards, and

(*ii*) Seven tools of statistical process control (SPC).

(*b*) Distinguish between :

(*i*) Producer's risk and consumer's risk in the context of statistical quality control

(*ii*) Chance and assignable causes of variation. 7,5.5

Section C

7. (*a*) Distinguish between σ-scores and standard scores.

The fifth grade norms for a reading examination are mean = 60, s.d. = 10; for an arithmetic examinations mean = 26, s.d. = 4. A student X scores 55 on the reading test and 24 on the arithmetic test. Compute his σ scores. In which test is he better ?

(*b*) Describe scaling of rankings in terms of normal probability curve. Hence, explain how will you combine ranks by three judges to get the final ranking ? 7,5.5

8. (*a*) Explain briefly the concept of reliability in psychological and educational experiment. Describe the 'Split half method' and 'Rational equivalence method' of assessing the reliability of the test.

(*b*) Define percentile scores and percentile scales. What are the assumptions in the construction of percentile scale ? Discuss advantages and disadvantages of percentile scores. 7,5.5