M.Phil 1st Semester Examination, 2019

QUANTITATIVE TECHNIQUES

PAPER –LIS-113

Full Marks : 40

Time : 2 hours

Answer **all** questions

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

GROUP – A

1. Write short notes on any *two* of the following : 5×2

(*a*) Non-probabilistic sampling

(*b*) Queuing theory

(*c*) Growth of literature : De Solla Price model

(*d*) Components of Time series analysis.

GROUP – B

2. Answer 2(*a*) and any *two* from the rest :

(*a*) Data given below shows the number of users visited and number of books issued in a library for 12 days. Find out the number of users visited on a day when the number of books issued was 177 : 10

No. of users visited	No. of books issued
100	85
125	100
150	125
195	140
185	146
215	172
235	199

No. of users visited	No. of books issued
255	225
265	242
272	258
261	262
299	285

(*b*) Show that $-1 \leq r_{xy} \leq +1$ where $r_{xy} \rightarrow$ correlation coefficient of x with respect to y, where x and y are two discrete random variables. Define Spearman's Rank correlation coefficient. 8 + 2

(*c*) Define stratified random sampling and systematic sampling. What points should be taken into consideration by a researcher in developing a sample design for his research project ? Explain the situation, when snow-ball sampling technique is followed. 2 + 6 + 2

(*d*) What is the classical definition of probability ?

What are its limitations ? What is the probability that all 3 children in a family have different birthdays ? (Assume, 1 year = 365 days) State Bayes' theorem. 2 + 2 + 3 + 3

(*e*) Define 'Null Hypothesis' and 'Alternative Hypothesis'. What is chi-square test ? A dice was thrown 60 times with the following results :

Face	1	2	3	4	5	6	Total
Frequency	6	10	8	13	11	12	60

Are the data consistent with the hypothesis that the dice is unbiased ? (Given $\chi^2_{.01} = 15.09$ for 5 degrees of freedom) 2 + 2 + 3 + 3