PG/IIS/COM-203/12

M.Com. 2nd Semester Examination, 2012

ADVANCED BUSINESS STATISTICS

PAPER – COM-203

Full Marks : 50

Time : 2 hours

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

UNIT – I

1. Answer any *two* questions : 5 × 2

(*a*) Mention the important properties of Poisson distribution.

(*b*) The incidence of occupational disease in an industry is such that the workmen have a 20% chance of suffering from it. What is the probability that out of six workmen, four or more will contact the disease ?

(*c*) "Sampling is a necessity under certain conditions." – Explain with examples.

(*d*) The average number of enquiry made by the visitors in a particular office between 10.00 A.M. to 10.30 A.M. and 10.30 A.M. to 11.00 A.M. are 2 and 3 respectively. What is the probability that more than 3 enquiries will made by the visitors between 10.00 A.M. to 11.00 A.M. of a particular day ?

2. Answer any *one* question : 10 × 1

(*a*) (*i*) 1000 light bulbs with a mean life of 120 days are installed in a new factory ; their length of life is normally distributed with standard deviation 20 days (*I*) How many bulbs will expire in less than 90 days ? (*II*) If it is decided to replace all the bulbs together, what intervals should be allowed between replacements if not more than 10 percent should expire before replacement ?

(*ii*) The mean weight of male students in a certain college is 60 kgs and standard deviation is 5 kgs. If 10 students are taken at random, what is the probability that 3 of them will have at least 70 kgs weight? (Assuming the weights are normally distributed) 5 + 5

(*b*) (*i*) Distinguish between simple random sampling with replacement and simple random sampling without replacement from a finite population.

(*ii*) What do you mean by Non-sampling error? How does it arises in the process of sampling? 5 + 5

UNIT – II

3. Answer any *two* questions : 5 × 2

(*a*) Write short notes on :

(*i*) Point Estimation and Interval Estimation

(*ii*) Null-hypothesis and Alternative hypothesis.

(*b*) A researcher claims that North-Indian 18 year old females are, on an average, taller than the South-Indian 18 year old females. To test this claim a random sample of 50 North-Indian and 50 South-Indian females was taken and their measurements are summarized below:

	North-Indian	South-Indian
Average hight (in inches)	65·2	64·5
Standard Deviation (in inches)	2·5	2·8

Test the hypothesis that North-Indian females are taller than their South-Indian counterparts at $\alpha = 0{\cdot}05$.

(*c*) Compare and contrust the Non-parametric tests with the Parametric tests.

(*d*) Ram rolled a defective dice 60 times and got 13 'sixes', while Rahim rolled the same dice for 90 times and got 17 'sixes'. Estimate the probability of getting a 'six' from rolling the dice with the help of maximum likelihood estimation method.

4. Answer any *one* question : 10×1

(*a*) (*i*) What precautions do you follow before applying χ^2 - test ?

(*ii*) The following table gives the number of aircraft accidents occured during the various days of the weeks. Find whether the accidents one uniformly distributed over the week. $3 + 7$

Days :	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
No. of Accident :	14	16	8	19	11	9	14

(*b*) (*i*) What is ANOVA ? Write down its assumptions.

(*ii*) The emergency services of Midnapore Hospital are open 24 hours and the assignment of nurses is divided into 3 shifts of 8 hours each. The number of nurses assigned for each shift is equal. However, the Hospital Superintendent thinks that

the number of emergencies handled may not be the same for each shift. He selects a random sample of 5days from each shift and the number of emergencies is recorded.

Day Shift	Evening Shift	Night Shift
40	42	40
35	33	43
30	35	42
35	30	46
30	45	39

Run an ANOVA and test whether the average number of emergencies is the same for each shift. 4 + 6

[*Internal Assessment* – 10 Marks]