Question Paper Code : 60301

M.B.A. DEGREE EXAMINATION, JANUARY 2013.

First Semester

BA 9201/10488 MB 102/UBA 9101/BA 911/571101 — STATISTICS FOR MANAGEMENT

(Regulation 2009/2010)

Time : Three hours   Maximum : 100 marks

Use of statistical tables permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State Baye's theorem on rule of inverse probability.

2. Find the probability of getting a total of 5 atleast once in three tosses of a pair of fair dice.

3. State central limit theorem.

4. What are the properties of an estimator?

5. A dice is thrown 9000 times and a throw of 3 or 4 is observed 3240 times. Show that the dice is an unbiased.

6. What is the aim of design of experiment?

7. The following arrangement indicates whether twenty consecutive cars which went by the toll booth of a bridge had local plates, L, or out-of-state plates O :

   L L O L L L L O O L L L L O L O O L L L

   Test whether this arrangement may be regarded as random at $\alpha = 0.05$.

8. Write down the formula to calculate rank correlation coefficient.

9. Find the mean values of the variables X and Y from the following regression lines : $2Y - X = 50$, $3Y - 2X = 10$.

10. Mention the four basic elements of a time series.

PART B — (5 × 16 = 80 marks)

11. (a) (i) An urn A contains 2 white and 4 black balls. Another urn B contains 5 white and 7 black balls. A ball is transferred from urn A to urn B. Then a ball is drawn from urn B. Find the probability that it will be white. (8)

    (ii) Box I contains 1 white and 999 red balls. Box 2 contains 1 red and 999 white balls. A ball is picked from a randomly selected box. If the ball is red, what is the probability that it came from box 1? (8)

Or

   (b) In a test on 2000 electric bulbs, it was found that bulbs of a particular make, was normally distributed with an average life of 2040 hours and standard deviation of 60 hours. Estimate the number of bulbs likely to burn for (i) more than 2150 hours (ii) less than 1950 hours (iii) more 1920 hours but less than 2100 hours. (16)

12. (a) (i) Find the probability that in 120 tosses of a fair coin (1) between 40% and 60% will be heads, (2) $\frac{5}{8}$ or more will be heads. (8)

    (ii) A population consists of the five numbers 2, 3, 6, 8, 11. Consider all possible samples of size two which can be drawn with replacement from this population. Find the mean of the sampling distribution of means, the standard deviation of the sampling distribution of means. (8)

Or

   (b) (i) Suppose that the heights of 100 male students at XYZ university represent a random sample of the heights of all male students at the university. Find (1) 95% (2) 99% confidence intervals for estimating the mean height of the XYZ university students. (8)

    (ii) A sample of five measurements of the diameter of a sphere were recorded by a scientist as 6.33, 6.37, 6.36, 6.32 and 6.37 cm. Determine unbiased and efficient estimates of (1) the true mean (2) the true variance. Assume that the measured diameter is normally distributed. (8)

13. (a) (i) In a town A, there were 956 births of which 52.5% was males while in towns A and B combined, this proportion in total of 1406 births was 0.496. Is there any significant difference in the proportion of male births in the two towns? (8)

    (ii) The weights of 10 people of a locality are found to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 66 kilograms. Is it reasonable to believe that the average weights of the people of locality is greater than 64 kg? Test at 5% level of significance. (8)

Or

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(b) A company appoints four salesman A, B, C and D and observes their sales in three seasons : Summer, Winter and Monsoon. The figures (in lakhs of Rs.) are given in the following table :

Salesman

		A	B	C	D
Seasons	Summer	45	40	38	37
	Winter	43	41	45	38
	Monsoon	39	39	41	41

Carry out analysis of variance. (16)

14. (a) (i) In an investigation into the health and nutrition of two groups of children of different social status, the following results are got. (10)

Social status / Healths	Poor	Rich	Total
Below normal	130	20	150
Above normal	24	96	120
Normal	102	108	210
Total	256	224	480

Discuss the relation between the health and their social status.

(ii) In a study of sedimentary rocks, the following diameters (in millimeters) were obtained for samples of 29 grains from two kinds of sand :

Sand I : 0.63 0.17 0.35 0.49 0.18 0.43 0.12 0.20 0.47 1.36 0.51 0.45 0.84 0.32 0.40

Sand II : 1.13 0.54 0.96 0.26 0.39 0.88 0.92 0.53 1.01 0.48 0.89 1.07 1.11 0.58

Use Mann-Whitney U test to test the hypothesis. (6)

Or

(b) (i) Suppose that an experiment, designed to compare three preventive methods against corrosion, fielded the following maximum depths of pits (in thousands of an inch) in pieces of wire subjected to the respective treatments. (8)

Method A : 77 54 67 74 71 66

Method B : 60 41 59 65 62 64 52

Method C : 49 52 69 47 56

Use Kruskal Wallis H test to test whether the three preventive methods against corrosion are equally effective or not.

(ii) Suppose it is desired to check whether pinholes in electrolytic tin plate are distributed uniformly across a plated coil on the basis of the following distances (in inches) of 10 pinholes from one edge of a long strip of tin plate 30 inches wide.

4.8 14.8 28.2 23.1 4.4 28.7 19.5 2.4 25.0 6.2

Use Kolmogorov Smirnov test to test the null hypothesis. (8)

15. (a) Let X_1 and X_2 be two independent random variables with means 5 and 10 and standard deviations 2 and 3 respectively. Obtain r_{UV} where $U = 3X_1 + 4X_2$ and $V = 3X_1 - X_2$. (16)

Or

(b) Find seasonal variations by the ratio-to-trend method from the data given below : (16)

Year	I Quarter	II Quarter	III Quarter	IV Quarter
1991	30	40	36	34
1992	34	52	50	44
1993	40	58	54	48
1994	54	76	68	62
1995	80	92	56	82

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