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Question Paper Code : 91101

M.B.A. DEGREE EXAMINATION, JANUARY 2012.

First Semester

BA 9201 — STATISTICS FOR MANAGEMENT

(Regulation 2009)

Time : Three hours   Maximum : 100 marks

Use of Statistical Tables is permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is a random experiment? — Unit 1 —variables

2. Given $\lambda = 4.2$, for a Poisson distribution, find $P(x \leq 2)$. — Unit-1

3. What do you mean by sampling distribution of the mean? — Unit 2

4. Define point estimate and interval estimate. — Unit-2

5. What is the relationship between the significance level of a test and Type I error? — Unit 3

6. What probability distribution is used in each of these types of statistical tests?

    (a) Comparing two population variances   Unit-3

    (b) Value of a single population mean and based on large samples.

7. What are the primary shortcomings of nonparametric tests? Unit 4

8. Define rank-correlation co-efficient. Unit-5

9. Which of the four components of a time series would we use to describe the effect of Christmas sales on a retail department store? —Unit 5

10. Explain the differences among the three principal types of indices price, quantity and value. unit 5

11. (a) (i) A doctor has decided to prescribe two new drugs to 200 heart patients as follows : 50 get drug A, 50 get drug B, and 100 get both. The 200 patients were chosen so that each had an 80 percent chance of having a heart attack if given neither drug. Drug A reduces the probability of a heart attack by 35 percent, drug B reduces the probability by 20 percent, and the two drugs, when taken together, work independently. If a randomly selected patient in the program has a heart attack, what is the probability that the patient was given both drugs? (8)

(ii) Military radar and missile detection systems are designed to warn a country of an enemy attacks. A reliability question is whether a detection system will be able to identify an attack and issue of warning. Assume that a particular detection system has 0.90 probability of detecting a missile attack. Use the binomial probability distribution to answer the following questions (1) If two detection systems are installed in the same area and operate independently, what is the probability that atleast one of the systems will detect the attack? (2) If three systems are installed, what is the probability that atleast one of the systems will detect the attack? (3) Would you recommend the multiple detection systems be used? Explain. (8)

Or

(b) (i) The average monthly sales of 5000 firms are normally distributed. Its mean and standard deviation are Rs. 36,000 and Rs. 10,000 respectively. Find (1) the number of firms having sales over Rs. 40,000 (2) the percentage of firms having sales between Rs. 38,500 and Rs. 41,000. (8)

(ii) The frequency distribution below represents the average monthly balances for 600 customers, in a bank. Calculate the median for these data : (8)

Class in Dollars	Frequency
0–49.99	78
50–99.99	123
100–149.99	187
150–199.99	82
200–249.99	51
250–299.99	47
300–349.99	13
350–399.99	9
400–449.99	6
450–499.99	4
	600

Unit1

Unit - 2

12. (a) (i) A researcher for a Coffee Corporation, is interested in determining the rate of coffee usage per household in the United States. She believes that yearly consumption per household is normally distributed with an unknown mean μ and a standard deviation of about 1.25 pounds (1) If she takes a sample of 36 households and records their consumption, of coffee for one year, what is the probability that the sample mean is within one-half pound of the population mean? (2) How large a sample must she take in order to be 98 percent certain that the sample mean is within one-half pound of the population mean? (8)

Unit-2

(ii) From a population of 540, a sample of 60 individuals is taken. From this sample, the mean is found to be 6.2 and the standard deviation 1.368. (1) Find the estimated standard error of the mean (2) Construct a 96 percent confidence interval for the mean. (8)

Or

(b) (i) A social psychologist surveyed 150 persons and found that 42 percent of them were unable to add fractions correctly (1) Estimate the standard error of the population (2) Construct a 99 percent confidence interval for the true proportion of the group who cannot correctly add fractions. (8)

Unit-2

(ii) Seven home makers were randomly sampled, and it was determined that the distances they walked in their housework an average of 39.2 miles per week and a sample standard deviation of 3.2 miles per week. Construct a 95 percent confidence interval for the population mean. (8)

Unit2

13. (a) (i) Two independent samples of observations were collected. For the first sample of 60 elements, the mean was 86 and the standard deviation 6. The second sample of 75 elements had a mean of 82 and a standard deviation of 9. (1) compute the estimated standard error of the difference between the two means (2) using $\alpha = 0.01$, test whether the two samples can reasonably be considered to have come from populations with the same mean. (8)

Unit 3

(ii) Given a sample mean of 83, a sample standard deviation of 12.5 and a sample size of 22, test the hypothesis that the value of the population mean is 70 against the alternative that it is more than 70. Use the 0.025 significance level. (8)

Unit 3

Or

(b) A company has appointed four salesman, A, B, C and D, and observed their sales in three seasons - summer, winter and monsoon. The figures (in Rs. Lakh) are given in the following table :

Seasons	Salesmen			
	A	B	C	D
Summer	36	36	21	35
Winter	28	29	31	32
Monsoon	26	28	29	29

Unit3 Two way Anova

Using 5% level of significance, perform an anlysis of variance on the above data and interpret the results. (16)

14. (a) A Boutique has 3 mall locations. The owner keeps a daily record for each location of the number of customers who actually make a purchase. A sample of these data follows. Using the Kruskal Wallis test, can you say at the 0.05 level of significance that the stores have the same number of customers who buy? (16)

Unit-4

Mall A	99	64	101	85	79	88	97	95	90	100
Mall B	83	102	125	61	91	96	94	89	93	75
Mall C	89	98	56	105	87	90	87	101	76	89

Or

(b) A plant supervisor ranked a sample of eight workers on the number of hours of overtime worked and length of employment. Is the rank correlation between the two measures significant at the 0.01 level : (16)

Unit-5

Amount of overtime : 5   8   2   4   3   7   1   6

Years employed :   1   6   4.5   2   7   8   4.5   3

15. (a) Mr. X owns a small company that manufactures portable message tables. Since he started the company, the number of tables he has sold is reprsented by this time series :

Unit-5

Year :	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Tables sold :	42	50	61	75	92	111	120	127	140	138

Find the linear equation that describes the trend in the number of tables sold by him. (16)

Or

(b) The owner of a Vineyard has collected the following information describing the prices and quantities of harvested crops for the years 1992–1995 :

Type of Grape	Price (per ton) (in $)				Quantity harvested (tons)			
Ruby Cabernet	108	109	113	111	1280	1150	1330	1360
Barbera	93	96	96	101	830	860	850	890
Cherian Blank	97	99	106	107	1640	1760	1630	1660

(i) Construct a Laspeyers index for each of these 4 years using 1992 as the base period.

(ii) Calculate a Paasche index for each year using 1993 as the base period as the base period. (16)

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