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**Question Paper Code : 63204**

M.B.A. DEGREE EXAMINATION, APRIL/MAY 2017.

First Semester

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

(Regulations 2009/2010)

Time : Three hours

Maximum : 100 marks

(Statistical Table Book needs to be provided)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define probability and state its rules.
2. What is meant by continuous and discrete variables? Give example in each.
3. What is a sampling distribution?
4. What are point and interval estimates?
5. Define Null and Alternative Hypotheses.
6. Write any two uses of F test.
7. What is a non parametric test?
8. What is meant by rank correlation?
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 1 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.
12. (a) The life expectancy in the United States is 75 with a standard deviation of 7 years. A random sample of 49 individuals is selected.
- (i) What is the probability that the sample mean will be larger than 77 years?
- (ii) What is the probability that the sample mean will be less than 72.7 years?
- (iii) What is the probability that the sample mean will be between 73.5 and 76 years?
- (iv) What is the probability that the sample mean will be between 72 and 74 years?
- (v) What is the probability that the sample mean will be larger than 73-46 years?

Or

- (b) A random sample of 121 checking accounts at a bank showed an average daily balance of \$280. The standard deviation of the population is known to be \$66.
- (i) Is it necessary to know anything about the shape of the distribution of the account balances in order to make an interval estimate of the mean of all the account balances? Explain.
- (ii) Find the standard error of the mean.
- (iii) Give a point estimate of the population mean.
- (iv) Construct a 80% confidence interval estimates for the mean.
- (v) Construct a 95% confidence interval for the mean.

13. (a) The following is the information obtained from a random sample of 5 observations. Assume the population has a normal distribution.

20, 18, 17, 22, 18

It is required to determine whether or not the mean of the population from which this sample was taken is significantly less than 21.

- (i) State the null and the alternative hypotheses.
- (ii) Compute the standard error of the mean.
- (iii) Determine the test statistic.
- (iv) Determine the  $p$ -value and at 90% confidence, test whether or not the mean of the population is significantly less than 21.

Or

- (b) In order to test to see if there is any significant difference in the mean number of units produced per week by each of three production methods, the following data were collected. (Note that the sample sizes are not equal).

Method I	Method II	Method III
182	170	162
170	192	166
179	190	

- (i) Compute  $\bar{x}$ .
- (ii) At the  $\alpha = 0.05$  level of significance, is there any difference in the mean number of units produced per week by each method? Show the complete ANOVA table. Use both the critical and  $p$ -value approaches.

14. (a) A random sample of 200 married men, all retired, were classified according to education and number of children.

Education	Number of children		
	0-1	2-3	Over 3
Elementary	14	37	32
Secondary	19	42	17
College	12	17	10

Test the hypothesis, at the 0.05 level of significance, that the size of a family is independent of the level of education attained by the father.

Or

- (b) The following data represent the number of hours that two different types of scientific pocket calculators operate before a recharge is required.

Calculator A: 5.5 5.6 6.3 4.6 5.3 5.0 6.2 5.8 5.1

Calculator B: 3.8 4.8 4.3 4.2 4.0 4.9 4.5 5.2 4.5

Use the rank-sum test with  $\alpha = 0.01$  to determine if calculator A operates longer than calculator B on a full battery charge.

15. (a) Obtain the two regression lines :

$x$ : 45 48 50 55 65 70 75 72 80 85

$y$ : 25 30 35 30 40 50 45 55 60 65

Or

- (b) Calculate seasonal index from the following data :

Year	(Sales in 100 tonnes)			
	I quarter	II quarter	III quarter	IV quarter
2005	30	22	15	45
2006	32	24	18	40
2007	35	29	20	37
2008	45	32	14	30
2009	50	30	12	35