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Question Paper Code : 70301

M.B.A. DEGREE EXAMINATION, MAY/JUNE 2013.

First Semester

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

(Regulation 2009/2010)

Time : Three hours   Maximum : 100 marks

Use of statistical table is permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is conditional probability?

2. Trains arrive at a station at 15 min intervals starting at 4 a.m. If a passenger arrives at the station at a time that is uniformly distributed between 9.00 a.m. and 9.30 a.m., find the probability that she has to wait for the train for less than 6 min.

3. Distinguish between one tailed and two tailed tests.

4. Differentiate between point estimate and interval estimate.

5. Briefly describe significance level.

6. State the applications of Z and t tests.

7. What are the advantages of non-parametric tests?

8. State the limitations of rank correlation test.

9. Differentiate between correlation and regression.

10. Briefly explain Fisher's Ideal Index.

PART B — (5 × 16 = 80 marks)

11. (a) (i) An urn contains 75 marbles. 35 of them are blue and the rest are red. 25 of the blue marbles are swirled while 30 of red ones are swirled. Find the probabilities of drawing Blue marble, Clear (Not swirled) marble, Blue swirled marble and Red clear marble. (8)

   (ii) A blade manufacturer manufactures and supplies blades in packets of 10. There is a 0.2% probability for any blade to be defective. Find approximately the number of packets containing two defective blades in a consignment of 20,000 packets. (8)

Or

(b) (i) A group was planning to make a court challenge to two wheeler insurance rate in one of the three cities in Tamil Nadu: Madurai, Trichy and Chennai. The probability that it would choose Madurai = 0.4, Trichy = 0.35 and Chennai = 0.25. The chance of succeeding in the challenge in the above cities are 60%, 45% and 35% respectively. Determine the city where the chance of success is the maximum. (10)

   (ii) It is observed that 80% of television viewers watch "Kaiyil Oru Kodi" programme. Find the probability that at least 80% of the viewers in a random sample of five, watch the programme. (6)

12. (a) (i) In a normally distributed population, average income per household is Rs.20,000 with a standard deviation of Rs.1,600. Find the probability that the sample mean will be between Rs. 19,600 and Rs.20,200 in a survey of a random sample of 100 households. (10)

   (ii) A university wants to determine the percentage of students who would accept proposed fees hike for improving facilities. The university wants to be 90% confident that the percentage is within 2% of the true value. Find the sample size to achieve the accuracy regardless of the true percentage assuming the percentage of students accepting the increase in tuition fees to be 0.5. (6)

Or

(b) (i) A movie maker sampled 55 fans who viewed his master piece movie and asked them whether they had planned to see it again. Only 10 of them believed that the movie was worthy of a second look. Find the standard error of the population of fans who will view the film a second time. Construct a 90% confidence interval for this population. (6)

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(ii) The manager of a shop selling beverages wants to estimate the actual amount of beverage in one litre bottles from a nationally known manufacturer. As per manufacturer's specifications the standard deviation of the volume of the beverage is 0.02 litre. The average amount of beverage per 1 litre bottle is found to be 0.995 litre on checking 50 bottles. Set up 99% confidence interval estimate of the true population average amount of beverage in a 1 litre bottle. Check whether the manufacturer is genuine in filling the beverage. (10)

13. (a) (i) ATMs must be stocked with enough cash to meet the requirements of customers over a week but excess cash results in loss of income as investment opportunities could not be utilized. In an ATM, the average transaction per customer in a week is Rs.8,000 with a standard deviation of Rs.1,500. If a random sample of 36 customer transactions is examined and it is observed that the sample mean withdrawal is Rs.8,600, check the belief that the true average withdrawal is no longer Rs.8,000. Assume 0.05 level of significance. (8)

(ii) The success of a sales engineer in adopting the proven sales technique was found to be 12 out of 30 occasions. Hence he tried a novel technique and achieved success at a rate of 23 out of 40 occasions. Check whether the novel technique is effective at 5% level of significance. (8)

Or

(b) (i) A consumer product manufacturing company was selling one of its leading products through a large number of retail shops. Before a heavy advertisement campaign, the average sales per week per shop was 140 dozens. After the campaign, a sample of 26 shops was taken and the mean sales improved to 147 dozens with a standard deviation of 16. Check the effectiveness of the advertisement campaign at 5% level of significance. (8)

(ii) A quality control supervisor for an automobile manufacturer is concerned with uniformity in the number of defects in cars from assembly lines. If one assembly has significantly more variability in the number of defects, then changes are to be made. Data collected by the supervisor are as follows :

Number of Defects

	Assembly Line A	Assembly Line B
Mean	10	11
Variance	9	25
Sample size	20	16

Check whether the lines differ significantly on variability in the number of defects at 0.05 level of significance. (8)

14. (a) A large organization is checking whether a relationship exists between the commuting time of its employees and the level of stress related problems. A survey of 116 assembly line operators revealed the following :

	Level of stress			Total
Commuting Time	High	Moderate	Low	
Under 15 min.	9	5	18	32
15-45 min.	17	8	28	53
Over 45 min.	18	6	7	31
Total	44	19	53	116

Check whether a relationship exists between the factors at 0.01 level of significance. (16)

Or

(b) The following are the final examination score of three groups of students who were taught computer science by three different methods :

First method   94 88 91 74 87 97

Second method   85 82 79 84 61 72 80

Third method   89 67 72 76 69

Verify whether the three methods are equally effective at 0.05 significance. (16)

15. (a) Data on rainfall and crop production for the past seven years are as follows :

Rainfall in inches :   20 22 24 26 28 30 32

Crop production in '00 mds : 30 35 40 50 60 60 55

Find the correlation coefficient and comment on the relationship. (16)

Or

(b) The percentage of students getting dream placements in campus selection in a leading technical institution during the past five years are as follows :

Year :   2008 2009 2010 2011 2012

Percentage : 7.3   8.7   10.2 7.6   7.4

Find the linear equation that describes the data. Also calculate the percent of trend and relative cyclical residual. Check whether the year of largest fluctuation is same by both the methods. (16)

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