Question Paper Code : 44032

M.B.A. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

First Semester

BA 7102 – STATISTICS FOR MANAGEMENT

(Regulations 2013)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   (10×2=20 Marks)

1. Define Statistics.

2. List out the uses of Baye's Theorem.

3. What is the rule of central limit theorem in estimation and testing problems ?

4. Define Confidence Co-efficient.

5. Recall the difference between Type I error and Type II error.

6. State the applications of Z-test and T-test.

7. When Kruskal-Wallis test is used ?

8. List out the working rules of Mann-Whitney Test.

9. Define Secular trends in time series.

10. When liner regression can be used ?

11. a) In an industry, three machines X, Y and Z produce stainless steel tumblers in the ratio of 4 : 5 : 3 of the total production. Past experience revealed that machine X produce 4 defective in every 50, machine Y produce 1 defectives and machine Z produce 2 defectives in every 60 units. One tumbler was drawn at random from a day's output and found to be defective. Find the probability that it was produced by machine Z.

(OR)

b) In the production of electric bulbs, the quality specification of their life was found to normally distribute with average life of 2100 hours and standard deviation of 80 hours. In a sample of 1500 bulbs, find out the expected number of bulbs likely to burn for (i) more than 2200 hours, (ii) less than 1950 hours and (iii) more than 2000 hours but less than 2150 hours.

12. a) There are 10000 students in a University. The average age of all the students is 48 years with standard deviation of 16 years. A random sample of 100 students is selected. (i) Determine the standard error of the mean. (ii) What is the probability that the sample mean will be larger than 42.5 years ? (iii) What is the probability that the sample mean will be between 50 and 56.5 years ?

(OR)

b) A car dealer wants to estimate the proportion of customers who still own the cars they purchased 5 years earlier. A random sample of 500 customers selected from the dealer's records indicates that 315 customers still own cars that they were purchased 5 years earlier. Set up 95% confidence interval estimation of the population proportion of all the customers who still own the cars 5 years after they were purchased.

Districts	A	B	C	D	E
No. of cases	8	5	3	3	3

Assuming normal distribution, test if the average no. of cases is more than 4.

13. a) Apply the ANOVA Techniques and write the comment regarding the sales (in ₹ lacs).

		Area			
		1	2	3	4
Representatives	A	24	32	40	36
	B	30	20	24	32
	C	20	16	32	30

(OR)

b) Three samples below have been obtained from normal population with equal variance. Test the hypothesis that the means are equal.

Sample - I	10	12	18	15	16
Sample - II	7	15	10	12	8
Sample - III	12	8	15	16	15

14. a) The production volume of units assembled by three different operators during 9 shifts is summarized below. Check whether there is significant difference between the production volumes of units assembled by the three operators using Kruskal-Wallis test at a significant level of 0.05.

Operator - I	29	34	34	20	32	45	42	24	35
Operator - II	30	21	23	25	44	37	34	19	38
Operator - III	26	36	41	48	27	39	28	46	15

(OR)

b) Two sample polls of votes for two candidates A and B for a public office are taken, one from among the residents of rural areas and one from the residents of urban areas. The results are given in the table. Examine whether the nature of the area is related to voting preference in this election.

Votes for area	A	B	Total
Rural	620	380	1000
Urban	550	450	1000
Total	1170	830	2000

15. a) Find seasonal variations by the ratio-to-trend method from the data given below :

Years	I Quarter	II Quarter	III Quarter	IV Quarter
2007	30	40	36	34
2008	34	52	59	44
2009	40	58	54	48
2010	54	76	68	62
2011	80	92	56	82

(OR)

b) The following data pertains of X = Revenue (in '000 of rupees) generated at a Corporate Hospital and Y = Number of Patients (in '00) arrived for the last ten years :

X	86	95	75	85	90	98	112	74	100	110
Y	21	24	18	24	22	30	27	18	25	28

Find the Karl Pearson's co-efficient of correlation and give your comment.

PART – C   (1×15=15 Marks)

16. a) A bank has kept records of the checking balances of its customers and determined that the average daily balances of its customers are Rs. 300 with a standard deviation of Rs. 48. A random sample of 144 checking accounts is selected.

   i) What is the probability that the sample mean will be more than Rs. 306.60 ?

   ii) What is the probability that the sample mean will be less than Rs. 308 ?

   iii) What is the probability that the sample mean will between Rs. 302 and Rs. 308 ?

   iv) What is the probability that the sample mean will be atleast Rs. 296 ?

   (OR)

b) i) Apply Mann-Whitney U test to determine if there is a significant difference in the age distribution of the two groups.

Day College	26	18	25	27	19	30	34	21	33	31
Evening College	32	24	23	30	40	41	42	39	45	35

   ii) The president of a company wants to see if the new anti-smoking campaign is having any influence on his employers. A sample of 100 employers who smoked prior to the campaign is taken. 36 employers said they smoked less, 15 employers said they smoked more 49 employers said there was no change. Use Chi-square test of homogeneity.

   1) State the null and alternative hypothesis.

   2) Test the null hypothesis at 1% level of significance.

   _____