20MBA14

USN

First Semester MBA Degree Examination, Jan./Feb. 2023
Business Statistics

Time: 3 hrs.　　　　　　　　　　　　　　　　　　　　　　Max. Marks:100

Note: 1. *Answer any FOUR full questions from Q.No.1 to Q.No.7.*
**　　　2. *Question No. 8 is compulsory.***
**　　　3. *Use of standard normal tables, t-distribution, critical values of***
**　　　　　 *F-distribution tables is permitted.***

1　a. Explain merits and demerits of Harmonic Mean and give the relation between Arithmetic Mean, Geometric Mean and Harmonic Mean. **(03 Marks)**

　b. From the prices X and Y of shares A and B respectively given below. State which share is more stable in value:

| Price of share A, X | 55 | 54 | 52 | 53 | 56 | 58 | 52 | 50 | 51 | 49 |
| Price of share B, Y | 108 | 107 | 105 | 105 | 106 | 107 | 104 | 103 | 104 | 101 |

(07 Marks)

　c. Calculate Karl Pearson's coefficient of correlation for the following paired data:

| X | 28 | 21 | 40 | 38 | 35 | 33 | 40 | 32 | 36 | 33 |
| Y | 23 | 34 | 33 | 34 | 30 | 26 | 28 | 31 | 36 | 38 |

(10 Marks)

2　a. Distinguish between Correlation and Regression. **(03 Marks)**

　b. The heights of mothers and daughters are given in the following table. From the tables of regression estimate the expected average height of daughter when the height of the mother is 64.5 inch.

| Height of mother X inches | 62 | 63 | 64 | 64 | 65 | 66 | 68 | 70 |
| Height of daughter Y inches | 64 | 65 | 61 | 69 | 67 | 68 | 71 | 65 |

(07 Marks)

　c. Calculate the coefficient of correlation by Karl Pearson's method from the following table:

| Overhead (in 000 Rs) | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 |
| Cost (in 000 Rs.) | 15 | 15 | 16 | 19 | 17 | 18 | 16 | 18 | 19 |

(10 Marks)

3　a. Write the probability density function of normal distribution and characteristics of normal distribution. **(03 Marks)**

　b. Given the mean height of students in a class is 158 cm with standard deviation of 20 cm. Find how many students heights lie between 150 cm and 170 cm if there are 100 students in the class. **(07 Marks)**

　c. In an intelligence test administered to 500 students and data is normally distributed the average score was 42 and standard deviation was 24. Find:
　　(i)　The number of students whose score exceeded 50.
　　(ii)　The number of students who scored between 30 and 40
　　(iii)　The number of students who scored above 60. **(10 Marks)**

4 a. Explain the uses of time series analysis. **(03 Marks)**

b. The sales of lathes in the last 3 years is given below. Use the method of simple averages to determine seasonal index of each month.

Month	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2009	16	17	19	19	24	24	21	29	30	34	34	39
2010	22	21	27	26	30	27	21	27	31	36	33	43
2011	28	28	38	39	39	33	33	37	41	50	44	56

(07 Marks)

c. If two large populations, there are 30% and 25% respectively of fair haired people. Is the difference likely to be hidden in samples of 1200 and 900 respectively from the two populations? **(10 Marks)**

5 a. Write the objectives of studying time series analysis and variations in time series. **(03 Marks)**

b. A sample of size 10 was taken from a population standard deviation of sample is 0.03. Find the maximum error with 99% confidence. **(07 Marks)**

c. The quarterly sales for 5 years from 2008-2011 is given below. Use ratio to moving average method to determine seasonal indexes:

Quarter	Sales in Rs. (Thousands)			
	I	II	III	IV
2008	77	62	56	61
2009	85	64	62	79
2010	91	73	67	86
2011	102	80	74	95

(10 Marks)

6 a. If the probability of defective bolt is 0.2, find (i) Mean (ii) Standard deviation for the distribution of bolts in a total of 400. Assume the distribution be binomial distribution. **(03 Marks)**

b. Explain the different steps in hypothesis testing. **(07 Marks)**

c. A survey was conducted to determine the age (in years) of 120 automobiles.

Age of Auto	0 - 4	4 - 8	8 - 12	12 - 16	16 - 20
Number of Auto	13	29	48	22	8

Find the Median age, Modal age and Mean age. **(10 Marks)**

7 a. Write the types of measures of dispersion. **(03 Marks)**

b. The average breaking strength of steel rods is specified to be 18.5 thousand pounds. To test this sample of 14 rods were tested. The mean and standard deviations obtained were 17.85 and 1.955 respectively. Is the result of experiment significant? **(07 Marks)**

c. Calculate Spearman's rank correlation coefficient between demand and sales from the following data and interpret your result:

Demand X	68	64	75	50	64	80	75	40	55	64
Sales Y	62	58	68	45	81	60	68	48	50	70

(10 Marks)

8 Company's trainees are randomly divided into 3 groups of 10 each and are given a course in management skills by 3 different methods. At the end of the training period, they are given a test and their scores are as follows:

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

Use Kruskal-Walli's test (K-W test) to determine at 5% level of significance if the three methods are equally effective. **(20 Marks)**