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First Semester MBA Degree Examination, June/July 2013
Statistics for Management

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions.
2. Use of statistical tables is permitted.

- 1 a. What are advantages and limitations of diagrammatic representation of data? (06 Marks)
 b. Draw give curves for the following data of mutual funds and find the median value:

Mutual fund price (Rs.)	10-15	15-20	20-25	25-30	30-35	35-40
No. of funds	6	11	9	7	5	2

(07 Marks)

- c. Compute Fisher's index number from the following data: (07 Marks)

Item	Year 2009		Year 2008	
	Price	Value	Price	Value
A	60	180	50	100
B	40	200	40	200
C	120	120	100	100
D	25	100	20	80

- 2 a. Differentiate between correlation and regression and define them. (05 Marks)
 b. From the given data, find out missing frequencies, if $M = 21$, $Z = 21.5$ and $N = 100$.

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45
No. of students	2	10	?	?	?	7	8	9	4

(07 Marks)

- c. Goals scored by two teams A and B in a football season were as shown below. Which team is more consistent in scoring? (08 Marks)

No. of goals in a match	0	1	2	3	4
No. of matches played by A	27	9	8	5	4
No. of matches played by B	17	9	6	5	3

- 3 a. What are index numbers? Write atleast five uses of them. (06 Marks)
 b. Computer while calculating correlation coefficient between two variable X and Y from 25 pairs of observations obtained the following results:

$$N = 25, \quad \sum X = 125, \quad \sum Y = 100, \quad \sum X^2 = 650, \quad \sum Y^2 = 460, \quad \sum XY = 508.$$

It was however discovered that two pairs of observations were not correctly taken. They were taken as (6, 14) and (8, 6) while the correct values were (8, 12) and (6, 8). Find the correct correlation coefficient. (07 Marks)

- c. From the following data, determine the rank correlation coefficient: (07 Marks)

X	43	96	74	38	35	43	22	56	35	80
Y	30	94	84	13	30	18	30	41	48	95

- 4 a. Explain different sampling methods. (07 Marks)
 b. Suppose an item is manufactured by three machines X, Y and Z. All the three machine have equal capacity and are operated at the same rate. It is known that the percentages of defective items produced by X, Y and Z are 2, 7 and 12 percent respectively. All the items produced by X, Y and Z are put into one bin. From this bin, one item is drawn at random and is found to be defective. What is the probability that this item was produced on Y? (05 Marks)

- 4 c. The production in a sugar factory in 1000 tonnes is

Year	1989	1990	1991	1992	1993	1994	1995
Production	77	88	94	85	91	98	90

- i) Fit a straight line by the method of least squares and show the trend values.
 ii) What will be the production for year 2000?

(08 Marks)

- 5 a. What is hypothesis testing? Explain the procedure for hypothesis testing.

(07 Marks)

- b. Find the probability that in a family of 5 children there will be:

- i) at least one boy
 ii) at least one boy and one girl.

(06 Marks)

- c. In a sample of 1000 the mean is 17.5 and standard deviation is 2.5. In another sample of 800, the mean is 18 and the standard deviation is 2.7. Assuming that samples are independent, discuss whether two samples could have come from a population which have the same standard deviation. (Critical value $Z = 1.96$ at $\alpha = 5\%$).

(07 Marks)

- 6 a. Brief about the following:

- i) One tailed and two tailed tests
 ii) Absolute and relative measures
 iii) Exclusive and inclusive methods of classification
 iv) Primary data and secondary data.

(08 Marks)

- b. A research was conducted to understand whether women have greater variations in attitude on political issues than men. Two independent samples of 31 men and 41 women were used for the study. The sample variances so calculated were 120 for women and 80 for men. Test whether the difference in attitude toward political issues is significant at $\alpha = 5\%$.

(07 Marks)

- c. A personnel manager is interested in typing to determine whether absenteeism is greater on one day of the week than on another. His records for the past year show the following sample distribution:

Day of week	Monday	Tuesday	Wednesday	Thursday	Friday
No. of absentees	66	56	54	48	75

Test whether the absence is uniformly distributed over the week at 5% level of significance.

(Critical value of $\chi^2 = 9.49$ at $\alpha = 0.05$ and $df = 4$)

(05 Marks)

- 7 a. What is the role of statistics in business management?

(07 Marks)

- b. The data on the profits (in Rs. lakh) earned by 60 companies as follows:

Profits below	10	20	30	40	50	60
No. of companies	5	17	37	53	58	60

Calculate Bowley's coefficient of skewness.

(05 Marks)

- c. A food processor uses a moving average to forecast next month's demand. Past actual demand (in units) is shown below:

Month	43	44	45	46	47	48	49	50	51
Actual demand	105	106	110	110	114	121	130	128	137

- i) Compute a simple five-month moving average to forecast demand for month 52.
 ii) Compute a weighted three month moving average where the weights for the latest months and descend in order of 3, 2, 1.

(08 Marks)

- 8 a. List out different types of measures of dispersion that are commonly used. Write three advantages of standard deviation. **(05 Marks)**
- b. To test the significance of variation in the retail prices of a commodity in three cities. Mumbai, Kolkata and Delhi, four shops were chosen at random in each city and the prices who lack confidence in their mathematical ability observed in rupees were as follows:

Mumbai	16	8	12	14
Kolkata	14	10	10	06
Delhi	04	10	08	08

Do the data indicate that the price in the three cities are significantly different? Test the hypothesis at $\alpha = 5\%$. **(08 Marks)**

- c. A company is interested in determining whether an association exists between the commuting time of their employees and the level of stress related problems observed on the job. A study of 116 assembly-line workers reveals the following:

Commuting time	Stress			Total
	High	Moderate	Low	
Under 20 minutes	9	5	18	32
20-50 minutes	17	8	28	53
Over 50 minutes	18	6	7	31
Total	44	19	19	116

At 5% level of significance, is there any evidence of a significant relationship between commuting time and stress? **(07 Marks)**

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