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First Semester MBA Degree Examination, December 2012

Statistics for Management

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer any FIVE full questions.
2. Question No. 8 is compulsory.
3. The use of calculator and statistical table is permitted.**

- 1 a. Define the term 'statistics' and discuss its functions and limitations. (06 Marks)
b. Draw a frequency polygon for the given frequency distribution: (06 Marks)

C.I.	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	2	4	10	12	6	4

- c. Calculate A.M. using direct and short cut method. (A.M – Arithmetic Mean). (08 Marks)

Marks	5	10	15	20	25	30	35
Students	8	12	18	12	17	16	17

- 2 a. Name the various measures of central tendency. Explain any one of them. (06 Marks)
b. For a certain frequency table which has only been partly reproduced here, the mean was found to be 1.46.

No. of accidents	0	1	2	3	4	5	Total
Frequency (No. of days)	46	?	?	25	10	5	200

Calculate the missing frequencies. (06 Marks)

- c. Find: i) Inter-quartile range, ii) Quartile deviation, iii) coefficient of quartile deviation for the following distribution. (08 Marks)

C.I.	0-15	15-30	30-45	45-60	60-75	75-90	90-105
f	8	26	30	45	20	17	4

- 3 a. Name the measures of dispersion and define range. (06 Marks)
b. The sum of 50 observations is 500 and the sum of their squares is 6000 and median is 12. Compute the coefficient of variation and the coefficient of skewness. (06 Marks)
c. From the following data calculate the coefficient of correlation of Karl Pearson's method.

X	6	2	10	4	8
Y	9	11	?	8	7

Arithmetic means of X and Y series are 6 and 8 respectively. (08 Marks)

- 4 a. Mention the methods of studying correlation and define line of regression. (06 Marks)
b. If the two lines of regression are $4x - 5y + 30 = 0$ and $20x - 9y - 107 = 0$ which of these is the line of regression of x on y, and y on x. Find r_{xy} and σ_y when $\sigma_x = 3$. (06 Marks)
c. From the following data calculate price index numbers for 1980 with 1970 as base by (i) Laspeyre's method and (ii) Paasche's method. (08 Marks)

Commodities	1970		1980	
	Price	Quantity	Price	Quantity
A	20	8	40	6
B	50	10	60	5
C	40	15	50	15
D	20	20	20	25

- 5 a. Define index number. Why Fisher method is called as an ideal method of index numbers? (06 Marks)

- b. Below are given the figures of production (in thousand tons) of a sugar factory:

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

Fit a straight line by the method of 'least squares' and show the trend values. (06 Marks)

- c. Fit a binomial distribution to the following data: (08 Marks)

x	0	1	2	3	4
f	28	62	46	10	4

- 6 a. Define permutation and combination. Also define sample space and event. (06 Marks)
- b. Probability that a man will be alive 25 years hence is 0.3 and the probability that his wife will be alive 25 years hence is 0.4. Find the probability that 25 years hence
- i) both will be alive ii) only the man will be alive iii) only the woman will be alive
- iv) none will be alive v) atleast one of them will be alive (06 Marks)
- c. A random sample of 100 articles taken from a batch of 2696 articles contains 5 defective articles. Find 95% and 99% confidence interval for the proportion of defective articles in the whole batch (i) with replacement and (ii) without replacement. (08 Marks)

- 7 a. Define sampling. Name the types of sampling. (06 Marks)
- b. Write the merits and demerits of quota sampling. (06 Marks)
- c. In order to test whether a coin is perfect, it is tossed 5 times. The null hypothesis of perfectness is rejected if and only if more than 4 heads are obtained. Obtain the (i) critical region, (ii) probability of type I error and (ii) probability of type II error, when the corresponding probability of getting a head is 0.2. (08 Marks)

- 8 a. Define type I and type II errors. Mention the applications of the χ^2 - distribution. (06 Marks)
- b. A machine is designed to produce insulating washers for electrical devices of average thickness of 0.025 cm. A random sample of 10 washers was found to have an average thickness of 0.024 cm with a standard deviation of 0.002 cm. Test the significance of the deviation. Value of t for 9 degrees of freedom at 5% level is 2.262. (06 Marks)
- c. Given the following data, test the hypothesis H_0 : All the means are equal; H_1 : At least two means are different.

$$\bar{X}_1 = 27, S_1 = 8, n_1 = 4 ; \bar{X}_2 = 25, S_2 = 9, n_2 = 7 ; \bar{X}_3 = 28, S_3 = 5, n_3 = 5 \text{ and } \alpha = 0.05.$$

(08 Marks)

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