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[4966]-1003

M.C.A. (Commerce Faculty) (First Semester) EXAMINATION, 2016
ELEMENT OF STATISTICS
(2013 PATTERN)

Time : Three Hours

Maximum Marks : 50

- N.B. :—** (i) All questions are compulsory.
(ii) Figures to the right indicate full marks.
(iii) Use of calculator and statistical tables is allowed.
(iv) Symbols and abbreviations have their usual meanings.

1. Attempt any *two* of the following : [14]

(A) In a study of correlation between the amount of rainfall (X) and the iron building material (Y) measured in suitable units, the following data were recorded :

X	Y
4.3	86
4.5	90
5.9	115
6.1	102
5.2	122
3.8	76
2.1	50
7.5	145
7	135

Estimate Y when X = 8.

P.T.O.

- (B) Calculate mean and median for the following frequency distribution :

Marks	No. of Students
0—10	8
10—20	12
20—30	20
30—40	10
40—50	6
50—60	2

- (C) Using C.V. find which of the batsman is more consistent in scoring :

Score of A	Score of B
42	47
115	12
6	76
73	42
7	4
19	51
119	37
36	48
84	13
29	0

2. Attempt any *two* of the following : [12]

- (A) Explain the following terms :

- (i) Type-I and Type-II error
- (ii) Level of Significance
- (iii) Simple and Composite Hypothesis.

- (B) If the correlation coefficient X and Y is 0.67, find the correlation between :
- (i) X and $-Y$
 - (ii) $2X$ and $3Y$
 - (iii) $X - 10$ and $Y + 15$
 - (iv) $X/2$ and $Y/5$
 - (v) $(X - 10)/3$ and $(10 - Y)/5$
 - (vi) $3X$ and $-Y/5$
- (C) Let X be a discrete random variable with probability mass function (p.m.f.)

$$P(X = x) = \frac{1}{6}, \quad X = 1, 2, 3, 4, 5, 6$$
$$= 0, \quad \text{otherwise}$$

Calculate mean and variance of X.

3. Attempt any *three* of the following : [12]

- (A) State the P.M.F. of Poisson distribution with parameter λ . State real life examples of Poisson distribution.
- (B) Let $X \rightarrow B(n, P)$ then comment on the following :
- (i) $E(X) = 7$ and $\text{Var}(X) = 12$
 - (ii) $E(X) = 4$ and $\text{s.d.}(X) = \sqrt{3}$, what are the values of n, p, q
 - (iii) If $n = 10$, $E(X) = 5$, find p .
- (C) Explain the procedure of Chi-square test for goodness of fit.

(D) The following 2×2 contingency table :

	Smoker	Non-Smoker
Literate	83	57
Illiterate	45	68

Test whether there is any relation between literacy and the smoking at 5% level of significance.

(E) A random sample of 27 pairs of observations from a normal population gives a correlation of 0.72. Is it likely that variables in the population are uncorrelated ? (Use 5% LOS. Given that $t_{25} = 2.060$, $t_{26} = 2.056$, $t_{27} = 2.052$)

4. Attempt any *three* of the following : [12]

(A) Explain large sample test.

(B) A sample of 225 bricks has mean weight of 2.12 kg with standard deviation of 0.56 kg. Test the hypothesis that the samples from a population with mean weight 2 kg at 5% level of significance.

(C) Let $X \rightarrow N(3, 2^2)$, find $P(X < 5)$ and $P(2 < X < 8)$

(D) Calculate mean and median for the following observations :

52, 45, 60, 53, 48, 55, 57, 46

(E) State any *four* properties of normal distribution.