

Code : 303404

B.C.A. 4th Semester Exam., 2015

INTRODUCTION TO STATISTICS

Time : 3 hours

Full Marks : 60

Instructions :

- (i) The marks are indicated in the right-hand margin.
- (ii) There are **SEVEN** questions in this paper.
- (iii) Attempt **FIVE** questions in all.
- (iv) Question Nos. **1** and **2** are compulsory.

1. Answer any six questions : 2×6=12

- (a) Determine the range of the following numbers : 17, 45, 38, 27, 6, 48, 11, 57, 34 and 22.
- (b) Express the following using the summation notations :
$$F_1x_1y_1 + F_2x_2y_2 + F_3x_3y_3 + F_4x_4y_4$$
- (c) Find the third moments of the set 2, 3, 7, 8, 10.
- (d) Determine the probability P for the given events :
"At least one head appears in the two tosses of a fair coin."
- (e) Write the binomial expansion for $(q + p)^4$.

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(Turn Over)

(2)

- (f) Find the probability that in five tosses of a fair die a 3 appears 'at no time'.
- (g) What is the formula for χ^2 ?
- (h) What is the equation for cubic curve?
- (i) What is the equation for modified exponential curve? :
- (j) What is the equation for logistic curve?

2. Answer any three questions : 4×3=12

- (a) Write down the properties of the arithmetic mean and also write the empirical relation between the mean, median and mode.
- (b) What are the purposes of skewness and kurtosis?
- (c) What do you mean by conditional probability? A fair die is tossed twice. Find the probability of getting a 4, 5 or 6 on the first toss and a 1, 2, 3 or 4 on the second toss.
- (d) Explain the relation between the binomial and Poisson distributions.
- (e) Find the probability that in a family of four children there will be—
 - (i) at least one boy;
 - (ii) at least one boy and two girls.Assume that the probability of a male birth is $1/2$.

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(Continued)

3. What do you mean by moments? Find the moment coefficient of skewness, a_3 , for the distribution of problem mentioned below : 12

(a) Without Sheppard's corrections

(b) With Sheppard's corrections

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|-----|----|----|----|----|----|----|-------------|
| X : | 12 | 14 | 16 | 18 | 20 | 22 | |
| Y : | 1 | 4 | 6 | 10 | 7 | 2 | Total 30 |

4. What is the relation between the binomial and normal distributions? Evaluate

(a) $\sum_{x=0}^N XP(x)$ a

(b) $\sum_{x=0}^N x^2 P(x)$ where $P(x) = \binom{N}{x} p^x q^{N-x}$ 12

5. What do you mean by coefficient of contingency? In this experiment with peas, xyz observed that 315 were round and yellow, 108 were round and green, 101 were wrinkled and yellow, and 32 were wrinkled and green. According to this theory of heredity, the number should be in the proportion 9 : 3 : 3 : 1. Is there any evidence to doubt his theory at the (a) 0.01 and (b) 0.05 significance levels? 12

6. What do you mean by the method of least squares and the least square level? Explain. 12
7. What do you mean by small and large samplings? In the past, a machine has produced washers having a thickness of 0.050 inch. To determine whether the machine is in proper working order, a sample of 10 washers is chosen, for which the mean thickness is 0.053 inch and the standard deviation is 0.003 inch. Test the hypothesis that the machine is in proper working order, using significance levels of (a) 0.05 and (b) 0.01. 12
