



SLR-CT – 65

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| Seat No. | |
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B.Com. (Part – III) (Semester – V) (CGPA) Examination, 2018
ADVANCED STATISTICS (Paper – I)

Day and Date : Monday, 26-3-2018

Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

- N.B. :** 1) **All questions are compulsory.**
2) **Each question carries equal marks.**
3) **Figures to the right indicate full marks.**
4) **Use of calculators is allowed.**

1. Choose the most appropriate alternative amongst the given for each question : **14**

1) From all observations selecting few of them simultaneously is called

- a) Permutation b) Combination c) Both a) and b) d) None of these

2) ${}^9C_4 = ?$

- a) 9 b) 36 c) 126 d) none of these

3) ${}^7P_3 = ?$

- a) $\frac{7!}{3!}$ b) $\frac{7!}{4!}$ c) $\frac{7!}{4! 3!}$ d) none of these

4) All possible outcomes of a random experiment is called as

- a) event b) sample space
c) both a) and b) d) none of these

5) When the events are mutually exclusive then $P(A \cup B)$ is

- a) 1 b) $P(A) + P(B)$ c) 0 d) $P(A) P(B)$

6) The probability of sure event is

- a) 0 b) 1 c) ∞ d) none of these

7) The conditional probability of event B given that event A has occurred is

- a) $P(B/A) = P(AB)/P(B)$ b) $P(B/A) = P(AB) / P(A)$
c) $P(B/A) = P(AB)$ d) none of them

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- 8) The total of Probability mass function is always
 a) -1 b) 0 c) 1 d) none of these
- 9) If $E(X) = 10$ then $E(2X)$ is
 a) 5 b) 20 c) 40 d) none of these
- 10) If k is a constant then variance of $2k$ is
 a) K^2 b) 0 c) $4k$ d) none of these
- 11) Which of the following is probability distribution ?
 a) $(0.2, 0.2, 0.7)$ b) $(0.5, 0.5)$ c) $(-0.1, 1.1)$ d) $(0, 1, 0.1, 0.3, 0.6)$
- 12) A number is selected at random from a set of numbers $(1, 2, 3, \dots, 50)$ what is the probability that selected number is divisible by 9 ?
 a) $9/50$ b) $5/50$ c) $10/50$ d) none of these
- 13) $(X + Y)^0$ is
 a) 0 b) 0.5
 c) 1 d) cannot be determined
- 14) In tossing of three coins at a time the probability of getting at least two heads is
 a) $1/8$ b) $1/2$ c) $7/8$ d) none of these
2. A) Define Combination of things. Find n if $nC_2 = 55$. 7
- B) Expand $\left(x + \frac{3}{x^4}\right)^7$. 7
3. A) State and prove additive law of probability. 7
- B) The pmf of a r.v. X is given by $P(X) = \frac{x}{15}$ $x = 1, 2, 3, 4, 5$
 Find $E(X)$ and $E(2X + 3)$ 7
4. Attempt **any one** of the following :
- A) Define Expectation of a discrete random variable. Write the sample space when two dice are thrown simultaneously. Obtain the probability distribution of sum of points appearing on the uppermost faces. Obtain $P(\text{Sum of points is greater than } 8)$. 14



- B) Define joint pmf of (X, Y) . Also define marginal distributions of x and y . 14
For the following joint probability distribution

$$P(X, Y) = \frac{X + 3Y}{24} \quad X = 1, 2 \quad Y = 1, 2$$

Obtain :

- i) marginal distribution of x and y
- ii) conditional distribution of X given $Y = 2$
- iii) conditional distribution of Y given $X = 1$

5. Attempt **any one** :

- A) Define mathematical expectation of r.v. X . Prove that if r.v. (X, Y) are independent then $E(XY) = E(X)E(Y)$. 14
The joint probability of X and Y is

| $x \backslash y$ | -1 | 0 | 1 |
|------------------|-----|-----|-----|
| -1 | 0 | 0.2 | 0 |
| 0 | 0.1 | 0.2 | 0.1 |
| 1 | 0.1 | 0.2 | 0.1 |

Find :

- i) marginal distributions of X and Y
 - ii) Are X and Y are independent ?
 - iii) Find $E(X + Y)$
 - iv) Find $E(XY)$
- B) The pmf of X is 14

| X | 1 | 2 | 3 | 4 |
|--------|-----|------|------|------|
| $P(X)$ | k | $2k$ | $3k$ | $4k$ |

Find :

- i) k
- ii) $E(X)$
- iii) $V(X)$
- iv) $E(4X - 2)$
- v) $V(4X - 2)$

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