



K15U 0337

Reg. No. : \_\_\_\_\_

Name : \_\_\_\_\_

**III Semester B.Sc. Degree (CCSS-2014 Admn. – Regular)**  
**Examination, November 2015**  
**COMPLEMENTARY COURSE IN STATISTICS FOR MATHS AND**  
**COMPUTER SCIENCE**

**3C035TA (Maths and Comp. Sci.) : Standard Probability Distributions**

Time : 3 Hours

Max. Marks : 40

PART – A

Answer **all** questions. **Each** question carries **one** mark :

1. A player is to toss 3 coins. He wins Rs.10 if three heads appear, Rs.5 if two heads appear, Re. 1 if one head appears. He will lose Rs. 12 no heads appears. Then the expected amount is \_\_\_\_\_
2. Define conditional expectation.
3. Define binomial distribution.
4. The continuous distribution with lack of memory property is \_\_\_\_\_
5. Write down the p. d. f. of a two parameter gamma distribution.
6. State Chebychev's inequality. (6×1=6)

PART – B

Answer **any six** questions. **Each** question carries **two** marks :

7. Distinguish between  $r^{\text{th}}$  raw moment and  $r^{\text{th}}$  central moment.
8. Define characteristic function. How can we obtain moments from characteristic function ?

P.T.O.



9. Derive the m. g. f. of a bernoulli distribution.
10. State and prove additive property of poison distribution.
11. If Z has a standard normal distribution find  $P(-1 < Z < 3)$ .
12. Find cumulant generating function of a normal distribution.
13. Distinguish between type – I beta and type – II beta distributions.
14. State Central Limit Theorem. (6×2=12)

### PART – C

Answer **any four** questions. **Each** question carries **three** marks :

15. Prove that  $E[E(X|Y)] = E(X)$ .
16. Obtain Poison distribution as a limiting case of binomial distribution.
17. If X is uniformly distributed with mean 1 and variance  $\frac{4}{3}$ , find  $P(X < 0)$ .
18. Let X be a random variable with distribution function

$$F(X) = \begin{cases} 0 & : x \leq 0 \\ 1 - e^{-\lambda x} & : x > 0 \end{cases}$$

Obtain the m. g. f. and first four moments.

19. Let X be a random variable taking values  $-1, 0, 1$  with probabilities  $\frac{1}{8}, \frac{6}{8}, \frac{1}{8}$  respectively. Using Chebychev's inequality find an upper bound of the probability  $P\{|X| \geq 1\}$ .
20. Examine whether WLLN holds for the sequence  $\{X_k\}$  of random variables defined as follows :

$$P(X_k = -2^k) = P(X_k = 2^k) = 2^{-(2k+1)}, \quad P(X_k = 0) = 1 - 2^{-(2k+1)}. \quad (4 \times 3 = 12)$$



PART – D

Answer **any 2** questions. **Each** question carries **5** marks :

21. A pair of fair dice is tossed. Let  $X$  and  $Y$  be random variables such that  $X$  denotes the maximum of the numbers and  $Y$  denotes the sum of the numbers. Find  $E(X)$  and  $E(Y)$ .
  22. Derive the recurrence relation for the central moments of a Poisson distribution.
  23. What are the important properties of a normal distribution.
  24. State and prove Weak Law of Large Numbers. **(2×5=10)**
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