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^{th} raw moment and r^{th} central moment.

8. Define characteristic function. How can we obtain moments from characteristic function ?

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 $E[E(X \mid Y)] = E(X)$.

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

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

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 $P\{|X| \ge 1\}$.

20. Examine whether WLLN holds for the sequence $\{X_k\}$ of random variables defined as follows :

$$P(X_k = -2^k) = P(X_k = 2^k) = 2^{-(2k+1)},\ P(X_k = 0) = 1 - 2^{-(2k+1)}.$$ **(4×3=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 Poison distribution.

23. What are the important properties of a normal distribution.

24. State and prove Weak Law of Large Numbers. **(2×5=10)**
