K15U 0336

Reg. No. : ....

Name : ....

III Semester B.Sc. Degree (CCSS – 2014 Admn. – Regular) Examination, November 2015
CORE COURSE IN STATISTICS
3B03STA : Probability Distributions

Time : 3 Hours   Max. Marks : 48

Instruction : ***Use** of calculators and statistical tables are **permitted.***

PART – A

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

1. What is the distribution function of a degenerate random variable degenerated at 'C' ?
2. Find the variance of a discrete uniform distribution taking values 1, 2, ... n.
3. Define geometric distribution.
4. Define multinomial distribution.
5. What is the relationship between Mean deviation, Standard deviation and Quartile deviation of a normal distribution ?
6. Define Cauchy distribution. **(6×1=6)**

PART – B

Answer **any seven** questions. **Each** question carries **two** marks.

7. Derive the m.g.f. of a Bernoulli distribution.
8. Obtain the variance of a binomial distribution.
9. Derive the p.g.f. of a Poisson distribution.
10. Explain the area property of a normal distribution.
11. If Z has a standard normal distribution find $P(-1 < Z < 3)$.

P.T.O.

12. Find mean and variance of a one parameter Gamma distribution.

13. Distinguish between type – I beta and type – II beta distributions.

14. 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 $P\{|X| \geq 1\}$.

15. State Central Limit Theorem. **(7×2=14)**

PART – C

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

16. Obtain Poisson distribution as a limiting case of binomial distribution.

17. State and prove lack of memory property of geometric distribution.

18. If X is uniformly distributed with mean 1 and variance $\frac{4}{3}$, find $P(X < 0)$.

19. Let $X_1, X_2, \ldots, X_n$ be n independent exponential variables with parameters $\theta_1, \theta_2, \ldots \theta_n$ respectively. Obtain the distribution of $X_1 + X_2 + \ldots + X_n$.

20. Show that the linear combination of n independent normal variates is also a normal variate.

21. Examine whether WLLN holds for the sequence $\{X_k\}$ of random variables defined as follows $P(X_k = -2^k) = P(X_k = 2^k) = 2^{-(2k+1)}$, $P(X_k = 0) = 1 - 2^{-(2k+1)}$. **(4×4=16)**

PART– D

Answer **any 2** questions. **Each** question carries **6** marks.

22. Establish Renovsky formula.

23. Derive the mean and variance of a negative binomial distribution.

24. Obtain Normal distribution as a limiting case of binomial distribution.

25. State and prove Chebychev's inequality. **(2×6=12)**
