K16U 2129

Reg. No. : ....

Name : ....

III Semester B.Sc. Degree (CBCSS – Reg./Supple./Imp.) Examination, November 2016
(2014 Admn. Onwards)
COMPLEMENTARY COURSE IN STATISTICS FOR MATHS AND COMPUTER SCIENCE
3C03 STA (Maths and Comp. Sci.) : Standard Probability Distributions

Time : 3 Hours Max. Marks : 40

PART – A

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

1. Define variance of a random variable.
2. Define correlation coefficient between two random variables.
3. If X follows binomial (10, 0.4), Y = 10 – X follows ________ .
4. Let X be a geometric random variable taking values 0, 1, 2, ... What is the mode of this distribution ?
5. Write down the p.d.f. of a type-II beta distribution.
6. State Weak Law of Large numbers. **(6×1=6)**

PART – B

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

7. A box contains 6 tickets. Two of the tickets carry a prize of Rs. 5 each and other four carry prizes of Rs. 1. If one ticket is drawn, what is the expected value of the prize ?
8. State and prove addition theorem of expectation.
9. If X has a discrete uniform distribution over the integers 1, 2, 3, . . ., n. Obtain the variance of X.

P.T.O.

10. Comment on the following statement : 'For a binomial distribution mean = 3 and variance = 4'.

11. If X follows a normal distribution with mean 20 and standard deviation 5. Find P(X > 25).

12. Find distribution function of an exponential distribution.

13. State and prove additive property of Gamma distribution.

14. State Central Limit Theorem. **(6×2=12)**

PART – C

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

15. Show that moment generating function need not exist always.

16. Derive the m.g.f. of a Poisson distribution.

17. Show that linear combination of a set of independent normal variates is also a normal variate.

18. State and prove lack of memory property of exponential distribution.

19. If X is a random variable such that $E(X) = 3$ and $E(X^2) = 13$. Use Chebyshev's inequality to determine a lower bound for $P(-2 < X < 8)$.

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

$$P\left(X_n = \frac{1}{\sqrt{n}}\right) = \frac{2}{3}, P\left(X_k = -\frac{1}{\sqrt{n}}\right) = \frac{1}{3}.$$ **(4×3=12)**

PART – D

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

21. Define characteristic function of a random variable. Obtain the characteristic function of $Y = \frac{X-\mu}{\sigma}$ interms of the characteristic function of X. ($\mu \in R(-\infty, \infty)$, $\sigma > 0$).

22. Establish Renovsky formula.

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

24. State and prove Chebyshev's inequality. **(2×5=10)**