M 7590

Reg. No. : ....

Name : ....

III Semester B.Sc. Degree (CCSS – Reg./Supple./Imp.) Examination, November 2014
COMPLEMENTARY COURSE IN STATISTICS
3C03 STA (Maths and Comp. Sci.) : Standard Distributions

Time : 3 Hours Max. Weightage : 30

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

PART – A

Answer **any 10** questions. Weight **1 each**.

1. Define and discuss mathematical expectation.

2. A player tosses 3 fair coins. He wins Rs. 8/= if three heads occur; Rs. 3/= if 2 heads occur and Re : 1/= if one head occurs. He loses Rs. 10/= if no heads occur. Find the expected gain of the player.

3. X and Y are independent variables with means 10 and 20 and variances 2 and 3 respectively. Find the variance of 3X + 4Y.

4. Show that the moment generating function of sum of a number of independent random variables is equal to the product of their respective moment generating functions.

5. If $f(x) = \frac{1}{\theta}$; $0 < x < \theta$, obtain the characteristic function.

6. The mean and variance of binomial destination are 4 and $\frac{4}{3}$ respectively. Find the parameters of binomial distribution.

7. Define Poisson probability mass function under what conditions binomial distribution tends to Poisson distribution.

P.T.O.

8. State the important properties of normal distribution.

9. State the Lindberg-Levy central limit theorem for independent and identically distributed variables.

10. Explain the concept of convergence in probability.

11. State the weak law of large numbers. **(10×1=10)**

PART – B

Answer **any 6** questions. Weight **2 each**.

12. What is the expectation of the number of failures preceding the first success in an infinite series of independent trials with constant probability P of success in each trial ?

13. Find the moment generating function of random variable whose moments are $\mu_r^1 = (r+1)!\, 2^r$.

14. Define : Cumulant generating function. Show that all cumulants are independent of change of origin and not of scale.

15. State and prove additive property of binomial distribution.

16. Show that for a Poisson distribution the coefficient of variation is the reciprocal of the standard deviation.

17. Obtain mean deviation about mean for normal distribution.

18. Obtain mean and variance of Gamma distribution with parameters 'm' and 'p'.

19. State and prove Bernoullis law of large numbers.

20. A symmetric die is thrown 600 times. Using Chebychev's inequality, find the lower bound for the probability of getting 80 to 120 sixes. **(6×2=12)**

PART – C

Answer **any two** questions. Weight **4 each**.

21. State the r^{th} central moment in terms of raw moments. Establish the relationship between r^{th} central moment and raw moments. Obtain μ_2, μ_3 and μ_4 in terms of raw moments.

22. If $f(x, y) = 21x^2y^3$; $0 < x < y < 1$ find conditional mean and variance of x given y = y.

23. Show that the exponential distribution lacks memory.

24. Derive the recurrence relation for the central moments of Poisson distribution. Obtain the coefficients of Skewness and Kurtosis. **(2×4=8)**