M 5273

Reg. No. : ....

Name : ....

III Semester B.A./B.Sc./B.Com./B.B.A./B.B.A.T.T.M./B.B.M./B.C.A./B.S.W./ B.A. Afsal-Ul-Ulama Degree (CCSS-Regular/Supple./Improvement) Examination, November 2013
COMPLEMENTARY COURSE IN STATISTICS FOR MATHS/ COMP. SCI. CORE
3C03 STA : Standard Distributions

Time : 3 Hours Max. Weightage : 30

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

PART – A

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

1. Define mathematical expectation of a random variable.

   If $X_i = 2^i$ and $P(X_i) = \frac{1}{2^i}$; i = 1, 2, 3, ... Find E(X).

2. State and prove addition theorem of expectation of a sum of stochastic variables.

3. Define conditional mean and conditional variance in discrete and continuous cases.

4. If $\mu_r^1 = r!$ for a random variable X_1 find its moment generating function.

5. Define cumulants and explain how you will determine them.

6. If $f(x) = \frac{1}{n}$; $x = x_1, x_2, \ldots x_n$. Find mean and variance of X.

7. Explain, how Poisson distribution arise in practice. Give suitable examples.

8. What are the main features of normal distribution ?

9. Define : Gamma distribution with two parameter. State additive property of gamma distribution.

10. State central limit theorem.

11. Find $P\left[|X - 2| \leq 2\right]$ by using Chebychev's inequality. **(10×1=10)**

P.T.O.

PART – B

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

12. Show that for two random variables X and Y $-1 \leq \gamma_{XY} \leq +1$.

13. Find the moment generating function of X, if $f(x) = \frac{1}{2} e^{-|x|}$; $-\infty < X < \infty$.

14. If $f(x, y) = 3XY(X + Y)$ $0 \leq X \leq 1$, $0 \leq Y \leq 1$. Find $E\left[Y/X = x\right]$.

15. State and prove additive property of binomial distribution.

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

17. Obtain the points of inflexion of a normal distribution.

18. Find the mean and variance of Beta distribution of second kind.

19. If X has a uniform distribution over [0, 1], find the distribution of $Y = -2\log X$.

20. State and prove Bernoulli's law of large numbers. **(6×2=12)**

PART – C

Answer **any 2** questions. Weight **4 each** :

21. Find the coefficient of correlation between X and Y if $f(x, y) = X + Y$, $0 \leq X, Y \leq 1$.

22. Obtain the cumulant generating function of normal distribution. Hence determine K_2 and K_4.

23. X and Y are independent gamma variates with parameters m and n respectively, show that $U = X + Y$ and $V = \frac{X}{Y}$ are independent. Identify the distributions of U and V.

24. State and prove Chebychev's inequality. Explain its importance. **(2×4=8)**

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