M 3544

Reg. No. : ....

Name : ....

IV 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 – Reg./Supple./Improv.) Examination, May 2013

CORE COURSE IN STATISTICS

4B 04 STA : Probability Distribution

Time: 3 Hours | Max. Weightage : 30

Instruction : *Statistical table and calculators are* ***permitted.***

PART – A **(Weightage 1)**

Answer **any ten** questions :

1. If X follows Binomial distribution with $p = \frac{1}{4}$ find V(X) when n = 16.

2. If the m.g.f. of a R.V. X is $M^{(t)}x = (0.4 + 0.6e^{t})^{10}$ find E(X).

3. Define genmetric distribution.

4. If X follows Poisson distribution with parameter λ, what is the distribution of $\frac{X-\lambda}{\sqrt{\lambda}}$ as $\lambda \to \infty$.

5. If the p.d.f.of a R.V.X is given by f(x) = 0.5, $-1 \le x \le 1$, find P(X = 0).

6. State Jenson's inequality.

7. Define Beta distribution.

8. If X is a R.V. with mean = 2 and unit variance, find $P\{|x-2| \ge 1\}$.

9. State central limit theorem.

10. Define convergence in probability.

11. What is simulation ? **(10×1=10)**

P.T.O.

PART – B

Answer **any six** questions : Weightage **2 each**. **(Weightage : 2)**

12. Derive the m.g.f of exponential distribution and hence find its mean.

13. The probability of a man hitting a target is $\frac{1}{4}$. If he fires 7 times, what is the probability that the target is hit.

14. If X follows Poisson distribution with P (X = 8) = P (X = 9), find variance of X.

15. If X and Y are independent normal variates, derive the distribution of X + Y.

16. If X_1, X_2 .... are independent Random variables each having finite mean μ and variance σ^2, show that $P\left\{\left|\frac{S_n}{n} - \mu\right| > \varepsilon\right\} \to 0$ as $n \to \infty$.

17. If X is the number scored in a throw of a fair die, find an upper limit for $P(|X - \mu| > 2.5)$.

18. Derive the recurrence relation for central moments of Poisson distribution with parameter λ, in the form $\mu_{\gamma+1} = \gamma\lambda\mu_{\gamma-1} + \lambda \frac{d}{d\lambda}\mu_\gamma$.

19. If X and Y are independent Poisson variates, find the distribution of X given X + Y.

20. How will you generate exponential R.V ? **(6×2=12)**

PART – C

Answer **any two** questions : Weightage **4 each** : **(Weightage : 4)**

21. State and prove Tchebyshev's inequality.

22. For a normal distribution with parameters μ and σ, derive the mean deviation about mean.

23. a) Explain the lack of memory property of the geometric distribution.

    b) Find the m.g.f. of Geometric distribution and hence find its mean and variance.

24. If $X_1, X_2, \ldots X_n$ are independent random variables having exponential distribution with parameter λ, find the distribution of $Y = \sum_{i=1}^{n} X_i$. Also find the mean of Y. **(2×4=8)**
