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Reg. No. : MT18CMS R01

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III Semester B.Sc. Degree (CBCSS-Reg./Supple./Imp.)
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(2014 Admission Onwards)

COMPLEMENTARY COURSE IN STATISTICS FOR MATHS/ COMPUTER SCIENCE CORE

3C 03 STA: STANDARD PROBABILITY DISTRIBUTIONS

Time : 3 Hours Max. Marks : 40

PART - A

Answer **All** questions. Each question carries **1** mark. (6×1=6)

1. Define Moment generating function of a random variable X.
2. Show that $E(cX + dY) = cE(X) + dE(Y)$.
3. Show that for the geometric distribution $P(x+1) = qP(x)$.
4. If X is N(5,3) find the distribution $Y = 2X+5$.
5. Define Beta distribution of the first kind with parameters p and q.
6. State central limit theorem for iid random variables.

PART - B

Answer any **Six** questions. Each question carries **2** marks. (6×2=12)

7. State and prove the addition theorem of expectation of a sum of stochastic variables.
8. Write down the relation between raw moments and central moments.
9. Let X and Y have the joint p.d.f., $f(xy) = \frac{x+2y}{18}, x = 1,2, y = 1,2$. Find E(X) and E(Y).

P.T.O.

10. Five unbiased dice are tossed. Find the probability that at most two of them will show six.

11. Write down the important properties of the normal distribution.

12. State and prove the additive property of Gamma Distribution.

13. Explain the lack of memory property of exponential distribution.

14. State the Bernoulli law of large numbers.

PART - C

Answer any **Four** questions. Each question carries **3** marks. **(4×3=12)**

15. Define characteristic function. State its properties.

16. Show that $V(X) = E[V(X/Y)] + V[E(X/Y)]$.

17. A Poisson variate is such that P(X=1)=2P(X=2). Find P(X=0).

18. The mean yield for one - acre plot is 662 kilos with a s.d .32 kilos. Assuming normal distribution, how many one- acre plots in a batch of 1000 plots would you expect to have yield a) over 700 kilos b) below 650 kilos.

19. Find the Arithmetic mean and Harmonic mean of a Beta distribution of the first kind.

20. Examine whether the weak law of large numbers holds for the sequence X_k of independent random variables defined as

$P(X_k = \pm 2^k) = 2^{-(2k+1)}$, $P(X_k = 0) = -2^{-2k}$.

PART - D

Answer any **Two** questions. Each question carries **5** marks. **(2×5=10)**

21. Let X and Y are two random variables with joint p.d.f. $f(x,y)=2;\ 0<x<y<1$. Find the correlation between X and Y.

22. Show that under certain limiting conditions Binomial distribution tends to Poisson distribution.

23. Derive the mean deviation about mean of the normal distribution.

24. State and prove Tehebycheff's inequality.