

0113733



Reg. No. :

Name :



K19U 2488

III Semester B.Sc. Degree (CBCSS- Reg./Sup./Imp.)

Examination, November-2019

(2014 Admn. Onwards)

CORE COURSE IN STATISTICS

3B03 STA : PROBABILITY DISTRIBUTIONS

Time : 3 Hours

Max. Marks :48

PART -A

- I. (Short Answer - Answer All the 6 questions) (6×1=6)
1. If the p.d.f. of a variable X is defined as $f(x) = cx(2-x)$, $0 < x < 2$. then find the value of c.
 2. Define characteristic function.
 3. Write the m.g.f of Normal distribution $N(\mu, \sigma^2)$
 4. Name the continuous distribution which possesses the memory less property.
 5. Give an example of a distribution whose mean, median and mode are equal.
 6. Define central limit theorem.

PART-B

- II. (Short Essay - Answer Any 7 questions) (7×2=14)
7. Define m.g.f of a random variable (discrete and continuous)
 8. Find the probability of getting 2 heads when three coins are tossed.
 9. Derive the first moment about origin of Binomial distribution.
 10. Find the mean of discrete Uniform distribution.
 11. If the probability that a target is destroyed on any one shot is 0.5, What is the probability that it would be destroyed on 6th attempt?
 12. Define Log Normal distribution.
 13. Derive the mean of Exponential distribution.
 14. Suppose X is Normally distributed with 12 and standard deviation 4, Find $P(X \geq 20)$.
 15. Define Gamma distribution with one parameter and two parameters.

P.T.O.

**PART- C**

- III. (Essay - Answer Any 4 questions) (4×4=16)
16. Out of 800 families with 5 children each. how many would you expect to have
(i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys
(Assume equal probabilities for boys and girls).
17. State and prove Lack of memory property of Geometric distribution.
18. Derive mean and variance of continuous Uniform distribution.
19. If the annual proportion of a component that fails in a certain brand of TV set may be looked upon as a random variable having a beta distribution with $m=2$, $n=4$. Find the probability that at least 25% of all that component will fail in the TV set of that brand.
20. Show that the standard deviation for a Normal distribution is approximately 25% more than mean deviation.
21. Find the characteristic function of Cauchy (0,1) random variable.

PART-D

- IV. (Long Essay- Answer Any 2 questions) (2×6=12)
22. Define Hyper geometric distribution, and derive its mean and variance.
23. When X follows Binomial distribution with parameters n and p, show that $\mu_{r+1} = pq[nr \mu_{r-1} + (d\mu_r / dp)]$ and hence find third central moment μ_3 .
24. In an MCA exam. a student is considered to have failed. secured second class, first class and distinction according as he scores less than 45%, between 45% and 60%, between 60% and 75% and above 75% marks respectively. In a particular year 10% of the students failed in the exam and 5% of them got distinction. Find the percentage of students who have got first class and second class (Assume Normal distribution of marks).
25. a). State and prove Tchebyshev's inequality.
b). A fair die is tossed 600 times. Use Tchebyshev's inequality to find a lower bound for the probability of getting 80 to 120 sixes.