Reg. No. :	K18U 19
Name :	
Examin (201 Core	Degree (CBCSS – Reg./Sup./Imp.) ation, November 2018 4 Admn. Onwards) Course in Statistics OBABILITY DISTRIBUTIONS
Time: 3 Hours	Max. Marks
	PART – A
	(Short Answer)
Answer all the 6 questions.	(6×1
1. Define nth central moment of a	random variable X.
2. Find the mean of a binomial va	ariate with $M_x(t) = \left(\frac{1}{2}\right)^5 (1 + e^1)^5$.
3. If X & Y are independent random	om variables, show that $M_{x+y}(t) = M_x(t).M_y(t)$.
4. If $X \stackrel{d}{\rightarrow} B(n, p)$, find $V(X)$.	
 State the probability density reduce to exponential distribut 	function of gamma distribution. When will this tion?
	I random variables with means μ_i and standard the distribution of $Y = \sum_{i=1}^n a_i X_i $.
	PART – B

 $(7 \times 2 = 14)$

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Max. Marks: 48

 $(6 \times 1 = 6)$

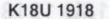
7. Find the moment generating function of geometric distribution.

Answer any 7 questions.

8. A fair coin is tossed five times. Find the chance of getting 3 heads.

(Short Essay)

P.T.O.



- 9. What are the important characteristics of a normal curve ?
- 10. Arandom variable X has the probability density function $f(x) = \begin{cases} Kx(1-x), & 0 \le x \le 1 \\ 0, & \text{elsewhere} \end{cases}$
- 11. If $X \xrightarrow{\sigma} N(\mu, \sigma)$. Find $M_{\chi}(t)$.
- 12. Define log-normal probability distribution.
- 13. If $X \stackrel{d}{\rightarrow} B$ (n, p) withprobability b (x; n, p) = $\binom{n}{x} p^x (1-p)^{n-x}$, x = 0, 1, 2..., n; p + q = 1. Show that b (x + 1; n, p) = $\frac{n-x}{x+1}$ b (x; n, p).
- 14. Define Multinomial distribution.
- 15. If the heights of school children in a district are found to follow normal distribution with μ = 56 and σ = 10. What percent of children have height?
 - a) Less than 40 inches.
 - b) Between 50 & 60 inches.

Answer any 4 questions.

 $(4 \times 4 = 16)$

- 16. If $X \xrightarrow{\sigma} N(\mu, \sigma)$. Find mode.
- 17. If $X \stackrel{d}{\rightarrow} N (\mu, \sigma)$. Show that $\mu_{2r} = 1.3.5 \dots (2r-1)\sigma^{2r}$.
- 18. Describe beta distribution of first kind. Find its variance.
- 19. Explain convergence in probability.
- 20. State and prove central limit theorem.
- 21. Find the first three central moments of gamma distribution.



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PART - D

(Long Essay)

Answer any 2 questions.

 $(2 \times 6 = 12)$

- 22. Define negative binomial distribution. Find its mean and variance.
- 23. Let X_1 , X_2 be independent and identically distributed Geo (p) random variable and $Y = X_1 + X_2$. Find the conditional probability $P\{X_1 = t | X_1 + X_2 = n\}$.
- 24. Find the distribution of $Y = \frac{1}{X}$, where $X \stackrel{d}{\rightarrow} Cauchy$ (a, h).
- 25. Show that a continuous non-negative random variable X follows the exponential distribution if and only if the relationship P (X > t + s | X > t) = P (X > s) holds for all real t, s ≥ 0.