PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Second Semester)

Branch - **STATISTICS**

PROBABILITY THEORY / PROBABILITY & DISTRIBUTIONS - I

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)
All Questions are Multiple Choice

Module No.	Question No.	Question	K Level	CO
1	1	If two event the conditional probability of A given A is equal to a) 0 b)1 c)Infinite d) inter determinate	K1	CO1
	2	If B⊂A the probability P(A/B) is equal to a) 0 b)1 c) P(A)/P(B) d) P(B)/P(A)	K2	CO1
2	3	Two random variable X and Y are said to be independent if a) E(XY)=0 b) E(XY)=1 c) E(XY)=E(X)E(Y) d) All of these	K1	CO2
	4	If X is a random variable the $E(t^x)$ is a) CGF b) MGF c) PGF d) X^{th} moment	K2	CO2
3	5	The heights of father and their sons form bivariable variables which are a) Continuous b) Discrete c) Both a and b d) None of these	K1	CO3
	6	Bivariate normal distribution is named as a) Bravais distribution b) Laplace-gauss distribution c) Gaussian distribution d) All the above	K2	CO3
4	7	If X is a random variable the $E(e^{xti})$ is a) CGF b) MGF c) PGF d) X^{th} moment	K1	CO4
	8	If X is a random variable the $E(e^{xt})$ is a) CGF b) MGF c) PGF d) X^{th} moment	K2	CO4
5	9	If X is a random variable with its mean $\bar{X}$ the expression $E(X-\bar{X})^2$ represents a) Variance b) covariance c) second central moment d) both a and c	K1	CO5
	10	If X is a r.v, which can take only non negative values then a) $E(X^2) = [E(X)]^2$ b) $E(X^2) \geq [E(X)]^2$ c) $E(X^2) \leq [E(X)]^2$ d) $E(X^2) \neq [E(X)]^2$	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Define i)Random experiment ii) Algebra of events.	K2	CO1
		(OR)		
	11.b.	Show that the multiplication theorem on probability.		
2	12.a.	Prove that $V(aX+b) = a^2$	K3	CO2
		(OR)		
	12.b.	Examine Random variable and its types.		
3	13.a.	Inspect the assumptions of Bivariate Distribution.	K3	CO3
		(OR)		
	13.b.	Organize the properties of joint distribution function.		
4	14.a.	Mention the properties of moment generating function.	K5	CO4
		(OR)		
	14.b.	State and prove the weak law of large numbers.		
5	15.a.	Estimate the distribution of the difference of two random variable.	K5	CO5
		(OR)		
	15.b.	Derive the distribution of the quotient of two random variable.		

SECTION - C (30 Marks)

Answer **ANY THREE** questions
ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	A letter is known to have come either from TATANAGAR or from CALCUTTA. On the envelop just two consecutive letters TA are visible. What is the probability that the letter came from CALCUTTA?	K3	CO1
2	17	Prove that the properties of Expectation of random variables.	K5	CO2
3	18	Derive the marginal density function of bivariate distribution.	K4	CO3
4	19	State and prove the chebychev's Inequality.	K5	CO4
5	20	If X and Y are independent continuous random variable, then the pdf of U =X +Y is given by h(u)= $\int_{-\infty}^{\infty} f(v)f(u-v)dv$.	K4	CO5

Z-Z-Z END