22STP206N/ 22STP206

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2024
(Second Semester)

Branch- **STATISTICS**

DISTRIBUTION THEORY

Time: Three Hours Maximum: 75 Marks

SECTION - A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	An observation is said to left truncated at d if it is not recorded within a) <d b) >d c) ≤d d) ≥d	K1	CO1
	2	If X and Y are independent with common p.d.f $f(u) = e^{-u}$, $u \geq 0$ then p.d.f of X-Y follows a) Laplace distribution b) gamma distribution c) exponential distribution d) uniform distribution	K2	CO1
2	3	Let $F_r(x)$ r = 1,2,……n denote the c.d.f of r^{th} order statistic then c.d.f of $F_n(x)$ of the largest order statistic $X_{(n)}$ is given by a) $1-F(x)^n$ b) $F(x)^n$ c) $1-(1-(F(x))^n$ d) $1-F(x)$	K1	CO2
	4	In $X_{(1)} \leq X_{(2)} \leq X_{(3)} \ldots X_{(n)}$ is the order statistic and if $X_{(r)}$ is the rth order statistic the c.d.f $F_r(x)$ of the rth order is a) Incomplete Beta function b) multinomial distribution c) Incomplete gamma distribution d) Cauchy distribution	K2	CO2
3	5	In deriving the bivariate normal distribution the assumption regarding array is a) hetroscedastic b) homoscedastic c) may not be defined d) increasing	K1	CO3
	6	The cummulant generating function of normal distribution is $K_x(t)$ = a) $\mu t+\sigma t^2$ b) $\mu t+\sigma^2 t^2$ c) $\mu t-\sigma t$ d) $\mu t+\sigma^2 t^2/2$	K2	CO3
4	7	Relationship between Manalanobis D^2 and T^2 is a) $T^2 = D^2$ b) $T^2 = \lambda D^2$ c) $T^2 = \lambda^2 D^2$ d) $T^2 = \lambda^2 D^2/2$	K1	CO4
	8	Generalised form of chi square distribution is a) Whishart distribution b) Beta distribution c) normal distribution d) t distribution	K2	CO4
5	9	_____ is a technique which is used to identify the pairs of variable which has least magnitude of correlation coefficient. a) Canonical correlation b) discriminant analysis c) Factor analysis d) Principal component analysis	K1	CO5
	10	Principal component analysis is the techniques which is used to identify set of variable which has more influence on _____. a) independent b) dependent variable c) uncorrelated d) correlated	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.	Derive mean and variance of Truncated Binomial Distribution.	K 2	CO1
		(OR)		
	11.b.	If X and Y are independent and also normally distributed with mean 0 and S.D 1. Find the distribution of X/Y.		
2	12.a.	Show that for a random sample of size 2 from $N(0,\sigma^2)$ population then $E(X_{(1)}) = -\sigma/\sqrt{\pi}$.	K 3	CO2
		(OR)		
	12.b.	Derive sampling distribution of partial correlation coefficient.		
3	13.a.	Derive the MGF of multivariate normal distribution.	K 3	CO3
		(OR)		
	13.b.	Elucidate singular and non- singular distribution.		
4	14.a.	State and prove additive property of whishart distribution.	K 3	CO4
		(OR)		
	14.b.	Elucidate the uses of Hotelling's T^2 Statistic.		
5	15.a.	Explain canaonical correlations.	K 3	CO5
		(OR)		
	15.b.	Explain the concept of factor anlaysis.		

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	If x is a standard normal variate and when all the values of X<a are missing find its mean.	K 2	CO1
2	17	Derive the probability density function of non-central t distribution.	K 3	CO2
3	18	Derive the characteristic function of multivariate Normal distribution.	K 4	CO3
4	19	Derive the distribution of Hotelling's T^2 distribution.	K 3	CO4
5	20	Derive the distribution of Discriminant function.	K 3	CO5

Z-Z-Z END