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SUBJECT CODE NO:- B-2122
FACULTY OF SCIENCE & TECHNOLOGY
B.Sc. T.Y. (Sem-VI)
Examination November/December- 2022
Mathematics
Mathematical Statistics-II – MAT -603

[Time: 1:30 Hours] **[Max. Marks:50]**

Please check whether you have got the right question paper.

N.B
1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Attempt any one: 08

a) if X and Y are random variables then prove that:

E(X+y)=E(x) + E(y),

provided that both the expectations exist

b) if X is a random variables, then prove that

$v(ax + b) = a^2 \vee (x)$,

Where a and b constants.

Also prove that variance is independent of change of origin and scale.

Q.1 B) Attempt any one: - 07

c) Two unbiased dice are thrown find the expected values of the sum of numbers of points on them.

d) If x is a Poisson variate such that

$P(x = 2) = gp(x = 4) + 90\, P(x = 6)$

Find (i) λ ii) The Mean.

Q.2 A) Attempt any one: 08

a) Find first four central moments of a binomial distribution by using moment generation function.

b) Find the moment generating function of exponential distribution.

B) Attempt any one: 07

Q.2 c) Ten coins are thrown simultaneously. Find the probability of getting at least seven heads.

d) If x and y are independent Poisson variates such that P(X=1)=P(x=2) and P(y=2)= P(y=3) find the variance of x-2y

Q.3 A) Attempt any one: 05

a) Find the median of normal distribution.

b) Prove that correlation coefficient is independent of change of origin and scale.

Q.3 B) Attempt any one: 05

a) Determine the binomial distribution for which the mean is 4 and variance 3 and find its mode..

b) If x has a Uniform distribution in [0,1] find the distribution (p.d.f) of -2logx. Identify the distribution also.

Q.4 Choose the correct alternative. 10

i. If x and y are independent then cov (x,y)=--------

a) 1 b) 0 c) -1 d) 2

ii. The mean of Poisson variate is ----------its variance.

a) Greater than b) less than c) equal to d) twice

iii. The moment generating function of gamma distribution is --------

a) $(1+t)^{\lambda}$ b) $(1-t)^{\lambda}$ c) $(1-t)^{-\lambda}$ d) $(1+t)^{-\lambda}$

iv. The mean and median of normal distribution are -------

a) The same b) Not Same c) Mean < Median d) Mean > median

v. The variance of Bernoulli distribution is -------

a) p b) pq c) q d) p-q