(Please write your Enrollment Number) Enrollment No._____

Supplementary Examination- ONLINE MODE
(CBCS)
<Programme Name Btech> <II SEM>
(Jan, 2022)

Subject Code:< BAS 108 >	**Subject: < Probability and Statistics >**
Time : 1 Hour 15 minutes	**Maximum Marks :** 30
Note: Q. 1 is compulsory. Attempt any one question from the rest.	

Q1 **(5*3=15)**

(a) Suppose X has the moment generating function

$$m_X(t) = (1-2t)^{-1/2} \text{ for } t < 1/2$$

Find the second moment of X.

(b) A normal distribution has the mean 0.1 and the standard deviation 2.1. Find the probability that mean of a sample of size 900 will be negative.

(c) An individual has 3 email accounts. Most of her messages, in fact 70% come into account #1, whereas 20% come into account #2 and the remaining 10% into account #3. Of the messages into account #1, only 1% are spam, whereas the corresponding percentages for #2 and #3 are 2% and 5%, respectively. What is the probability that a randomly selected message is a spam?

Q2 **(7.5+7.5= 15)**

(a) Let the joint probability density function for (X, Y) be

$$f(x,y) = \begin{cases} \frac{x+y}{2}, x > 0, y > 0, 3x + y < 3 \\ 0, \quad otherwise \end{cases}$$

Find the probability $P(X < Y)$. Also, find the marginal density function of X.

(b) In a state with 100 dams, the probability that a dam is dry is 0.7. For a year, the state government declares a drought if atleast 75 dams are dry, while the central government declares a drought if atleast 80 dams are dry. Using normal approximation, find the probability that for a year, the decision of the state government to declare a drought is not approved by the central government.

Q3 **(7.5+7.5= 15)**

(a) The time to pass through a security screening at an airport follows an exponential distribution. The mean time to pass through the security screening is 15 minutes. To catch the flight, a passenger must clear the security screening within 15 minutes. What is the probability that the passenger will miss the flight?

(b) Obtain the equations of the lines of regression from the following data

X	1	2	3	4	5	6	7
Y	9	8	10	12	11	13	14

Declaration of the Paper Setter(s)

I have followed these instructions provided by the examination division during last end-term examination, December 2021 for paper setting with best of my knowledge