Roll No. 18BTo 20347 Total Pages : 04

MAR-21-210015

B. Tech. EXAMINATION, March 2021

Semester III (CBCS)

PROBABILITY & STATISTICS

(CE, ME, TE, AE, ECE, EE, EEE, CES, IT)

MA-301

Time : 3 Hours *Maximum Marks : 60*

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt *Five* questions in all, selecting *one* question from each Sections A, B, C and D. Q. No. 9 is compulsory.

Assume missing data if any. Given that :

$P(Z<=2) = 0.9772$; $P(0<Z<2) = 0.4772$; $P(Z<=1.18) = 0.9641$; $P(Z<=0.45) = 0.6736$; $P(0<Z<0.92) = 0.3212$; $P(0<Z<1.75) = 0.46$.

Section A

1. Define conditional probability and independence. Show their relation with a suitable example. **10**

2. A computer store has 10 computers out of which 3 are detective. A customer buys 2 computers at random. Find the probability mass function that customer will get defective systems. **10**

Section B

3. (a) Define Binomial distribution and also state formula of mean and variance for this distribution.

   (b) 10 coins tossed simultaneously, find the probability of getting at least 7 heads. **10**

4. If x is a random variable that follows a normal distribution, *i.e.* $x \sim N(12, 16)$; then find the probability of the following : **10**

   (a) $x>=20$

   (b) $0<=x<=12$.

Section C

5. State and prove any sampling distribution of the mean, with a suitable example. **10**

6. Define the following terms with a suitable example :

   (a) Properties of point estimators

   (b) Statistics. **10**

Section D

7. Explain the following terms with suitable examples :

   (a) Null Hypothesis

   (b) Normal Sampling Distribution **10**

8. Explain Chi-square and F sampling distribution. State difference and importance of these distributions. **10**

(Compulsory Question)

9. Answer the following questions in brief : **2×10=20**

   (i) Define events in probability.

   (ii) What is a random variable ?

   (iii) State discrete uniform distribution.

   (iv) State negative binomial distribution.

(v) Name and define the parameters of normal distribution.

(vi) What is random sampling ?

(vii) State Bayes estimator.

(viii) Define Hypothesis.

(ix) State any *two* differences between Normal and *t* sampling distribution

(x) What is the regression analysis ?