R20 Regulation *Subject code:* 3B3CA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech III Semester Regular Examinations, February 2022

PROBABILITY & STATISTICS AND COMPLEX VARIABLE
(MECHANCAL ENGINEERING)

Maximum Marks: 70 Date:21.02.2022 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 Define discrete random variable,
2 Describe probability mass function.
3 Explain the standard normal variate
4 Write the characteristics of Normal distribution
5 Define Point and Interval Estimations
6 Explain about Type-I, & Type-II errors
7 What is the Maximum error of estimation for large Sample
8 Write the confidence limits for small samples with two means
9 Define Analytic,& Harmonic functions
10 Explain about Milne Thompson method.

Part-B

Answer All the following questions. (5X10M=50Marks)

11 (a) Two dice are thrown .Let X assigns to each point (a,b) in S the maximum of its numbers i.e.,X(a,b) = max (a,b) .Find the probability distribution. X is a random variable with X(s) = { 1,2,3,4,5,6 }.Also find the mean and variance of the distribution. 5M

(b) Find the Mean of Binomial Distribution. 5M

OR

12 (a) Find the Mean of Poisson Distribution. 5M

(b) A random variable x has the following probability function 5M

x	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Find (i) Mean (ii) Variance

13 A continuous random variable has the pdf, $f(x) = kxe^{-\lambda x}$, if $x \geq 0, \lambda > 0$
$= 0$ otherwise 10M
determine the construct k, find Mean & variance.

OR

14 (a) In a normal distribution 7% of the items are under 35 and 89% are under 63. Determine the mean and The variance of the distribution 5M

(b) Show that the mean deviation from the mean for normal distribution is equal to 4/5 times of standard deviation 5M

15 (a) A population consists of six numbers 4,8,12,16,20,24. Consider all samples of size two which can be drawn without replacement from this population. 5M
Find a) The population mean
b) The population standard deviation
c) The mean of the sampling distribution of means
d) The standard deviation of sampling distribution of means.
(b) Show that the Mean of the sample is an unbiased estimator of mean of the Population. 5M

OR

16 (a) Write the Procedure of the testing of hypothesis? 5M
(b) If a sample is taken from the population show that the variance is not an unbiased estimator of the variance of the population. 5M

17 (a) A sample of 25 members has a mean of 3.4 cms and S.D. 2.61 cms. Is this sample Has been taken from a large population of mean 3.25 cm at 5% level. 5M
(b) Explain about Chi Square Goodness of fit. 5M

OR

18 Use F-test, to test the significance difference of two variances. 10M

x	12	13	10	5	6	10	13
y	11	11	10	11	12	14	15

19 Evaluate $\int_c \frac{z-3}{z^2+2z+5} dz$ Where C is $|z+1-i| = 2$ using Cauchy's Integral formula. 10M

OR

20 Find the analytic function Whose Imaginary part is $e^{-x}(x\cos y + y\sin y)$. 10M