R18 Regulation *Subject code:* 2H3AE

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech III Semester Regular/Supplementary Examinations, February 2021

PROBABILITY AND STATISTICS
(Common to CE,ME,CSE & IT)

Maximum Marks: 70 Date: 26.02.2021 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 **(2M X 10=20 Marks)**

1 If the probability that a target is destroyed on any one shot is 0.5. What is the probability that it would be destroyed on 6^{th} attempt.
2 If X_1, X_2 are two random variables and a,b are constants then $E(aX_1 + bX_2)$?
3 If X is a poisson variate such that p(x=0) = p(x=1) = K. Determine K
4 The two lines of regression are 8x−10y+66=0;40 x−18y−214=0Find the mean values of x and y?.
5 Define Type-I and Type-II errors
6 Write any two uses of Chi-square distribution.
7 Write the test statistic of single mean in large samples.
8 Define critical region.
9 Write the assumptions of student's t- test.
10 Write the formula for F- test.

Part-B

Answer All the following questions. **(10M X 5=50Marks)**

11 A continuous random variable 'X' is defined by [10M]

$$f(x) = \begin{cases} \frac{1}{16}(3+x)^2, & \text{if } -3 \le x \le -1 \\ \frac{1}{16}(6-2x^2), & \text{if } -1 \le x < 1 \\ \frac{1}{16}(3-x)^2, & \text{if } 1 \le x \le 3 \\ 0 & \text{elsewhere} \end{cases}$$

Verify that f(x) is a density function & also find the Mean of 'x'

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OR

12 An electrical firm manufactures light bulbs that have a life, before burnout, which is normally distributed with mean equal to 800h and a standard deviation of 40h. Find the probability that a bulb burns between 778h and 834h. [10 M]

13 It has been found that 2% of the tools produced by a certain machine are defective what is the probability that in a shipment of 400 such tools

(a) 3% of more (b) 2% or less will prove defective [10M]

OR

14 A random sample of size 100 is taken from a population whose mean is 60 and variance is 400.Using central limit theorem,with what probability can we assert that mean of the sample will not differ from μ =60 by more than 4? [10M]

15 Fit a second degree polynomial to the following data $y = a + bx + cx^2$ [10M]

X	1	2	3	4	5	6	7
y	2.3	5.2	9.7	16.5	29.4	35.5	54.4

OR

16 Fit a following of the curve $y = ae^{bx}$

X	2	3	4	5	6
Y	144	172.8	207.4	248.8	298.5

17 A sample of 64 students have a mean weight of 70 kgs. Can this be regarded as a sample from a population with mean weight 56 kgs and standard deviation 25 kgs.

OR

18 A simple sample of the heights of 6400 English men has a mean of 67.585 inches and a S.D of 2.56 inches while a simple sample of height of 1600 Australians has mean of 68.55 and a S.D of 2.52.D the data indicate the Australians are on the average taller than Englishmen use 1% l.o.s (10M)

19 The number of automobile accidents per week in a certain community are as follows: 12,8,20,2,14,10,15,6,9,4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period. (10M)

OR

20 Given the following contingence table for hair colour and eye colour .find the value of Chi- square ,Is there good association between the two.

Hair colour					
Eye colour		Fair	Brown	Black	Total
	Blue	15	5	20	40
	Grey	20	10	20	50
	Brown	25	15	20	60
	total	60	30	60	150

[10M]