6. b. A coin was tossed 400 times and returned heads 216 times. Test the hypothesis that the coin is unbiased. Use a 0.05 Level of significance. **7M**

(or)

7. a. From the following data, find whether there is any significant liking in the habit of taking soft drinks among the categories of employees. **9M**

	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumps up	15	30	65
Fanta	50	60	30

b. Explain the analysis rxc contingency tables. **6M**

UNIT-IV

8. a. State the meaning of the term statistical quality control and write its advantages. **9M**

b. The number of customer's complaints received by an organization is given below.

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Complaints	2	3	0	1	9	2	0	0	4	2	0	7	0	2	4

Does it mean that the number of complaints is under statistical control. Establish the control scheme for future. **6M**

(or)

9. a. Explain reliability and life testing. **7M**

b. A system consists of 5 identical components connected in parallel. Find the reliability of each component if the overall reliability of the system is to be 0.96. **8M**

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SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, JULY, 2022

Fourth Semester

COMPUTER SCIENCE AND ENGINEERING

20BS4101A PROBABILITY AND STATISTICS

Time: 3 hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part - B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. State Discrete Random variable with an example.
   b. State any three properties of Normal Distribution.
   c. Define joint probability density function.
   d. The variance of a population is 2. The size of the sample collected from the population is 169. What is the standard error of mean?
   e. Define Level of significance in test of hypothesis.
   f. Distinguish Type-I and Type-II errors.
   g. Write the standard error of the statistic difference of two sample proportions.
   h. Write formula for χ^2 test of goodness of fit.
   i. Define control charts for attributes.
   j. Define time distributions.

PART-B

4 x 15 = 60M

UNIT-I

2. a. The probability function of a random variable X is **8M**

X	0	1	2	3	4	5	6
P(X)	k	3k	5k	7k	9k	11k	13k

i) Find the value of k
ii) Find P $(3 < X \leq 6)$
iii) Find mean and variance.

b. The mean of Binomial distribution is 3 and the variance is 9/4. Find
i) P(X>7) ii) P(1<X<6) **7M**

(or)

3. a. If the masses of 300 students are normally distributed with mean 68 kgs and standard deviation 3 kgs, how many students have masses
i) Greater than 72 kgs ii) Less than or equal to 64kgs
iii) between 65 and 71 kgs inclusive. **8M**

b. The joint density function of W and Z is given by **7M**

$$f_{wz}(WZ) = \begin{cases} bwz, & 1 \leq w \leq 3, \quad 2 \leq z \leq 4 \\ 0, & otherwise \end{cases}$$

Find b and marginal density function,

UNIT-II

4. A population consists of five numbers 2, 3, 6, 8 and11. Consider all possible samples of size 2 that can be drawn with replacement from this population. Find
i) The mean of the population
ii) The standard deviation of the population
iii) The mean of the sampling distribution of means and
iv) The standard deviation of the sampling distribution of means. **15M**

(or)

5. a. A random sample of 8 boys had the following IQ's
70, 120, 110, 101, 88, 83, 95, 98. Do these data support the assumption of population mean IQ of 100? **8M**

b. Measurements of the fat content of two kinds of ice cream, Brand A and Brand B, yielded the following sample data: **7M**

Brand A (%)	13	14	13	12	13
Brand B (%)	12	13	12	13	12

Test the null hypothesis $\mu_1=\mu_2$ (where μ_1 and μ_2 are the respective true average fat contents of the two kinds of ice cream) against the alternative hypothesis $\mu_1 \neq \mu_2$ at the level of significance of $\alpha=0.01$.

UNIT-III

6. a. Two independent samples of 8 and 7 times respectively had the following values of variables.

Sample I:	9	11	13	11	15	9	12	14
Sample II:	10	12	10	14	9	8	10	-

Do the estimates of population variance differ significantly? **8M**