

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV (NEW) EXAMINATION – WINTER 2023****Subject Code:2142505****Date: 06-02-2024****Subject Name: Probability and Introduction to Statistics****Time: 10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Define Probability. **03**
 (b) Explain frequency distribution curves. **04**
 (c) State Bay's Theorem in detail. **07**

- Q.2** (a) What is cumulative distribution? **03**
 (b) What is type-1 and type-2 errors? **04**
 (c) Calculate the mean for the following data; **07**

CLASS	10-20	20-30	30-40	40-50	50-60
Frequency	13	23	12	17	20

OR

- (c) Find variance, standard deviation and coefficient of variance: **07**

Gross profit	1-10	10-20	20-30	30-40
No. of companies	12	15	09	17

- Q.3** (a) Explain normal distribution. **03**
 (b) Discuss use of Normal distribution. **04**
 (c) When a machine is set correctly, it produces 15% defectives; otherwise it produces 30% defectives. From the past knowledge and experience, the manufacturer knows that the chances that the machine is set correctly or wrongly are 50:50. The machine was set and before commencement of production, one piece was inspected and found to be defectives. What is the probability of machine set up being correct? **07**

OR

- Q.3** (a) Explain Binomial distribution. **03**
 (b) Discuss use of Binomial distribution. **04**
 (c) What is z test. Discuss with examples. **07**

- Q.4** (a) What is F test? **03**
 (b) Write note: core relation **04**
 (c) A machine produces 60 articles per day. On average 4 articles produced are found defective in a day. If a sample of 20 articles are drawn at random, what is the probability that one article of this lot is defective? **07**

OR

- Q.4** (a) What is sampling? **03**
 (b) Write note: ANOVA **04**
 (c) Let X and Y be the random variables such that $E[X] = 1.8$, $E[Y] = 4.3$, $V[X] = 16.6$, $V[Y] = 40.3$. Compute the following: **07**
 1. $E(X+1)$
 2. $E(X+2Y+1)$
 3. $V(2X+5)$
 4. $V(6Y+9)$

- Q.5** (a) What is regression analysis? **03**
 (b) Explain correlation coefficient. **04**
 (c) Find the probability distribution: **07**

X	1	2	3	4
P(X)	0.10	0.25	.05	.035

OR

- Q.5** (a) What is chi square test? **03**
 (b) Explain application of Chi-Square Test **04**
 (c) Write note: measures of skewness & kurtosis **07**
