

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-IV (NEW) EXAMINATION – WINTER 2018

**Subject Code: 2142505**

**Date: 05/12/2018**

**Subject Name: Probability and Introduction to Statistics**

**Time: 02:30 PM TO 05:00 PM**

**Total Marks: 70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Discuss various means (averages) to describe data. **03**  
 (b) List various measures of Dispersion. Explain Standard Deviation in Detail. **04**  
 (c) Discuss various Data representation methods in detail. **07**

- Q.2** (a) Define following: **03**  
     1) Random Variable; 2) Random Experiment; 3) Event  
 (b) Explain T-test with suitable example. **04**  
 (c) A committee of 5 is to be selected from a group of 6 men and 9 women. If the selection made randomly, what is the probability that the committee consists of 3 men and 2 women? **07**

**OR**

- (c) Suppose that A and B are mutually exclusive events for which  $P(A) = 0.3$  and  $P(B) = 0.5$ . What is the probability that  
     1. Either A or B occurs.  
     2. A occur but B does not occur.  
     3. Both A and B occur? **07**

- Q.3** (a) What is the difference between Sample and Population? **03**  
 (b) In a hypothesis test, explain (a) left- tailed test, (b) right- tailed test, and (c) two tailed test. **04**  
 (c) Explain *Chi-Square* test with suitable example. **07**

**OR**

- Q.3** (a) Briefly explain ogive. **03**  
 (b) Explain Type-I and Type-II error with reference to Hypothesis Testing **04**  
 (c) Explain Simple Linear Regression with suitable data. **07**

- Q.4** (a) List various Sampling Methods. **03**  
 (b) The joint distribution of two random variable  $X_1$  and  $X_2$  is given as follows: **04**

$X_1 \backslash X_2$	1	2
0	0.35	0.25
1	0.3	0.1

Find  $E[X_1]$ ,  $E[X_2]$ ,  $V[X_1]$ ,  $V[X_2]$ .

- (c) Explain hypothesis test of a populations mean. **07**

**OR**

- Q.4** (a) What are Null Hypothesis and Alternate Hypothesis? **03**  
 (b) Suppose X is a general discrete random variable with following probability distribution. Calculate expectation and variance for X. **04**

X	0	1	3	5	7
P(X)	0.05	0.2	0.6	0.1	0.05

- (c) Explain ANOVA with suitable example. **07**

- Q.5** (a) Discuss the properties of Hyper Geometric Distribution **03**  
 (b) Give properties of Expectation and variance of Random Variable. **04**

- (c) Suppose that the time it takes the electronic device in the car to respond to the signal from toll plaza is normally distributed with mean 160 microseconds and standard deviation 30 microseconds. What is the probability that the device in the car will respond to a given signal within 100 to 180 microseconds? **07**

**OR**

- Q.5** (a) Give properties of Normal Distribution **03**  
(b) Explain Poisson Distribution. **04**  
(c) Five fair coins are flipped. If the outcomes are assumed independent, find the probability mass function of the number of heads obtained. **07**

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