

Time: 3 Hours

Marks: 80

**N.B. 1. Question No. 1 is compulsory.****2. Attempt any three questions out of remaining five.****3. All questions carry equal marks****4. Assume Suitable data, if required and state it clearly.****1 Attempt any four:****20**

- (a) What do you mean by random variables? Explain Bayes theorem
- (b) Explain Poisson probability distribution with one example.
- (c) What is statistical inference?
- (d) Discuss in detail Quantitative Data, Descriptive Statistics, Variables, Categorical data, Quantitative Data.
- (e) Why is sampling necessary? Describe population and sample mean.

**2 (a) What is null and alternate hypothesis? Explain type I and type II error?****10**

- (b) An agent sells life insurance policies to five equally aged, healthy people. According to recent data, the probability of a person living in these conditions for 30 years or more is  $\frac{2}{3}$ . Calculate the probability that after 30 years:

**10**

- (a) All five people are still living.
- (b) At least 3 people are still living.
- (c) Exactly 2 people are still living.

**3 (a) Explain time series. Discuss Moving averages and Exponential Smoothing.****10**

- (b) Differentiate between Simple Linear Regression, Multiple Regression

**10****4 (a) What is Logistic Regression?****10**

- (b) Find the simple linear regression equation that fits the given data.

|      |    |     |    |    |     |    |
|------|----|-----|----|----|-----|----|
| Bill | 35 | 118 | 62 | 88 | 100 | 54 |
| Tip  | 5  | 15  | 10 | 10 | 15  | 5  |

**5 (a)** You have just taken ownership of a pizza shop. The previous owner told you that you would save money if you bought the mozzarella cheese in a 4.5-pound slab. Each time you purchase a slab of cheese, you weigh it to ensure that you are receiving 72 ounces of cheese. The results of 7 random measurements are 70, 69, 73, 68, 71, 69 and 71 ounces. Are these differences due to chance or is the distributor giving you less cheese than you deserve?

**10**

- a. State the hypotheses.
- b. Calculate the test statistic.
- c. Would the null hypothesis be rejected at the 10% level? The 5% level? The 1% level?

- (b) Derive Simple Linear Regression parameters to predict the value of the output.

**6 (a) What do you mean by Sign Test? Explain Wilcoxon Signed-Rank Test.****10**

- (b) Explain the following (**any two**):

**10**

- i. Kruskal-Wallis Test
- ii. Scatter diagram
- iii. Sample space
- iv. Discrete probability distribution