**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27**

M.Sc. STATISTICS – III SEMESTER

OPEN ELECTIVE

SEMESTER EXAMINATION: OCTOBER 2021

(Examination conducted in March 2022)

**ST OE 9620: Statistical Methods**

**Time: 1½ Hours Max: 35 Marks**

*Instructions:*

* *This question paper contains* ***Two*** *printed pages and* ***Two*** *parts*
* *Scientific calculator is allowed*

**PART A**

**Answer any THREE from the following 3x3=9**

1. Explain the concept of positional averages. How do you obtain positional averages using graphical methods?
2. Define Poisson distribution. If a bank receives on an average 6 bad checks per day, what is the probability that it will receive 4 bad checks on any given day.
3. Write a short note on sample size determination in Simple random sampling without replacement
4. What is p-value? What are its significances?
5. Define (i) Correlation coefficient (ii) Coefficient of Determination. How do you interpret these?

**PART B**

**Answer any TWO from the following 2x13=26**

1. A) What are different scales of measurement? Explain with examples (4)

B) Joseph completed under-graduation with following marks. Help the Joseph to choose the subject for his post-graduation with proper justification. (5)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sem  Subject | I | II | III | IV | V | VI |
| Subject A | 79 | 56 | 64 | 57 | 79 | 50 |
| Subject B | 53 | 76 | 67 | 60 | 67 | 70 |
| Subject C | 73 | 80 | 58 | 55 | 60 | 67 |

C) Briefly explain the different types of probability sampling techniques (4)

1. A) Explain the classical definition of probability. Mention its limitations. (3)

B) Distinguish between discrete and continuous random variable? Obtain the mean and variance of Bernoulli distribution. (6)

C) Explain the Bayes theorem with an example (4)

1. A) Give the test procedure of testing for a single population mean when the population variance is known (4)

B) The operations manager of a company that manufactures tires wants to determine whether there are any differences in the quality of work among the three daily shifts. Each tire is either classified as *perfect, satisfactory, or defective*, and the shift that produced it is also recorded and summary is given below. Does the data provide sufficient evidence at the 5% significance level to infer that there are differences in quality among the three shifts? (Take critical value as 9.49) (6)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Perfect | Satisfactory | Defective |
| Shift 1 | 100 | 120 | 6 |
| Shift 2 | 69 | 36 | 8 |
| Shift 3 | 37 | 72 | 12 |

C) Stating the assumptions, give the mathematical model for simple linear regression?  
 (3)