|  |  |  |  |  |  |  |  |  |  |  |  |
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| Roll No |  |  |  |  |  |  |  |  |  |  |  |

PRESIDENCY UNIVERSITY BENGALURU

 **SET-A**

SCHOOL OF INFORMATION SCIENCE

 **END TERM EXAMINATION – MAY/JUNE 2024**

**Semester:** Semester II - 2023 - 24

**Course Code:** MAT1006

**Course Name:** - Statistical Methods and Techniques

**Program:** BCA

**Date:** JUNE 13, 2024

**Time:** 9:30 AM –12:30 PM

# Max Marks: 100

**Weightage:** 50%

# Instructions:

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

**PART A**

**Answer any FIVE questions 5Q X 4M = 20M**

1. State the four methods of collecting primary data?

(CO1) [Knowledge]

1. Draw a frequency polygon with the help of histogram from the following data:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Class interval | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
| Frequency | 15 | 25 | 45 | 20 | 60 | 80 | 30 |

(CO1) [Knowledge]

1. Recognize the average marks of students of a class.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Marks (x) | 20 | 35 | 40 | 44 | 50 |
| No. of students (f) | 7 | 10 | 20 | 15 | 8 |

(CO2) [Knowledge]

1. Compute the mode of the following data set.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Class Interval | 10-20 | 20-30 | 30-40 | 40-50 |
| Frequency | 5 | 9 | 3 | 2 |

(CO2) [Knowledge]

1. Compare Bowley’s coefficient of skewness of the following data set

|  |  |  |  |
| --- | --- | --- | --- |
|   | Q1 | MEDIAN(M) | Q3 |
| Series-A | 40 | 60 | 80 |
| Series-B | 62 | 142 | 195 |

(CO3) [Knowledge]

1. If regression line is 3X+4Y=20. Identity regression coefficient of Y on X and regression coefficient of X on Y.

(CO4) [Knowledge]

1. Write the sample space when three coins are tossed and compute the probability of getting all heads.

(CO5) [Knowledge]

**PART B**

**Answer any FOUR questions 4Q X 10M = 40M**

1. The following data relates to the marks of students obtained in Statistics. Draw ‘less than’ and ‘more than’ ogive curves from the following data set and locate the median.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
| No. of students  | 9 | 12 | 35 | 25 | 18 | 15 | 8 | 6 |

(CO1) [Comprehension]

1. Following are the marks obtained by a student A in 10 tests of 100 marks each. Estimate the coefficient of variation of marks foe the given data set.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Marks of A | 44 | 80 | 76 | 48 | 52 | 72 | 68 | 56 | 60 | 54 |

(CO2)[Comprehension]

1. The first four moments of a distribution about the value 5 of the variable are 2, 20, 40, and 50. Show that the mean is 7. Also compute the other moments, $β\_{1}$ and $β\_{2}$ , and comment upon the nature of the distribution and kurtosis.

(CO3) [Comprehension]

1. Consider the marks scored in 2 courses History and Sociology for 10 students on a scale of 0 - 10. Compute the Karl-Pearson’s correlation co-efficient and determine the nature of the correlation.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| History | 9 | 4 | 7 | 8 | 5 | 6 | 7 | 9 | 8 | 2 |
| Sociology  | 8 | 5 | 7 | 7 | 6 | 2 | 3 | 5 | 6 | 2 |

(CO4) [Comprehension]

1. The following are the marks obtained by a group of students in two papers. Explain Spearman’s rank correlation coefficient.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Economics | 78 | 36 | 98 | 25 | 75 | 82 | 92 | 62 | 65 | 39 |
| Statistics | 84 | 51 | 91 | 69 | 68 | 62 | 86 | 58 | 35 | 49 |

(CO4) [Comprehension]

1. For married couples living in a certain suburb, the probability that the husband will vote on a bond referendum is 0.21, the probability that the wife will vote on the referendum is 0.28, and the probability that both will vote is 0.15. Compute the probability that (a) at least one member of a married couple will vote? (b) wife will vote, given that her husband has voted? (c) husband will vote, given that his wife has voted?

(CO5) [Comprehension]

**PART C**

**Answer any TWO questions 2Q X 20M = 40M**

1. Consider the following frequency distribution given below.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Profit | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 |
| No. of books | 7 | 10 | 13 | 21 | 51 | 25 | 8 | 2 | 3 |

Determine:

* 1. Mean and Standard Deviation
	2. Mode or Median
	3. Karl Pearson’s Coefficient of Skewness and nature of skewness

(CO3) [Application]

1. Consider the following data set :

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks in Statistics | 10 | 25 | 13 | 25 | 22 | 11 | 12 | 25 | 21 | 20 |
| Marks in Mathematics | 12 | 22 | 16 | 15 | 18 | 18 | 17 | 23 | 24 | 17 |

Employ the suitable mathematical modal to estimate:

1. Marks in Statistics when marks in Mathematics is known
2. Marks in Mathematics when marks in Statistics is known

(CO4) [Application]

1. In a certain factory, three machines A1 , A2 and A3 make 30%, 45% and 25% of the products respectively. It is known that 2%, 3% and 2% of the products made by each machine, respectively, are defective. Suppose that a finished product is randomly selected. If the randomly selected product is found to be defective, then determine
	1. the probability that it is made by machine A1 ?
	2. the probability that it is made by machine A2 ?
	3. the probability that it is made by machine A3 ?

(CO5) [Application]