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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 11 – 01- 2025 **Time:** 01:00 pm – 04:00 pm |

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| **School:** SOM-PG | **Program:** MBA | |
| **Course Code :** MBA1007 | **Course Name :** Business Statistics | |
| **Semester**: I | **Max Marks**: 100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **16** | **19** | **31** | **34** |  |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. Each question carries 3marks. 3Mx10Q=30M** | | | | |
| **1** | Define the arithmetic mean and write its formula for ungrouped and grouped data. | **3 Marks** | **knowledge** | **CO1** |
| **2** | Write the formula for the variance of ungrouped data and explain each term. | **3 Marks** | **knowledge** | **CO1** |
| **3** | Explain the difference between positive and negative correlation with examples. | **3 Marks** | **knowledge** | **CO2** |
| **4** | Write the formula for Karl Pearson’s coefficient of correlation and Spearman’s rank correlation coefficient. | **3 Marks** | **knowledge** | **CO2** |
| **5** | Define mutually exclusive events and give an example. | **3 Marks** | **knowledge** | **CO2** |
| **6** | Write the formula for the variance of a discrete random variable. | **3 Marks** | **knowledge** | **CO3** |
| **7** | Differentiate between a discrete and continuous random variable and give examples | **3 Marks** | **knowledge** | **CO3** |
| **8** | Define population and a sample. Give examples. | **3 Marks** | **knowledge** | **CO4** |
| **9** | Define a null hypothesis and give an example. | **3 Marks** | **knowledge** | **CO4** |
| **10** | What are Type I error and Type II errors? | **3 Marks** | **knowledge** | **CO4** |

**Part B**

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| **Answer ALL the Questions. Each question carries 10 marks. 10Mx4Q=40M** | | | | |
| **11** | Given the following data, calculate the mean, median, and mode for the dataset:  Marks: 10, 20, 30, 40, 50  Frequencies: 3, 7, 9, 5, 6 | **10 Marks** | **Application** | **CO1** |
| **or** | | | | |
| **12** | For the grouped frequency distribution below, calculate the standard deviation:  Class Intervals: 10-20, 20-30, 30-40, 40-50  Frequencies: 5, 10, 8, 7 | **10 Marks** | **Application** | **CO1** |

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| **13** | A bag contains 4 red balls and 6 white balls. Two balls are drawn at random. What is the probability that:  (a) Both are red?  (b) Both are of different colors?  Use the classical approach and show all steps. | **10 Marks** | **Application** | **CO2** |
| **or** | | | | |
| **14** | Fit a simple linear regression model based on the data below, with 𝑋 as the independent variable and Y as the dependent variable. Find the regression equation Y= a+bX:  X: 1, 2, 3, 4, 5  Y: 2, 4, 5, 4, 6 | **10 Marks** | **Application** | **CO2** |

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| **115** | The number of accidents occurring on a busy road per day follows a Poisson distribution with a mean of 3.  (a) Find the probability that no accidents occur on a particular day.  (b) Calculate the probability that there are at least 2 accidents in a day. | **10 Marks** | **Application** | **CO3** |
| **or** | | | | |
| **16** | The heights of adult males in a city are normally distributed with a mean of 175 cm and a standard deviation of 10 cm.  (a) What percentage of men are taller than 185 cm?  (b) Find the probability that a randomly selected man has a height between 165 cm and 185 cm. | **10 Marks** | **Application** | **CO3** |

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| **17** | A company claims that the average lifetime of its light bulbs is 1,200 hours with a known standard deviation of 100 hours. A sample of 36 bulbs is tested, and the sample mean is found to be 1,180 hours. Test the claim at a 5% level of significance. ( Table value = 1.96) | **10 Marks** | **Application** | **CO4** |
| **or** | | | | |
| **18** | In a survey, it was found that 45% of people prefer online shopping. A random sample of 200 people shows that 90 people prefer online shopping. Test whether this result differs significantly from the population proportion at a 5% level of significance. ( Table value = 1.96) | **10 Marks** | **Application** | **CO4** |

**Part C**

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| **Answer all the Questions. Each Question carries 15 marks. 15Mx2Q=30M** | | | | |
| **19** | A factory produces bulbs, and the probability that a bulb is defective is 0.05. Out of a batch of 10 bulbs, calculate:  (a) The probability that exactly 2 bulbs are defective.  (b) The probability that at least one bulb is defective.  (c) The mean and variance of the number of defective bulbs. | **15 Marks** | **Application** | **CO3** |
| **20** | A fitness center claims that the average weight loss after 6 weeks of a new training program is 6 kg. A random sample of 10 participants following this program shows the following weight losses (in kg):  5.2, 6.4, 5.8, 6.1, 5.9, 6.5, 5.7, 6.2, 6.3, 5.6  Assume that the weight losses are normally distributed. Using a 5% level of significance, test whether the actual average weight loss is significantly different from the claimed value of 6 kg. ( Table value = 2.262) | **15 Marks** | **Application** | **CO4** |