Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18MA2005** | Duration : | **3hrs** |
| **Sub. Name :** | **PROBABILITY AND STATISTICS** | Max. marks : | **100** |

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| **Q. No.** | **Questions** | **Course Outcome** | **Marks** |
|  | **PART-A(10X1=10 MARKS)** | | |
| 1. | For any event A in a random experiment, the value of. | CO1 | 1 |
| 2. | What is the probability of getting an even number when a fair die is thrown? | CO1 | 1 |
| 3. | Let X be a random variable with cumulative distribution function F(x). Then . | CO2 | 1 |
| 4. | Two continuous random variables X and Y with joint pdf *f*(*x*,*y*) and marginal densities *g*(*x*) and *h*(*y*) is said to be independent if \_\_\_\_\_\_\_\_. | CO2 | 1 |
| 5. | A continuous random variable X is said to follow exponential distribution with parameter . What is the mean? | CO3 | 1 |
| 6. | Variance of Poisson distribution is \_\_\_\_\_\_\_\_\_\_\_\_\_. | CO3 | 1 |
| 7. | What are the limits for correlation coefficient? | CO5 | 1 |
| 8. | Find the mode of the values 7, 7, 12, 10, 17, 19, 21, 23, 1, 7, 21, 23, 10 | CO5 | 1 |
| 9. | Define small sample. | CO6 | 1 |
| 10. | Define Null Hypothesis. | CO6 | 1 |

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|  | **PART B (6 X 3= 18 MARKS)** | | |
| 11. | If P(A) = 0.4, P(B) = 0.7 and = 0.3 find (i) (ii) . | CO1 | 3 |
| 12. | Find the mean of a random variable X, when a fair die is thrown. | CO2 | 3 |
| 13. | A continuous random variable X is said to follow Gamma distribution with and . Find . | CO3 | 3 |
| 14. | Find the rank correlation coefficient for the following rank   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Rank of X | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | Rank of Y | 2 | 4 | 1 | 3 | 7 | 5 | 6 | | CO4 | 3 |
| 15. | Define Type I and Type II error in Sampling | CO6 | 3 |
| 16. | Find the value of the statistic for two small samples given , , and . | CO6 | 3 |

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|  | **PART C (6 X 12= 72 MARKS)**  **(Answer any five Questions from Q.no 17 to 23. Q.No 24 is a Compulsory Question)** | | | |
| 17. | a. | In a shooting test, the probability of hitting a target is for A, for B and for C. If all of them fire at the target, find the probability of (i) None of them hit the target  (ii) Atleast one of them hit the target (iii) Atleast two of them hit the target | CO1 | 6 |
| b. | The chances of A, B and C becoming a general manager of a certain company are in the ratio 4: 2: 3. The probability that the bonus scheme will be introduced in the company if A, B and C become general manager are 0.3, 0.7 and 0.8 respectively. If the bonus has been introduced what is the probability that B has been appointed as general manager. | CO1 | 6 |
| 18. | a. | A continuous random variable X has the following distribution  . Find (i) k (ii) P(3 < X < 4) (iii) mean (iv) variance. | CO2 | 12 |
| 19. | a. | Fit a Poisson distribution to the given data and calculate the expected frequencies.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | 4 | |  | 43 | 38 | 22 | 9 | 1 | | CO3 | 6 |
| b. | In a test on 2000 electric lamps, it was found that the life of a particular make was normally distributed with an average life of 2040 hours and S.D. of 60 hours. Estimate the number of lamps likely to burn for (i) More than 2150 hours (ii) Less than 1950 hours (iii) More than 1920 hours but less than 2160 hours. | CO3 | 6 |
| 20. | a. | Find the mean, median and mode for the following data   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Class | 10 – 25 | 25 – 40 | 40 – 55 | 55 – 70 | 70 – 85 | 85 – 100 | | Frequency | 6 | 20 | 44 | 26 | 3 | 1 | | CO4 | 12 |
| 21. | a. | The means of two simple large samples of 1000 and 2000 members are 67.5 inches and 68 inches respectively. Can the samples be regarded as drawn from the same population of standard deviation of 2.5 inches? | CO6 | 6 |
| b. | In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers? | CO6 | 6 |
| 22. | a. | The joint probability mass function of a two dimensional discrete random variable (X,Y) is given by*x* = 0, 1, 2 and *y* = 1, 2, 3. Find (i)the value of k (ii)the marginal probability distribution of X and Y (iii)conditional probability distribution.(iv)probability distribution of X+Y. | CO2 | 12 |
| 23. | a. | By the method of least squares, fit a parabola to the following data. Also estimate the value of *y* at *x* = 6   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 1 | 2 | 3 | 4 | 5 | |  | 5 | 12 | 26 | 60 | 97 | | CO5 | 12 |
|  | **Compulsory:** | | | |
| 24. | a. | The nicotine contents in two samples of tobacco are given below. Use F-test to test whether the variability of the nicotine content may be taken to be the same for the two samples   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | I | 21 | 24 | 25 | 26 | 27 |  | |  | 22 | 27 | 28 | 30 | 31 | 36 | | CO6 | 6 |
| b. | The following table gives the classification of 100 workers according to sex and the nature of work. Using Chi-Square Test, test whether the nature of work is independent of the sex of the workers  Question No.24 from Module 6   |  |  |  | | --- | --- | --- | |  | Skilled | Unskilled | | Male | 40 | 20 | | Female | 10 | 30 | | CO6 | 6 |