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

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**End Semester Examination – Nov/Dec - 2017**

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| **Code :** | **17MA1006** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **FOUNDATIONS OF MATHEMATICS AND STATISTICS** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Course**  **Outcome** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | | |
| 1. | State the condition on which the binomial expansion is valid. | CO1 | 1 |
| 2. | Expand in terms of . | CO1 | 1 |
| 3. | If , find . | CO1 | 1 |
| 4. | -----------. | CO1 | 1 |
| 5. | P(S) = -------------, where S is the sample space of an event. | CO3 | 1 |
| 6. | If  and  are independent events, find . | CO3 | 1 |
| 7. | Write down the probability function p(x) of a Poission distribution. | CO4 | 1 |
| 8. | The mean of the Binomial distribution is ---------------. | CO4 | 1 |
| 9. | The statistical constants of the sample in a population are known as ----------. | CO5 | 1 |
| 10. | If the sample size is greater than 30, then the sample is known as -------------. | CO5 | 1 |

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| **PART B(5 X 3= 15 MARKS)** | | | |
| 11. | Resolve into partial fractions | CO1 | 3 |
| 12. | Evaluate . | CO1 | 3 |
| 13. | and  are mutually exclusive such that , find and | CO3 | 3 |
| 14. | Find the mean and variance of a Binomial distribution with . | CO4 | 3 |
| 15. | In testing of hypothesis, define ‘null hypothesis’ and ‘alternative hypothesis’. | CO5 | 3 |

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| **PART C(5 X 15= 75 MARKS)** | | | | |
| 16. | a. | Expand in ascending powers of . Find the coefficient of . State the condition on which the expansion is valid. | CO1 | 8 |
| b. | Sum the series | CO1 | 7 |
| (OR) | | | | |
| 17. | a. | Sum the series | CO1 | 7 |
| b. | Prove that | CO1 | 8 |
|  | | | | |
| 18. | a. | Find if | CO1 | 4 |
| b. | Find if | CO1 | 4 |
| c. | Find the maxima and minima of | CO2 | 7 |
| (OR) | | | | |
| 19. | a. | Integrate | CO1 | 3 |
| b. | Evaluate | CO1 | 4 |
| c. | Using Bernoulli’s formula find. | CO1 | 4 |
| d. | Evaluate | CO1 | 4 |
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| 20. | a. | A statistical problem is given to three students ,,. The chances of solving it are ,,  respectively. Find the probability that (i) the problem is solved (ii) exactly one solves the problem (iii) none solves the problem | CO3 | 7 |
| b. | If , and . Find . | CO3 | 3 |
| c. | In a bag there are red balls and black balls. Find the probability of getting i. red balls ii. black balls iii.  red and  black balls. | CO3 | 5 |
| (OR) | | | | |
| 21. | a. | and alternatively throw a pair of dice. wins if he throws 6 before throws 7 and wins if he throws 7 before throws 6. If begins the game, find the probability of his winning. | CO3 | 7 |
| b. | A lot consists of 10 good articles, 4 with minor defect and 2 with major defects. Two articles are drawn at random. Find the probability that i. both are good ii. both have major defects iii. both have minor defects iv. exactly one is good v. neither is good. | CO3 | 8 |
|  | | | | |
| 22. | a. | In a large consignment of electric bulbs, 10 % are defective. A random sample of 20 is taken for inspection. Using Binomial distribution, find the probability that i. all are good bulbs ii. atmost 3 are defective bulbs iii. atleast 3 are defective bulbs. | CO6 | 8 |
| b. | Fit a Poisson distribution to the given data and calculate the theoretical frequencies.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **X** | 0 | 1 | 2 | 3 | 4 | | **f** | 123 | 59 | 14 | 3 | 1 | | CO4 | 7 |
| (OR) | | | | |
| 23. | a. | Fit a Binomial distribution to the following data and find theoretical frequencies.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **x** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | | **f** | 5 | 18 | 28 | 12 | 7 | 6 | 4 | | CO4 | 7 |
| b. | The weekly wages of 1000 workmen are normally distributed with mean of Rs.70 and Standard deviation of Rs.5 respectively. Estimate the number of workers whose weekly wages will be i. more than Rs.72 ii. less than Rs.69 iii. between Rs.69 and Rs.72. | CO6 | 8 |
|  | | | | |
| 24. | a. | In a random sample of 1000 persons from the city of Coimbatore, 400 are found to be consumers of wheat. In another sample of 800 from the city of Madurai 400 are found to be consumers of wheat. Do the data reveal a significant difference between the two cities, so far as the proportion of wheat consumers in concerned? | CO5 | 8 |
| b. | A test was given to 400 boys, who scored on the average of 62.5 marks with S.D. 12.5 marks. Test the hypothesis that average marks of the boys is 64.5. | CO5 | 7 |
| (OR) | | | | |
| 25. | a. | A group of 10 rats fed on diet A and another group of 8 rats fed on a different diet B recorded the following increase in weights   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Diet A (in gms)** | 5 | 6 | 8 | 1 | 12 | 4 | 3 | 9 | 6 | 10 | | **Diet B (in gms)** | 2 | 3 | 6 | 8 | 1 | 10 | 2 | 8 |  |  |   Find if the variances are significantly different. | CO5 | 8 |
| b. | On the basis of information noted below, find out whether the new treatment is comparatively superior to the conventional one.   |  |  |  | | --- | --- | --- | |  | **Favourable** | **Non - favourable** | | **Conventional** | 40 | 70 | | **New** | 60 | 30 | | CO5 | 7 |

ALL THE BEST