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



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

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

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| **Q. No.** | **Questions** | **Course Outcome** | **Marks** |
| **PART – A (20 X 1 = 20 MARKS)** | | | |
| 1. | State the condition on which the binomial expansion is valid. | CO1 | 1 |
| 2. | Write the expansion of log(1+x) in terms of x. | CO1 | 1 |
| 3. | Find the value of  in . | CO1 | 1 |
| 4. | Expand in terms of . | CO1 | 1 |
| 5. |  | CO1 | 1 |
| 6. | Evaluate | CO1 | 1 |
| 7. | -----------. | CO1 | 1 |
| 8. | If , find . | CO1 | 1 |
| 9. | If  and  are mutually exclusive events, then . | CO3 | 1 |
| 10. | Write down the probability of an impossible event. | CO3 | 1 |
| 11. | The probability of getting even number when a die is thrown is\_\_\_\_\_\_ | CO3 | 1 |
| 12. | If A is any event, then = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | CO3 | 1 |
| 13. | Write down the probability function p(x) of a Poission distribution. | CO4 | 1 |
| 14. | The standard normal variate Z =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | CO4 | 1 |
| 15. | Find the mean of the binomial distribution for n=30 and p =0.5. | CO4 | 1 |
| 16. | For a Poission distribution variance = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | CO4 | 1 |
| 17. | If the sample size is greater than 30, then the sample is known as\_\_\_\_\_\_\_\_\_\_\_\_. | CO5 | 1 |
| 18. | Write down the standard value of Z for two-tailed test at 5% level of significance. | CO6 | 1 |
| 19. | The statistical constants of the sample in a population are known as\_\_\_\_\_\_\_\_\_\_. | CO5 | 1 |
| 20. | = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | CO6 | 1 |

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| **PART – B (10 X 5= 50 MARKS)**  **(Answer any 10 from the following)** | | | |
| 21. | Split into partial fractions. | CO1 | 5 |
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| 22. | Find the sum of the series. | CO1 | 5 |
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| 23. | If y=  find | CO1 | 5 |
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| 24. | Evaluate . | CO1 | 5 |
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| 25. | Three students A,B,C have the chances of solving an Agriculture problem are 1/3, 2/3 and 3/4 respectively. Find the probability that the problem is solved. | CO3 | 5 |
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| 26. | If P(A) = 0.35, P(B) = 0.75 and P(A∪B) = 0.95, Find . | CO3 | 5 |
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| 27. | Ten coins are thrown simultaneously. Find the probability of getting exactly 7 heads? | CO4 | 5 |
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| 28. | A random variable X is normally distributed with mean 70 and standard deviation 5. Find P(X ≥ 72). | CO4 | 5 |
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| 29. | A sample of size of 600 persons selected at random from a large city shows that the percentage of males in the sample is 53. It is believed that the ratio of males to the total propotion in the city is. Test whether the belief is confirmed by the observation. | CO6 | 5 |
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| 30. | The following data are got from an investigation.   |  |  |  |  | | --- | --- | --- | --- | |  | Number of cases | Mean wages | Standard deviation of wages | | Sample I | 400 | Rs. 47.4 | Rs.3.1 | | Sample II | 900 | Rs.50.3 | Rs.3.3 |   Find out whether the two mean wages differ significantly. | CO5 | 5 |
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| 31. | The table below gives the number of aircraft accidents that happened during various days of the week. Test whether the accident conditions are uniformly distributed over the week.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Days | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | | No.of Accidents | 14 | 18 | 12 | 11 | 15 | 14 | | CO5 | 5 |
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| 32. | A sample of 20 items has mean 42 units and standard deviation 5 units. Test the hypothesis that it is a random sample from a normal population with mean 45 units. | CO6 | 5 |

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| **PART – C (2 X 15 = 30 MARKS)**  **(Answer any 2 from the following)** | | | | |
| 33. | a. | Expand in ascending powers of .  Find the coefficient of . State the condition on which the expansion is valid. | CO1 | 8 |
| b. | Prove that | CO1 | 7 |
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| 34. | a. | The weekly wages of 1000 workmen are normally distributed with mean ofRs.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. | CO4 | 8 |
| b. | |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Fit a Poisson distribution to the given data and calculate the theoretical frequencies.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | 4 | | f | 122 | 60 | 15 | 2 | 1 | | | CO4 | 7 |
|  |  |  |  |  |
| 35. | a. | If A and B alternately throws a pair of dice. A wins if he throws 6 before B throws 7 and B wins if he throws 7 before A throws 6. If B begins the game, find the chance of his winning. | CO3 | 8 |
| 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 | 7 |