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

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**End Semester Examination – Apr/May – 2018**

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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. | Find the value of  in . | CO1 | 1 |
| 2. | Write the expansion of log(1+x) in terms of x. | CO1 | 1 |
| 3. | -------------. | CO1 | 1 |
| 4. | If , find | CO1 | 1 |
| 5. | Write down the probability of an impossible event. | CO3 | 1 |
| 6. | If  and  are mutually exclusive events, then  ---------------. | CO3 | 1 |
| 7. | Write down the probability function p(x) of a Binomial distribution. | CO4 | 1 |
| 8. | The mean of the Poisson distribution is ---------------. | CO4 | 1 |
| 9. | The statistical constants of the population are known as ----------------. | CO5 | 1 |
| 10. | If the sample size is less 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. | Check whether A and B are independent events if P(A) = 0.65, P(B) = 0.4, P(A∩B) = 0.24. | CO3 | 3 |
| 14. | Find the probability of getting exactly 7 heads in tossing of 10 coins simultaneously; | CO4 | 3 |
| 15. | Define Type I and Type II error. | CO5 | 3 |

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| **PART C(5 X 15= 75 MARKS)** | | | | |
| 16. | a. | Expand  in ascending powers of x. Find the coefficient of . State the condition of validity. | 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 maxima and minima of | CO2 | 7 |
| (OR) | | | | |
| 19. | a. | Find | CO1 | 3 |
| b. | Evaluate | CO1 | 4 |
| c. | Using Bernoulli’s formula find . | CO1 | 4 |
| d. | Integrate | CO1 | 4 |
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| 20. | a. | Three guns are fired at a target with probabilities 0.7,0.8 and 0.9 respectively. Find the probability that (i) target is being hit (ii) exactly one hits the target (iii) none hits the target. | CO3 | 7 |
| b. | If P(A) = 0.35, P(B) = 0.75, P(A∪B) = 0.95 Find P() | CO3 | 3 |
| c. | Find the probability that (i) a leap year selected at random has 53 Sundays (ii) a non leap year selected at random has 53 Sundays. | CO3 | 5 |
| (OR) | | | | |
| 21. | a. | A and Balternatively throw a pair of dice. Player A wins if he throws 6 before B throws 7. Player B wins if he throws 7 before A throws 6. If player A begins the game, find the probability of his winning the game. | CO3 | 7 |
| b. | A lot consists of 10 good articles, 4 with minor defects, 2 with major defects. Two articles are taken 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 |
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| 22. | a. | A machine manufacturing screws is known to produce 5% defectives. In a random sample of 15 screws, what is the probability using the binomial distribution that there are (i) exactly 3 defectives (ii) at least 3 defectives (iii) almost 3 defectives | CO6 | 8 |
| b. | Fit a Poisson distribution and find theoretical frequencies.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **x** | 0 | 1 | 2 | 3 | 4 | | **f** | 122 | 60 | 15 | 2 | 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 | | **f** | 2 | 14 | 20 | 34 | 22 | 8 | | CO4 | 7 |
| b. | In a test of 2000 electric bulbs, it was found that the life of a particular type was normally distributed with average life of 2040 hrs and standard deviation 60 hrs. Estimate the number of bulbs likely to burn for (i) more than 2150 hrs (ii) less than 1950 hrs (iii) more than 1920 hrs but than 2160 hrs. | CO6 | 8 |
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| 24. | a. | In a city a sample of 1000 people was taken and out them 540 are vegetarians and the rest are non vegetarians. Can we say that both habits of eating are equally popular in the city at (i) 1% LOS (ii) 5% LOS. | CO5 | 8 |
| b. | The mean population of wheat of a sample of 100 fields comes to 200 kg per acre and another sample of 150 fields gives the mean of 220 Kg per acre. Assuming the S.D. of the yield at 11 Kg for the universe, test if there is a significant difference between the means of the samples. | CO5 | 7 |
| (OR) | | | | |
| 25. | a. | From the following data of two sample values, find if the sample variances are significantly different.   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Sample I** | 17 | 27 | 18 | 25 | 27 | 29 | 27 | 23 | 17 | | **Sample II** | 16 | 16 | 20 | 16 | 20 | 17 | 15 | 21 | ---- | | CO5 | 8 |
| b. | The following table gives a classification of a sample of 160 plants of their flower color and flatness of the leaf. Test whether the flower color is independent of flatness of the leaf.   |  |  |  | | --- | --- | --- | |  | **Flat leaves** | **Curled leaves** | | **White flower** | 99 | 36 | | **Red flower** | 20 | 5 | | CO5 | 7 |