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



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

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| **Code :** | **18MA3005** | **Duration :** | **3hrs** |
| **Sub Name :** | **FOUNDATIONS OF MATHEMATICS AND STATISTICS** | **Max. Marks :** | **100** |

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| **Q. No.** | **Sub Div.** | **Questions** | **Course Outcome** | **Marks** |
| **ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)** | | | | |
| 1. | a. | Expand  in ascending powers of x and find the coefficient of  in the equation. Under what condition on  this expansion is valid. | CO1 | 8 |
| b. | Show that  = | CO1 | 8 |
|  |  |  |  |  |
| 2. | a. | Find the maxima and minima values of the function given by | CO2 | 8 |
| b. | Find the derivative of | CO2 | 8 |
|  |  |  |  |  |
| 3. | a. | Integrate the following: | CO3 | 10 |
| b. | Evaluate the following: | CO3 | 6 |
|  |  |  |  |  |
| 4. | a. | Fit a Poisson distribution to the following data and hence find the expected frequencies.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | | f | 314 | 335 | 204 | 86 | 29 | 9 | 3 | | CO5 | 8 |
| b. | An irregular 6 faced die is such that the probability that it gives 3 even numbers in 5 throws is twice the probability that it gives 2 even numbers in 5 throws. How many sets of exactly 5 trials can be expected to give no even number out of 2500 sets? | CO5 | 4 |
| c. | The mileage which car owners get with a certain kind of radial tyre is a RV having an exponential distribution with mean 40,000km. Find the probabilities that one of these tyres will last (i) at least 20,000 km (ii) at most 30,000km. | CO5 | 4 |
|  |  |  |  |  |
| 5. | a. | Before an increase in excise duty on tea, 800 people out of a sample of 1000 were consumers of tea. After the increase in duty 800 people were consumers of tea in a sample of 1200 persons. Find whether there is significant decrease in the consumption of tea after the increase in duty. | CO6 | 8 |
| b. | A simple sample of heights of 6400 Englishmen has a mean of 170 cm and a S.D of 6.4 cm, while a simple sample of heights of 1600 Americans has a mean of 172 cm and a S.D of 6.3 cm. Do the data indicate that Americans are on the average taller than Englishmen? | CO6 | 8 |
|  |  |  |  |  |
| 6. | a. | Prove that | CO1 | 8 |
| b. | Find the sum to infinity of the series | CO1 | 8 |
|  |  |  |  |  |
| 7. | a. | Evaluate the following: | CO3 | 10 |
| b. | Prove that  = | CO3 | 6 |
|  | | **COMPULSORY QUESTION (1 x 20 = 20 Marks)** |  |  |
| 8. | a. | Three varieties of a crop are tested in a randomized block design with four replications, the layout being as given below. The yields are given in kilograms. Analyse for significance.   |  |  |  |  | | --- | --- | --- | --- | | C48 | A51 | B52 | A49 | | A47 | B49 | C52 | C51 | | B49 | C53 | A49 | B50 |   . | CO4 | 12 |
| b. | A completely randomised design experiment with 10 plots and 3 treatments gave the following results:   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Plot. No | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | Treatment | A | B | C | A | C | C | A | B | A | B | | Yield | 5 | 4 | 3 | 7 | 5 | 1 | 3 | 4 | 1 | 7 |   Analyse the results for treatment effects. | CO4 | 8 |