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



**End Semester Examination – Nov/Dec – 2018**

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

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

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| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Sum the series | CO1 | 8 |
| b. | Show that | CO1 | 8 |
|  |  |  |  |  |
| 2. | a. | Derive the differential coefficient of the quotient rule of any two functions. Using third rule find the values of | CO2 | 8 |
| b. | Show that the least value of  is . | CO2 | 8 |
|  |  |  |  |  |
| 3. | a. | Evaluate | CO3 | 8 |
| b. | State and prove Bernouilli’s formula. Using this evaluate . | CO3 | 8 |
|  |  |  |  |  |
| 4. | a. | In an engineering examination, a student is considered to have failed, secured second class, first class and distinction, according as he scores less than 45%, between 45% and 60%,between 60% and 75% and above 75% respectively. In a particular year 10% of the students failed in the examination and 5% of the students got distinction. Find the percentage of students who have got first class and second class. (Assume normal distribution marks). | CO4 | 8 |
| b. | Fit a Poisson distribution for the following data:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | 4 | 5 | Total | | f | 142 | 156 | 69 | 27 | 5 | 1 | 400 | | CO4 | 8 |
|  |  |  |  |  |
| 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. | The number of air-craft accidents that occurred during the various days of the week is given below. Test whether the accidents are uniformly distributed over the week.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Day | Mon | Tues | Wed | Thu | Fri | Sat | | No of Accidents | 15 | 19 | 13 | 12 | 16 | 15 | | CO6 | 8 |
|  |  |  |  |  |
| 6. | a. | Two independent samples of 8 and 7 items respectively had the following values of the variable: Do the two estimates of population variance differ significantly at 5% level of significance?   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Sample 1 | 9 | 11 | 13 | 11 | 15 | 9 | 12 | 14 | | Sample 2 | 10 | 12 | 10 | 14 | 9 | 8 | 10 |  | | CO6 | 8 |
| b. | The mean breaking strength of the cables supplied by a manufacturer is 1800 with a S.D of 100. By a new technique in the manufacturing process, it is claimed that the breaking strength of the cable has increased. In order to test this claim, a sample of 50 cables is tested and it is found that the mean breaking strength is 1850. Can we support the claim at 1 percent level of significance? | CO6 | 8 |
|  |  |  |  |  |
| 7. | a. | Out of 800 families with 4 children each, how many families would be expected to have (i) 2 boys and 2 girls (ii) at least 1 boy (iii) at most 2 girls. Assume equal probabilities for boys and girls. | CO4 | 8 |
| b. | Two defective tubes get mixed up with 2 good ones. The tubes are tested, one by one until both defectives are found. What is the probability that the last defective tube is obtained on (i) the second test (ii) the third test (iii) the fourth test? | CO4 | 8 |
|  | | | | |
| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | A completely randomized 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 | D | E | F | G | H | I | J | | Yield | 5 | 4 | 3 | 7 | 5 | 1 | 3 | 4 | 1 | 7 | | CO5 | 10 |
| b. | The following data resulted from an experiment to compare 3 burners B1, B2, B3. A Latin square design was used as the tests were made on 3 engines and were spread over 3 days.   |  |  |  |  | | --- | --- | --- | --- | |  | Engine 1 | Engine 2 | Engine 3 | | Day 1 | B1 | B2 | B3 | | Day 2 | B2 | B3 | B1 | | Day 3 | B3 | B1 | B2 |   Test the hypothesis that there is no difference between the burners. | CO5 | 10 |