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

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

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| **Code :** | **16MA1004** | **Duration :** | **3hrs** |
| **Sub. Name :** | **APPLIED MATHEMATICS – PROBABILITY AND STATISTICS** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | A class consists of 14 students, one of them is a girl student. In how many ways can the class committee of 3 students be formed such that (i) there are people of both gender (ii) all the members is of the same gender. | CO1 | 7 |
| b. | From a collection of 8red and 7green balls, five balls are to be selected to for a game so that at least 3 red are there. In how many ways can it be done? | CO1 | 7 |
| c. | In how many different ways can the letters of the word 'MATHEMATICS' be arranged so that vowels always come together? | CO1 | 6 |
| (OR) | | | | |
| 2. | a. | A project group consists of 40 members, 25 of which are women. The project head needs to select a committee of 9 to represent them in the state competition. How many committees are possible if (i) the committee must have exactly 5 women? (ii) The committee must have at least 5 women? | CO1 | 7 |
| b. | Twelve skiers are competing in the final round of the Olympic freestyle skiing aerial competition. In how many different ways can 3 of the skiers finish first, second, and third to win the gold, silver, and bronze medals? | CO1 | 7 |
| c. | In how many ordered ways can a television director schedule 6 different commercial during the 6 time slots allocated to commercials during the telecast of the first period of hockey game? | CO1 | 6 |
|  |  |  |  |  |
| 3. | a. | A has one share in a lottery in which there is 1 prize and 2 blanks. B has three shares in a lottery in which there are 3 prizes and 6 blanks. Compare the probability of A’s success to that of B’s success. | CO1 | 10 |
| b. | There are 10 counters in a bag, 6 of them worth Rs 5 each, while the other four are of equal but unknown value. If the expectation from drawing a single counter atrandom is 4 rupees, find the unknown value. | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | A lot consists of 10 good article, 4 with minor defects and 2 with major defects. Two articles are drawn at random, Find the probability that (i) both are good article (ii) both have major defects (iii) at least one is good (iv) at most 1 is good (v) Exactly 1 is good | CO1 | 10 |

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|  | b. | If the probability that a communication system has high selectivity is 0.54 and the probability that it will have high fidelity is 0.81 and the probability that it will have both is 0.18. What is the probability that (i) a system with high fidelity will also have high selectivity? (ii) a system with high selectivity will also have high fidelity? | CO1 | 10 |
|  |  |  |  |  |
| 5. | a. | If on average rain falls on 10 days in every 30 days, obtain the probability that (i). rain will fall at least 3 days of a given week and (ii). first three days of a given week will be fine and the remaining 4 days wet. | CO2 | 10 |
| b. | X is normally distributed and the mean is 30 and SD is 5. Find out the probability that P(240) (ii) P(45) (ii) P(X 25) | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | In a certain factory turning razor blades, there is a small probability of 1/500 for any blade to be defective. The blades are packed in packs of 10. Use poission distribution to calculate the approximate number of packets containing (i). no defective, (ii). one defective, (iii). Two defective blades in an consignment of 10,000 packets. | CO2 | 10 |
| b. | A typist kept a record of, mistakes per day during 300 working days. Fit a Poisson distribution for the following data:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Mistakes | 0 | 1 | 2 | 3 | 4 | | No of days | 143 | 90 | 44 | 14 | 9 | | CO2 | 10 |
|  |  |  |  |  |
| 7. | a. | Calculate mean, median and mode for the marks obtained by 49 students   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Class mark | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 | | No of students | 5 | 6 | 15 | 10 | 5 | 4 | 2 | 2 | | CO3 | 10 |
| b. | In a two-week study of the productivity of workers, the following data were obtained:  40 35 42 6 13 50 60 27 8 42 53 17 25 23 24 12 26 32 28 28 31 29 30 28 21 46 22 19 20 30 31 30 36  30 40 38 30 29 31 41.  Represent the data by means of histogram, frequency polygon and ogives curves. Also display Stem – Leaf data. | CO3 | 10 |
| (OR) | | | | |
| 8. | a. | The following are scores of two batsmen A and B in a series of innings. Who is the better score getter and who is more consistent.   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | A | 12 | 115 | 6 | 73 | 7 | 19 | 119 | 36 | 84 | 29 | | B | 47 | 12 | 16 | 42 | 4 | 51 | 37 | 48 | 13 | 0 | | CO3 | 10 |
| b. | Calculate mean and quartile deviation for the data given below.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | | No. of Students | 7 | 12 | 26 | 15 | 10 | 5 | | CO3 | 10 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Find the correlation between X and Y from the given data.   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | 78 | 89 | 97 | 69 | 59 | 79 | 68 | 57 | | Y | 125 | 137 | 156 | 112 | 107 | 138 | 123 | 108 | | CO3 | 10 |
| b. | Three judges A, B and C give the following ranks. Find which pair of judges has common approach.   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | A | 1 | 6 | 5 | 10 | 3 | 2 | 4 | 9 | 7 | 8 | | B | 3 | 5 | 8 | 4 | 7 | 10 | 2 | 1 | 6 | 9 | | C | 6 | 4 | 9 | 8 | 1 | 2 | 3 | 10 | 5 | 7 | | CO3 | 10 |