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



**End Semester Examination – Nov/Dec – 2017**

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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. | An elementary School has 500 students. How many of them were born on the same day of the year ? | CO1 | 6 |
| b. | Derek must choose a four-digit PIN number. Each digit can be chosen from 0 to 9. How many different possible PIN numbers can Derek choose? | CO1 | 6 |
| c. | 6 computers on a network are connected to at least 1 other computer. Show that there are at least two computers that are having the same number of connections. | CO1 | 8 |
| (OR) | | | | |
| 2. | a. | A die is tossed four times and the numbers shown are recorded in a sequence. How many different sequences (permutations) are there ? | CO1 | 5 |
| b. | How many distinct words can we make with letters in word ‘MISSISSIPPI’? | CO1 | 5 |
| c. | A bag contains 7 red and 3 black marbels and another bag contains 4 red and 5 black marbels. One marble is transferred from the first bag and then a marble is taken out of the second bag at random. If the marble happens to be red , find the probability that a black marble was transferred. | CO1 | 10 |
|  |  |  |  |
| 3. | a. | A manufacturer of metal pistons finds that on the average,  12% of his pistons are rejected because they are either oversize or undersize. What is the probability that a batch of 10 pistons will contain i. no more than 2 rejects? Ii. at least 2 rejects? | CO2 | 10 |
|  | b. | A die is tossed 3 times. What is the probability of i. No fives turning up? ii. 1 five? iii. 3 fives? | CO2 | 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 | CO2 | 10 |
|  | b. | Out of 800 families with 4 children each , how many families would be expected to have i. 2 boys and 2 girls. ii. atleast one boy ? Assume equal probabilities for both boys and girls. | CO2 | 10 |
|  |  |  |  |  |
| 5. | a. | The number of monthly breakdowns of a computer is a random variable having a Poisson distribution with mean equal to 1.8. Find the probability that this computer will function for a month i. without breakdown ii. with only one breakdown iii. with atleast one breakdown. | CO2 | 10 |
|  | b. | If X is a normal variate with means 30 and S.D is 5. Find  i. P(2 40) ii. P(0 3) iii. P( 5) |  | 10 |
| (OR) | | | | |
| 6. | a. | Fit a poisson distribution for the following data:   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | 4 | 5 | | f(x) | 142 | 156 | 69 | 27 | 5 | 1 | | CO3 | 10 |
|  | b. | The time required to assemble a piece of machinery is a random variable having approximately a normal distribution with mean 12.9 minutes and SD is 2 minutes. Using normal distribution, find the probabilities for assembling a piece of machinery of this kind will take i. Less than 11.5 minutes ii. More than 13.5 iii. between 11 and 14.8. | CO3 | 10 |
|  |  |  |  |  |
| 7. |  | Draw the histogram and frequency polygon from the following data and also find Mean, Median and Mode.   |  |  | | --- | --- | | Class Interval | frequency | | 0-10 | 5 | | 10-20 | 15 | | 20-30 | 20 | | 30-40 | 180 | | 40-50 | 20 | | 50-60 | 10 | | CO3 | 20 |
| (OR) | | | | |
| 8. | a. | Calculate mean, median and mode of the following data relating to weight of 120 articles.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Weight | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | | No of articles | 14 | 17 | 22 | 26 | 23 | 18 | | CO3 | 10 |
|  | b. | The marks obtained by 10 students in maths and statistics are given below.   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Marks in maths | 25 | 28 | 35 | 32 | 31 | 36 | 29 | 38 | 34 | 32 | | Marks in Stats | 43 | 46 | 49 | 41 | 36 | 32 | 31 | 30 | 33 | 39 |   From the above data find the two regression equations. | CO3 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Marks by Judge X | 52 | 53 | 42 | 60 | 45 | 41 | 37 | 38 | 25 | 27 | | Marks by Judge Y | 65 | 68 | 43 | 38 | 77 | 48 | 30 | 32 | 25 | 50 |   The marks assigned to ten students by judges X and Y in a certain  competitive test is shown below. Find the rank correlation coefficient. | CO3 | 10 |
|  | b. | The two regression equations are 5x-6y+90=0, 15x-8y-130=0. Find the mean value of x and y and also find the correlation coefficient. | CO3 | 10 |

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