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



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

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|  |  |  |  |
| **Code :** | **16MA1001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BASIC MATHEMATICS FOR SCIENCES** | **Max. marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | If . Prove that | CO1 | 10 |
| b. | Prove that . | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Prove that | CO1 | 10 |
| b. | If  then prove that | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | Find all the values of . | CO1 | 10 |
|  | b. | Find the real values of *x* and *y* if  is the conjugate of | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | If n is a positive integer, prove that. | CO1 | 10 |
|  | b. | Find the square root of . | CO1 | 10 |
|  |  |  |  |  |
| 5. | a. | Find the Eigen Values and Eigen vectors of the matrix | CO2 | 15 |
|  | b. | Test the consistency of the system of linear equation *x-y+2z=2*; *2x+y+4z=7 and 4x-y+z=4* . | CO2 | 5 |
| (OR) | | | | |
| 6. | a. | Verify Cayley-Hamilton theorem for the matrix A=  and hence find A-1. | CO2 | 15 |
|  | b. | Find the rank of a Matrix | CO2 | 5 |
|  |  |  |  |  |
| 7. | a. | Calculate mean, median and mode of the following data:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | x | 10 - 20 | 20 - 30 | | | 30 - 40 | 40 – 50 | 50 - 60 | | f | 5 | 8 | | | 30 | 82 | 45 | | x | 60 - 70 | | 70 – 80 | | f | 24 | | 6 | | CO3 | 15 |
|  | b. | Draw the histogram for the following distribution of marks obtained by 49 students:   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Class | | 5-10 | 10-15 | | 15-20 | | 20-25 | 25-30 | 35-40 | | Frequency | | 5 | 6 | | 15 | | 10 | 5 | 4 | | Class | 40-45 | | 45-50 | | | Frequency | 2 | | 2 | | | CO3 | 5 |
| (OR) | | | | |
| 8. | a. | Define monoids with examples. | CO3 | 5 |
|  | b. | Calculate the rank correlation coefficient for the following data:   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | 44 | 45 | 46 | 48 | 52 | 53 | 54 | 56 | 62 | 60 | | Y | 36 | 40 | 49 | 41 | 42 | 44 | 46 | 48 | 50 | 52 | | CO3 | 15 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Four cards are drawn at random on pack of 52 cards. Find the probability that,   1. They are a king, a queen, a jack and an ace 2. Two are kings and two are queens 3. Two are black and two are red 4. There are two cards of hearts and two cards of diamonds | CO3 | 10 |
|  | b. | In a bolt factory machines A, B and C manufacturer respectively 25%, 35% and40% of the total. Of their output5, 4, and 2 percents are defective bolts. A bolt is drawn at random from the product and it is found to be defective. What are the probabilities that it was manufactured by machines A, B and C? | CO3 | 10 |

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