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



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

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| **Code :** | **17MA1003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BASIC MATHEMATICS FOR SCIENCES** | **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. | If A+B+C = 180⁰ then prove that . | CO1 | 10 |
| b. | Prove that  , if xy < 1 | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Prove that . | CO1 | 10 |
| b. | Prove that | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | If , find the real numbers and b also find the modulus of . | CO1 | 10 |
|  | b. | Find all the values 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. | Find the rank of the matrix | CO2 | 5 |
| (OR) | | | | |
| 6. | a. | Verify Cayley-Hamilton theorem for the matrix and hence find A-1. | CO2 | 15 |
|  | b. | Investigate the consistency of the following system of equations, 2x+3y=1, x 2y=4, 4x y=9. | CO2 | 5 |
|  |  |  |  |  |
| 7. | a. | Calculate mean, median and mode of the following data:   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | C | 10– 15 | 15–20 | | 20 –25 | | 25 –30 | 30 – 35 | 35 – 40 | | F | 2 | 28 | | 125 | | 270 | 303 | 197 | | C | 40 – 45 | | 45 – 50 | | | F | 65 | | 10 | | | CO3 | 15 |
|  | b. | The two lines of regression of y on x and x on y are 7x–16y+9=0, 5y–4x–-3=0 respectively. Find the coefficient of correlation and the mean of x and y. | CO3 | 5 |
| (OR) | | | | |
| 8. | a. | Obtain the rank correlation co-efficient for the following data   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | 68 | 64 | 75 | 50 | 64 | 80 | 75 | 40 | 55 | 64 | | Y | 62 | 58 | 68 | 45 | 81 | 60 | 68 | 48 | 50 | 70 | | CO3 | 15 |
|  | b. | Define monoid with an example. | CO3 | 5 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | A box contains 6 red, 4 white and 5 black balls. A person draws 4 balls from the box at random. Find the probability that among the balls drawn there is at least one ball of each colour. | CO4 | 10 |
|  | b. | A bolt manufactured by 3 machines A, B and C. A turns out twice as many items as B, and machine B and C produce equal number of items. 2% of bolts produced by A and B are defective and 4% of bolts produced by C are defective. All bolts are put into 1 stock pile and 1 is chosen from this pile. What is the probability that it is defective? | CO5 | 10 |

ALL THE BEST