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



**End Semester Examination – Nov / Dec – 2019**

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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  show that | CO1 | 10 |
| b. | Prove that | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | Prove that | CO1 | 10 |
| b. | Prove that | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | Find the real values of *x* and *y* if | CO1 | 10 |
| b. | If n is a positive integer, prove that;  . | CO1 | 10 |
| **(OR)** | | | | |
| 4. | a. | Find all the values of . | 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 *4x*–5*y+33=0, 20x*–*9y=107* respectively. Find the coefficient of correlation and the mean of *x* and *y*. | CO3 | 5 |
| **(OR)** | | | | |
| 8. | a. | Three judges, A, B, 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 | 15 |
| b. | Define monoids with examples. | CO3 | 5 |
|  | | **Compulsory**: |  |  |
| 9. | a. | A box contains 4 white, 5 red and 6 black balls. Four balls are drawn at random from the box. Find the probability that among the balls drawn, there is atleast 1 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? | CO4 | 10 |