

First Year B.Sc (MRT) Degree Examinations February 2017

**Mathematics**

**Time: 3 Hours**

**Total Marks: 100**

- Answer all Questions.
- Draw Diagrams wherever necessary.

**Essay**

**(2x20=40)**

1. • Using Cramer's rule solve  $3x+y+2z=3, 2x-3y-z=-3, x+2y+z=4$ .
  - Find the sum of the series  $1 + \frac{2}{3} + \frac{4}{9} + \frac{8}{27} + \dots$
  - Find the term independent of x in  $(2x - \frac{1}{x})^{10}$ .
2. • Prove that  $\cos(\frac{\pi}{4} + x) + \cos(\frac{\pi}{4} - x) = \sqrt{2} \cos x$ .
  - Find  $\sin 15$ .
  - Solve  $2 \cos^2 x + 3 \sin x = 0$ .

**Short notes:**

**(8x5=40)**

3. How many two digit even numbers can be formed from the digits 1, 2, 3, 4, 5 if digits can be repeated.
4. Find the inverse of the matrix  $\begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$ .
5. Differentiate  $x^{\sin x}, x>0$  with respect to x.
6. Find  $\int x \cos x dx$ .
7. Find the divergence and curl of  $\vec{V}$  where  $\vec{V} = xyz\vec{i} + 3x^2y\vec{j} + (xz^2 - y^2z)\vec{k}$ .
8. If  $z_1=4-5i, z_2=2+3i$ , find  $z_1z_2$  and  $(z_1+z_2)^2$
9. Find the mean of the following frequency table
 

X	:	5	6	7	8	9	10	11	12	13	14	
f	:		25	45	90	165	112	96	81	26	18	12
10. Find Laplace transform of  $e^{-2t} \sin 4t$ .