QP CODE:105018 **Reg.No: ……………………..**

First Year B.Sc (MRT) Degree Supplementary Examinations –

November 2015

Mathematics

Time: 3 Hours **Total Marks: 100**

- Answer all Questions.
- Draw Diagrams wherever necessary.

Essay **(2x20=40)**

1. a) Show that if A and B are two conformable matrix , then A+B=B+A

   b) Using Cramer' s rule , solve $x-3y+z=2$, $3x+y+z=6$, $5x+y+3z=3$

   c) Find k , if the expansion of $(1-kx^2)/ (\sqrt{(1-x^2})$ has no terms in x^2

2. a) $x=\cos \Theta - \cos 2\Theta$, $y= \sin\Theta - \sin 2\Theta$, find dy/dx

   b) If $z (x+y) = x^2 +y^2$, Show that $(\partial z/\partial x -\partial z/\partial y)^2 =4(1- \partial z/\partial x -\partial z/\partial y)$

   c) Integrate $1/ ((1 +e^x)(1+ e^{-x}))$

Short notes: **(8x5=40)**

3. The 8th and 23rd terms of an AP are 30 and 75 respectively. Find sum of first 10 terms.
4. $\cos \Theta=4/5$,where $\Theta <90^0$, Find $(5 \tan \Theta -4\cos \Theta)/(5\sec \Theta -4\cot \Theta)$.
5. Find all the 4 fourth roots of unity.
6. Show that $A = \begin{bmatrix} 0 & 1 & -1 \\ -1 & 0 & 1 \\ 1 & -1 & 0 \end{bmatrix}$ is skewed symmetric .
7. Show that the vectors 4i-j-k, 2i+6j+2k are perpendicular
8. Find mean using empirical formula

X:	0—10,	10—20,	20—30,	30—40,	40—50
Frequency:	5	22	33	17	10

9. Obtain the Fourier series for the function $f(x) =x^2$, $-\pi<x<\pi$
10. Differentiate $(\sqrt{3}-\sqrt{x}) /(\sqrt{3}+\sqrt{x})$ and simplify.

P.T.O

Answer briefly: **(10x2=20)**

11. Find the imaginary part of $(3+4i)/(7-i)$
12. In a GP, 7^{th} term is 384 and 12^{th} term is 12288. Find sum of first three terms.
13. Solve by matrix method, $2x+5y=1$, $3x+2y=7$.
14. Find the area of triangle whose vertices are (2,7), (1,1), (10,8).
15. Find the correlation coefficient for the equations in question 13.
16. Find the vector and scalar product $a = 3i+2j+4k$, $b=2i-3j+k$
17. Express the complex number $1+\sqrt{3}i$ in the standard form.
18. What is the probability of getting a sum 8 in two faces of 2 dice, when they were thrown together
19. For a Poisson distribution $P(X=0) = 0.1832$, Find $P(X=2)$.
20. If $f(x,y) = xy/(x^2+y^2)$, Show that $\partial^2 f/\partial x\partial y = \partial^2 f/\partial y\partial x$

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