

First Year B.Sc (MRT) Degree Examinations – March 2015

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

- Answer all Questions.
- Draw Diagrams wherever necessary.

Essay**(2x20=40)**

- Show that $\tan\theta / (\sec\theta + 1) + \tan\theta / (\sec\theta - 1) = 2 \operatorname{cosec}\theta$
 - If $\sin(A-B) = 1/2$ and $\cos(A+B) = 1/2$, Find A, B.
 - Show that $\tan(\pi/4 + A) - \tan(\pi/4 - A) = 2 \tan 2A$
- Find mean and standard deviation for the data

X: 0—5, 5—10, 10—15, 15—20, 20—25

Frequency: 3 7 15 14 4

- For a poisson distribution $P(X=1) = P(X=2)$, Find $P(X=3)$
- Two cricket players Mean and SD of scores are given below. Who is the consistent player

	Player A	Player B
Mean	48.4	50.8
SD	12.1	14.6

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

- Find the inverse of the matrix A

$$\begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$$
- Show that the vectors $A = 2i + j - 3k$, $B = i - 4k$, $C = 4i + 3j - k$ are linearly independent.
- Prove that $\sec^4 A - \sec^2 A = \tan^2 A + \tan^4 A$
- If $x = \log t + \sin t$, $y = e^t + \cos t$, find dy/dx .
- Solve $(x+y+1)^2 \cdot dy/dx = 1$
- Identify the regression lines $3x - 5y = 12$, $2x - 7y = 23$
- Evaluate $\log_e 7$ by Simpson's Rule
- Find the second order partial derivatives of $u = \log(x^2 + y^2)$

Answer briefly:

(10x2=20)

11. Demovire's theorem
12. What is the exponential rule of indices
13. Expand $\log(1-x)$, where $0 < x < 1$
14. When a matrix is said to be Hermitian
15. Give an application for $\sin(A-B)$
16. Integrate $1/(25-x^2)$
17. Solve $x^8 - x^5 + x^3 - 1 = 0$
18. How SD is better than mean deviation
19. $z = x + iy$, Express x and y in terms of z
20. Two regression coefficients are $3/16$ and $1/3$. Find correlation coefficient.
