QP CODE:105018 **Reg.No: ……..**

First Year B.Sc (MRT) Degree Examinations - July 2015

Mathematics

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

- Answer all Questions.
- Draw Diagrams wherever necessary.

Essay **(2x20=40)**

1. a) Differentiate $\sqrt{(3x+2)} + 1/\sqrt{(2x^2+4)}$

   b) If $x^y = e^{(x-y)}$ Show that $dy/dx = \log x/(1+\log x)^2$.

   c) Integrate $1/(\sqrt{(81+64x^2)})$

   d) Integrate $(e^x (x+1))/(x+2)^2$

2. a) Find correlation coefficient

X:	1	3	5	6	8	10	12
Y:	2	6	8	10	14	16	19

   b) Write properties of normal distribution

   c) For a binomial distribution mean= 12, variance=4, Find P(X=2)

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

3. Show that the matrix $A = \begin{bmatrix} 3 & 1 & 0 \\ 1 & 2 & -1 \\ 4 & -3 & 1 \end{bmatrix}$ is non singular.

4. Show that $\cos 2\Theta = (1 - \tan^2 \Theta)/(1 + \tan^2 \Theta)$.
5. If $y = 3e^{2x} + 2e^{3x}$, Show that $d^2y/dx^2 - 5\,dy/dx + 6y = 0$.
6. Integrate $4x/((x-2)(x-1))$
7. Find the angle between two lines AB and AC where A=(1,4,3), B=(2,3,2), C=(5,2,6) in a cartesian plain.
8. Derive the Euler formula $e^{ix} = \cos x + i \sin x$
9. Show that $\sin A + \sin(120+A) + \sin(240+A) = 0$
10. From an urn containing 5 white and 7 black balls, 2 balls were selected randomly. What is the probability that both are (1) same colour (2) different colour.

P.T.O

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

11. Write a general form of fourier series.
12. When a matrix is said to be symmetric.
13. Define non –singularity of a matrix.
14. When did a set of vector are said to be linearly independent.
15. Sum of 1st 3 terms of an AP is 30 and the difference between 3rd and 1st term is 12. Find the terms.
16. Find sin (22 ½^0)
17. Find lim ((2+n)(3+n^2)/((n^2+1)(2n+1)) as n tends to infinity.
18. Write down Simpson's 1/3rd rule for numerical integration.
19. Find a.b , where a=i+2j-3k, b=2i-4j+6k.
20. Give an example of 1st order differential equations.

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