

QP CODE: 105018

Reg. No:

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

Mathematics

Time: 3 Hours

Total Marks: 100

- Answer all Questions.
- Draw Diagrams wherever necessary.

Essay

(2x20=40)

1. Find the Fourier sine and cosine transform of $\frac{e^{-ax}}{x}$.
If X is a Poisson variate show that $P(X = 2) = 9 P(X = 4) + 90 P(X = 6)$, then find the variance of X .
Find the product of the matrices A & B
 $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 2 & 3 & 4 \end{bmatrix}$ $B = \begin{bmatrix} 1 & -2 \\ -1 & 0 \\ 2 & -1 \end{bmatrix}$.
2. From the following data find the regression equation of x on y .
 $x: 5 \ 6 \ 7 \ 3 \ 2$
 $y: 4 \ 5 \ 8 \ 2 \ 1$
If $y = \frac{\cos x}{x^2}$ find $\frac{dy}{dx}$.
Prove that $\sin 75^\circ - \sin 15^\circ = \cos 105^\circ + \cos 15^\circ$.

Short notes:

(8x5=40)

3. How many different committees of 6 members may be formed from 7 gentlemen and 5 ladies.
4. The first and of the last term of an arithmetic progression are -4 and 146 respectively and the sum of the arithmetic progression is 7171. Find the number of terms in the arithmetic progression and the common difference.
5. Find $\int_0^{\pi/4} \sin^3 2t \cos 2t \, dt$.
6. Find the divergence and curl of $\vec{v} = (x + 3y)\hat{i} + (y - 3z)\hat{j} + (x - 2z)\hat{k}$.
7. Find the difference and quotient of the complex numbers
 $z_1 = 8 + 3i$ and $z_2 = 9 - 2i$.
8. Find the coefficient of correlation between x and y .
 $x: 2 \ 3 \ 4 \ 5 \ 6 \ 7 \ 8$
 $y: 4 \ 5 \ 6 \ 8 \ 9 \ 7 \ 10$
9. Solve $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} - 4y = 0$.
10. Solve $5x + 3y + 7z = 4, 3x + 26y + 2z = 9, 7x + 2y + 11z = 5$.

P.T.O

Answer briefly:

(10x2=20)

11. Four coins are tossed simultaneously. What is the probability of getting 2 heads.
12. Define the term correlation.
13. Find the value of $8 \times (4)^{-3/2}$.
14. Determine the arithmetic progression whose 3rd term is 5 and 7th term is 9.
15. Evaluate $\frac{\sin 18}{\cos 72}$.
16. Find grad ϕ where $\phi = 2xy + z^2$ at the point (1,-1,3).
17. Find Laplace transform of $\cos(at+b)$.
18. State De Moivre's theorem.
19. The probability that A solves a problem in Statistics is $\frac{2}{5}$ and the probability that B solves it is $\frac{3}{8}$. If they try independently, find the probability that both solve the problem.
20. Find $\frac{dy}{dx}$ if $y = x^x$.
