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MATH211 Enrol. No. 12.3.5.92.1.0.8.4.

[ST]

END SEMESTER EXAMINATION : NOV-DEC 2022

APPLIED MATHEMATICS – III

Time : 3 Hrs. *Maximum Marks : 60*

Note: ***Attempt questions from all sections as directed. Use of scientific calculator is allowed.***

SECTION – A (24 Marks)

Attempt any **four** *questions out of* **five.**
Each question carries **06** *marks.*

1. Form a partial differential equation by eliminating arbitrary function f from $z = f\left(\frac{xy}{z}\right)$.

2. Reduce into canonical form

$$y^2 \frac{\partial^2 z}{\partial x^2} + x^2 \frac{\partial^2 z}{\partial y^2} = 0$$

P.T.O.

3. Obtain the constant term and the coefficients of first sine and cosine terms in the Fourier series expansion of y given by :

x	0	1	2	3	4	5
y	9	18	24	28	26	20

4. Find a Fourier series to represent x^2 in the interval (–L.L).

5. Find the Fourier Integral representation of

$$f(x)=\begin{cases}1, & |x|\le 1\\ 0, & |x|>1\end{cases}$$

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three**.

Each question carries **10** *marks.*

6. A string is stretched and fastened to two points '*l*' apart. Motion is started by displacing the string in the form $y = K(lx - x^2)$ from which it is released at time $t = 0$. Find the displacement of any point on the string at a distance x from one end at time t.

7. Find the Fourier transform of e^{-x^2}.

8. Obtain the Fourier series for the following function:

$f(x) = x - x^2$ in the interval $[-\pi,\pi]$.

SECTION – C (16 Marks)

(Compulsory)

9. (a) Solve $\frac{\partial^2 z}{\partial x^2} - 3\frac{\partial^2 z}{\partial x \partial y} + 2\frac{\partial^2 z}{\partial y^2} = e^{2x-y} + e^{x+y} + \cos(x + 2y)$ (10)

(b) Solve $(x^2 - yz)p + (y^2 - zx)q = (z^2 - yx)$. (6)