[No. of Printed Pages – 2] 788

MATH122 Enrol. No. .....

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END SEMESTER EXAMINATION : April-May, 2023

APPLIED MATHEMATICS – II

Time : 3 Hrs. *Maximum Marks : 60*

Note: ***Attempt questions from all sections as directed.***

SECTION – A (24 Marks)

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

1. Solve $x\,dy = y\,(\log y - \log x + 1)dx$.

2. Solve $(D^2 + 6D + 9)y = e^{-3x}$

3. Find the Laplace Transform of $te^{-t}\sin 2t$.

4. Evaluate the integral $\int_0^\infty \frac{e^{-t}\sin t}{t}\,dt$ using Laplace Transform.

5. Find the inverse Laplace Transform of $\tan^{-1}(s + 1)$.

P.T.O.

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three.**
Each question carries **10** *marks.*

6. If $f(z)=\begin{cases}\dfrac{x^3y(y-ix)}{x^6+y^2} & z\neq 0\\ 0 & z=0\end{cases}$ then discuss $\dfrac{df}{dz}$ at $z=0$.

7. Solve $(D^2 + 1)y = \text{cosec}x$.

8. Obtain the Taylor's or Laurent's series for the function $f(z)=\dfrac{1}{(1+z^2)(z+2)}$ valid in the region

(i) $1 < |z| < 2$ (ii) $|z| > 2$

SECTION – C (16 Marks)

(Compulsory)

9. (a) Find the values of C_1 and C_2 such that the function

$f(z) = x^2 + C_1y^2 - 2xy + i(C_2x^2 - y^2 + 2xy)$

is analytic. (8)

(b) Evaluate $\int_C \dfrac{\sin z}{z\cos z}\,dz$ where C is the circle $|z| = 2$.

(8)