Reg.No.									

INTERNATIONAL CENTRE FOR APPLIED SCIENCES (MAHE)

III SEMESTER B.Sc. (Applied Sciences) MAKE -UP EXAMINATION – January 2022

SUBJECT: MATHEMATCS-III (IMA 231)

(BRANCH: CS/MECHANICAL)

Timing: 3 hours **DATE: 07th January 2022** **Max. Marks: 50**

- ✓ **Answer All questions**
- ✓ **Missing data, if any, may be suitably assumed**

1 a. Solve $2ye^{x/y}dx + (y - 2xe^{x/y})dy = 0$ *3M*

b. Solve $(D^3 - 5D^2 + 8D - 4)y = e^{2x} + 2e^x + 3e^{-x} + 2$ *3M*

c. Solve $x\tan(y/x) - y\sec^2(y/x)dx + x\sec^2(y/x)dy = 0$ *4M*

2 a. Using the method of variation of parameters solve $(D^2 + 4)y = \tan 2x$ *3M*

b. Solve $3u_x + 2u_y = 0, u(x,0) = 4e^{-x}$ by method of separation of variables. *3M*

c. $\frac{dy}{dx} = xy^{1/3}$, $y(1) = 1$, find $y(1.1)$ by Taylor's series method. *4M*

3 a. Find $L\left\{t.\int_0^t e^{-t}\frac{\sin t}{t}dt\right\}$ *3M*

b. Solve by unit step function $f(t) = \begin{cases} cost & 0 < t < \pi \\ 1 & \pi \le t < 2\pi \\ sint & t \ge 2\pi \end{cases}$ *3M*

c. Solve the linear differential Equation $y''(x) + 2y'(x) + y(x) = x, \quad y(0) = -3, y'(0) = 0$ *4M*

4 a. Show that $f(z) = e^{-z}$ is analytic and find $f'(z)$. *3M*

b. Find all the possible expansions of the given function $f(z) = \frac{1}{Z^2 - 3z + 2}$ at $z = 1$ *3M*

c. Evaluate by Residue $\oint \frac{z+2}{z(z-1)}dz$ where i). $c:|z|=\frac{1}{2}$ *4M*

ii). $c:|z|=2$ iii. $c:|z+1|=\frac{1}{2}$

5 a. State and prove Residue Theorem. *3M*

b. Find $L\left\{\frac{1-\cos t}{t}\right\}$. *3M*

c. Evaluate $\int_c (4z-3)dz$ where c is a straight line from i to π+i 4M