

**VIT**Vellore Institute of Technology
(Chartered by the University Grants Commission, UGC, Act, 1956)DEPARTMENT OF MATHEMATICS
SCHOOL OF ADVANCED SCIENCES

Continuous Assessment Test-I, March 2023

Course Code: BMAT102L

Date of Exam: 26-03-2023

Course Name: Differential Equations and Transforms

Slot: A1+TA1+TAA1

Maximum Marks: 50

Duration: 90 Minutes

Answer ALL the questions (5x10=50)

1. Solve $x^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + 2y = x \log x$ [CO1] [BT2]
2. Solve $\frac{d^2 y}{dx^2} + 4y = \tan 2x$, by the method of variation of parameters. [CO1] [BT2]
3. An electric circuit consists of an inductance 0.1 henry, a resistance of 20 ohms and a condenser of capacitance 25 micro-farads. Find the charge 'q' and current 'i' at any time 't', given that at $t=0$, $q=0.05$ coulomb and $i=0$ when $t=0$. [CO1] [BT3]
4. (i) Form the partial differential equation by eliminating the arbitrary function f from $f(x^2 + y^2, x^2 - z^2) = 0$. [CO1] [BT2]
(ii) Solve $p^2 + q^2 = n^2$
5. Solve the partial differential equation $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$ [CO1] [BT2]