Shri Mata Vaishno Devi University

School Of Mathematics

B.Tech. II Semester (Civil, Computer Science, Electrical, Electronics, Mechanical)

Minor Exam 2: Spring 2023–2024

Entry No.: 23bcs021

Date:

Total No. Pages: [2]

Total No. Questions: [3]

Course Title: Engineering Mathematics II (MTL BS-102)

Time alloted : 1 Hours

Total marks: [20]

**Attempt all questions.**

1. Do any two of the followings each carry two marks.

   (a) Find the differential equation of all non-verticle lines in the $xy$-plane. [CO 3]

   (b) Define integrating factor and exact differential equation. [CO 3]

   (c) Find the order and degree of the differential equation: [CO 3]

$$\left(1+\left(\frac{d^2y}{dx^2}\right)^2\right)^{3/2} = k\left(\frac{d^2y}{dx^2}\right)^{-2}.$$

2. Solve any two differential equations, each carry three marks.

   (a) $(x+y)^2dy = a^2dx.$ [CO 4]

   (b) $x^2ydx - (x^3+y^3)dy = 0.$ [CO 4]

   (c) $x\log x\frac{dy}{dx} + y = 2\log x$ [CO 4]

3. Solve any two differential equations, each carry five marks.

   (a) $(x^2y^2+xy+1)ydx + (x^2y^2-xy+1)xdy = 0.$ [CO 4]

   (b) $(D^2-3D+2)y = e^{-x}\sin x.$ [CO 4]

   (c) $(D^2+3D+2)y = xe^x\sin x$ [CO 4]