

Maulana Azad National Institute of Technology Bhopal

Mini Test - (Session: 2020-2021)

B.Tech.(A and G)

Semester-I

Max. Marks: 10

Subject: Mathematics-I

Code: MTH-111

Time: 1hour

Note: All questions are compulsory

S .No.	Question	Marks
Q.1	<p>If $u = \log (x^3 + y^3 - x^2y - y^2x)$</p> <p>Show that $\left(\frac{\partial}{\partial x} + \frac{\partial}{\partial y}\right)^2 u = -\frac{4}{(x+y)^2}$</p>	2.5
Q.2	<p>If $u = \log \left(\frac{x^2+y^2}{x+y}\right)$ find the value of</p> $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$	2
Q.3	<p>If v is function of r , $r^2 = x^2 + y^2$, show that $\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} = \frac{1}{r} \frac{\partial v}{\partial r} + \frac{\partial^2 v}{\partial r^2}$</p>	2.5
Q.4	<p>Discuss the maxima and minima of the function</p> $u = \sin x \sin y \sin (x + y)$	3