

Ramrao Adik Institute of Technology, Nerul.

Term Test -I

Time: 1 Hr.

Div:

Subject- AM-I

Marks: 30

Note: All questions are compulsory

Q.1

✓ A) Find n^{th} derivative of $y = \frac{4x}{(x-1)^2(x+1)}$ 05

✓ B) Find $\frac{\partial(u,v)}{\partial(x,y)}$ $x = e^u \cos v, y = e^u \sin v$ 05

OR

A) $y = (x-1)^n$, then P.T. $y + \frac{y_1}{1!} + \frac{y_2}{2!} + \frac{y_3}{3!} + \dots + \frac{y_n}{n!} = x^n$ 05

✓ B) Find $\frac{\partial(u,v)}{\partial(x,y)}$ $u = x \sin y, v = y \sin x$ 05

Q.2 If $v = (1 - 2xy + y^2)^{-1/2}$ then prove that $x \frac{\partial v}{\partial x} - y \frac{\partial v}{\partial y} = y^2 v^3$ and also find the value of

$$\frac{\partial}{\partial x} \left[(1-x^2) \frac{\partial v}{\partial x} \right] + \frac{\partial}{\partial y} \left[y^2 \frac{\partial v}{\partial y} \right]$$
10

OR

✓ Q.2 If $y = \tan^{-1} \left[\frac{a+x}{a-x} \right]$ then prove that $((x^2+a^2) y_{n+2} + 2(n+1)x y_{n+1}) + n(n+1) y_n = 0$ 10

✓ Q.3 Show that the minimum value of $u = xy + a^3 \left(\frac{1}{x} + \frac{1}{y} \right)$ is $3a^2$ 10

OR

Q.3 Divide 24 into three parts such that the continued product of the first, square of the second and cube of the third may be maximum. 10