PART – A (5X4 =20 marks)

ANSWER ALL THE QUESTIONS

1) Find $\dfrac{dy}{dx}$, if $(\cos x)^y = (\sin y)^x$.

2) If $u = \tan^{-1}\left(\dfrac{x^3 + y^3}{x - y}\right)$ then show that $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} = \sin 2u$.

3) Examine the extreme values of $f(x,y) = x^3 + y^3 - 12x - 3y + 20$.

4) If $x = r\cos\theta$, $y = r\sin\theta$ verify that $\dfrac{\partial(x,y)}{\partial(r,\theta)} \times \dfrac{\partial(r,\theta)}{\partial(x,y)} = 1$.

5) Solve $\left(D^2 + 6D + 9\right)y = 3e^{4x}$.

PART – B (3X10 =30 marks)

ANSWER ALL THE QUESTIONS

6) Using Taylor's Series expand $e^x \log(1 + y)$ up to third degree term in the neighborhood of Origin.

7) Find the dimensions of the rectangular box, open at the top of maximum capacity whose surface is 108 sq. feet.

8) Solve $(D^2 + 3D + 2)y = e^{-2x} + \sin x$.

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