SRM Institute of Science and Technology, Kattankulathur
Department of Mathematics
18MAB101T – CALCULUS AND LINEAR ALGEBRA
TUTORIAL SHEET - UNIT II - FUNCTIONS OF SEVERAL VARIABLES

SLOT:B2 **SHEET 1**

PART - B

1. **Find** $\frac{dy}{dx}$**, if** $(cosx)^y = (siny)^x$**.**
2. **Find** $\frac{du}{dx}$**, if** $u = tan^{-1}\left(\frac{y}{x}\right)$**.**
3. **Find** $\frac{dz}{dt}$**, when** $z = xy^2 + x^2y$**, where** $x = at^2,\ \ y = 2at$**.**
4. **If** $u = x^2y^3,\ x = logt,\ y = e^t$**, then find** $\frac{du}{dt}$**.**
5. **Find** $\frac{du}{dt}$**, when** $u = x^2y,\ x = t^2,\ y = e^t$**.**

PART - C

6. **Expand** e^xcosy **near the point** $\left(1, \frac{\pi}{4}\right)$ **by Taylor's series up to second degree.**
7. **Expand** $x^2y + 3y - 2$ **in powers of** $x - 1$ **and** $y + 2$ **using Taylor's theorem up to third degree.**
8. **If** $z = f(x, y)$**, where** $x = u^2 - v^2,\ y = 2uv$**, then prove that** $\frac{\partial^2 z}{\partial u^2} + \frac{\partial^2 z}{\partial v^2} = 4\left(u^2 + v^2\right)\left[\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2}\right]$**.**
9. **Expand** e^{xy} **in powers of** $x - 1$ **and** $y - 1$ **using Taylor's theorem up to third degree.**
10. **Find** $\frac{du}{dt}$**, when** $u = sin\left(\frac{x}{y}\right),\ x = e^t,\ y = t^2$**.**

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