Department of Mathematics and Statistics (KFUPM)
Math-302 Semester-173 QUIZ III

NAME: S.No. ID:
Maximum Marks: 10 Section:01 Time Allowed: 30 minutes

(1) Express the point $P(1,1,1)$ and the vector $\mathbf{A} = y\ \mathbf{a_x} + (x+z)\mathbf{a_z}$ in cylindrical coordinates. Evaluate $\mathbf{A}$ at P in Cartesian and cylindrical systems.

(2) Find the directional derivative of $V = r\sin(\theta)\cos(\phi)$ in the direction of $3\mathbf{a_x} - 4\mathbf{a_z}$ at the point $P(1, \frac{\pi}{6}, \frac{\pi}{2})$. [Hint: $\nabla V = \frac{\partial V}{\partial r}\mathbf{a_r} + \frac{1}{r}\frac{\partial V}{\partial \theta}\mathbf{a}_\theta + \frac{1}{r\ sin\theta}\frac{\partial V}{\partial \phi}\mathbf{a}_\phi$]