

Math 302 – 02 Quiz 3

(A)

Name:.....Serial#:.....

Q.1: Let $\mathbf{F}(t) = -(t + \sin(t))\mathbf{i} + \cos(2 + t)\mathbf{j} + 3t^2\mathbf{k}$, and $f(t) = -2t^2$. Find $\mathbf{F}(f(t))$ and use this to compute $\frac{d}{dt}\mathbf{F}(f(t))$

Q.2: Let $\varphi(x, y, z) = e^z \sin(y) \sin(z)$. Find the gradient of φ and evaluate the gradient at $\left(0, \frac{\pi}{4}, -\frac{\pi}{4}\right)$. Also find the maximum and minimum rate of change φ at this point.

Q.3: Let $\mathbf{A} = a\mathbf{i} + b\mathbf{j} + c\mathbf{k}$ be a constant vector and $\mathbf{R} = x\mathbf{i} + y\mathbf{j} + z\mathbf{k}$. Prove that divergence of $3\mathbf{A} - 5\mathbf{R}$ is equal to -15 .