No.

Date

Quiz 19.

$$P \qquad Q \qquad R$$

Q1. $F(x,y,z) = y^2z^3 i + 2xyz^3 j + 3xy^2z^2 k$

Answer: $f_x = y^2z^3 \quad f_y = 2xyz^3 \quad f_z = 3xy^2z^2$

$$\frac{d}{dy}(P) = 2yz^3 \quad \frac{d}{dx}(Q) = 2yz^3$$

$$\frac{d}{dz}(P) = 3y^2z^2 \quad \frac{d}{dx}(R) = 3y^2z^2$$

$\therefore$ it is conservative.

$\therefore \quad f_x = y^2z^3$

$$f = \int f_x\, dx = xy^2z^3 + g(y,z)$$

$$\frac{d}{dy} f = 2xyz^3 + g_y(y,z) = 2xyz^3$$

$$\therefore g_y(y,z) = 0$$

$$\therefore f = xy^2z^3 + h(z)$$

$$\frac{d}{dz} f = 3xy^2z^2 + h'(z) = 3xy^2z^2$$

$$h'(z) = 0$$

$$\therefore f = xy^2z^3$$

Q2. $\int_C 2xy^2dx + 2x^2y\,dy$ C is any path from $(1,0)$ to $(0,1)$

$$f = \int 2xy^2 dx = x^2y^2 + g(y)$$

$$\frac{d}{dy} P = 2y2x$$

$$\frac{d}{dy} f = 2yx^2 + g_y = 2x^2y$$

$$\frac{d}{dx} Q = 2x2y$$

$\therefore$ it is conservative.

$$\therefore g_y = 0$$

$$f = (x^2y^2)$$

$$f(0,1) - f(1,0) = 0 - 0 = 0$$

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