

SINIKUN KURNIAWA (MATHS)

19/END 2 DS/DS 9

MATHS TESTS

MAT 182.

1. $x = t^2$ $y = -5t^2 + t$, $z = t + t^3$
forming equation of motion

$$2ti + 2t^3j + 2k$$

$$\Delta = t^2i + -5t^2j + t^3k + t^2k + 2k \rightarrow \text{distance}$$

~~separating~~

$$\text{Velocity} = \frac{dx}{dt} = 2ti + (-10tj + 3t^2k) + k + 3t^2k$$

$$\text{Acceleration} = \frac{d^2x}{dt^2} = 2i - 10j + 6k$$

$= -7 \text{ms}^{-1} \Rightarrow$ deceleration.

2. $P = i - 2j - 4k$, $Q = 8i - 3j + 6k$, $R = i - 4j - 8k$.

$$(P \times Q) \cdot (R \times P)$$

$$(P \times Q) = \begin{vmatrix} i & j & k \\ 1 & -2 & -4 \\ 8 & -3 & 6 \end{vmatrix}$$

$$i[-9 - 12] - j[6 + 32] + k[-3 + 72]$$

$$(-9 \times 8)j$$

$$i[-54 - 12] - j[6 + 32] + k[-3 + 72]$$

$$-66i - 38j + 69k$$

$$(R \times P) = \begin{vmatrix} 1 & -4 & -3 \\ 1 & -9 & -4 \end{vmatrix}$$

$$i \int (4x - 4) - (-3x - 9) \cdot \frac{1}{s} [k(x-4) - (3x)] + k [x-9] - (4x)$$

$$i \int [6 \cdot 27] - j [-4 + 3] + k [-9 + 4]$$

$$i [-11] - j [-7] + k [-5] \quad \therefore (R \times P) (R \times P)$$

$$= -66i - 38j + 69k \cdot (-i + j - 5k)$$

$$= 66 - 38 - 345$$

$$= -317$$

$$8. F = 5 \cos 7t i - 2e^{3t} j - 4t^3 k$$

$$\int F = 5x \sin 7t$$

$$F = 5x \sin 7t i - \frac{1}{3} e^{3t} j - \frac{4t^3}{3} k$$

$$= 5x \sin 7t i - \frac{2}{3} x e^{3t} j - t^4 k + C$$