NAME :- IBE CHIAMAKA ALMA

MATRIC NO :- 18/MHS01/171

DEPARTMENT :- ANATOMY

COURSE :- MAT 102.

ASSIGNMENT

1 A particle moves along a curve, $x=t^3, y=5t^2+t, z=t+7$ where t is time. Find its acceleration.

2 If $P=i-9j-4k$, $Q=8i-3j+6k$, $R=i-4j-3k$, Find $(P\times Q).(R\times P)$

3 Given $F=5\cos 7t\,i - 2e^{3t}j - 4t^3k$, find the integral of F with respect to t

ANSWER

2 $P=i-9j-4k$, $Q=8i-3j+6k$, $R=i-4j-3k$

$(P\times Q)$

$$\begin{vmatrix} i & j & k \\ 1 & -9 & -4 \\ 8 & -3 & 6 \end{vmatrix} \quad i\begin{vmatrix} -9 & -4 \\ -3 & 6 \end{vmatrix} - j\begin{vmatrix} 1 & -4 \\ 8 & 6 \end{vmatrix} + k\begin{vmatrix} 1 & -9 \\ 8 & -3 \end{vmatrix}$$

$$(-54-12)i - (6-(-32))j + (-3-(-72))$$

$$= -68i - 38j + (-69)k$$

$$= -68i - 38j - 69k$$

$(R\times P)$

$$\begin{vmatrix} i & j & k \\ 1 & -4 & -3 \\ 1 & -9 & -4 \end{vmatrix} \quad i\begin{vmatrix} -4 & -3 \\ -9 & -4 \end{vmatrix} - j\begin{vmatrix} 1 & -3 \\ 1 & -4 \end{vmatrix} + k\begin{vmatrix} 1 & -4 \\ 1 & -9 \end{vmatrix}$$

$$(16-27)i - (-4-(-3))j + (-9-(-4))k$$

$$= -11i + j - 5k$$

$\therefore (P\times Q).(R\times P)$

$= (-68i - 38j - 69k).(-11i + j - 5k)$

~~$= 748i - 38j$~~

$= 748 - 38 + 345$

$= 1055$ //

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

Solution

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

$f = \int 5\cos 7t\,i - \int 2e^{3t}j - \int 4t^3k$

$= 5\int \cos 7t\,i - 2\int e^{3t}j - 4\int t^3k$

$= 5\left(\frac{1}{7}\sin 7t\right)i - 2\left(\frac{1}{3}e^{3t}\right)j - 4\left(\frac{t^4}{4}\right)k$

$= \frac{5}{7}\sin 7t\,i - \frac{2}{3}e^{3t}j - \frac{4}{4}t^4k$ //

1 $x = t^2$, $y = 5t^2 + t$, $z = t + 7$

$r = xi + yj + zk$

$= t^2i + (5t^2 + t)j + (t + 7)k$

$dr/dt\,(t^2i + (5t^2 + t)j + (t + 7)k)$

$= 2ti + (10t + 1)j + k$

Acceleration $= d^2r/dt^2 = 2i + 10j$ //