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COURSE TITLE: GENERAL MATHEMATICS II.

ANSWERS TO ASSIGNMENT.

1). $x = 7t^2$, $y = 6t^2 - 4t$, $z = t - 5$.

Given $A(t) = a_x(t)\,i + a_y(t)\,j + a_z(t)\,k$.

Velocity $\left(\frac{dA}{dt}\right) = ?$

but $A(t) = 7t^2\,i + (6t^2 - 4t)\,j + (t - 5)\,k$.

Velocity $\left(\frac{dA}{dt}\right) = 14t\,i + (12t - 4)\,j + k$. //

2) If $A = i + 2j - 4k$, $B = 2i - 3j + k$, $C = 4j - 3k$,

$$\therefore (B \times C) = \begin{vmatrix} + & - & + \\ i & j & k \\ 2 & -3 & 1 \\ 0 & 4 & -3 \end{vmatrix}$$

$$(B \times C) = i\begin{vmatrix} -3 & 1 \\ 4 & -3 \end{vmatrix} - j\begin{vmatrix} 2 & 1 \\ 0 & -3 \end{vmatrix} + k\begin{vmatrix} 2 & -3 \\ 0 & 4 \end{vmatrix}.$$

$$(B \times C) = i(9 - 4) - j(6 - 0) + k(8 - 0).$$

$$= i(5) - j(-6) + 8k = 5i + 6j + 8k$$

$$A \times (B \times C) = \begin{vmatrix} + & - & + \\ i & j & k \\ 1 & 2 & -4 \\ 5 & 6 & 8 \end{vmatrix}$$

$$= i\begin{vmatrix} 2 & -4 \\ 6 & 8 \end{vmatrix} - j\begin{vmatrix} 1 & -4 \\ 5 & 8 \end{vmatrix} + k\begin{vmatrix} 1 & 2 \\ 5 & 6 \end{vmatrix}.$$

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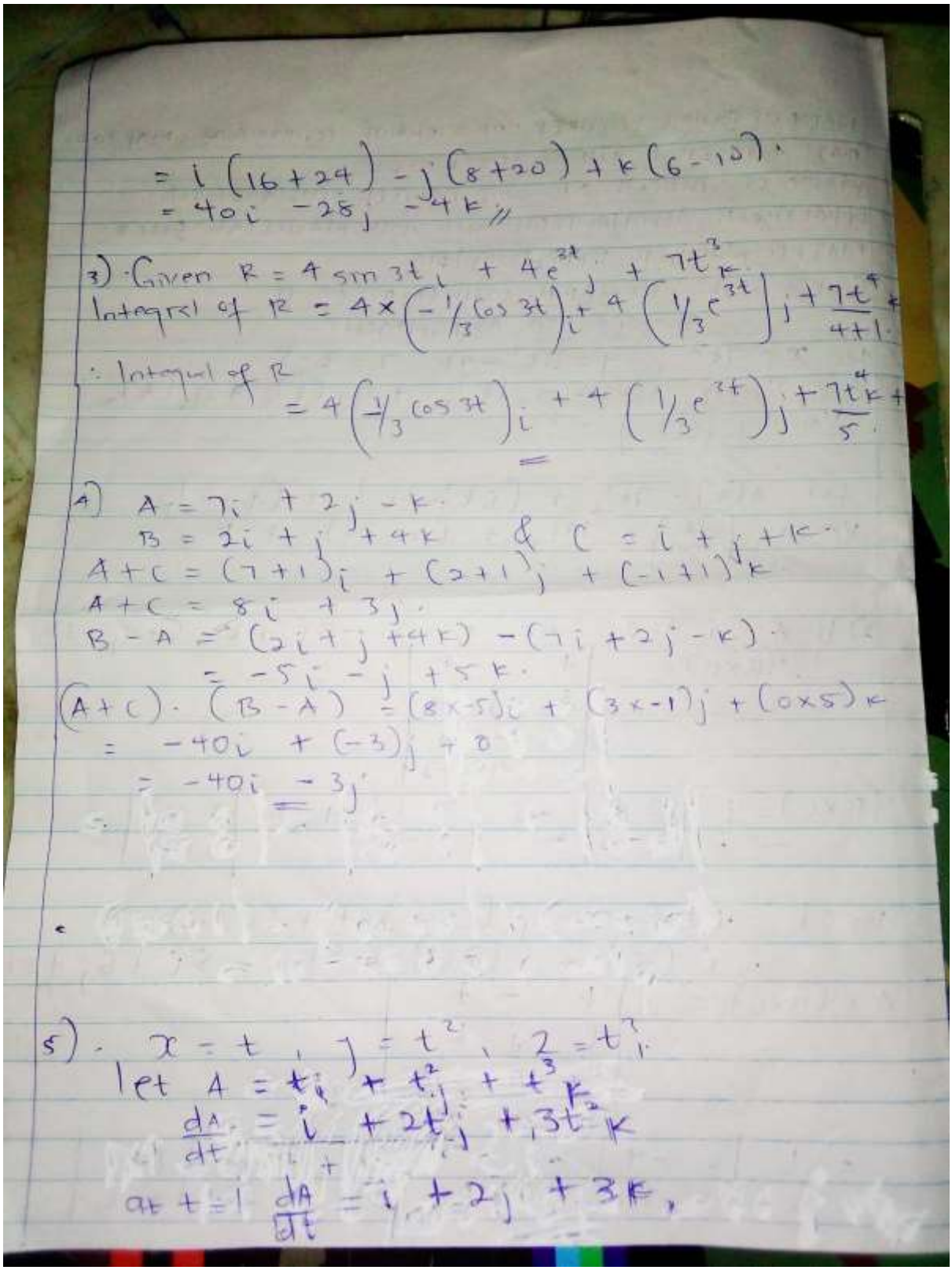

$= i(16+24) - j(8+20) + k(6-10)$.

$= 40i - 28j - 4k$ //

3) Given $R = 4\sin 3t\, i + 4e^{3t} j + 7t^3 k$

Integral of $R = 4 \times \left(-\frac{1}{3}\cos 3t\right) i + 4\left(\frac{1}{3}e^{3t}\right) j + \frac{7t^4}{4+1} k$

$\therefore$ Integral of $R = 4\left(-\frac{1}{3}\cos 3t\right) i + 4\left(\frac{1}{3}e^{3t}\right) j + \frac{7t^4}{5} k$

4) $A = 7i + 2j - k$.

$B = 2i + j + 4k$ & $C = i + j + k$.

$A + C = (7+1) i + (2+1) j + (-1+1) k$

$A + C = 8i + 3j$.

$B - A = (2i + j + 4k) - (7i + 2j - k)$.

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

$(A+C) \cdot (B-A) = (8 \times -5) i + (3 \times -1) j + (0 \times 5) k$

$= -40i + (-3) j + 0$

$= -40i - 3j$

5) $x = t$, $y = t^2$, $z = t^3$.

let $A = t i + t^2 j + t^3 k$

$\frac{dA}{dt} = i + 2t j + 3t^2 k$

at $t = 1$ $\frac{dA}{dt} = i + 2j + 3k$.

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