

Q1

$$I = mv - mu$$

$$-2i - 4j = (0.1)(v) - 0.1(30i)$$

$$-2i - 4j = 0.1v - 3i$$

$$i - 4j = 0.1v$$

$$v = 10i - 40j$$

Q2

$$I = mv - mu$$

$$3i + 6j = 2v - 2(i - 4j)$$

$$3i + 6j = 2v - 2i + 8j$$

$$5i - 2j = 2v$$

$$v = \frac{5}{2}i - j$$

$$\text{Speed} = \sqrt{\left(\frac{5}{2}\right)^2 + (1)^2} = \underline{\underline{2.69 \text{ ms}^{-1}}}$$

Q3.

$$I = mv - mu$$

$$5i - 3j = 0.25(v) - 0.25(3i + 7j)$$

$$5i - 3j = 0.25v - 0.75i - 1.75j$$

$$5.75i - 1.25j = 0.25v$$

$$v = 23i - 5j$$

$$\text{Speed} = \sqrt{23^2 + (5)^2} = \underline{\underline{23.5 \text{ ms}^{-1}}}$$

Q4

$$a) \quad I = 0.6(2ci - cj) - 0.6(ci + 2cj)$$

$$I = 1.2ci - 0.6cj - 0.6ci - 1.2cj$$

$$I = 0.6ci - 1.8cj$$

$$\sqrt{(0.6c)^2 + (1.8c)^2} = 2\sqrt{10}$$

$$0.36c^2 + 3.24c^2 = 4(10)$$

$$3.6c^2 = 40$$

$$c = \frac{10}{3}$$

Q5

(a)

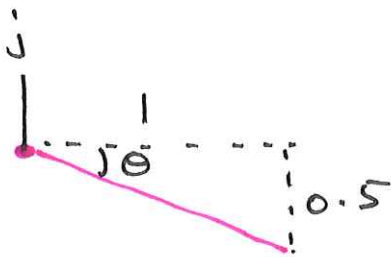
$$I = 0.5(2i + 3j) - 0.5(4j)$$

$$I = i + 1.5j - 2j$$

$$I = i - 0.5j$$

$$\sqrt{1^2 + 0.5^2} = \frac{\sqrt{5}}{2} = \underline{\underline{1.12 \text{ Ns}}}$$

(b)



$$\tan \theta = \frac{0.5}{1}$$

$$\theta = 26.6^\circ$$

$$\text{Angle } 90 + 26.6^\circ = \underline{\underline{116.6^\circ}}$$