

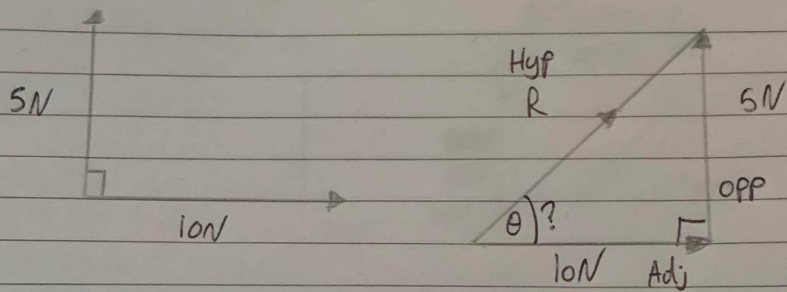
Science / Electronics Exam

1

- a) Area = m^2
- b) Volume = m^3
- c) Mass = Kg
- d) Force = N
- e) Weight = N

2) m units of density = $\frac{Kg}{m^3} = Kg/m^3$

3)



$$R = 5^2 + 10^2$$

$$R = 25 + 100$$

$$R = \sqrt{125}$$

$$R = 11.9N$$

SoH CAH (ToA)

$$\tan \theta = \frac{5}{10}$$

~~Plat~~ ~~tan~~

$$\theta = \tan^{-1}\left(\frac{5}{10}\right) = 26.6^\circ$$

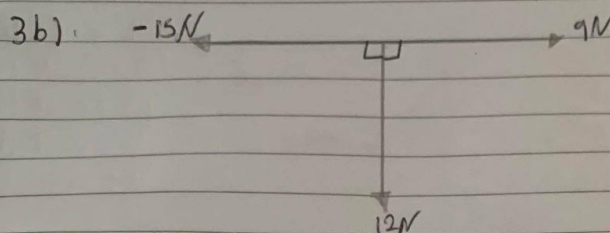
Resultant = 11.9N to the right
26.6° above horizontal

$$\text{Bearing} = 90 - 26.6^\circ$$

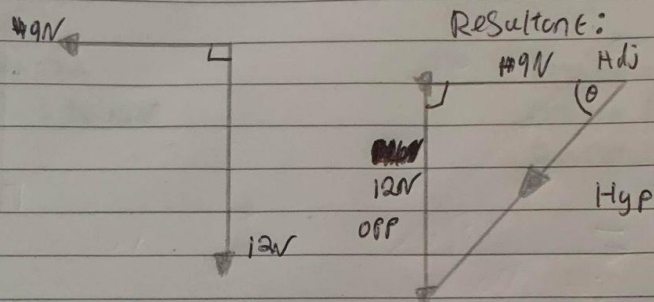
$$= 63.4^\circ$$

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Exam



$$-15 + 9 = -6N$$



$$Resultant = 12^2 + 9^2$$

$$R = 144 + 81 = 225$$

$$R = \sqrt{225} = 15N$$

SOH CAH TOA

$$\tan \theta = \frac{12}{9}$$

~~ON A TANT~~

$$\tan^{-1}\left(\frac{12}{9}\right) = 53.13^\circ$$

Resultant is 15N to the left

53.13° below horizontal

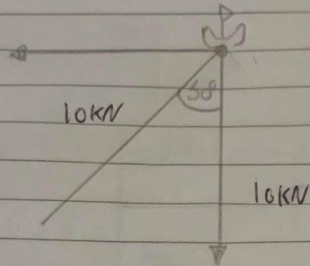
$$Bearing = 90 + 90 + 90 - 53.13^\circ$$

$$bearing = 216.87^\circ$$

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Exam

Q41



$$R = 10^2 + 10^2$$

$$R = 100 + 100 = 200$$

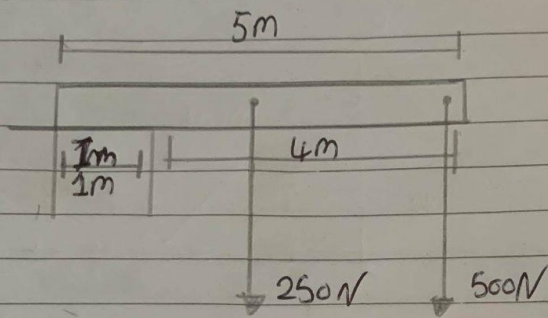
$$R = \sqrt{200} = 14.14 \text{ N}$$

Drag Force acts in the opposite direction to the resultant force.

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Exam

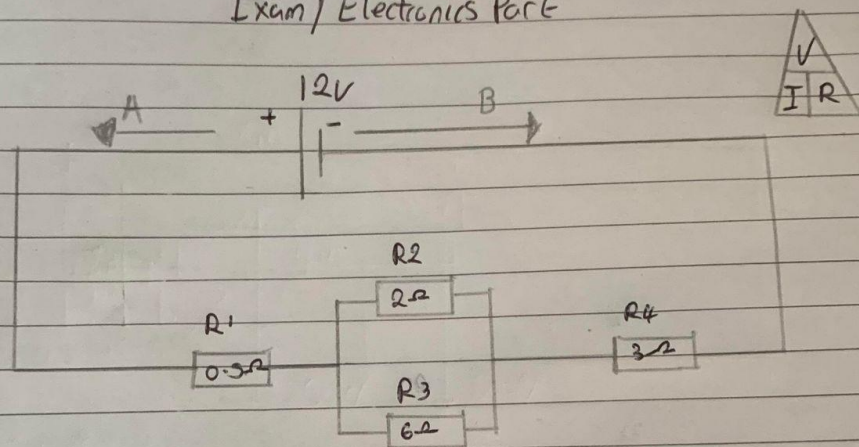
Q5



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Exam / Electronics Part

Q6



a) The current flows + positive to - negative in a DC circuit - A

b) $R_T \text{ Series} = 0.5 + 3 = 3.5\Omega$

$$R_T \text{ Parallel} = \frac{1}{\frac{1}{2} + \frac{1}{6}} = 1.5\Omega$$

$$R_T = 3.5 + 1.5 = 5\Omega$$

$$R_T = 5\Omega$$

c) Current = $\frac{V}{R}$ $V = 12$ $R = 5$

$$\frac{12}{5} = 2.4A$$

d) $V = I \times R$

$$V = 2.4 \times 5 = 12V$$

e) Voltage across $R_1 = 2.4 \times 0.5 = 1.2V$

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Exam

Q6

$$e) I = \frac{V}{R} \quad V = I \times R$$

$$I \times R = 2.4 \times 1.5$$

$$2.4 \times 1.5 = 3.6V$$

$$I = 3.6$$

$$1.5 = 2.4A$$

$$f) I = \frac{V}{R} \quad V = I \times R$$

$$I \times R = 2.4 \times 6 = 14.4V$$

$$I = \frac{14.4}{1.5} = 9.6A$$

g) Voltage drop =

$$R_1 - 2.4 \times 0.5 = 3.6V$$

$$R_2 - 2.4 \times 2 = 4.8V$$

$$R_3 - 9.6 \times 6 = 57.6V$$

$$R_4 - 4 \times 3 = 12V$$

$$R_1 \quad 2.4 \times 3.6 = 8.64W$$

$$R_2 \quad 2.4 \times 4.8 = 11.52W$$

$$R_3 \quad 9.6 \times 57.6 = 552.96W$$

$$R_4 \quad 4 \times 12 = 48W$$

R3 transfers the highest amount of energy at 552.96W