



12 Pages

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1	Student Number	2219605
2	Title of Examination Paper	Electrical and Electronic Principles
3	Module Code	ACDA4006
4	Date and Time of Examination	12:03 09/01/2024
5	Examination Venue	310
6	Seat Number	034
7	Number of Answer Books handed in	

[illegible]

(Gweler yr ochr arall am y fersiwn Cymraeg)

Q.1

a) $330\ \Omega$ resistor (R) 3V voltage (V)

Find Current (I)

$$I = \frac{V}{R}$$

$$I = \frac{3}{330}$$

$$I = 0.009\text{ A}$$

If resistor is $270\ \Omega$ then;

$$I = \frac{V}{R}$$

$$I = \frac{3}{270}$$

$$I = 0.01\text{ A}$$

b) 1.0 W power 3.0 V batteries max charging current =

Power or W is P

$$I = \frac{P}{V}$$

$$I = \frac{1}{3}$$

$$I = 0.3\text{ A}$$

d)

i)

ii) $20\ \Omega$ resistor (R), 15 V battery (V)
Find Current (I)

$$I = \frac{V}{R}$$

$$I = \frac{15}{20}$$

$$I = 0.75\text{ A}$$

e) Power Supply requires 25 W of input Power.
Outputs 20 W . Efficiency in percentage and
the total power loss?

$$\text{Efficiency} = \frac{P_{\text{out}}}{P_{\text{in}}}$$

$$= \frac{20}{25}$$

$$= 0.8 \text{ or } 80\%$$

$$\text{Total power lost} = P_{\text{in}} - P_{\text{out}}$$

$$= 25 - 20$$

$$= 5\text{ W of power lost}$$

Q.32

a)

b) 250V source. Three resistor series (R_A, R_B, R_C)
 $R_C = 50\ \Omega$ $V_B = 80V$ and Total current = 2A

i) Voltage across R_A

~~$V = I \times R$~~ First resistor in series

~~$V = 2 \times$~~ voltage is 250V

R_A Voltage = 250V ~~✓~~

0

ii) Voltage across R_C

$$V = I \times R$$

$$V = 2 \times 50$$

$$V = 100V$$

Voltage across R_C is 100V ✓

2

iii) Resistor value of R_A and R_B

$$R_A = \frac{\text{Voltage}}{\text{Current}} = \frac{250V}{2A}$$

$$R_B = \frac{\text{Voltage}}{\text{Current}} = \frac{80V}{2A}$$

$$R = \frac{V}{I}$$

$$R = \frac{250}{2}$$

$$R = 125\ \Omega$$

$$R = \frac{V}{I}$$

$$R = \frac{80}{2}$$

$$R = 40\ \Omega$$

$$R_A = 125\ \Omega$$

$$R_B = 40\ \Omega$$

2

C)

i) Resistance = The resistance that is limiting or controlling the current

iv) Doping = Doping is the act of adding impurities to a semi-conductive material to change how it behaves.

Q₂ = 9
(9)

Q.4

a) alternating current is given by $i = 40 \sin 314t$

i) Maximum value of current = 40 ✓

ii) RMS value of current

$$I = I_{rms} = \frac{I_m}{\sqrt{2}} \quad I_{rms} = \frac{V}{X_c} = \frac{V}{X_L} = \frac{V}{R} \quad \checkmark$$

~~ANSWER~~

iii) Frequency (f) or (s)

$$f = \frac{1}{T} \quad \checkmark$$

b) Difference between P-type and N-type.

A P-type semiconductor is a positively charged semi-conductor. Where as an N-type is negative. A P-type semiconductor will be less pure than an N-type.

Q4 - 5 ✓

⑤

a) Q.5 12 V battery internal resistance of ~~12~~ ^{12 Ω}

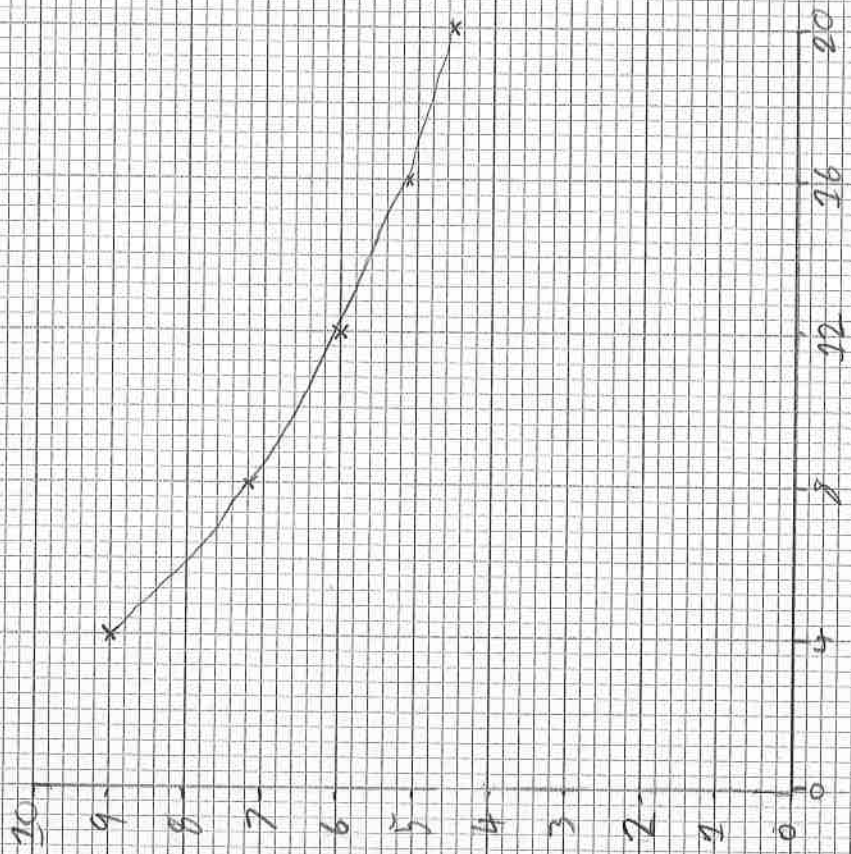
Calculate power dissipated by load resistors in table

Load resistance (Ω)	Load power (W)
4	9
8	7.2
12	6
16	5.1
20	4.5

Watts or power = $\frac{V^2}{R}$

Q5 3
(3)

2.5 b)



9

2

