

Electronics Exam

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Submission date: 14-Jan-2022 12:14PM (UTC+0000)

Submission ID: 168968814

File name: 27271_Ihaab_Mahmoud_Electronics_Exam_395682_1729420115.odt (2.13M)

Word count: 22

Character count: 108

This is the Electronics exam Sent at 10 AM and hopefully this should be more than 20 words.

Q1

a) $V = IR$

$15 = 7 \times 667.2 \Omega$
 $I = 0.0225 A$
 $22.5 mA$

$193.875 \Omega + 180$
 $257.17 \Omega + 410$
 667.17Ω

b) $V = I \times R$

$22.5 mA$

c) $I_{R3} = \frac{193.875}{270 + 193.875} \times 22.5 mA = 9.4 mA$

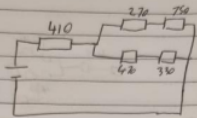
d) $P = I \times V$

$0.0225 A \times 15 = 0.337 W$

e) $P = I \times V$ $R = \frac{V^2}{P}$

$V =$

f)



$$V = I \times R$$

$$15 = I \times 410 + \left(\frac{270 \times 750}{270 + 750} + \frac{420 \times 360}{420 + 360} \right)$$

$$R = 444.3516 \Omega$$

$$I = 0.02676 A \text{ or } 26.8 mA$$

2.

a) $100ms \times 4 = 400ms$

b) $\frac{1}{400} = 0.0025 \text{ or } 2.5 Hz$

c) $500mV \times 2 = 1V$

d) ~~$0.5 \times 0.707 = 0.3535$~~ $0.5 \times 0.707 = 0.354V$

3.

$$a) \quad V_c = 12x(e^{-1040 \times 10^{-5}})$$

$$V_c = 8.044V$$

b)

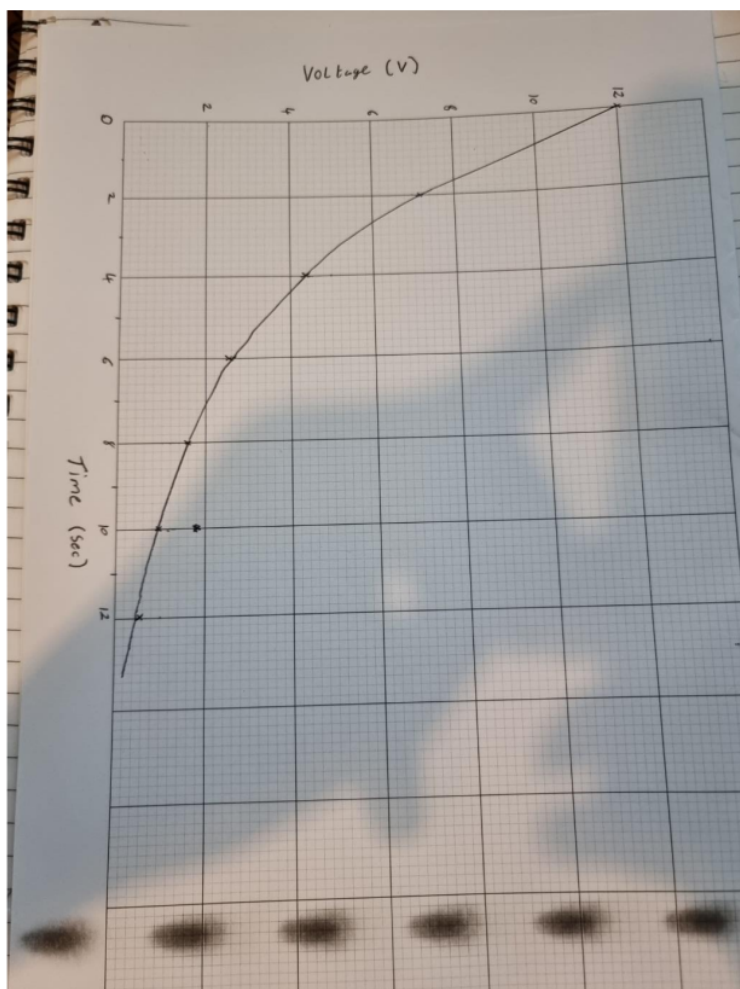
See Graph

c)

$$\frac{Q \times V}{2} \quad Q = CV = 12x$$

$$\frac{10^{-5} \times 12^2}{2} = 0.0072J \quad \text{or} \quad 7.2mJ$$

d)



4)

a)

$$X_L = 2\pi \times 100 \times 200 \text{ mH} = 125.664 \Omega$$

$$X_C = \frac{1}{2\pi \times 100 \times 5 \times 10^{-6}} = 318.310 \Omega$$

$$Z = \sqrt{200^2 + (125 - 318)^2} = 277.691 \Omega$$

b)

$$V = I \times R$$

$$20 = I \times 643.974 \quad I = 31.1 \mu\text{A}$$

c) Voltage lags current by 90°

$$d) \left(\frac{200}{644} \right) \times 20 = 6.211 \text{ V}$$

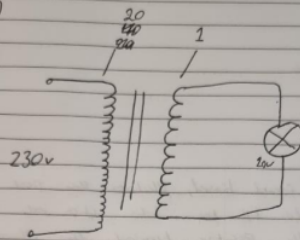
$$e) \left(\frac{318.310}{644} \right) \times 20 = 9.9 \text{ V}$$

$$f) \left(\frac{125.664}{644} \right) \times 20 = 3.9 \text{ V}$$

$$g) \frac{1}{2\pi \sqrt{200 \text{ mH} \times 5 \times 10^{-6}}} = 159.2 \text{ Hz}$$

5)

9)



6)

$$P = 1 \text{ W}$$

$$20 = 7 \times (230 \times \frac{1}{20}) = 1.739 \text{ A}$$

A

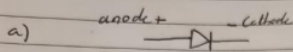
$$R = 1 \text{ k}\Omega$$

C)

$$20 = 7 \times 230$$

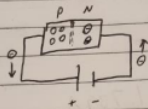
$$I = 0.869 \text{ GA or } 87 \text{ mA}$$

c)

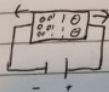


b)

When the diode is forward biased, electrons flow past the depletion region to fill the holes which are then attracted to the positive terminal thus allowing for current to flow. (This reduces the depletion region)



When in Reverse bias, the electrons are attracted to the positive terminal which in turn increases the size of the depletion region, ~~even~~ thus preventing the flow of current.



Electronics Exam

GRADEMARK REPORT

FINAL GRADE

56/100

GENERAL COMMENTS

Instructor

39 Marks out of 70

$39 / 70 \times 100 = 56\%$

Q1 - 10 Marks

a) 4 Marks

b) 2 Marks

c) 0 Mark - incorrect resistor values used

d) 2 Marks

e) 0 Marks

f) 2 Marks - R7 as a wire link would short circuit R4 also

Q2 - 3 Marks

a) 1 Mark

b) 1 Mark

c) 0 Mark

d) 1 Mark (Error carried Forward)

Q3 - 7 Marks

a) 2 Marks - right workings, wrong answer

b) 3 Marks - Wrong values

c) 2 Marks - right workings, wrong answer

d) 0 Marks

Q4 - 4 Marks

a) 2 Marks

b) 0 Mark

c) 0 Mark

d) 0 Mark

e) 0 Mark

f) 0 Mak

g) 2 Marks

Q5 - 6 Marks

a) 2 Marks

b) 2 Marks

c) 2 Marks

Q6 - 9 Marks

a) 2 Marks

b) 7 Marks

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