

Complete, fold and seal
(see note 2 below)

SURNAME: Bernard

FORENAME(S): Matthew James

Instructions to Candidates

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, for the invigilator to see, and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners cannot ignore illegible script or have it typed and the expense of typing charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
8. **Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.**

1	Student Number	1702418
2	Title of Examination Paper	Electrical & Electronic principles
3	Module Code	ACDA 4002
4	Date and Time of Examination	21/05/18 3.00pm
5	Examination Venue	Town hall gym
6	Seat Number	G014
7	Number of Answer Books handed in	1

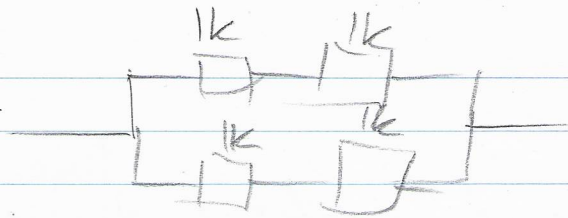
List the numbers of the questions you have attempted	Office Use
1	9
2	~~7~~
3	4
4	4 1/2
Total	24 1/2 / 35

(Gweler yr ochr arall am y fersiwn Cymraeg)

70%

24.5
35

Gang



$$\begin{aligned}
 R_T &= \frac{R_1 \times R_2}{R_1 + R_2} \\
 &= \frac{2k \times 2k}{4k} \\
 &= \frac{4M}{4k} \\
 &= \underline{\underline{1k \Omega}}
 \end{aligned}$$

b)

$$\begin{aligned}
 I_s &= \frac{V_s}{R_T} \\
 &= \frac{50}{1k}
 \end{aligned}$$

$$= \underline{\underline{50mA}}$$

c)

$$P = I^2 R$$

$$= 50m^2 \times 1k$$

$$= \underline{\underline{2.5W}}$$

$$P = VI$$

$$= 50 \times 50m$$

$$= 2.5W$$

ii
a

$$\text{Period} = \text{no. of blocks} \times \text{time per division.}$$

$$\approx 4 \times 10 \text{ ms}$$

$$\approx \underline{\underline{40 \text{ ms}}}$$

①

b

$$F = \frac{1}{T}$$

$$= \frac{1}{40 \text{ ms}}$$

$$= \underline{\underline{25 \text{ Hz}}}$$

①

c

$$\text{Peak to peak} = \text{no. of blocks} \times \text{Volts per division}$$

$$= 4 \times 2$$

$$= \underline{\underline{8 \text{ V}}}$$

①

d

$$\text{R.M.S.} = 0.77 \times \text{Pk to Pk.}$$

$$0.707 \times V_{\text{pk.}}$$

$$= 0.77 \times 8$$

$$= \underline{\underline{6.16 \text{ V}}}$$

①

2
a
i

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

$$R = 250 + 2 \times \pi \times f \times L + \frac{1}{2 \pi \times f \times C}$$

$$R = 250 + 2 \times \pi \times 60 \times 100 \text{m} + \frac{1}{2 \pi \times 60 \times 100 \mu}$$

$$R = 250 + 37.699 \Omega + 26.5265 \Omega$$

$$= 314.225 \Omega$$

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

$$= \frac{120}{314.225}$$

$$= \cancel{3.819 \text{ mA}} \quad \underline{381.892 \text{ mA}}$$

$$V = IR$$

$$= 250 \times \underline{381.892 \text{ mA}}$$

$$= \underline{95.473 \text{ V}}$$

right method
wrong value
for current.

(ii)

$$V = IR$$

$$= 381.892 \text{ m} \times 100 \mu$$

$$= \underline{38.19 \mu\text{V}} \quad \times$$

(iii) ~~(ix)~~

$$V = IR$$

$$= 381.892 \text{ m} \times 100 \text{ m}$$

$$= \underline{38.189 \text{ mV}} \quad \times$$

(b)

~~R~~~~Q~~~~L~~

$$\cancel{2\pi \times F \times 100 \mu\text{H}}$$

$$2\pi \times F \times 100 \mu = 1$$

$$2\pi \times F = \cancel{100 \mu} \quad 10 \text{ k}$$

$$F = \cancel{15.9 \text{ Hz}} \quad 15.7 \text{ kHz}$$

(c)

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

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

$$= \frac{120}{250}$$

$$I = 0.48 \text{ A} \quad \checkmark$$

$$I = \underline{\underline{480 \text{ mA}}}$$



③

$$R_2 \quad I = \frac{V}{R}$$

$$I_1 = \frac{V - 10}{R}$$

$$I = \frac{n}{20} \quad \checkmark$$

$$= \frac{n - 20}{10} \quad \checkmark$$

$$I_2 = \frac{V - 20}{R} \quad \checkmark$$

$$= \frac{n - 20}{10} \quad \checkmark$$

$$0 = \frac{n}{20} + \frac{n - 20}{10} \times 2 + \frac{n - 20}{10} \times 2 \quad \checkmark$$

$$0 = \frac{n}{20} + \frac{2n - 20}{20} + \frac{2n - 40}{20}$$

$$0 = \frac{n + 2n - 20 + 2n - 40}{240}$$

$$\frac{5n - 60}{20}$$

$$\frac{5n}{20} - 3 = 0$$

$$\frac{5n}{20} = 3$$

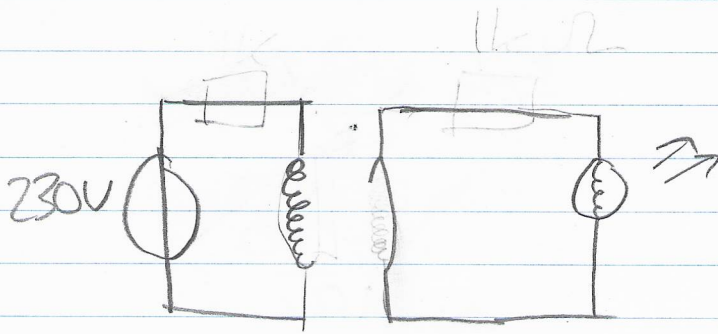
$$5n = 60 \quad \checkmark$$

$$n = \underline{12A} \quad \times$$

$$V_n = 12V$$

④

4
a



1/2

b

$$P = VI$$

$$V = 230 \times \frac{1}{20}$$

$$20 = 11.5 \times I$$

$$\frac{20}{11.5} = I$$

$$I = \underline{\underline{1.739A}}$$

2

c

~~The current will remain the~~

$$P = VI$$

$$30 = 230 \times I$$

$$\frac{30}{230} = I$$

$$\underline{\underline{I = 130.435mA}}$$

$$I = \underline{\underline{86.957mA}}$$

2

$$\cancel{2\pi fL} = \frac{1}{\cancel{2\pi fL}}$$

$$\frac{1}{\cancel{400\mu}} = \frac{1}{\cancel{2\pi fL}}$$

$$\cancel{2\pi fL} \times \cancel{2\pi fL} = 1$$

~~2~~

$$\cancel{2\pi f 100\mu} = \frac{1}{\cancel{2\pi f 100\mu}}$$

~~2x~~

$$\cancel{628.318\mu F} = \frac{1}{\cancel{628.3\mu F}}$$

②
③

$$2\pi fC - \frac{1}{2\pi fC} = 0$$

$$628.18 \text{ mF} - \frac{1}{2\pi 628.18 \mu\text{F}} = 0$$

$$628.18 \text{ mF} = \frac{1}{628.18 \mu\text{F}}$$

$$(628.18 \text{ m} \times \text{F})(628.18 \mu \times \text{F}) = 1$$

6

$$\frac{1}{2\pi fC} = 2\pi fL = 0$$

$$\frac{1}{2\pi fC} = 2\pi fL$$

$$\frac{1}{628.18 \mu\text{F}} = 628.18 \text{ mF}$$

$$\frac{1}{628.18 \mu\text{F}} \div \text{F}$$

$$\frac{1}{628.18 \mu\text{F}} \times \frac{1}{\text{F}} = 628.18 \text{ m}$$

$$\frac{1}{628.18 \mu\text{F}^2} = 628.18 \text{ m}$$

$$\frac{1}{F^2} = 0.0395 \mu$$

$$\frac{1}{0.0395 \mu} = F^2$$

$$F^2 = 2534.147$$

$$F = \underline{\underline{50.34 \text{ Hz}}}$$

