



Examination Answer Books

12 Pages

Instructions to Candidates

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold over and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can either 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.

Complete, fold and seal
(see note 2 below)

SURNAME: Hartou

FORENAME(S): Mohamed

Rabeih

1	Student Number	<u>kn16t74616</u>
2	Title of Examination Paper	<u>Electrical Electronics, & Practical</u>
3	Module Code	<u>GOEE4005</u>
4	Date and Time of Examination	<u>20/05/2024 13:30</u>
5	Examination Venue	<u>UoW Hall</u>
6	Seat Number	<u>14</u>
7	Number of Answer Books handed in	<u>1</u>

List the numbers of the questions you have attempted	Office Use
<u>Q1</u>	<u>15</u> ✓
<u>Q2</u>	<u>23</u> ✓
<u>Q3</u>	<u>14</u> ✓
<u>Q4</u>	<u>0</u> ✓
Total	<u>52/100</u>

52

52%

01

(i) $R_{th} = \frac{1}{\frac{1}{R_3} + \frac{1}{R_4}}$

$\frac{1}{R_3} + \frac{1}{R_4}$

$R_{th} = 4.55 \Omega$

$R_{34} + R_6 = 4.55 + 4.45 = 9 \Omega$

$\frac{1}{R_{346}} + \frac{1}{R_5}$

$\frac{1}{9} + \frac{1}{11}$

$R_{th} = 4.95 \Omega$

(ii) $V = I \times R$

$10A - 2A = 8A$

$V = I \times R_{th}$
 $V = 8 \times 7.05$
 $V = 56.4V$

(iii) $P = I^2 \times R$
 $P = 8^2 \times 7.05$
 $P = 451.2W$

$\frac{1}{R_7} + \frac{1}{R_8}$
 $\frac{1}{3} + \frac{1}{7}$

$R_{78} = 2.1 \Omega$

$R_{th} = R_{3456} + R_{78}$

$R_{th} = 4.95 + 2.1 = 7.05 \Omega$

$R_{945678} = 7.05 \Omega$

(iv) $I_1 = \frac{R_{346}}{R_{946785}}$

$I_1 = \frac{9}{9+11}$

$I_1 = 0.45A$

$I_2 = \frac{R_5}{R_5 + R_{346}}$

$I_2 = \frac{11}{11+9}$

$I_2 = 0.55A$

Q1

15/20

Q2

b)

$$V_{th} = \frac{R_2}{R_1 + R_2} \times V$$

$$\frac{15}{10 + 15} \times 100$$

$$V_{th} = 60V$$

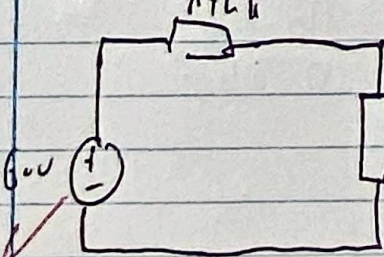
$$R_{th} = \frac{R_1 \times R_2}{R_1 + R_2} + R_3$$

$$\frac{10 \times 15}{10 + 15} + 5$$

$$R_{th} = 11 \Omega$$

iii)

For maximum power transfer for $R_L = R_{th} = 11 \text{ units}$



$$R_L = 11 \text{ units}$$

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

$$I = \frac{60}{22}$$

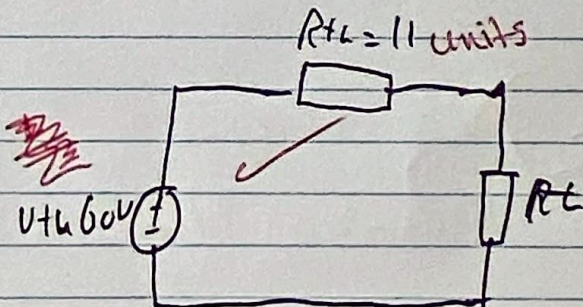
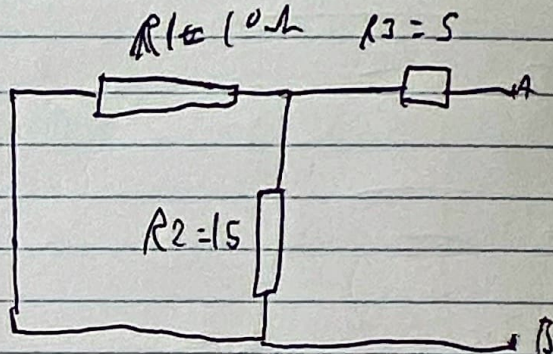
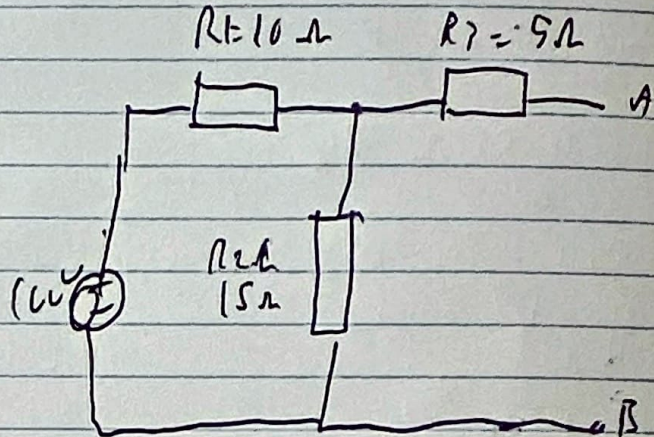
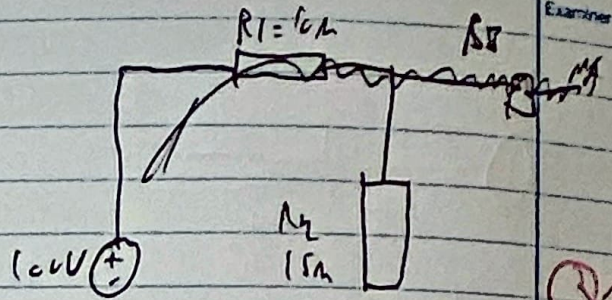
$$I = 2.72A$$

$$P \propto I^2 \times R$$

$$P = 207.22$$

$$P = 162.76$$

units.



Q2
23/30

Q2
10/15

Q2 a |

~~-120 + 30I1~~

-120 + 30I1 + 10(I1 + I2) = 0

-120 + 30I1 + 10I1 + 10I2 = 0

40I1 + 10I2 = 120

5

-60 + 50I2 + 10(I1 + I2) = 0

-60 + 50I2 + 10I1 + I2 = 0

5

10I1 + 60I2 = 60

40I1 + 10I2 = 120

10I1 + 60I2 = 60 x4

40I1 + 10I2 = 120

40I1 + 240I2 = 240

-230 = -120

I2 = 0.52 units?

3

240I1 + 60 = 240

10I1 + 60I2 = 60

$\frac{660}{230} = 2.86$ units

230 = 660

I1 = 2.86 units, I2 = 0.52 I3 = 3.38

I1 + I2 = I3

2.86 + 0.52 = 3.38

units??

Q2a

Q2a

13/15

Q 3

$$i) \quad X_L = 2\pi fL$$

$$X_L = 2\pi \times 50 \times 150 \times 10^{-3}$$

$$X_L = 47.123 \text{ units?} \quad \underline{\underline{2}}$$

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

$$X_C = \frac{1}{2\pi \times 50 \times 100 \times 10^{-6}}$$

$$X_C = 31.830 \text{ units?} \quad \underline{\underline{2}}$$

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

$$Z = \sqrt{8^2 + (47.123 - 31.830)^2}$$

$$Z = 17.25$$

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

$$Z = \sqrt{8^2 + (47.123 - 31.830)^2}$$

$$Z = 17.25$$

$$Z = 17.25$$

units?

$$ii) \quad I = \frac{V}{Z}$$

$$I = \frac{240}{17.25}$$

$$I = 13.91 \text{ A}$$

$$I = 13.91 \text{ A}$$

$$P = I^2 \times R$$

$$P = 13.91^2 \times 8$$

$$P = 1567.9 \text{ W}$$

Q3

14/20

iii

$$Z_{coil} = \sqrt{R^2 + (X_L)^2}$$

$$Z_{coil} = \cancel{40.45} \quad 47.74 \text{ units?}$$

$$V_{coil} = \frac{Z_{coil}}{I}$$

$$V_{coil} = \frac{47.74}{13.91}$$

$$V_{coil} = 3.43$$

$$iV \quad \frac{X_L}{I} = \frac{51.88}{13.91} = 2.28V$$

$$V = \cos^{-1} \frac{R}{Z}$$

$$\cos^{-1} \frac{8}{17.21}$$

$$\phi = 62.79^\circ$$

$$P = I^2 \times R$$

$$P = I^2 \times R$$

$$P = 13.91^2 \times 8$$

$$P = 1547.90W$$