



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

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: Mohamed

FORENAME(S): Ibrahim
Babiker

1	Student Number	MOH19849002
2	Title of Examination Paper	Electrical and electronics Principles
3	Module Code	GOEF4003
4	Date and Time of Examination	22.05.2026 10:00
5	Examination Venue	Main Hall 68860
6	Seat Number	

7	Number of Answer Books handed in	1
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List the numbers of the questions you have attempted	Office Use
Q1	20 ✓
Q2	25 ✓
Q3	13 ✓
Q4	15 ✓
Total	73/100

L2

73%



Q1-Q4
Q1-Q4
Q1-Q4
Q1-Q4

Q1-Q4
Q1-Q4

Q1

$$\textcircled{1} R_{12} = \frac{24 \times 12}{24 + 12} = \underline{8 \Omega} \quad R_{12} = \frac{R_1 \times R_2}{R_1 + R_2}$$

$$R_{123} = 8 + 8 = \underline{16 \Omega} \quad R_{123} = R_{12} + R_3$$

$$R_{45} = 2 + 6 = \underline{8 \Omega}$$

$$R_{(123)(45)} = \frac{16 \times 8}{16 + 8} = \underline{5.33 \Omega}$$

$$R_T = 10 + 5.33 = \underline{15.33 \Omega}$$

$$\textcircled{2} I_T = \frac{V}{R_T} = \frac{20}{15.33} = \underline{1.3 \text{ A}}$$

$$\textcircled{3} P = I_T^2 R_T = 1.3^2 \times 15.33 = \underline{25.91 \text{ W}}$$

$$\textcircled{4} V_{R_{10}} = I_T R_T = 1.3 \times 10 = \underline{13 \text{ V}}$$

$$\textcircled{5} V_{R_{(12345)}} = I_T \times R_{(12345)} = 1.3 \times 5.33 = \underline{6.99 \text{ V}}$$

$$\textcircled{6} I = \frac{V_{\text{source}}}{R}$$

$$\textcircled{7} I_{(46)} = \frac{R_{123}}{R_{(46)} + R_{123}} \times 1.3 = \left(\frac{16}{16 + 8} \right) 1.3 = \underline{0.87 \text{ A}}$$

$$I_{R_{12}} = \underline{0.87 \text{ A}}$$

$$\textcircled{8} V_{R_{6\Omega}} = I \times R = 0.87 \times 6 = \underline{5.22 \text{ V}}$$

$$\textcircled{9} V_{R_{8\Omega}} = R \times I \quad I = I_T - I_{R_{45}} \quad 1.3 - 0.87 = \underline{0.43 \text{ A}}$$

$$V_{8\Omega} = 8 \times 0.43 = \underline{3.44 \text{ V}}$$

$$\textcircled{10} I_{(24)} = \left(\frac{12}{12 + 24} \right) 0.43 = \underline{0.143 \text{ A}}$$

Q1

20/20

Q1a

16/16

①

$$I_{12} = 4A$$

$$I_{12} = \left(\frac{2}{1+2}\right) I_T \quad 4 = \frac{2}{3} \times I_T$$

$$I_T = \frac{4 \times 3}{2} = \underline{\underline{6A}}$$

$$R_{12} = \frac{1 \times 2}{1+2} = 0.67 \Omega$$

$$R_T = 0.5 + 0.67 + 2 = 3.17 \Omega$$

$$V = R_T I_T = 6 \times 3.17 = \underline{\underline{19.02V}}$$

Q114/4

Q2

$$-96 + 4I_1 + 12(I_1 + I_2) = 0$$

$$-96 + 4I_1 + 12I_1 + 12I_2 = 0$$

$$16I_1 + 12I_2 = 96$$

$$4I_1 + 3I_2 = 24 \quad \text{--- (1)}$$

$$-32 + 8I_2 + 12(I_1 + I_2) = 0$$

$$-32 + 8I_2 + 12I_1 + 12I_2 = 0$$

$$20I_2 + 12I_1 = 32 \quad \text{--- (2)}$$

~~$$5I_2 + 3I_1 = 8$$~~

x 4

~~(2)~~

$$4I_1 + 3I_2 = 24$$

x 3

--- (1)

$$12I_1 + 20I_2 = 32$$

$$12I_1 + 9I_2 = 72$$

$$0 + 11I_2 = -40$$

$$I_2 = \frac{-40}{11} = \underline{\underline{-3.64 \text{ A}}}$$

$$I_2 = \underline{\underline{-3.64 \text{ A}}}$$

$$20(-3.64) + 12I_1 = 32$$

$$-72.8 + 12I_1 = 32$$

$$12I_1 = 32 + 72.8 =$$

$$I_1 = \underline{\underline{8.73 \text{ A}}}$$

Q₂

$$-96 + 4I_1 + 12(I_1 + I_2) + 4I_1 = 0$$

$$-96 + 4I_1 + 12I_1 + 12I_2 + 4I_1 = 0$$

$$20I_1 + 12I_2 = 96 \quad \text{--- (1)}$$

$$-32 + 8I_2 + 12(I_1 + I_2) + 8I_2 = 0$$

$$-32 + 8I_2 + 12I_1 + 12I_2 + 8I_2 = 0$$

$$28I_2 + 12I_1 = 32 \quad \text{--- (2)}$$

$$20I_1 + 12I_2 = 96 \rightarrow 5I_1 + 3I_2 = 24 \quad \times 3$$

$$12I_1 + 28I_2 = 32 \rightarrow 3I_1 + 7I_2 = 8 \quad \times 5$$

18

$$15I_1 + 9I_2 = 72$$

$$15I_1 + 35I_2 = 40 \quad \text{---}$$

$$-26I_2 = +32$$

$$I_2 = -1.23 \text{ A}$$

$$20I_1 + 12(-1.23) = 96$$

$$20I_1 = 96 + 14.76$$

$$20I_1 = 110.76$$

$$I_1 = 5.54 \text{ A}$$

$$I_{122} = 5.54 - 1.23 = 4.31 \text{ A}$$

$$P = I^2 R = 4.31^2 \times 2 = 37.22 \text{ W}$$

Q₂25/30Q_{2a}14/15

Q2b11/15

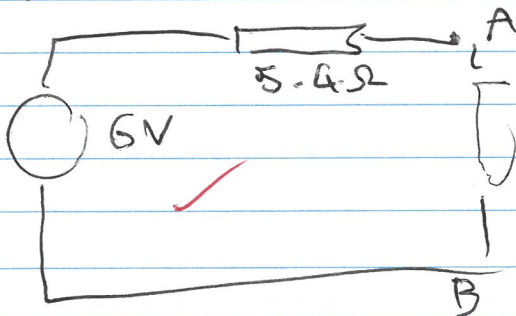
b)

$$R_{12} = \frac{8 \times 8}{8 + 8} = 4 \Omega \quad \checkmark$$

$$V_{th} = \frac{10 \times 6}{10 + 6} = V_s \quad \checkmark$$

$$V_{th} = \left(\frac{6}{6 + 4} \right) \times 6 = 2.4 \text{ V} \quad \checkmark \quad 6.11$$

$$R_{th} = \frac{6 \times 4}{6 + 4} + 3 = 5.4 \Omega \quad \checkmark$$



② $R_{mx} = R_{th} \quad \text{max } P_o$

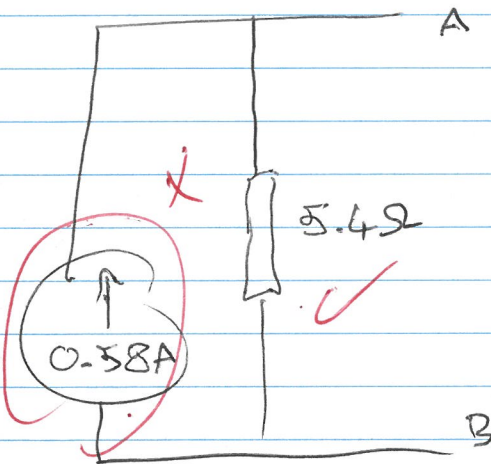
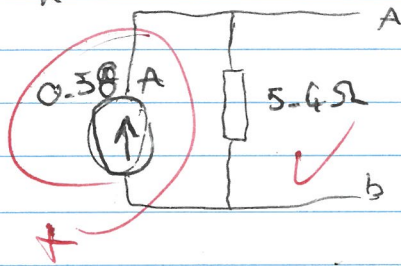
$R_L = \underline{5.4 \Omega}$

$P_{AB} \quad I = \frac{V_{th}}{R_{th}} = \frac{6}{10.8} = \underline{0.58 A} \quad \frac{6}{5.4} = 1.1 A$

③ $R_{max} = I^2 R_{th} = 1.1^2 \times 5.4 = 1.81 W$

$P = I^2 R = 1.1^2 \times 5.4 = \underline{6.53 W}$

④ $R_n = R_{th} = 5.4 \Omega$ $I = \frac{V_{th}}{R_{th}} = \frac{6}{10.8} = 0.58 A$



Q3

Q3

13/20

$$① \quad X_L = 2\pi fL = 2\pi \times 50 \times 32 \times 10^{-3} = 10.5 \Omega$$

$$X_C = \frac{1}{2\pi fC} = \frac{1}{2\pi \times 50 \times 10^{-6} \times 800} = 3.99 \Omega$$

$$Z = \sqrt{R^2 + (X_L - X_C)^2} = \sqrt{8^2 + (10.5 - 3.99)^2} = 10.31 \Omega$$

$$② \quad I = \frac{V}{Z} = \frac{200}{10.31} = 19.4 \text{ A}$$

$$③ \quad V_R = IR = 19.4 \times 8 = 155.2 \text{ V}$$

$$V_{X_L} = I X_L = 19.4 \times 10.5 = 203.7 \text{ V}$$

$$V_C = I X_C = 3.99 \times 19.4 = 77.41 \text{ V}$$

$$④ \quad \theta = \cos^{-1} \frac{R}{Z} = \frac{8}{10.31} = 39.11^\circ$$

$$⑤ \quad I \frac{V}{Z} = \frac{200}{100} = 2 \text{ A}$$

6 Capacitive because Capacitor after charge the circuit will be open circuit



Question No.

Examiner Only

Arholwr yn unig

Rhif y Cwestiwn

Q4

$$\textcircled{1} V_E = I_C R = 2 \times 10^{-3} \times 1500 = \underline{\underline{3V}} \quad \underline{\underline{2}}$$

$$\textcircled{2} V_D = V_E + 0.7 = 3 + 0.7 = \underline{\underline{3.7V}} \quad \underline{\underline{2}}$$

$$\textcircled{3} V_{R_1} \quad V_{R_2} \quad V_{CC} \quad V_{R_2} = \frac{V_D}{\beta} = \quad \underline{\underline{0}}$$

Q4

15/30

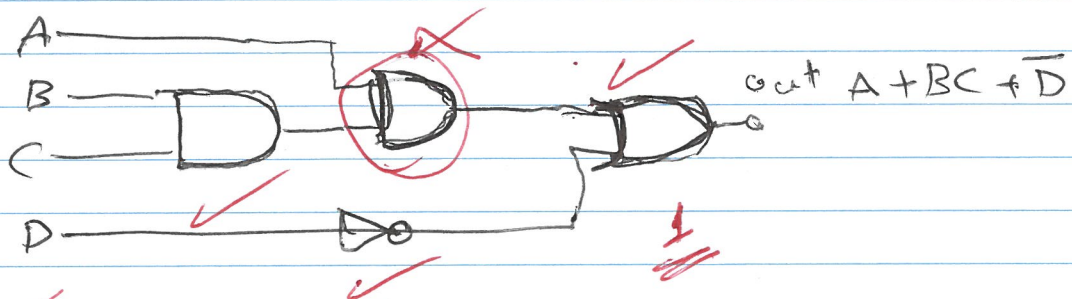
Q40

4/12

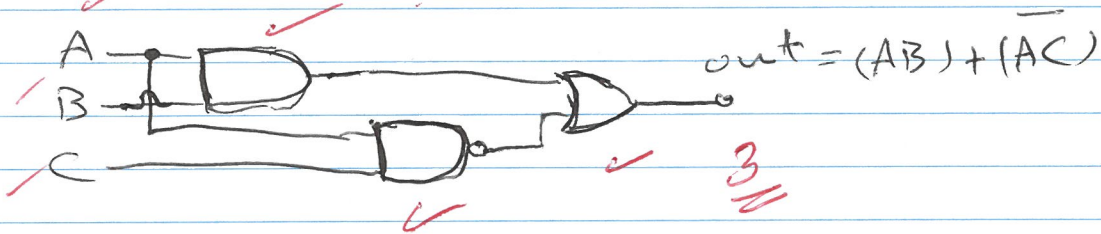
$$\textcircled{6} V_C =$$

(b)

(1)

Q4b4/6

(2)



(c)

$$(1) Y = (\overline{A+B}) \cdot (\overline{C}) \cdot (C+D)$$

✓ ✓ ✓ 3Q4c5/6

$$(2) Y = \overline{(AB) + (A+B)} = ? ? \underline{2}$$

(d)

$$Y = \overline{(\overline{A+B})(\overline{B}+C)}$$

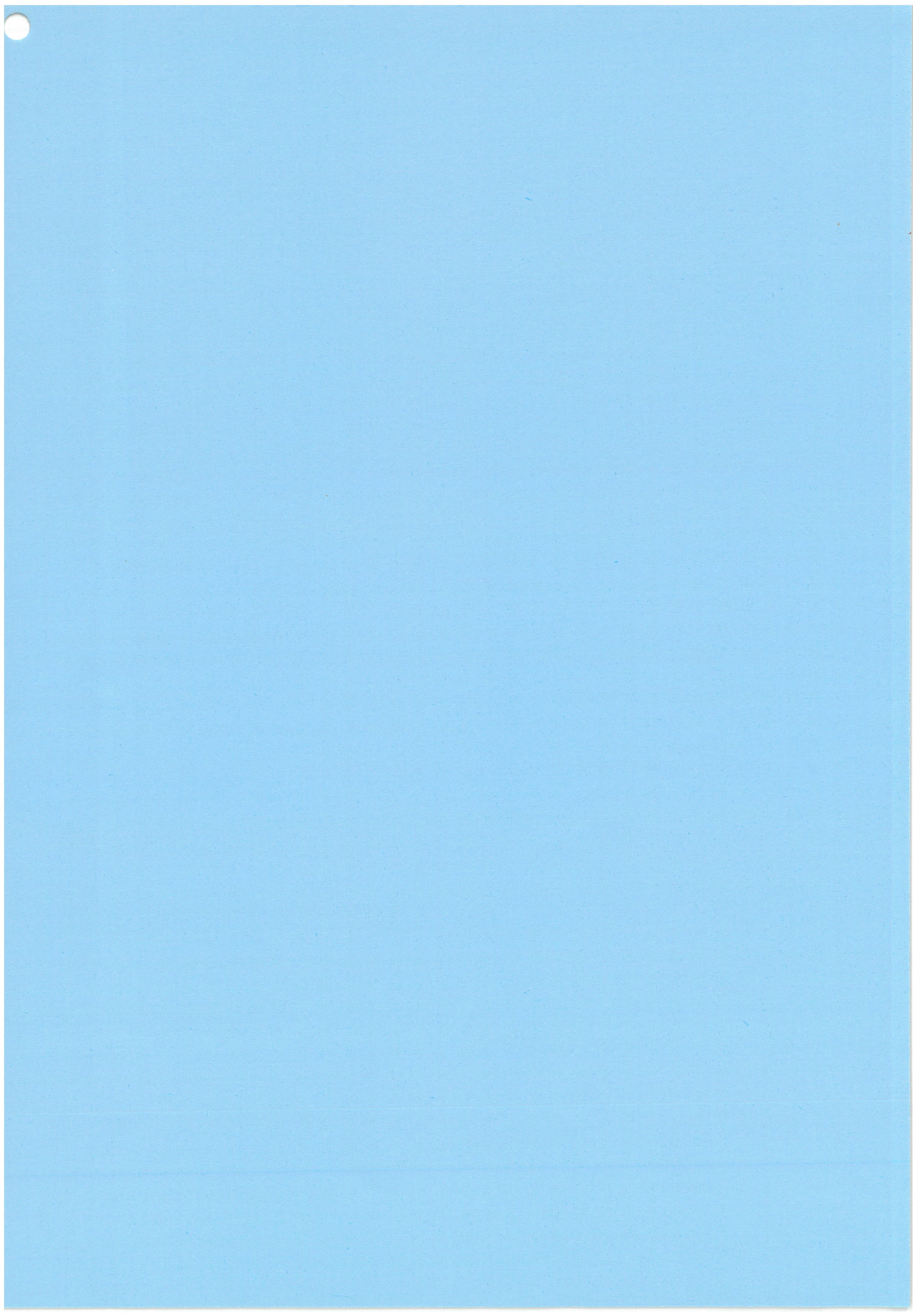
$$Y = \overline{(\overline{A+B}) + (\overline{B}+C)} \quad \checkmark$$

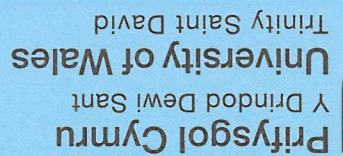
$$Y = (A+B) + (\overline{\overline{B}} + \overline{C}) \quad \checkmark$$

$$Y = (A+B) + (B + \overline{C})$$

X

Q4d2/6





Cyfarwyddiadau i Ymgeiswyr

1. Rhwch yr holl wybodaeth y gofynnir amdani yn y blychau isod.
2. Rhwch eich enw yn lle a ddarparwyd ar y dde, plynwch et a'i selio i lawr (gan ddefnyddio'r label a ddarparwyd) i guddio'ch enw.

3. Rhaid i'r atebion fod mewn llawysgrifen ddarllenadwy. Gall yr Arholwyr naill ai anwybyddu sgrïpt annarllenadwy, neu drefnu iddi gael ei theipio a chael yr ymgeisydd i dalu.

4. Ysgrifennwch eich atebion mewn inc.

5. Dechreuwch bob ateb ar dudalen newydd. Gwnewch unrhyw fras nodiadau yn y llyfr atebion a thynnu llinell drwyddynt.
6. Ni ddylid rhwygo unrhyw ran o'r llyfr hwn; rhaid ei gyflwyno yn gyfan.
7. Os defnyddir mwy nag un llyfr, rhwymwch hwy gyda'i gilydd gan ddefnyddio'r tagiau sydd ar gael oddi wrth y gwyllyllwrgwyllyfr.

8. Rhaid dychwelyd pob llyfr. Ni chaniad arholi o dan unrhyw amgylchiadau.

7	Nifer y Llyfrau Atebion a gyflwynwyd	
6	Rhif Sedd	
5	Lleoliad yr Arholiad	
4	Dyddiad ac Amser yr Archoliad	
3	Cod y Modwl	
2	Teitl y Papur Arholiad	
1	Rhif Myfyriwr	

[illegible]

(See the other side for English version)

Llenwch, plygwh a seliwh
(gweler nodyn 2 isod)

CYFENN:

ENW(AU) CYNTAF:

ENW(AU) CYNTAF: