



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:

Wright

FORENAME(S):

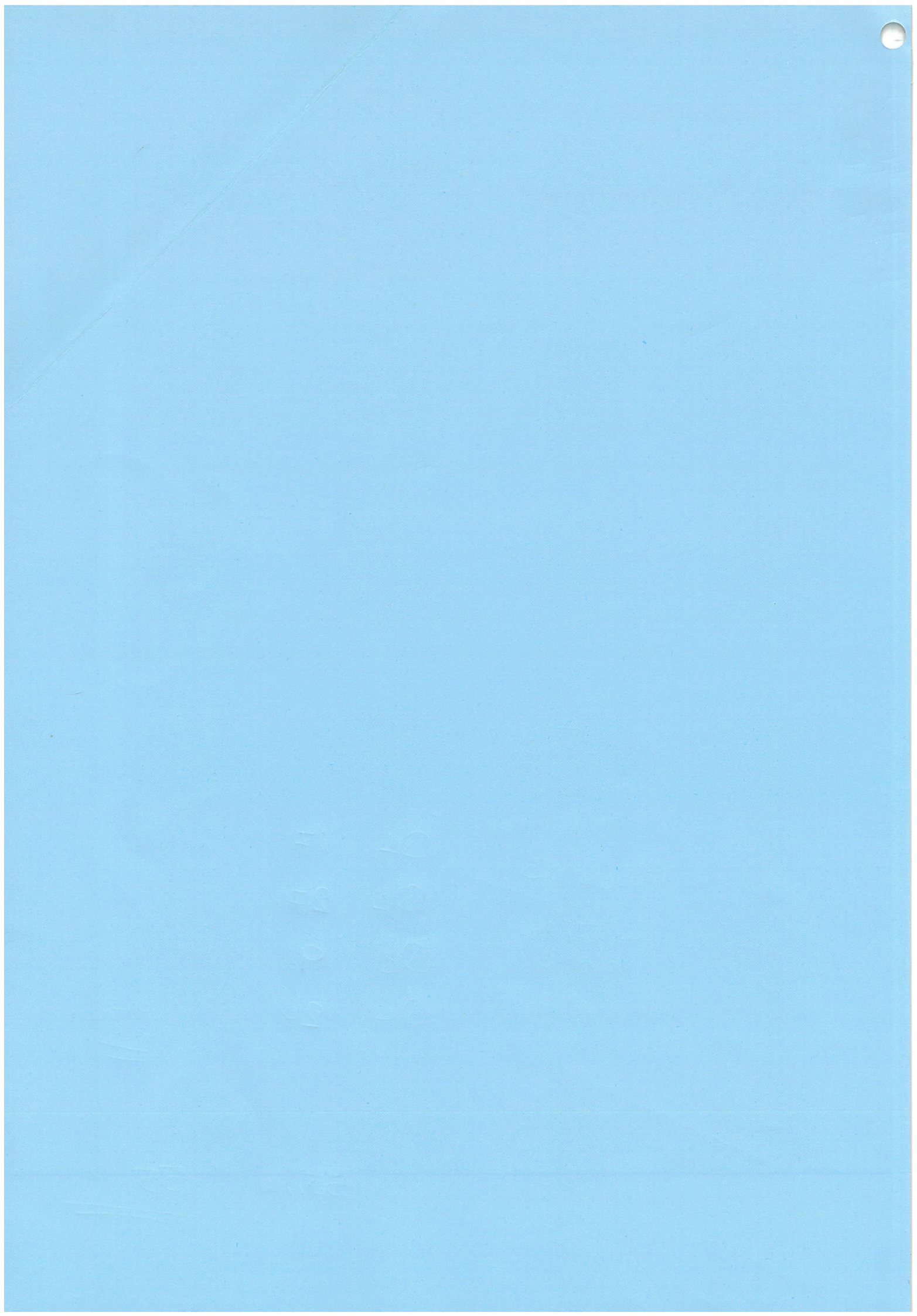
Levi

1	Student Number	WR125892500
2	Title of Examination Paper	Electrical & Electronic Principles
3	Module Code	GOEE4003
4	Date and Time of Examination	22/05/26 16.00am
5	Examination Venue	main hall
6	Seat Number	
7	Number of Answer Books handed in	1

List the numbers of the questions you have attempted	Office Use
Q1	17 ✓
Q2	27 ✓
Q3	9 ✓
Q4	2 ✓
Total	55/100

(Gweler yr ochr arall am y fersiwn Cymraeg)

12
55%



Q1

$$1) R_{eq} = R_{123456}$$

$$R_{12} = \frac{R_1 \times R_2}{R_1 + R_2}$$

$$R_{12} = \frac{24 \times 12}{36}$$

$$R_{12} = 8 \Omega$$

$$R_{123} = R_{12} + R_3$$

$$R_{123} = 8 + 8$$

$$R_{123} = 16 \Omega$$

$$R_{45} = R_4 + R_5$$

$$R_{45} = 2 + 6$$

$$R_{45} = 8 \Omega$$

$$R_{12345} = \frac{R_{123} \times R_{45}}{R_{123} + R_{45}}$$

$$R_{12345} = \frac{16 \times 8}{24}$$

$$R_{12345} = 5.3 \Omega$$

$$R_{123456} = R_{12345} + R_6$$

$$R_{123456} = 5.3 + 10 \Omega$$

$$R_{eq} = 15.3 \Omega$$

$$2) I = \frac{V}{R}$$

$$I = \frac{20}{15.3}$$

$$I = 1.307 A$$

$$3) P = I^2 R$$

$$P = 1.307^2 (15.3)$$

$$P = 26.136 W$$

$$4) V = IR$$

$$V = 1.307 (10)$$

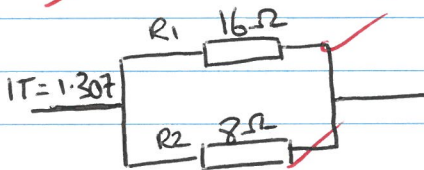
$$V = 13.07 V$$

$$5) V_{ab} = IR_{12345}$$

$$V_{ab} = 1.307 (5.3)$$

$$V_{ab} = 6.927 V$$

$$6) I_{R2} =$$



$$I_{R2} = \frac{16}{24} (1.307) = 0.871 A$$

$$= \frac{R_1}{R_1 + R_2} (I_T)$$

$$7) V_{R5} = I_{R5} R_5$$

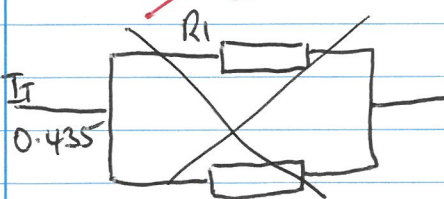
$$V_{R5} = 0.871 (6)$$

$$V_{R5} = 5.226 V$$

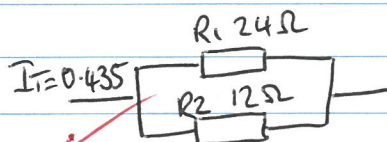
$$8) V_{R3} = I_{R3} R_3$$

$$V_{R3} = 0.435 (8)$$

$$V_{R3} = 3.48 V$$



$$9) I_{R1} =$$



$$I_{R1} = \frac{R_2}{R_1 + R_2} (I_T)$$

$$I_{R1} = \frac{12}{36} (0.435)$$

$$I_{R1} = 0.145 A$$

Q1

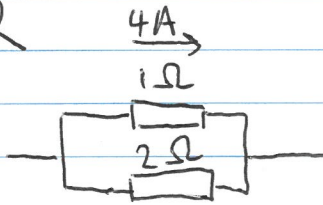
17/20

Q1a

16/16

$$b) V = IR$$

$$I =$$



$$R_{eq} = \frac{1 \times 2}{1 + 2} + 0.5 + 2$$

$$R_{eq} = \frac{2}{3} + 0.5 + 2 = 3.16\Omega$$

$$V =$$

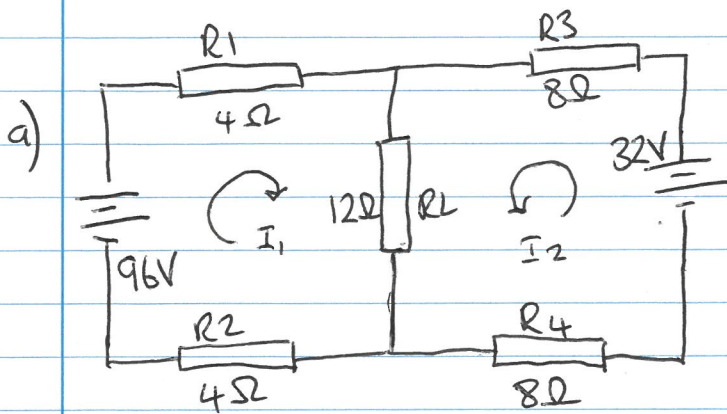
$$R = 3.16\Omega$$

$$I = ??$$

Q11

2/4

Q2

Q227/30Q2a14/15

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

$$-96 + 8I_1 + 12(I_1 + I_2) = 0$$

$$-96 + 20I_1 + 12I_2 = 0$$

$$20I_1 + 12I_2 = 96$$

$$10I_1 + 6I_2 = 48$$

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

$$-32 + 16I_2 + 12(I_1 + I_2) = 0$$

$$-32 + 28I_2 + 12I_1 = 0$$

$$28I_2 + 12I_1 = 32$$

$$7I_2 + 3I_1 = 8$$

$$10I_1 + 6I_2 = 48$$

$$3I_1 + 7I_2 = 8$$

$$30I_1 + 18I_2 = 144$$

$$30I_1 + 70I_2 = 80$$

$$18 - 70 = -52I_2$$

$$144 - 80 = 64$$

$$I_2 = \frac{64}{-52}$$

$$I_2 = -1.230A$$

$$10I_1 - 7.38 = 48$$

$$48 - 7.38 = 10I_1$$

$$48 - 7.38 = 40.62$$

$$10I_1 = 40.62$$

$$I_1 = \frac{40.62}{10}$$

$$I_1 = 4.062A$$

$$I_1 + I_2 = I_3$$

$$4.062 - 1.230 = 2.832A$$

Correct method E.C.F

$$P = I^2 R_L$$

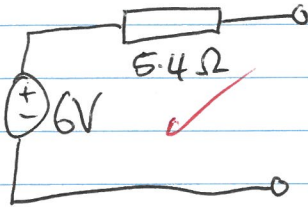
$$P = 2.832^2 (12) = 96.242W$$

E.C.F
Correct method.

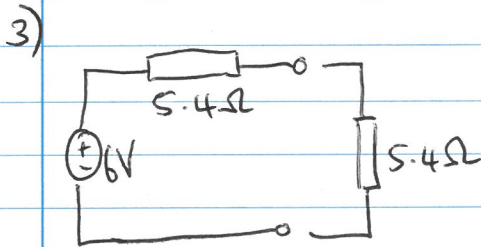
$$b) R_{12} = \frac{R_1 \times R_2}{R_1 + R_2} \quad R_{12} = \frac{8 \times 8}{8 + 8} \quad R_{12} = \frac{64}{16} \quad R_{12} = 4 \Omega$$

$$V_{TH} = \frac{R_3}{R_{12} + R_3} (10) \quad V_{TH} = \frac{6}{10} (10) \quad \underline{V_{TH} = 6V}$$

$$R_{TH} = \frac{R_{12} \times R_3}{R_{12} + R_3} + R_4 \quad R_{TH} = \frac{4 \times 6}{10} + 3 \quad \underline{R_{TH} = 5.4 \Omega}$$



$$2) R_{TH} = R_L \quad \underline{R_L = 5.4 \Omega}$$

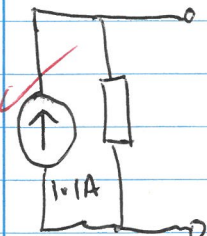


$$P = I^2 R_L \quad P = (1.1)^2 (5.4)$$

$$\underline{P = 6.534 W}$$

$$4) R_N = R_{TH} \quad I_N = \frac{V_{TH}}{R_{TH}}$$

$$R_N = 5.4 \Omega \quad I_N = \frac{6}{5.4} = 1.1 A$$



Q2b

13/15

Q3

Q3

$$1) X_C = \frac{1}{2\pi fC} \quad X_L = 2\pi fL$$

$$X_C = \frac{1}{2\pi(50)(800 \times 10^{-6})} \quad X_L = 2\pi(50)(32 \times 10^{-3})$$

$$X_C = 3.978 \Omega \quad X_L = 10.053 \Omega$$

$$Z = \sqrt{R^2 + (X_L - X_C)^2} \quad Z = \sqrt{8^2 + (10.053 - 3.978)^2}$$

$$Z = 10.045 \Omega$$

$$2) I = \frac{V}{Z} \quad I = \frac{200}{10.045} \quad I = 19.910 A$$

$$3) V_{R1} = IR_1 \quad V_{R1} = 19.910(8) \quad V_{R1} = 159.28 V$$

$$V_{L1} = I X_L \quad V_{L1} = 19.910(10.053)$$

$$V_L = I R = ?$$

$$159.28 V$$

$$\frac{159.28 V}{10.053} = 15.844 A$$

$$V_L = I_L R_L = 15.844(10.053) = 159.279 V$$

9/20

Q4

Q4

$$1) V_E = I_E R_E$$

$$I_E = I_C \quad I_C = 2 \text{ mA} \quad V_E = 2 \times 10^{-3} (1500)$$

$$V_E = 3 \text{ V}$$

2/30

$$2) V_B = V_{CC} - V_{BE} \quad V_B = 20 - 0.7 \text{ V} = 19.3 \text{ V}$$

$$4) \frac{20}{15000} = 1.333 \text{ mA} \leftarrow I_2 = \frac{V_{CC}}{R_2}$$

Q4a

$$5) R_1 = \frac{V}{I_{R1}} = \frac{20}{1.333 \times 10^{-3}} = R_1 = 15 \text{ k}\Omega$$

2/12

$$3) V_{R1} = I_{R1} R_1 \quad V_{R1} = 1.333 (15000)$$

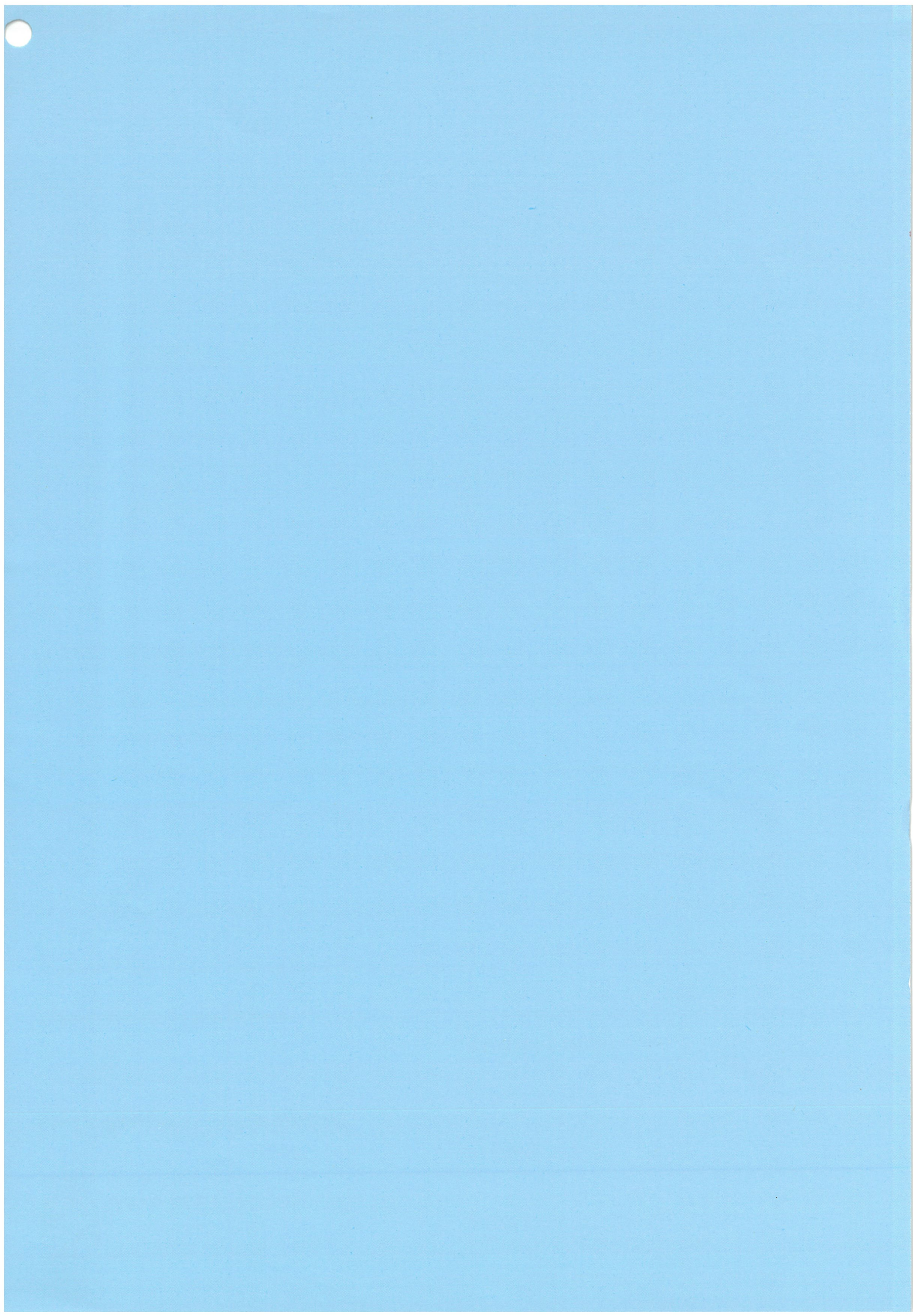
$$6) V_C = V_{CC} - I_C R_C \quad V_C = 20 - (2 \times 10^{-3} (10 \text{ k}))$$

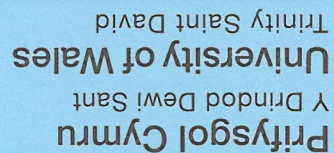
$$7) R_C = \frac{V_{CC}}{I_C} \quad R_C = \frac{20}{2 \times 10^{-3}} \quad R_C = 10 \text{ k}\Omega$$

$$I_{R1} = \frac{V_{R1}}{R_1} \quad I_{R1} =$$

$$V_{R1} = I$$

Q4bQ4cQ4d





Cyfarwyddiadau i Ymgeiswyr

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

3. Rhaid i'r atebion fod mewn llawysgriflen ddarlennadwy. Gall yr Arholwyr naill ai anwybyddu sgript annarllennadwy, neu drefnu iddi gael ei theipio a chael yr ymgeisydd i dalu.

4. Ysgriftennwyd eich atebion mewn inc.
5. Dechreuwyd 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 gwyllwyr/gwylwyr.
8. Rhaid dychwelyd pob llyfr. Ni chaniateir mynd â llyfrau atebion, wedi eu defnyddio neu heb eu defnyddio, allan o'r lleoliad arholi o dan unrhyw amgylchiadau.

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

[illegible]

(See the other side for English version)

Llenwch, plygwch a seilwch
(gweler nodyn 2 isod)

CYFENN:

ENW(AU) CYN TAF:

ENW(AU) CYNTAF: