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: White

FORENAME(S): Kai

1	Student Number	2221114
2	Title of Examination Paper	Electronics I
3	Module Code	SCEE4003
4	Date and Time of Examination	15/5/23 9.30 - 11.30
5	Examination Venue	
6	Seat Number	33
7	Number of Answer Books handed in	

List the numbers of the questions you have attempted	Office Use
A	12
B2	2.
B3.	21½.
Total	35½

36 - Mark Confirmed

(Gweler yr ochr arall am y fersiwn Cymraeg)

(See the other side for English version)

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Llyfr Atebion Arholiadau

12 Tudalen

Cyfarwyddiadau i Ymgeiswyr

1. Rhowch yr holl wybodaeth y gofynnir amdani yn y bylchau isod.
2. Rhowch eich enw yn y lle a ddarparwyd ar y dde, plygwch ef 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 sgript annarllenadwy, neu drefnu iddi gael ei theipio a chael yr ymgeisydd i dalu.
4. Ysgrifennwch eich atebion mewn inc.
5. Dechreuwch bob ateb ar ddalen 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 gwylwyr/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.**

CYFENW:

ENW(AU) CYNTAF:

Llenwch, plygwch a selwch
(gweler nodyn 2 isod)

1	Rhif Mynfynwr	
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	

Rhestrwch rifau'r cwestiynau a ymgeisiwyd genynch	At Ddibenion y Swyddfa
Cyfanswm	

Question No. | Examiner Only

A2. $R_S = \frac{V_S - V_D}{I_F}$

$= \frac{6 - 2.2}{8 \times 10^{-3}}$

$= -475\ \Omega$ ✓ (3)

A3. $\beta \times I_B = I_C$

$90 \times 30 \times 10^{-6} = 2.7 \times 10^{-3}$ A ✓

$I_E = I_B + I_C$

$= 30 \times 10^{-6} + 2.7 \times 10^{-3}$

2.73×10^{-3} A ✓ (4)

A5. $A_V = -\frac{R_{FB}}{R_S}$

$= -\frac{30000}{1500}$

$= -20$ ✓ (3)

A7. $f_c = \frac{1}{2\pi f_F C}$ ✓

$= \frac{1}{2 \times \pi \times 100000 \times 0.033 \times 10^{-6}}$ ✓

$= 20.7 \times 10^{-3}$ A ✗ (2)

Arholwr yn unig | Rhif y Cwestiwn

12

Question No.

Examiner Only

A9.

CD \ AB	00	01	11	10
00	k			1
01				
11			1	
10				

B2

a) Increased bandwidth
Increased voltage
Less buffer ✗

0

c) ~~$A_V = \frac{R_A \| R_B}{R_S} V_{in} - \frac{R_F}{R_S} = V_{out}$~~

$$V_{out} = \left(\frac{-R_F}{R_S}\right) \times V_{in}$$

$$\boxed{-48.958V} = \left(\frac{-470{,}000}{2{,}400}\right) \times 250\times10^{-3} \text{ ✗}$$

0

Athrawr yn unig

Rhif y Cwestiwn

Question No.

Examiner Only

e) $f_{max} = \frac{\text{Slew rate}}{2\pi \times V_{pk}}$

$= \frac{1\text{M} \times 10^{6}}{2\pi \times 200\times10^{-3}}$

$= 795.775$ nHz

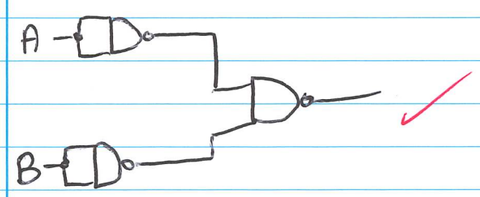
2

B3

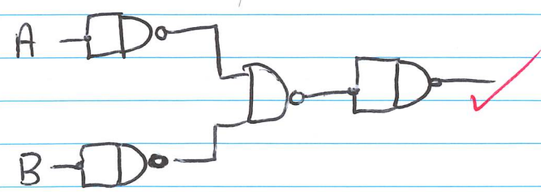
a) i) A — A ✓

ii) A, B — ✓

iii)



iv)



4

B2 - 2
B3 - 4

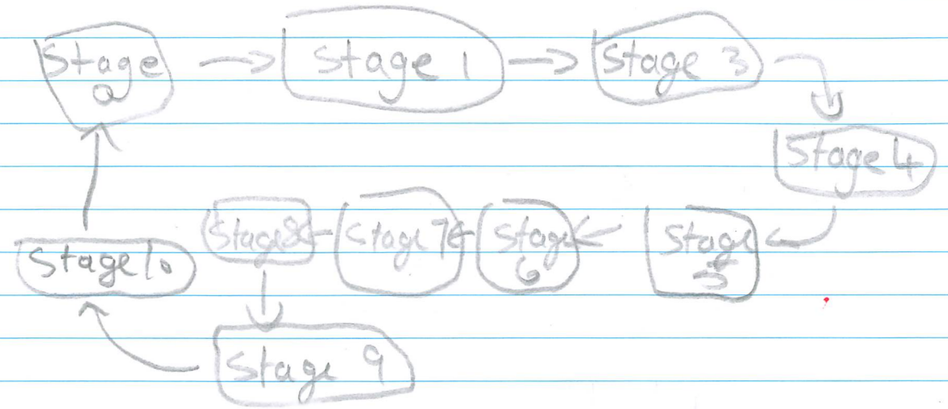
Athrawr yn unig

Rhif y Cwestiwn

Question No.

b) a → flipped
b → Same
c → Off
D → No comment

c)



current	Next	Current				Next				output			
		Q_A	Q_B	Q_C	Q_D	Q_{A+}	Q_{B+}	Q_{C+}	Q_{D+}	W	X	Y	Z
St 0	St 1	0	0	0	1	0	0	1	0	0	0	0	1
St 1	St 2	0	0	1	0	0	0	1	1	0	0	1	0
St2	St 3	0	0	1	1	0	1	0	0	0	0	1	1
St 3	St 4	0	1	0	0	0	1	0	1	0	1	0	0
St 4	St 5	0	1	0	1	0	1	1	0	0	1	0	1
St 5	St 6	0	1	1	0	0	1	1	1	0	1	1	0
St 6	St 7	0	1	1	1	1	0	0	0	0	1	1	1
St 7	St 8	1	0	0	0	1	0	0	1	1	0	0	0
St 8	St 9	1	0	0	1	1	0	1	0	1	0	0	1
St 9	St 10	1	0	1	0	1	0	1	1	1	0	1	0
St 10	St 0	1	0	1	1	0	0	0	1	1	0	1	1

Examiner Only

0

1/2

3

3 1/2

Question No.

Q_{A+}

AB \ CD	00	10	11	10
00	0	0	0	0
10	0	0	1	1
11	X	X	X	X
01	1	1	X	0

$\overline{B}\overline{D} + \overline{B}D + AC$ ✓ CE.

Q_{B+}

AB \ CD	00	01	11	10
00	0	0	1	1
01	1	1	0	0
11	X	X	X	X
10	0	0	X	0

$A\overline{C}\overline{D} + \overline{A}\overline{C}D$ ✓ CE

Q_{C+}

AB \ CD	00	01	11	10
00	1	1	0	0
01	1	1	0	0
11	X	X	X	X
10	1	1	X	0

$\overline{A}\cdot\overline{C} + \overline{A}C\overline{D}$ ✓ CE

Q_{D+}

AB \ CD	00	01	11	10
00	0	1	1	0
01	0	1	1	0
11	X	X	X	X
10	0	1	X	1

$B\overline{A} + B$
$B + AC$ ✓ CE.

8

8

Arholwr yn unig

Rhif y Cwestiwn

Question No.

Examiner Only

Question No.

Examiner Only

W	AB 00	01	11	10
00	0	0	0	0
01	0	0	1	0
11	x	x	x	x
10	1	1	x	1

$C + ABD$ ✓

X	00	01	11	10
00	0	0	1	0
01	1	1	0	1
11	x	x	x	x
10	0	0	x	0

$\bar{A}D + AB\bar{D} + A\bar{B}D$ ✓

Y	00	01	11	10
00	0	1	0	1
01	0	1	0	1
11	x	x	x	x
10	0	1	x	1

$\bar{A}B\bar{C} + BC + A\bar{B}\bar{C} + A\bar{B}C$ ✗

Z	00	01	11	10
00	1	0	0	1
01	1	0	0	1
11	x	x	x	x
10	1	0	x	1

$\bar{B}$ ✓

6

6

Arholwr yn unig

Rhif y Cwestiwn

Arholwr yn unig

Rhif y Cwestiwn