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

Llyfr Atebion Arholiadau

12 Tudalen

Cyfarwyddiadau i Ymgeiswyr

1. Rhowch yr holl wybodaeth y gofynnir amdani yn y blychau 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 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 gwyliwr/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	

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

(See the other side for English version)

Llenwch, plygwch a seliwch
(gweler nodyn 2 isod)

CYFENW: _____

_____

ENW(AU) CYNTAF: _____

_____

_____

(Gweler yr ochr arall am y fersiwn Cymraeg)

7	Number of Answer Books handed in	
6	Seat Number	
5	Examination Venue	Coleg Sir Gâr CG43
4	Date and Time of Examination	7/5/24 9.30
3	Module Code	SCFE 5000
2	Title of Examination Paper	Electronics II
1	Student Number	

List the numbers of the questions you have attempted	Office Use
A	47
82	18
83	4
Total	49/72

8. **Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.**

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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

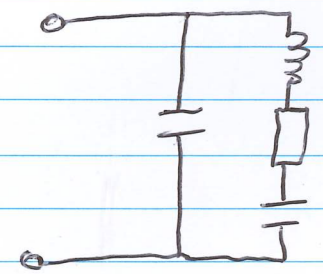
_____

FORENAME(S): Kai

_____

_____

_____

Question No.		Examiner Only
1		
a)	$20 \log(220) = 46.85$ dB ✓2	4
b)	$10 \log(2500) = 33.98$ dB ✓2	
2	$\frac{55}{\text{antilog}(4.5)} = 1.739 \times 10^{-3}$ dB ✓	3
3.	$\frac{Av - Avf}{Av \times Avf} = \frac{1500 - 50}{1500 \times 50} = 0.0193$ ✓	4
4.	It has a high frequency range. x	0
5.	 ✓1	1
6.	$C = \frac{1}{L(2\pi \times f)^2} = \frac{1}{2u(2\pi \times 20M)^2} = 31.66 \times 10^{-12}$ f ✓	4
7.	$\text{Gain} = \frac{10 \times 10^6}{75000} = 133.3$ ✓	3
8.	a) 1.3617 b) 0.6180	
	$R_1 = \frac{1}{\pi fc \times C \times a_2} = \frac{1}{\pi \times 120{,}000 \times 1 \times 10^{-9} \times 1.3617}$	
	$= 1947.99\,\Omega$ ✓	
	$R_2 = \frac{a_2}{4\pi fc \times C \times b_2} = \frac{1.3617}{4\pi \times 120000 \times 1 \times 10^{-9} \times 0.6180}$	8
	$= 1461.17\,\Omega$ ✓	

Arholwr yn unig

Rhif y Dwestiwn

27

(27)

Question No. | Examiner Only

9 ✗ | 0

Section 2

Q2

a) Stage 1 $a_1 = 0.6656$

WRONG FORMULA.

$$R_1 = \frac{1}{2\pi fc \times a_1 \times C_1} = \frac{1}{2\pi \times 75000 \times 0.6656 \times 470\times10^{-12}}$$

$= 6783.40\ \Omega$ ✓ CARRIED ERROR.

Stage 2 $a_2 = 1.1402$ $b_2 = 0.4128$

$$C_2 > \frac{C_1 \times 46}{a^2} = \frac{(470\times10^{-12}) \times 4 \times 0.4128}{(1.1402)^2}$$ ✓1

$= 5.97\times10^{-10}\ F$ ✓2

$$R_2 = \frac{a C_2 \pm \sqrt{a^2 C_2^2 - 46 \times C_1 \times C_2}}{4\pi \times fc \times C_1 \times C_2}$$

$$R_2 = \frac{1.1402 \times 5.97\times10^{-10} - \sqrt{(1.1402 \times 5.97\times10^{-10})^2 - 4\times0.4128 \times 470p \times 5.97\times10^{-10}}}{4\pi \times 75000 \times 470p \times (5.97\times10^{-10})}$$

$$R_2 = \frac{6.8\times10^{-10} - \sqrt{4.15\times10^{-23}}}{2.64\times10^{-13}}$$

$= 2551.36\ \Omega$ ✓

$$R_3 = \frac{1.1402 \times 5.97\times10^{-10} + \sqrt{(1.1402 \times 5.97\times10^{-10})^2 - 4\times0.4128 \times 470p \times 5.97\times10^{-10}}}{4\pi \times 75000 \times 470p \times (5.97\times10^{-10})}$$

$$= \frac{6.807\times10^{-10} + \sqrt{4.147\times10^{-23}}}{2.64\times10^{-13}}$$

$= 2602.8\ \Omega$ ✓

Stage 3 $a_3 = 0.6216$ $b_3 = 0.3245$

$$C_2 > \frac{C_1 \times 46}{a^2} = \frac{(470\times10^{-12}) \times 4 \times 0.3245}{0.6216^2}$$

$= 1.58\times10^{-9}$ ✓

$$R_4 = \frac{0.6216 \times 1.58n - \sqrt{(0.6216 \times 1.58n)^2 - 4\times0.3245 \times 470p \times 1.58n}}{4\pi \times 7500 \times 470p \times 1.58n}$$

$$= \frac{9.82\times10^{-10} - \sqrt{6.83\times10^{-21}}}{6.999\times10^{-13}}$$

$= 1264.98\ \Omega$ ✓

Athrawr yn unig | Rhif y Cwestiwn | 0

Question No. | Examiner Only

$a_3 = 0.6216$ $b_3 = 0.3245$ $C_2 = 1.58 \times 10^{-9}$

$$R5 = \frac{0.6216_2 1.58n + \sqrt{(0.6218 \times 1.58n)^2 - 4 \times 0.3245 \times 470p \times 1.58n}}{4\pi \times 75000 \times 470p \times 1.58n}$$

$$= \frac{9.82 \times 10^{-10} + \sqrt{6.81 \times 10^{-22}}}{6.999 \times 10^{-13}}$$

$= 1440.34\Omega$ Rounding error.

$1.56k$.

6) $Mv = \frac{C_1}{C_2}$

$0.25 =$

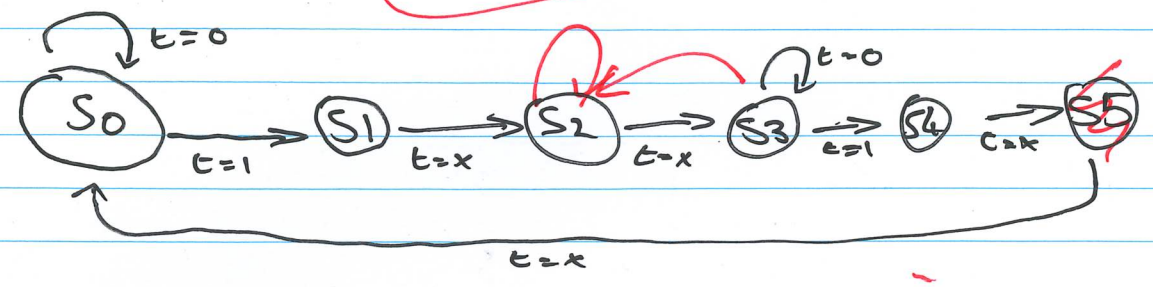
$C_1 \times Mv = C_2$

$2p \times 0.25 = 5 \times 10^{-13} f$

Q3

a)

S_0 = Red S_1 = Red/Amber S_2 = ~~Red~~/Amber S_3 = green
S_4 = Amber S_5 = ~~Amber~~



1

You've confused the questions.

Current	Next		Current			Next			Next					
	t=0	t=1	t=0			t=1			t=0			t=1		
			Q_A^+	Q_B^+	Q_C^+	Q_A^+	Q_B^+	Q_C^+	Q_A^+	Q_B^+	Q_C^+	Q_A^+	Q_B^+	Q_C^+
S_0	S_0	S_1	0	0	0				0	0	0	0	0	1
S_1	S_2	S_2	0	0	1				0	1	0	0	1	0
S_2	S_3	S_3	0	1	0				0	1	1	0	1	1
S_3	S_3	S_4	0	1	1				0	1	1	1	0	0
S_4	S_5	S_6	1	0	0				1	0	1	1	0	1
S_5	S_6	S_0	1	0	1				0	0	0	0	0	0

Output		
R	A	G
S_0 1	0	0
S_1 1	1	0
S_2 1	1	0
S_3 0	0	1
S_4 0	1	0
S_6 0	1	0

Q_A^+	00	01	11	10
00	0	0	0	0
01	1	0	X	X
11	1	0	X	X
10	0	0	1	0

Q_B^+	00	01	11	10
00	0	1	1	1
01	0	0	X	X
11	0	0	X	X
10	0	1	0	1

Q_C^+	00	01	11	10
00	0	0	1	1
01	1	0	X	X
11	1	0	X	X
10	1	0	0	1

3

R	00	01	11	10
00	1	1	0	1
01	0	0	X	X

G	00	01	11	10
00	0	0	1	0
01	0	0	X	X

A	00	01	11	10
00	0	1	0	1
01	1	1	X	X