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.**

Llenwch, plygwch a seliwch
(gweler nodyn 2 isod)

CYFENW: _____

_____

ENW(AU) CYNTAF: _____

_____

_____

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)

(Gweler yr ochr arall am y fersiwn Cymraeg)

1	Student Number	
2	Title of Examination Paper	Engineering Mathematics
3	Module Code	SGIE 4002
4	Date and Time of Examination	13-5-2024 9:30 am
5	Examination Venue	Lecture Room
6	Seat Number	
7	Number of Answer Books handed in	

List the numbers of the questions you have attempted	Office Use
Total	205

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

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.**

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Complete, fold and seal
(see note 2 below)

SURNAME: Williams

FORENAME(S): Siôn Rhys

Question No. | Examiner Only

1.

a) $v^2 = u^2 + 2as$ (a)

$v^2 - u^2 = 2as$

$\frac{v^2 - u^2}{2s} = a$ ✓

3

b) $V = \frac{V_0}{\sqrt{r^2 - 1}}$ (r)

$V = \frac{1}{\sqrt{r^2 - 1}}$

$V = \sqrt{-r^2 + 1}$

$V = -r + 1$

$V - 1 = -r$

$r = -V + 1$ ✗

0

2. a) $(x^2)^3$

$= x^6$ ✓ $2 \times 3 = 6$

b) $\frac{y^6}{y^2} = 6 - 2 = 4$ ✓

$= y^4$ ✓

4.

3. a) ~~$4x^2 + 3x$~~ $7x^3y + 14x^2y$

$7x^2y(x + 2)$

b) $12x^4y^2 + 9x^3y^2$

$3x^3y^2(4x + 3)$ ✓

c) $x^2 + 8x + 15$

$(x + 5)(x + 3)$ ✓

6

d) $x^2 + 13x + 22$

$(x + 11)(x + 2)$ ✓

Arholwr yn unig | Rhif y Cwestiwn

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Question No. | Examiner Only

4. (a) (b) (c)

a) $4x^2 + 3x - 7 = 0$

$$\frac{-(3) \pm \sqrt{(3)^2 - 4(4)(-7)}}{2(4)}$$

=

$x = 1$ or $x = -1.75$ ✓

3

b) $3x^2 - 16x - 12 = 0$

$$\frac{-(-16) \pm \sqrt{(-16)^2 - 4(3)(-12)}}{2(3)}$$

=

$x = 6$ or $x = -0.6$ ✓

3

6. $A = 13.4 \angle 126.5°$ $B = 14.3 \angle 112.1°$ $C = 10.8 \angle 121.8$

a) $(A + B)$

$(12 + j6 + 14 - j3)$

$26 + j3$

Polar = $26.17 \angle 6.58°$ ✓

3

b) $(B - C)$

$(14 - j3 - 10 + j4)$

$4 + j$

Polar = $4.1 \angle 14.03°$ ✓

3.

c) $(A \times B) - C$

$(12 + j6)(14 - j3)$

$168 - j36 + j84 - 18j^2$

$(149 + j48) - 10 + j4$

$139 + j52$

Polar = $148.4 \angle 20.5°$

1

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13

Question No. | Examiner Only

7.

a) $b^2 = a^2 + c^2 - 2ac\cos B$

$= 56^2 + 47^2 - 2(56)(47)\cos(124)$

$b^2 = 8288.59$

$b = \sqrt{8288.59}$

$b = 91.$ ✓

3

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

$$\sin A = \left(\frac{\sin B}{b}\right) a$$

$$\sin A = \left(\frac{\sin(124)}{91}\right) \times 56$$

$\sin A = 0.51$

$A = \sin^{-1}(0.51)$

$A = 30.66°$ ✓

3

6

$C = 180 - (A + B)$

$= 180 - (30.66 + 124)$

$C = 25.34°$ ✓

b) $a^2 = b^2 + c^2 - 2bc\cos A$

$A = \cos^{-1}\left(\frac{a^2}{b^2 + c^2 - 2bc}\right)$

$A = \cos^{-1}\left(\frac{17^2}{19^2 + 14^2 - 2(19)(14)}\right)$

$$\cos A = \frac{19^2 + 14^2 - 2(19)(14)}{17^2}$$

$A = \cos^{-1}(0.086)$

$A = 85°$

2

$$\frac{\sin A}{a} = \frac{\sin C}{c}$$

$$\sin B = \left(\frac{\sin(85)}{17}\right) \times 14$$

$\sin B = 0.82$

$B = \sin^{-1}(0.82)$

$B = 55°$

$B = 180 - (A + C)$

$B = 40°$

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Question No.

10.

a) $\begin{bmatrix} 4 & 5 \\ 6 & 7 \end{bmatrix} + \begin{bmatrix} 8 & 9 \\ 10 & 11 \end{bmatrix}$

$4+8=12$
$5+9=14$
$6+10=16$
$7+11=18$

$= \begin{bmatrix} 12 & 14 \\ 16 & 18 \end{bmatrix}$ ✓

b) $\begin{bmatrix} 4 & 5 \\ 6 & 7 \end{bmatrix} - \begin{bmatrix} 8 & 9 \\ 10 & 11 \end{bmatrix}$

$4-8=-4$
$5-9=-4$
$6-10=-4$
$7-11=-4$

$= \begin{bmatrix} -4 & -4 \\ -4 & -4 \end{bmatrix}$ ✓

c) $\begin{bmatrix} 4 & 5 \\ 6 & 7 \end{bmatrix} \times \begin{bmatrix} 8 & 9 \\ 10 & 11 \end{bmatrix}$

$4\times8=32$
$5\times9=45$
$6\times10=60$
$7\times11=77$

$= \begin{bmatrix} 32+45 \\ 60+77 \end{bmatrix} = \begin{bmatrix} 77 \\ 137 \end{bmatrix}$ x

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2

1

5

Rhif y Cwestiwn

Arholwr yn unig

Question No.

11. $\sin(5x+2)$

$y = 5\cos5x$

$v = y^2$?

$\frac{dy}{dx} = (5\cos5x) \times (5\cos5x)^2$

12. x^2e^{-x}

$u = x^2$ $\quad v = e^{-x}$

$\frac{du}{dx} = 2x$ $\quad \frac{dv}{dx} = -1e^{-x}$

$\frac{dy}{dx} = x^2(-1e^{-x}) + e^{-x}(2x)$ ✓

5.

13. $\frac{3x-4}{2x+1}$

$u = 3x-4$ $\quad v = 2x+1$

$\frac{du}{dx} = 3(1)$ $\quad \frac{dv}{dx} = 2(1)$

$\frac{dy}{dx} = \frac{2x+1(3) - 3x-4(2)}{(2x+1)^2}$ ✓

5.

14. $\int x\sin x \; dx$

$u = x$ $\quad v = \sin x$

$\frac{du}{dx} = \frac{x^2}{2} + c$ $\quad \frac{dv}{dx} = -\cos x + c$

finish on Next Page

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Rhif y Cwestiwn

10

Arholwr yn unig

Question No. | Examiner Only | Question No. | Examiner Only

~~$\int x(-\cos x + c)\,dx$~~ Sinx ~~$\int$~~

14. follow on

$$\int x(-\cos x + c)\,dx = x(\sin x) - \int \sin x\left(\frac{x^2}{2} + c\right)dx$$

1

1

1

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