



PRIFYSGOL CYMRU

Y Drindod Dewi Sant

UNIVERSITY OF WALES

Trinity Saint David

Examination Answer Book

24 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 and seal 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.**

1	Student Number	149775
2	Title of Examination Paper	Maths for Software Development
3	Module Code	mpc01015
4	Date and Time of Examination	2:15 pm 15th Feb 2018
5	Examination Venue	mh411
6	Seat Number	

7	Number of Answer Books handed in	
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List the numbers of the questions you have attempted	Office Use
1	7/18 ✓
2	2/6 ✓
3	0/10 ✓
4	4/9 ✓
5	6/18 ✓
6	0/7 ✓
7	0/7 ✓
8	1/9 ✓
Total	20 1/2

28/80

Please complete this section and SEAL before the examination starts.

Surname Ayres Forename(s) John (Block Capitals)

Complete section, remove strip, fold as indicated and SEAL

PATENT PENDING
INFOSAFE

PULL & TEAR

FOR ADMINISTRATIVE USE ONLY, CAREFULLY REMOVE PERFORATED STRIP

$$4a \quad a = (2, 1, 3) \quad b = (3, 2, -3)$$

$$\begin{vmatrix} 1 & 2 & 1 \\ 2 & 1 & 3 \\ 3 & 2 & -3 \end{vmatrix}$$

$$1 = \begin{vmatrix} 1 & 3 \\ 2 & -3 \end{vmatrix} - 2 \begin{vmatrix} 2 & 3 \\ 3 & -3 \end{vmatrix} + 1 \begin{vmatrix} 2 & 1 \\ 3 & 2 \end{vmatrix}$$

$$1(-3 - 6) - 2(-6 - 9) + 1(4 - 3)$$

$$1(-3) - 2(-15) + 1(1)$$

$$a \times b = (-3, 15, 1)$$

9/7

4b)

$$a \times b = ab \sin \theta$$

$$a \times b = 5 \times 10 \times \sin(71.828^\circ)$$

$$\text{Vector } a = (2, 1, 3)$$

$$\text{Cross Product} = (-3, -15, 1)$$

Dot product

$$a = (2, 1, 3)$$

$$b = (-3, -15, 1)$$

$$-6 + -15 + 3$$

no 2

$$\frac{4}{9}$$

$$\frac{4}{9}$$

4b

$$5 \quad (3, 4, 0)$$

$$(8, 6, 0)$$

$$3 \times 8 = 24$$

$$\frac{24 + 24 + 0}{48}$$

$$a = \sqrt{3^2 + 4^2 + 0^2}$$

$$b = \sqrt{8^2 + 6^2 + 0^2}$$

$$b = 64 + 36$$

$$a = 9 + 16$$

$$b = \sqrt{100}$$

$$a = \sqrt{25}$$

$$a = 5$$

$$b = 10$$

$$a \times b = 15$$

$$48/10$$

$$15/48$$

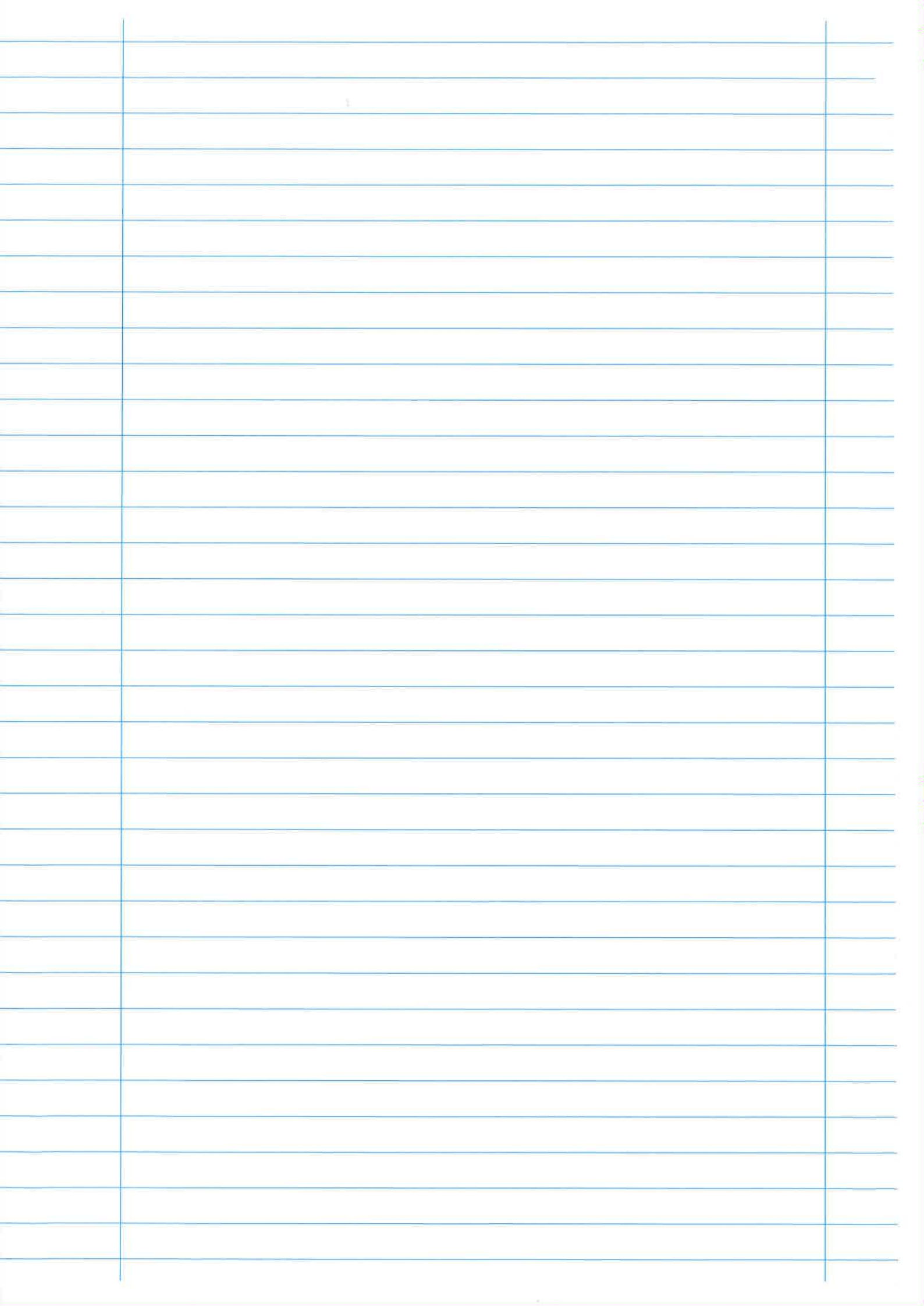
$$\theta = \cos^{-1} \left(\frac{48}{15} \right)$$

$$\frac{15}{48} = 0.312$$

$$\theta = \cos^{-1} (0.312)$$

$$\theta = 71.82^\circ$$

$$\frac{64}{8}$$



Inverse

7)

$$\begin{vmatrix} x & y & z \\ a^1 & a^2 & a^3 \\ b^1 & b^2 & b^3 \end{vmatrix} \begin{vmatrix} -8 & 19 & -10 \\ 3 & -7 & 4 \\ 1 & -2 & 1 \end{vmatrix}$$

Determinant

$$A = -8(-7 \times 1 - 4 \times -2) - 19(3 \times 1 - 4 \times 1) + -10(3 \times -2 - -7 \times 1)$$

$$= -56 - 8(-7 - 4) - 19(3 - 4) - 10(-6 + 7)$$

$$= -56$$

$$-56 \times -8 + 32 \times 16 - 57 \times 19 + 76 \times -19 - 30 \times 20 + 70 \times -10$$

$$448 + 512 - 1083 + -1444 - 600 - 700$$

0/7

0/7



Simultaneous Equations

$$8 \quad 1x + 1y + 6z = 1 \quad (1)$$

$$1x + 2y + 2z = 2 \quad (2)$$

$$1x + 3y - 1z = 4 \quad (3)$$

add

$$+ (2) \quad 1x + 1y + 6z = 1$$

$$1x + 2y + 2z = 2$$

$$2x + 3y + 8z = 3 \quad (4)$$

(2)

$$3 \quad 1x + 2y + 2z = 2 \quad \times 3$$

$$= 3x + 6y + 6z = 6$$

$$(2) \quad 3x + 6y + 6z = 6$$

$$(3) \quad 1x + 3y - 1z = 4$$

$$4x + 9y - 5z = 10 \quad (5)$$

$$(4) \quad 2x + 3y + 8z = 3$$

$$(5) \quad 4x + 9y - 7z = 10$$

1st

olve

$$= 8x + 12y + 32z = 12$$

$$8x + 72y + 14z = 20$$

$$= 0x + 84y + 18z = 32$$

Sub. z in Sol. (4)

$$2x + 3y + 8(18) = 3$$

$$2x + 3y + 144 = 3$$

$$2x + 3y = -141$$

$$\frac{8}{9} = \frac{1}{9}$$

$$1) \quad \begin{array}{ccc|ccc} & A & & B & & \\ 1) & 1 & -3 & 2 & 2 & 1 & -3 \\ & 4 & 0 & 2 & 0 & -1 & -1 \\ & 5 & 1 & 1 & 4 & 2 & 1 \end{array}$$

$$i) \quad A|B \quad \left| \begin{array}{l} 1(2) + -3(0) + 2(4) \\ 4(2) + 0(0) + 2(4) \\ 5(2) + 1(0) + 1(4) \end{array} \right|$$

$$\left| \begin{array}{l} 1(1) + -3(-1) + 2(2) \\ 4(1) + 0(-1) + 2(2) \\ 5(1) + 1(-1) + 1(2) \end{array} \right|$$

$$\left| \begin{array}{l} 1(-3) + -3(-1) + 2(2) \\ 4(-3) + 0(-1) + 2(2) \\ 5(-3) + 1(-1) + 2(2) \end{array} \right|$$

$$\left| \begin{array}{ccc|ccc|ccc} 2 & 0 & 8 & 1 & 3 & 4 & -3 & 3 & 2 \\ 8 & 0 & 8 & 4 & 0 & 4 & -12 & 0 & 2 \\ 10 & 0 & 4 & 5 & -1 & 2 & -15 & -1 & 2 \end{array} \right|$$

$$ii) \quad A - B$$

$$\begin{array}{ccc|ccc|ccc} & A & & B & & & & & \\ 1 & -3 & 2 & 2 & 1 & -3 & -1 & -4 & 5 \\ 4 & 0 & 2 & 0 & -1 & -1 & 4 & 5 & 4 \\ 5 & 1 & 1 & 4 & 2 & 1 & 1 & -1 & 0 \end{array} =$$

3 1/2
4

iii) $A + B$

$$\begin{bmatrix} 1 & -3 & 2 \\ 4 & 0 & 2 \\ 5 & 1 & 1 \end{bmatrix} + \begin{bmatrix} 2 & 1 & -3 \\ 0 & -1 & -1 \\ 4 & 2 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -3 & 2 \\ 4 & 0 & 2 \\ 5 & 1 & 1 \end{bmatrix} + \begin{bmatrix} 2 & 1 & -3 \\ 0 & -1 & -1 \\ 4 & 2 & 1 \end{bmatrix} = \begin{bmatrix} 3 & -2 & -1 \\ 4 & -1 & -1 \\ 9 & 3 & 2 \end{bmatrix}$$

iv)

$$\begin{bmatrix} 2 & 1 & -3 \\ 0 & -1 & -1 \\ 4 & 2 & 1 \end{bmatrix} + \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$$

$$\begin{bmatrix} 2(1) + 1(2) + 3(3) \\ 0(1) + -1(2) + -1(3) \\ 4(1) + 2(2) + 1(3) \end{bmatrix} = \begin{bmatrix} 2 & 2 & -9 \\ 0 & -2 & -3 \\ 4 & 4 & 3 \end{bmatrix}$$

! $Q5 = 0/18$ ✓
 $Q6 = 0/7$ ✓
 $Q7 = 0/7$ ✓

$Q8 = 7/18$ ✓
 $Q9 = 7/18$ ✓



2)

T

P

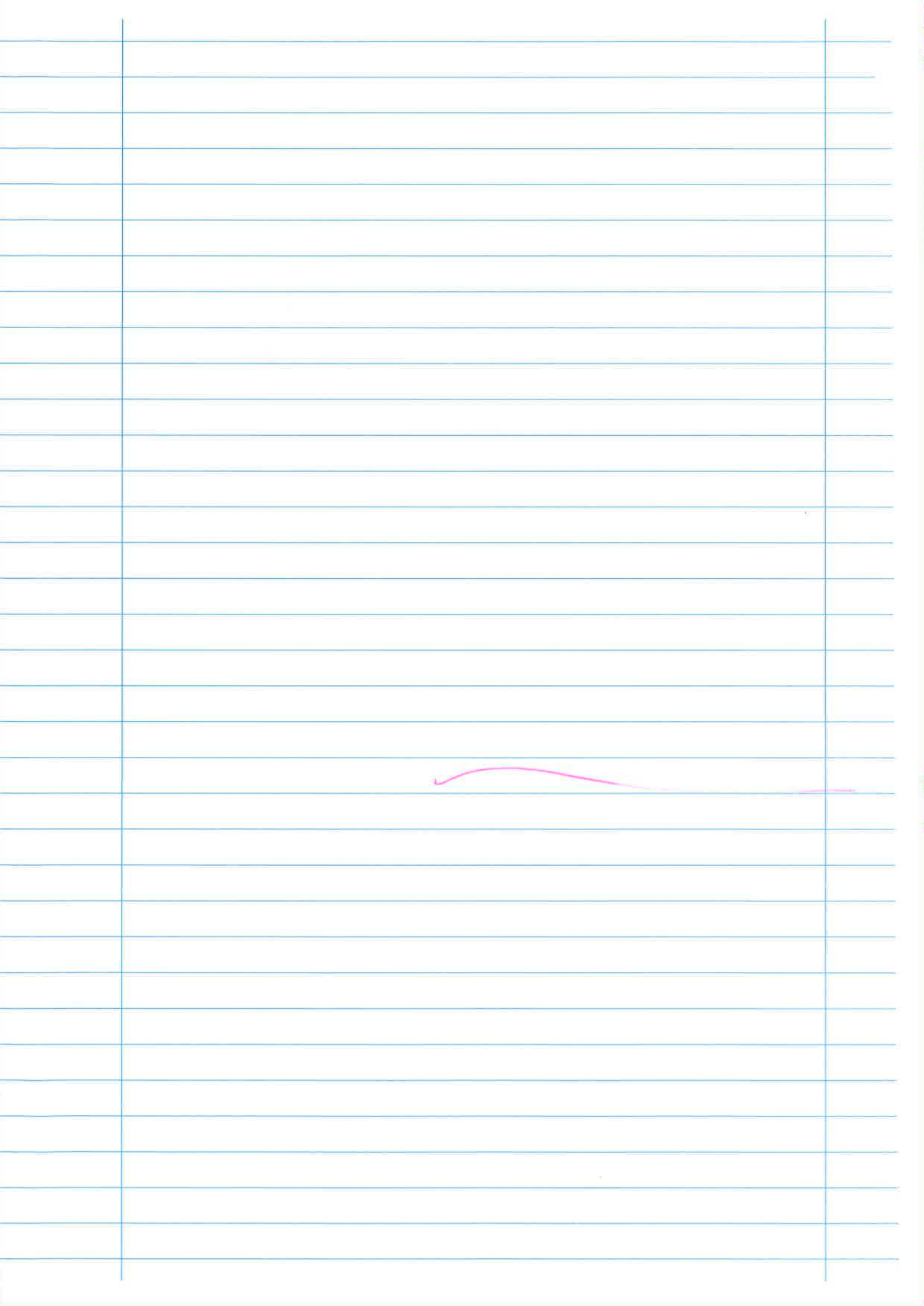
			1			
1	0	0	~~1~~		2	
0	1	0	2	x	4	
0	0	1	3		6	
0	0	0	1		1	

T P

$$\begin{aligned}
 &1(2) + 0(4) + 0(6) + 1(1) \\
 &0(2) + 1(4) + 0(6) + 2(1) \\
 &0(2) + 0(4) + 1(6) + 3(1) \\
 &0(2) + 0(4) + 0(6) + 1(1)
 \end{aligned}$$

2	0	0	1
0	4	0	2
0	0	6	3
0	0	0	1

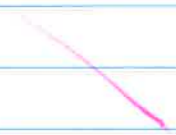
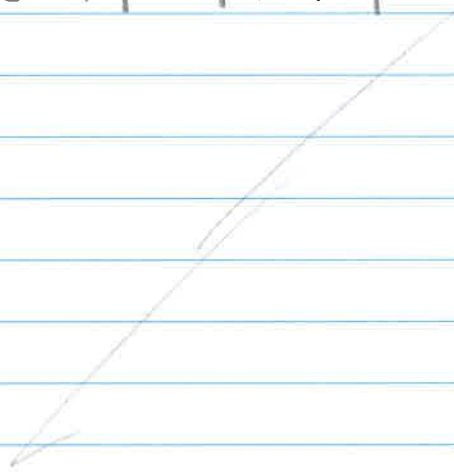
$$2/6$$



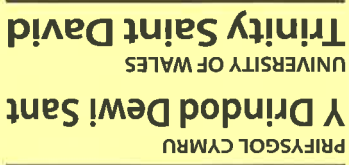


$$-8 \left| \begin{array}{cc|c} -7 & 4 & 19 \\ -2 & 1 & \end{array} \right| \left| \begin{array}{cc|c} 3 & 1 & \\ 4 & 1 & \end{array} \right|$$

$$-8 \left| \begin{array}{cc|cc|cc} -7 & 4 & 19 & 3 & 1 & -10 & 3 & -7 \\ -2 & 1 & & 4 & 1 & & -1 & -2 \end{array} \right|$$



AR GYFER DEFNYDD GWEINYDDOL YN UNIG, TYNWCH Y STRIBYN TYLLOG I FFWRDD YN OFALUS



24 Tüdalen

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 amgylchiadan.

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

[illegible]

(See the other side for English version)

A wneuch chi lenw'r rhan hon a'i SELIO cyn i'r arholiad ddechrau.

Cyfenw

(LLYTHRENNAU BREISION) Enw(au) cyntaf

PLYGWCH