



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: Evans

FORENAME(S): Nathan

Robert

1	Student Number	EVA17835085 ~~068860~~
2	Title of Examination Paper	MATHEMATICS (TEST 2)
3	Module Code	GOEN4001
4	Date and Time of Examination	15 th MAY 9:38 AM
5	Examination Venue	TYLOCH
6	Seat Number	C2
7	Number of Answer Books handed in	1

List the numbers of the questions you have attempted	Office Use
Q1	
a	10
b	0
c	1
Q2	
a	7
b	4
c	5
Q3	
a	4
b	0
c	0
Total	31/100

31%
31% ML

(a)

I.

$$(2+4j) + (5+3j) = 7+7j \quad \checkmark \quad \underline{1}$$

$$\text{II. } 3(2+4j) + 2(3+2j) =$$

$$(6+12j) + (6+4j) =$$

$$12+16j \quad \checkmark \quad \underline{2}$$

III.

$$\cancel{(2+4j)} + \cancel{(2+4j)} + (2+4j)(5+3j) \quad \checkmark$$

$$10+6j+20j+12 \quad \checkmark$$

$$= -2+26j \quad \checkmark \quad \underline{3}$$

IV.

$$(2+4j) + (3+2j)^2 = 1+4j \quad \times \quad \underline{0}$$

V.

$$\cancel{-(8)} + \sqrt{(8)^2} - 4(2)$$

$$\underline{\underline{-(8) + \sqrt{(8)^2} - 4(2)(26)}}$$

$$\underline{\underline{-2+26}}$$

V.

$$(-2+26j)(3+2j) \quad \underline{4}$$

$$-6-4j+78j-52 = 58+74j$$

Q1a

10/18

2.

a.

i.

$$0 + 30 + 8 = 38$$

$$0 + 12 + 15 = 27$$

$$D = 11$$

$$4$$

ii.

$$10 \quad 0 + 2$$

$$2 + 0 + 10$$

$$D = 0$$

iii.

$$\begin{bmatrix} 4 & 5 \\ 1 & 5 \end{bmatrix}$$

$$D = 15$$

iv.

$$A = \begin{bmatrix} 3 & 2 & 3 \\ 1 & 0 & 2 \\ 3 & 5 & 4 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 2 & 2 \\ 3 & 0 & 5 \\ 1 & 1 & 3 \end{bmatrix}$$

$$AB = \begin{bmatrix} 3 & 6 & 3 \\ 2 & 0 & 2 \\ 6 & 25 & 12 \end{bmatrix}$$

v.

$$A = \begin{bmatrix} 3 & 2 & 3 \\ 1 & 0 & 2 \\ 3 & 5 & 4 \end{bmatrix} \quad C = \begin{bmatrix} 4 & 5 \\ 2 & -2 \\ 0 & 1 \end{bmatrix}$$

$$AC = \begin{bmatrix} 12 & 5 \\ 4 & 0 \\ 0 & 2 \end{bmatrix}$$

Q2a

7/16

2

U1. NOT possible ✓

b)

$$\begin{array}{rcl} 3 + 2 + 4 & \times & 5 \\ 2 + 3 + 3 & \checkmark & 2 \\ 5 + 2 + 5 & 2 & 3 \end{array}$$

$$\begin{bmatrix} 3 & 2 & 4 \\ 2 & 3 & 3 \\ 5 & 2 & 5 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ 2 \\ 3 \end{bmatrix}$$

$$x = \begin{bmatrix} 5 & 2 & 4 \\ 2 & 3 & 3 \\ 3 & 2 & 5 \end{bmatrix} \begin{bmatrix} 5 \\ 2 \\ 3 \end{bmatrix}$$

$$3 \times 3 + 2 \times 2 = 81$$

4

$$Dx = 28$$

$$75 + 48 + 16 = 109$$

$$4 \times 27 + 50 = 117$$

$$y = \begin{bmatrix} 3 & 5 & 4 \\ 2 & 2 & 2 \\ 5 & 3 & 5 \end{bmatrix} \begin{bmatrix} 5 \\ 2 \\ 3 \end{bmatrix}$$

$$Dy = 12$$

$$30 + 75 + 24 = 129$$

$$75 + 12 + 12 = 99$$

$$z = \begin{bmatrix} 3 & 2 & 5 \\ 2 & 3 & 3 \\ 5 & 2 & 5 \end{bmatrix} \begin{bmatrix} 5 \\ 2 \\ 3 \end{bmatrix}$$

$$27 + 20 + 20 = 67$$

Q2b

4/8

Correct method
error carried
forward

Correct method
error carried forward

$$Dz = -32$$

2

C.

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

$$(1 \times 3) - (4 \times 3) = -9 \checkmark$$

$$(4 \times 3) - (2 \times 3) = 6 \checkmark$$

$$(4 \times 4) - (2 \times 1) = 14 \checkmark$$

$$(3 \times 3) - (4 \times 0) = 9 \checkmark$$

$$(2 \times 2) - (2 \times 0) = 4 \times \checkmark$$

$$(4 \times 4) - (2 \times 1) = 14 \times \checkmark$$

$$(3 \times 3) - (1 \times 0) = 9 \checkmark$$

$$(2 \times 3) - (4 \times 0) = 6 \checkmark$$

$$(2 \times 1) - (4 \times 3) = -10 \checkmark$$

$$\begin{bmatrix} -9 & 6 & 14 \\ 9 & 4 & 14 \\ 9 & 6 & -10 \end{bmatrix}$$

$$\begin{matrix} + & - & + \\ - & + & - \\ + & - & + \end{matrix}$$

INVERSE

$$\begin{bmatrix} -9 & -6 & 14 \\ -9 & 4 & -14 \\ 9 & -6 & -10 \end{bmatrix}$$

Q2C

5/10

~~1~~

1

$$C. = -(-8) \pm \sqrt{(-8)^2 - 4(2)(26)}$$

52

2x2

Q1C

2/9

3

a)

$$b. \int (2x^4 + x^3 - 3x^2 + 5x) dx \quad 2 //$$

$$\frac{2x^5}{5} + \frac{x^4}{4} + 5x + C$$

$$ii. -\frac{1}{3} \cos 3x + \frac{1}{5} \sin 5x + C \quad 2 //$$

iii

$$(1 + 36)^{\frac{1}{3}} \times 0 //$$

$$c) 5x - \frac{1}{x} \cos x \times 0 //$$

Q3a4/18Q3b0Q3c0