



Complete, fold and seal
(see note 2 below)

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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.**

1	Student Number	<u>DAVE</u> <u>1504731</u>
2	Title of Examination Paper	<u>Module code</u> <u>N4X00391</u> <u>mathematic exam 1</u>
3	Module Code	<u>N4X00391</u>
4	Date and Time of Examination	<u>10/01/18</u> <u>2pm</u>
5	Examination Venue	<u>Hill house ITA</u> <u>Gower college</u>
6	Seat Number	<u>12</u>
7	Number of Answer Books handed in	<u>1</u>

List the numbers of the questions you have attempted	Office Use
<u>One</u>	
<u>Three</u>	
<u>Q1a</u>	<u>0</u>
<u>b</u>	<u>0</u>
<u>c</u>	<u>4</u>
<u>d</u>	<u>0</u>
<u>e</u>	<u>0</u>
<u>Q3a</u>	<u>6</u>
<u>b</u>	<u>0</u>
<u>c</u>	<u>2</u>
<u>d</u>	<u>1</u>
<u>e</u>	<u>0</u>
Office Use	<u>13/80</u>

Test 1

✓
✓
✓
✓
✓
✓
✓
✓
✓
✓

16% 16%

$$a) \frac{f(x)}{(x+a)(x+b)} = \frac{A}{(x+a)} + \frac{B}{(x+b)}$$

$$(i) \frac{4}{(2x+1)} = \frac{5}{x-1} \rightarrow$$

$$(ii) \frac{(x+2)}{6} - \frac{(2x+3)}{3} = \frac{x}{12}$$

$$(iii) 2^{x+1} = 5x \times 3 \rightarrow 5x \times 3 = 2^{x+1}$$

$$(iv) \log_a(2x+3) + \log_a(2x+1) = 2 \log_a(3x-1)$$

0/0 ✓

0/0 ✓

0/0 ✓

0/0 ✓

✓

$$B.) 2V = \frac{P+Q}{3P-T}$$

$$2(2) = \frac{P-(3)}{3P-(-1)}$$



c.)

(i) $2x^2 + 11x + 12 = 0$

$2 \times 12 = 24$

1×24

6×4

2×12

8×3

$2x(x+4) + 3(x+4) = 0$ ✓

$(2x+3)(x+4) = 0$ ✓ ②

$2x+3=0 \therefore x = \frac{-3}{2} = -1.5$ ✓

$x+4=0 \therefore x = -4$ ✓ ②

(ii) $x^2 - 28 = 3x^2 \rightarrow 3x^2 + x^2 - 28 = 0$

~~$3x^2 - 28 + x^2$~~

$3x - 28 = -84$

4×2

2×3

2×4

1×6

1×7

(iii) $-4 = -2x - 3x^2 \rightarrow -x - 3x^2 + 4$

Q.2) $5T^2 + 16T + 3$
 (i)

$$5 \times 3 = 30$$

$$2 \times 15$$

~~$$5 \times 3$$~~

$$1 \times 30$$

$$5 \times 6$$

$$10 \times 3$$

(ii) $a^2 - 4b^2$

e) $x = 2$
 $x = -3$

$(x-2) \rightarrow (x-2)(x+3)$
 $(x+3)$

~~$x^2 - 2x$~~ $x^2 + 3x - 2x - 6 = 0$ $x(x+3) - 2(x+3)$ ✓

a.) Find the first derivative of the following:

$$(i) y = 5x^4 + 3x^2 - x + 1$$

$$x^1 \rightarrow 1 \times x = 1$$

$$\frac{dy}{dx} = 20x^3 + 6x - 1 + 0$$

Good

3

✓

$$(ii) y = (2x+3)^2 \rightarrow 6(2x+3)^1$$

0

✓

$$(iii) y = x\sqrt{x} + \frac{2}{3\sqrt{x}} \rightarrow x \cdot \frac{1}{2}x + \frac{2}{3} \cdot \frac{1}{2}x^{-1/2}$$

0

$$(iv) y = \sin 2x - 3\cos 4x - \tan \frac{x}{2} =$$

$$\frac{dy}{dx} = 2\cos 2x + 12\sin 4x - \frac{1}{2}\sec^2 \frac{x}{2}$$

3

✓

$$(v) y = \frac{\sin 5x}{e^{2x} + 3x^2} = \frac{5\cos 5x}{2e^{2x} + 6x}$$

0

✓

$$(vi) \sqrt{6x^3 - 2x + 1} = \frac{1}{18x^2 - 2}$$

x

0/4

✓

$$(vii) y = 3x^2 \ln x = 6x \cdot \frac{1}{x}$$

x

0/4

✓

$$B.) 4x^2 + 3x - 5$$

$$3\left(\frac{d^2y}{dx^2}\right) + 2\left(\frac{dy}{dx}\right) - 30 - 16x = 0$$

$$4 \times 5 = 20$$

$$1 \times 20$$

$$2 \times 10$$

$$5 \times 4$$

x

0/4

✓

c.) $y = \sin 2x$

$$y = 2 \cos 2x \checkmark$$

$$-4 \sin 2x \checkmark \textcircled{1}$$

$$-6 \cos 2x \checkmark$$

$$12 \sin 2x \checkmark \textcircled{1}$$

21 ✓

d.) $z = x^3 y^5 + 2x^4 y + 3x^2 - 2y^3 + 10$

$$\frac{\partial z}{\partial x} = 3x^2 y^5 + 8x^3 y + 6x - 2y^3 + 10 \textcircled{1}$$

1 ✓

$$\frac{\partial z}{\partial y} = 5x^3 y^4 + 2x^4 + 6x - 6y^2 + 10$$

$$\frac{\partial^2 z}{\partial x^2} = 6x y^5 + 16x^2 y + 6 - 6y^3 + 10$$

✓

$$\frac{\partial^2 z}{\partial y^2} = 20x^3 y^3 + 18x^4 + 6x - 12y + 10$$

e.) $y = 5x - 1$

x

0

✓