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- Please give the information requested above and enter your name in the space provided at the top right of this page. If your answers are to be marked under a scheme whereby the examiners will not know your identity, fold over and seal down the top right-hand corner of the page (using the gummed label provided) in order to conceal your name.
- Commence each answer on a fresh page.
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 - be numbered consecutively;
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- Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the exam room.
- Your answers must be legibly written **IN INK**. The Examiners can either ignore illegible script or have it typed and the expense of typing charged to the candidate.

Summary of Marks

Question Numbers Answered	1st Examiner	2nd Examiner (optional)	3rd Examiner (optional)
1	24 1/2		
3	27		
	51 1/2		
TOTAL			
RESULT			

Complete, fold and seal
(see note 1 below)

SURNAME: JAMES

FORENAME(S): STEVEN

Answersheet 1

64%

Q1 a (i) $E = mgh$

(g)

$$\frac{E}{mh} = g$$

$$T = 2\pi \sqrt{\frac{L}{g}}$$

(g)

(ii) $\frac{T}{2\pi} = \sqrt{\frac{L}{g}}$

$$\left(\frac{T}{2\pi}\right)^2 = \frac{L}{g}$$

$$g = \frac{L}{\left(\frac{T}{2\pi}\right)^2}$$

(iii) $V^2 = u^2 + 2gs$

(g)

$$V^2 - u^2 = 2gs$$

$$\frac{V^2 - u^2}{2s} = g$$

~~$$\frac{V^2}{u^2} = 2gs$$~~

~~$$V^2 - u^2 = 2gs$$~~

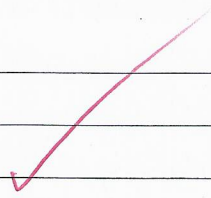
~~$$\frac{V^2 - u^2}{2s} = g$$~~

4

2

1b

$$(1) \quad (pq)^0 = 1$$



1

$$(ii) \quad (\sqrt{q})^4$$

$$(q^{\frac{1}{2}})^4$$

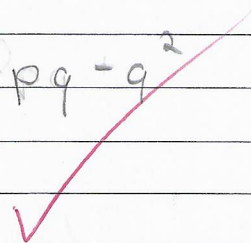
1

$$(iii) \quad (p+q)(3p-q) + (2p+q)(p-q)$$

$$3p^2 - pq + 3pq - q^2 + 2p^2 - 2pq + pq - q^2$$

$$5p^2 + 2pq - q^2 - 2pq - q^2$$

$$5p^2 + pq - 2q^2$$



3

$$\frac{1}{4} + \frac{1}{4} = \frac{1}{2} \quad \frac{1}{5} + \frac{1}{5} = \frac{1}{4} \quad \frac{1}{4} + \frac{1}{4} = \frac{1}{2}$$

Question No.

Examiner Only

Q c

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

$$\frac{5x-5}{(x+1)(x-2)}$$

$$(x-1)$$

$$\frac{5x-5}{(x+1)(x-4)}$$

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

1

$$\frac{A}{x+1} + \frac{B}{x-4}$$

$$\frac{Ax-4}{x-1} + \frac{Bx+1}{x-4}$$

$$A = +4$$

$$B = -1$$

10(1)

$$2^{3x-5} = 4^{5x-6}$$

$$(3x-5) \log 2 = (5x-6) \log 4$$

$$(3x-5) 0.301 = (5x-6) 0.602$$

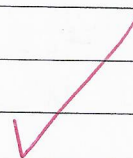
$$0.903x - 1.505 = 3.01x - 3.612$$

$$0.903x - 3.01x = -3.612 + 1.505$$

$$-2.107x = -2.107$$

$$x = \frac{-2.107}{-2.107}$$

$$x = 1$$



4

$$(1) \ln(x^2-4) - \ln(x+8) = \ln x$$

rule 2

$$\ln \frac{(x^2-4)(x+8)}{(x+8)} = \ln x$$

$$\ln \frac{(x^2-4)}{(x+8)} = \ln x$$

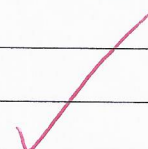
$$x^2-4 = x(x+8)$$

$$x^2-4 = x^2+8x$$

$$\therefore -4 = 8x$$

$$\frac{-4}{8} = x$$

$$x = -\frac{1}{2} \text{ or } -0.5$$



4

Q. e $y = \frac{2-3x}{1-5x^2}$

$$\frac{dy}{dx} = \frac{v \left(\frac{du}{dx} \right) - u \left(\frac{dv}{dx} \right)}{v^2}$$

$$u = 2-3x$$

$$v = 1-5x^2$$

$$\therefore \frac{du}{dx} = 3$$

$$\frac{dv}{dx} = -10x$$

$$\therefore \frac{(1-5x)(3) - (2-3x)(-10x)}{(1-5x^2)^2}$$

$$\therefore \frac{(3-15x) + (20x+30x^2)}{(1-5x^2)^2}$$

$$\frac{dy}{dx} = \frac{3-5x+30x^2}{(1-5x^2)^2}$$

$$\frac{3-5(-1)+30(-1)^2}{(1-5(-1))^2} = \frac{3+6+30}{49} = \frac{39}{49}$$

$$= 0.795$$

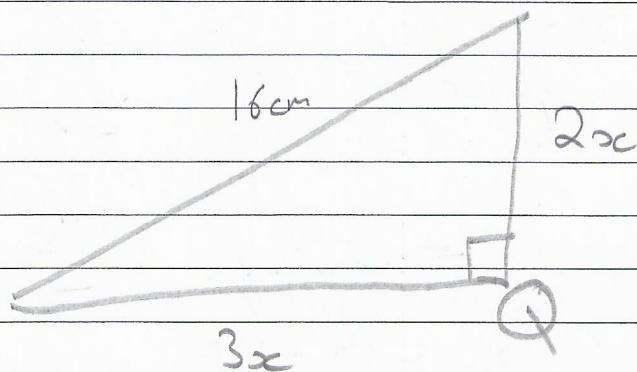
$$= 0.8$$

1 1/2

X

Q1

F



$$a^2 + b^2 = c^2$$

$$(2x)^2 + (3x)^2 = c^2$$

$$(2x)^2 + (3x)^2 = 16^2$$

$$(2x)^2 + (3x)^2 = 16^2$$

$$3x^2 = 16^2 - 2x^2$$

$$2x^2 + 3x^2$$

$$x^2(2+3) = 16^2$$

$$x^2 = 256 = 51.2$$

$$\sqrt{x^2} = 7.16$$

$$2(7.16)^2 + 3(7.16)^2 = 256$$

$$14.32 + 21.48$$

$$205.06 + 461.79 = 25$$

$$102$$

$$153$$

2

11/2

Q3

$$7x + 4y = 46 \quad (1)$$

(a)

$$8x + 6y = 57 \quad (2)$$

$$(1) \times 6 = 42x + 24y = 276 \quad (3)$$

$$(2) \times 4 = 32x + 24y = 228 \quad (4)$$

$$(3) - (4) \therefore 10x = 48$$

$$x = 4.8$$

~~$$7(4.8) + 4(4.8) =$$

$$33.6 + 19.2 =$$~~

$$7(4.8) + 4y = 46$$

$$33.6 + 4y = 46$$

$$4y = 46 - 33.6$$

$$= 12.4$$

$$y = 3.1$$

$$x = 4.8$$

$$y = 3.1$$

to lsf

$$x = 5$$

$$y = 3$$

6

Q3

b

$$3x^2 + 8x - 2 = 0$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2A}$$

$$A = 3$$

$$B = 5$$

$$C = -2$$

$$\frac{-(-5) \pm \sqrt{(-5)^2 - 4(3)(-2)}}{2(3)}$$

$$\therefore \frac{-5 \pm \sqrt{10 + 24}}{6}$$

$$\therefore \frac{-5 \pm \sqrt{34}}{6}$$

$$\sqrt{34} = 5.83$$

$$\therefore \frac{-5 + 5.83}{6} = 0.83$$

$$-5 - 5.83 = -1.805$$

Q3

B

$$3x^2 + 5x - 2 = 0$$

$$A = 3$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$B = 5$$

$$C = -2$$

$$\frac{-(-5) \pm \sqrt{5^2 - 4(3)(-2)}}{2(3)}$$

$$\frac{-5 \pm \sqrt{25 + 24}}{6}$$

$$\therefore \frac{-5 \pm \sqrt{49}}{6}$$

$$\therefore \frac{-5 + 7}{6} = 0.33$$

$$\frac{-5 - 7}{6} = -2.00$$

4

Q3

C

$$(1) \quad x^2 + 11x + 30 = 0$$

$$(x+5)(x+6)$$

$$x+2 \quad x+17$$

$$x = -6$$

$$x = -5$$

$$1 \quad 30$$

$$2 \quad 15$$

$$3 \quad 10$$

$$5 \quad 6$$

3

$$(ii) \quad x^2 - 11x + 0 = 0$$

$$x(x-11)$$

$$x(11) \quad x(11x) \quad x(x-11)$$

$$x = 11$$

$$x = -11$$

2

$$(iii) \quad x^2 - 4 = 0$$

$$(x-2)(x+2)$$

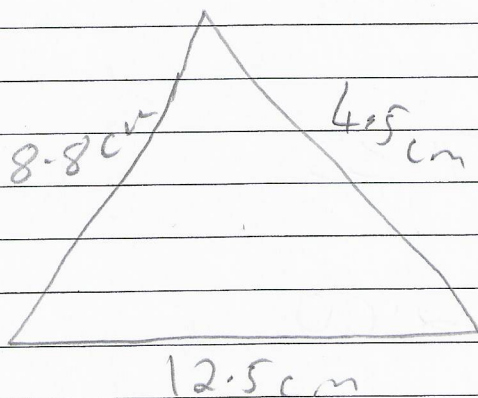
$$x = +2$$

$$x = -2$$

3

Q3

F



$$\sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \frac{a+b+c}{2}$$

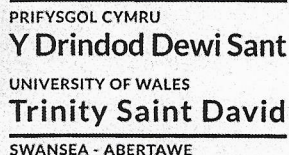
$$\sqrt{12.9 \times (4.1)(8.4)(0.4)}$$

$$\frac{8.8 + 4.5 + 12.5}{2}$$

$$= 12.9$$

$$13.33 \text{ cm}^2$$

5



Question Numbers Answered	1st Examiner	2nd Examiner (optional)	3rd Examiner (optional)
TOTAL			
RESULT			

EXPERIMENTAL APPROACH BOOKS

CONDUCTED BY JOHN WILSON

EXPERIMENTAL APPROACH

Task 10
Experiment 10

Task 10



Experiment 10

Experiment 10

Experiment 10

Experiment 10

Experiment 10

Experiment 10

Experiment 10

Experiment 10

Experiment 10

Experiment 10

Summary of Results

Conclusions in the Experiment

The results of the experiment show that the rate of reaction is directly proportional to the concentration of the reactants. This is in agreement with the theoretical prediction that the reaction is second order with respect to the reactants.

The rate of reaction is found to be constant at a given temperature.

The rate of reaction is found to be constant at a given concentration of the reactants.

The rate of reaction is found to be constant at a given pressure.

The rate of reaction is found to be constant at a given volume.

The rate of reaction is found to be constant at a given time.

The rate of reaction is found to be constant at a given distance.

The rate of reaction is found to be constant at a given angle.

The rate of reaction is found to be constant at a given frequency.

The rate of reaction is found to be constant at a given wavelength.

Q3 (e) (i) $y = (2x^2 - 5x + 1)^7$

~~$\frac{dy}{dx}$~~ $\frac{dy}{dx} = 4x - 5$

$\frac{dy}{dx} = 7(2x^2 - 5x + 1)^6 (4x - 5)$ ✓

2

(ii) $y = e^{x^2+4}$

~~$\frac{dy}{dx} = x e^{x^2+4}$~~

$e^{ax} = ae^{ax}$

$\therefore \frac{dy}{dx} = x e^{x^2+4}$ ✗

iii $\cos^3 2x$

$\frac{dy}{dx} = 3 \cos^2 2x$ ✗

Q3

$$(i) \quad y = 6x^2(x^3 - 2x^2 + 5x - 1)$$

$$\frac{dy}{dx} = 12x(3x^2 - 4x + 5)$$

NO

X

$$(ii) \quad y = \frac{7}{x^2} - \frac{4}{x} + 8$$

$$= 7x^{-2} - 4x^{-1} + 8$$

✓

1

$$\frac{dy}{dx} = -4x^{-3} + 4x$$

✓

1

$$(iii) \quad y = \frac{\sin x}{\cos x}$$

$$y = \sin x \cos x^{-1}$$

$$\frac{dy}{dx} = \cos x - (-\sin x)^{-2}$$

$$= \cos x \frac{\cos x}{\sin x^2}$$

X

(27)

Question No.

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