



Index Number: .....

# NATIONAL CERTIFICATE OF EDUCATION

2023

## PHYSICS (N530)

TIME: 45 MINUTES

Candidates answer on the Question Paper.  
Additional Materials: Mathematical set, Calculator

READ THESE INSTRUCTIONS FIRST

- 1. Write your index number in the space provided above.
- 2. Write in dark blue or black ink. Do not use correction fluid.
- 3. You may use a soft pencil for any diagram, graph or rough working.
- 4. Diagrams are not drawn to scale unless otherwise specified.
- 5. Any rough working should be done in this booklet.
- 6. Answer **ALL** questions.
- 7. This document consists of **6** questions printed on **14** pages, numbered **2** to **15**.
- 8. The total marks for each question is shown in brackets ( ) at the beginning of each question.
- 9. The number of marks for each part question is shown in brackets [ ].
- 10. The total number of marks for this paper is **50**.

For Examiners' use								
Question No.	1	2	3	4	5	6	Total	Signature
Examiner								
Team Leader								
CE/ACE								

**Question 1 (10 marks)**

(a) Which instrument is used to measure **mass**?



**A** A measuring tape



**B** An electronic balance



**C** A stopwatch

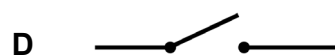
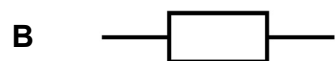
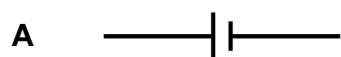


**D** A ruler

(b) Which one of the following is a **non-renewable** source of energy?

- A** Coal
- B** Falling water
- C** Solar energy
- D** Wind

(c) Which electrical symbol represents an **open switch**?



(d) What is the S.I. unit of **length**?

A kelvin (K)

B kilogram (kg)

C metre (m)

D second (s)

(e) Fig. 1.1 shows a **clinical thermometer**.

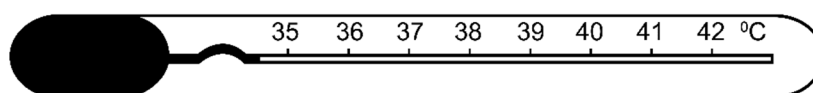


Fig. 1.1

Which temperature can be measured using this thermometer?

A 17 °C

B 27 °C

C 37 °C

D 47 °C

- (f) Fig. 1.2 shows an object **P** placed in front of a plane mirror.  
Circle the letter which shows the correct position of the image formed.

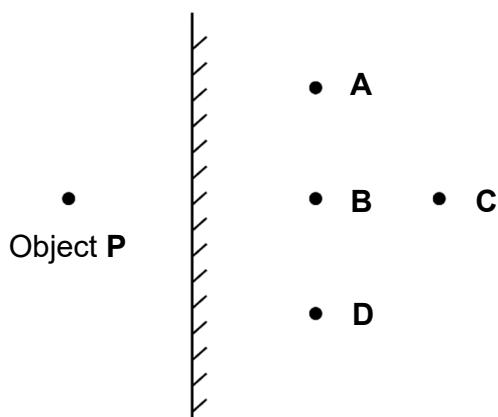
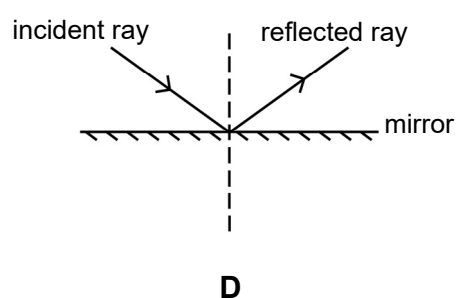
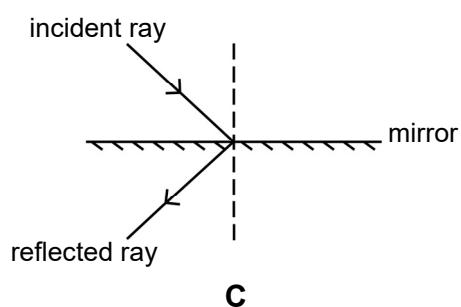
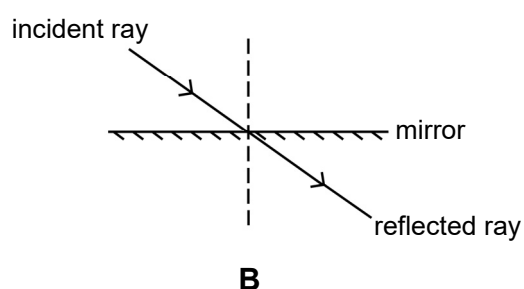
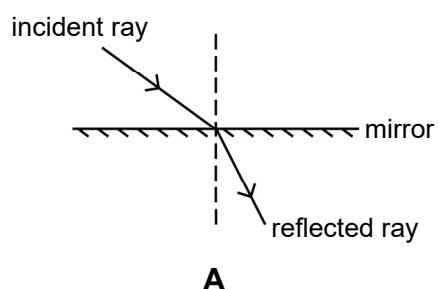


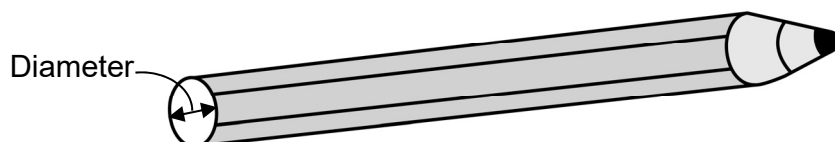
Fig. 1.2

- (g) Which one of the following is a **vector quantity**?
- A** Acceleration
  - B** Distance
  - C** Mass
  - D** Speed
- (h) Which quantity is defined as the **distance travelled per unit time**?
- A** Acceleration
  - B** Displacement
  - C** Speed
  - D** Velocity

- (i) Which one of the following ray diagrams shows the **correct** reflection of light in a plane mirror?



- (j) Fig. 1.3 shows a regular pencil.



**Fig. 1.3**

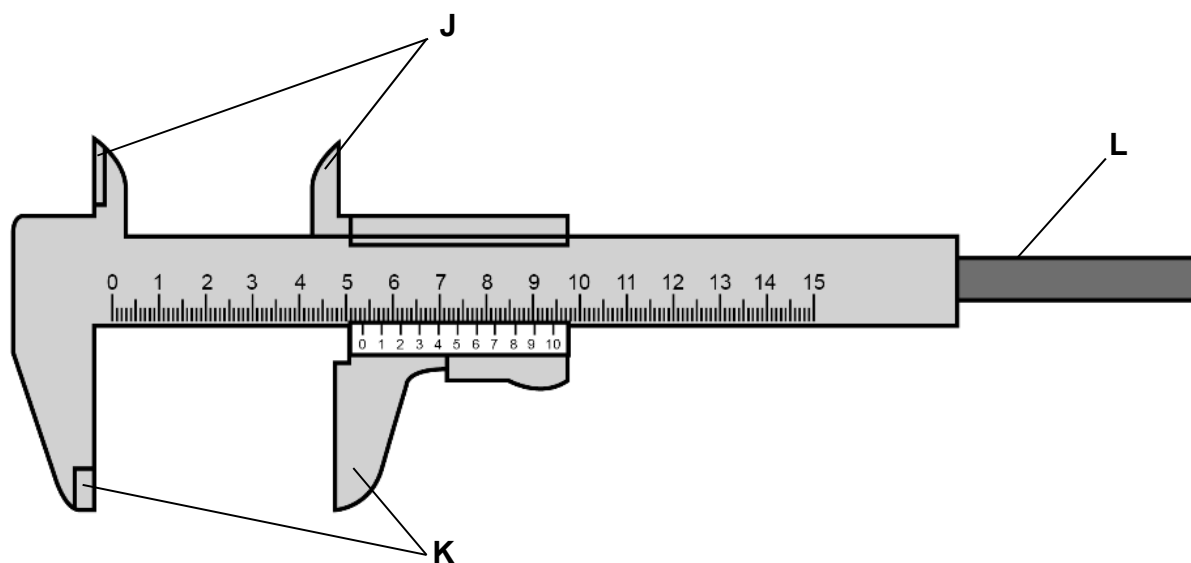
Which one of the following is likely to be the **diameter of the pencil**?

- A** 6 km
- B** 6 m
- C** 6 cm
- D** 6 mm

E
TL
CE

## Question 2 (7 marks)

Fig. 2.1 below shows a vernier caliper.



**Fig. 2.1**

(a) On Fig. 2.1, label the

- (i) main scale with the letter **M**.
- (ii) vernier scale with the letter **V**.

[2]

(b) Tick (✓) the correct box.

(i) What is part **J**?

☐

The internal jaws

☐

The external jaws

☐

The tail

(ii) What is part **L**?

☐

The internal jaws

☐

The external jaws

☐

The tail

[2]

(c) Tick (✓) the correct box.

Which part of the vernier caliper should be used to measure

(i) the **diameter** of a metal rod?

☐

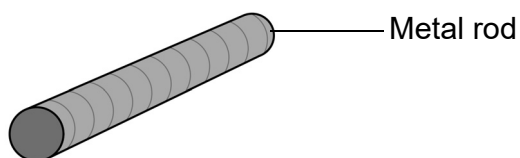
**J**

☐

**K**

☐

**L**



(ii) the **depth** of a beaker?

☐

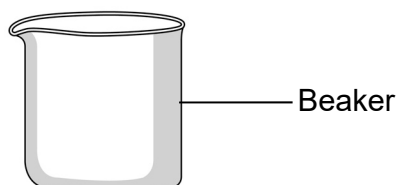
**J**

☐

**K**

☐

**L**



[2]

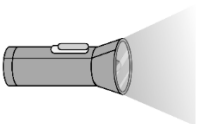


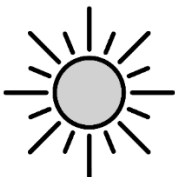
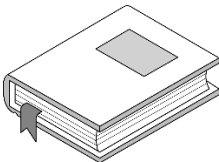
(d) Give one type of error that can occur when using a vernier caliper.

..... [1]

**Question 3 (8 marks)**

(a) The table below shows some objects.

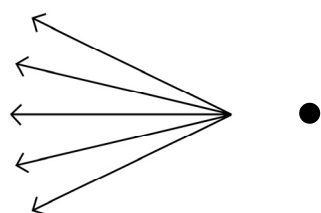
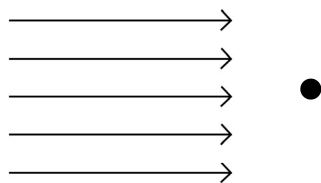
By putting a tick (✓) in the correct column, classify the objects as luminous or non-luminous.

Objects	Luminous	Non-luminous
 Lighted torch		
 Moon		
 Plane Mirror		
 Sun		
 Book		

[5]

- (b) Match each beam of light in **Column A** to its corresponding description in **Column B**.

**Column A**



**Column B**

● Divergent beam

● Convergent beam

● Parallel beam

[2]

- (c) Fig. 3.1 shows a man looking at the light from a candle through a bent flexible paper tube.

Tick (✓) the correct reason why the man cannot see the light from the candle.

☐

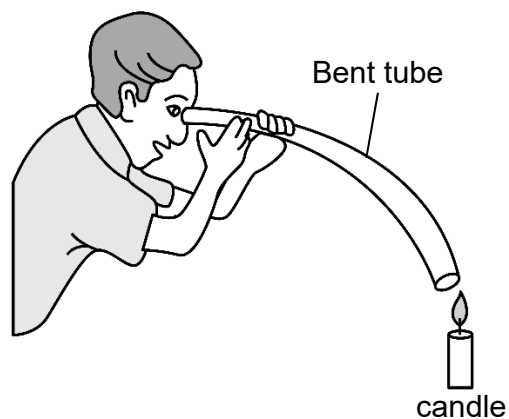
Light is reflected.

☐

Light travels in a straight line.

☐

Light is refracted.

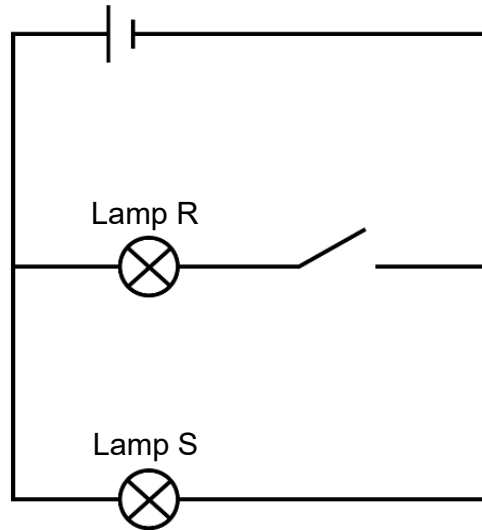


**Fig 3.1**

[1]

**Question 4 (7 marks)**

(a) Fig. 4.1 shows a circuit diagram.



**Fig. 4.1**

Tick (✓) the appropriate column in the table below to indicate which lamp(s) will light up or not.

Lamp	Will light up	Will not light up
Lamp R		
Lamp S		

[2]

(b) Explain your answer in (a).

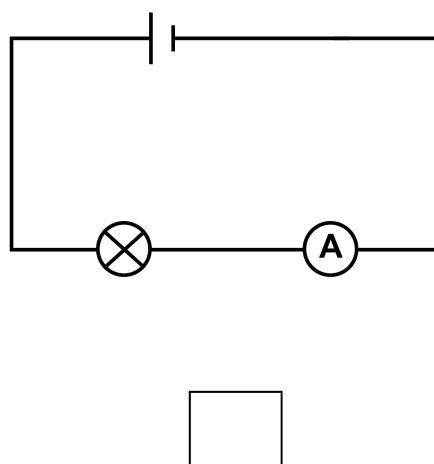
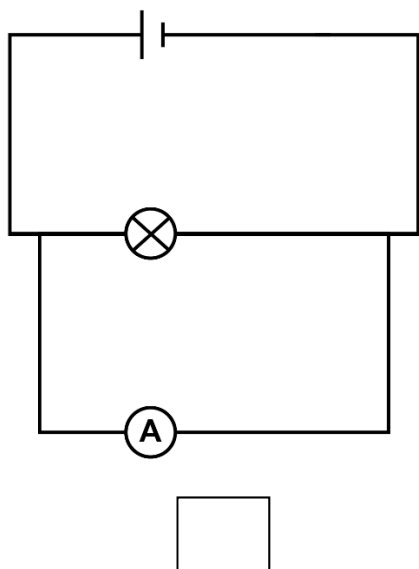
.....

..... [1]

(c) An ammeter is used to measure the current flowing in a lamp.

(i) Which electrical circuit in Fig. 4.2 shows the correct position of the ammeter?

Tick (✓) the correct box.



**Fig. 4.2**

[1]

(ii) Give a reason for your answer in (c)(i).

.....

..... [1]

(d) A current of 0.5 A flows in a circuit for 8 seconds.

Calculate the amount of charge that flows in the circuit.

Show all your workings.

Charge flowing = ..... C [2]

### Question 5 (12 marks)

- (a) Fig. 5.1 shows 3 different positions (**K**, **L**, **M**) of an apple falling from a tree.

In which position does the apple have **minimum**

- (i) potential energy?

..... [1]

- (ii) kinetic energy?

..... [1]

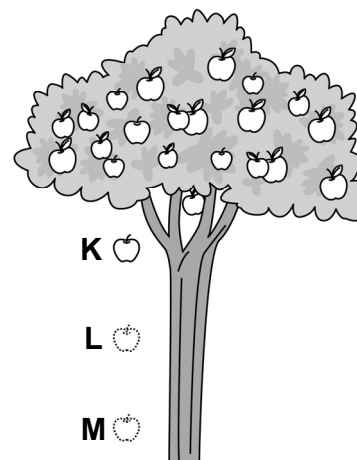


Fig. 5.1

- (b) Fig. 5.2 below shows the different positions of a pendulum bob while it is swinging to and fro between **X** and **Z**.

- (i) On Fig. 5.2, draw **two** arrows to show the direction of motion of the bob during one complete oscillation from **X**. [1]

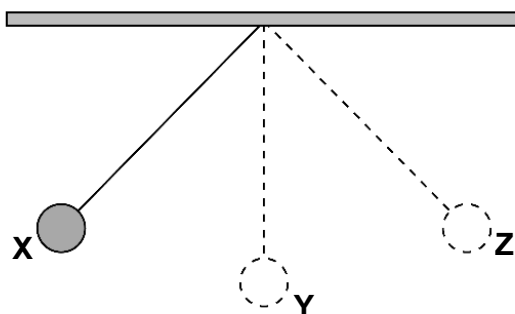


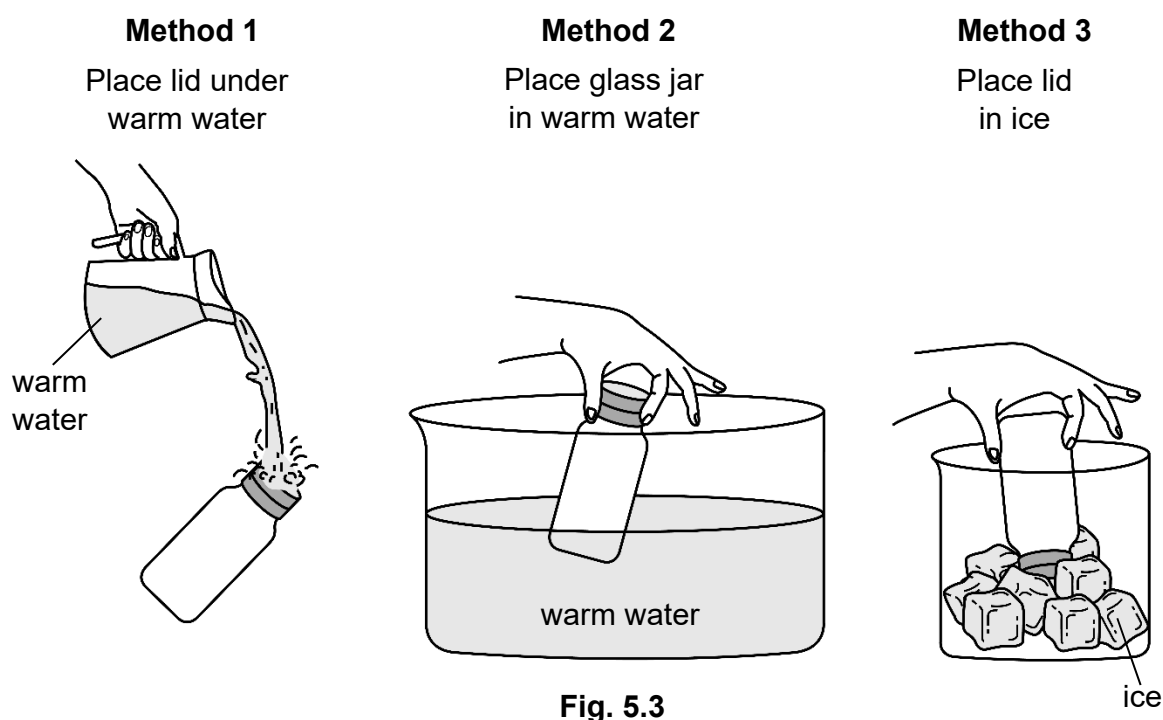
Fig. 5.2

- (ii) The pendulum bob makes 40 complete oscillations in 30 seconds. Calculate the period of the pendulum.

Period = ..... s [2]

- (c) A glass jar has a metal lid which is too tight to open.

A student tries to open the jar using three different methods, as shown in Fig. 5.3.



- (i) Which method will allow the student to open the lid?

Tick (✓) the correct box.

☐ Method 1

☐ Method 2

☐ Method 3

[1]

- (ii) Give a reason for your answer in (c)(i).

.....

..... [1]

- (d) The volume of two stones of different sizes is measured using the set-up shown in Fig. 5.4.

- (i) Name the method used in Fig. 5.4.

.....

[1]

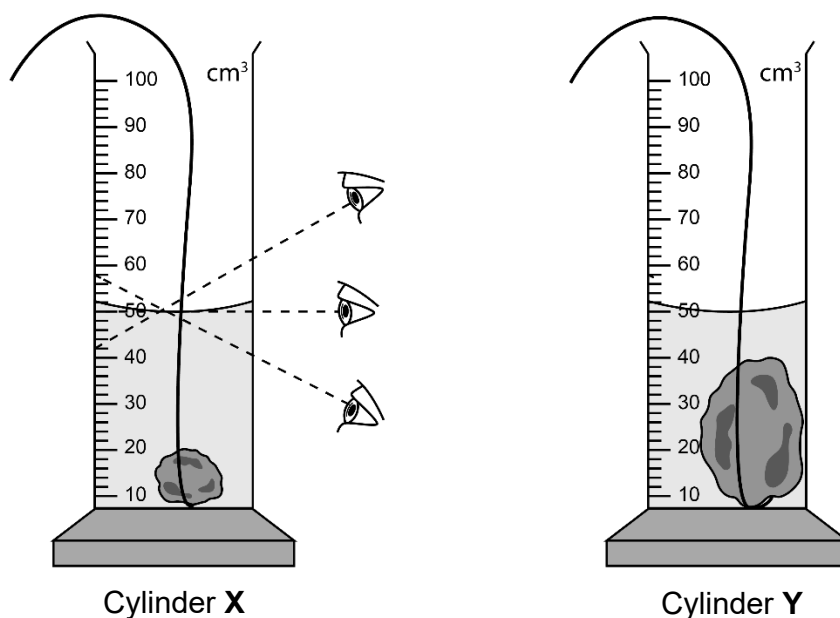


Fig 5.4

- (ii) Cylinder **X** and Cylinder **Y** **initially** contained different volumes of water.

After the stones are completely immersed, the level of water in both cylinders is the same.

Which cylinder contained the greater volume of water **at first**?

Tick (✓) the correct box.

☐

Cylinder **X**

☐

Cylinder **Y**

[1]

- (iii) Give a reason for your answer to (d)(ii).

.....

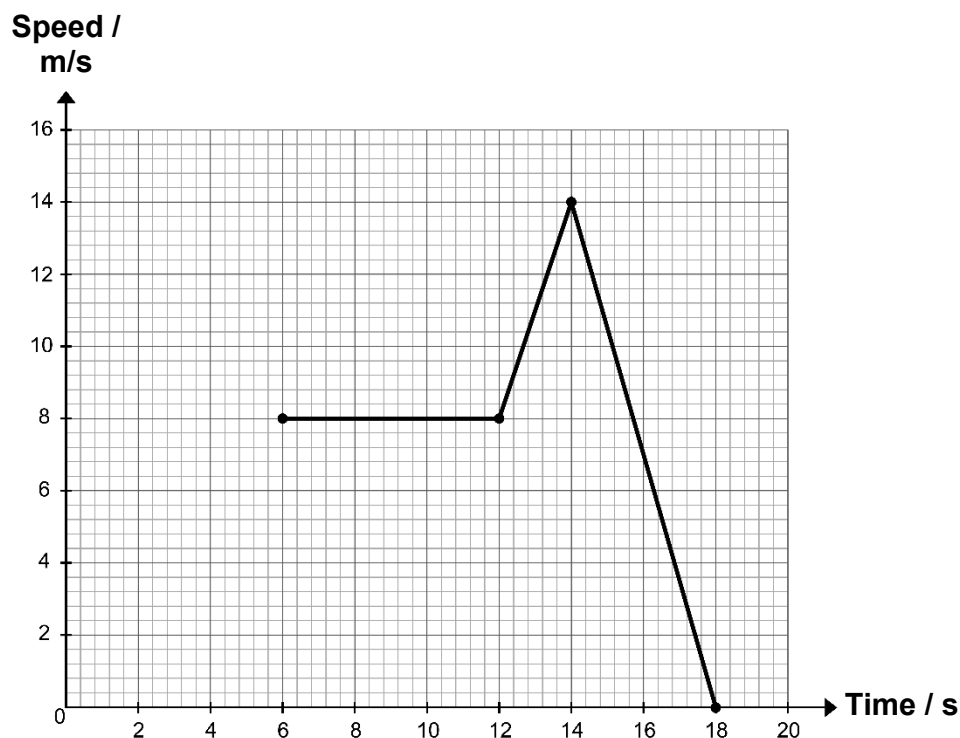
..... [2]

- (iv) On Fig. 5.4, put a tick (✓) beside the correct eye position when reading the volume in cylinder **X**.

[1]

### Question 6 (6 marks)

The speed-time graph below shows part of the motion of a car moving along a straight line.



- (a) The car accelerates uniformly from **rest** to a speed of 8 m/s in the **first 6 s**.  
Complete the speed-time graph to show this acceleration. [1]
- (b) For which time interval does the car move with **constant speed**? Tick (✓) the correct box. [1]
- ☐ 6 s – 12 s      ☐ 12 s – 14 s      ☐ 14 s – 18 s
- (c) Shade the area under the graph that represents the **distance moved during the deceleration of the car**. [1]
- (d) Calculate the **maximum** acceleration of the car.  
Show all your workings.

Acceleration = ..... m/s<sup>2</sup> [3]

**BLANK PAGE**