Let the mind manage the body
Que l'esprit gère le corps

Index Number: ....

NATIONAL CERTIFICATE OF EDUCATION

2021-2022

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								
Quality Controller								
CE/ACE								

Marks

Question 1 (10 marks)

Circle the correct answer. Each item carries one mark.

(a) What is the S.I. unit of mass?

A kelvin (K)

B kilogram (kg)

C metre (m)

D second (s)

(b) Fig. 1.1 shows an electrical circuit.

Circle the letter which shows the cell.

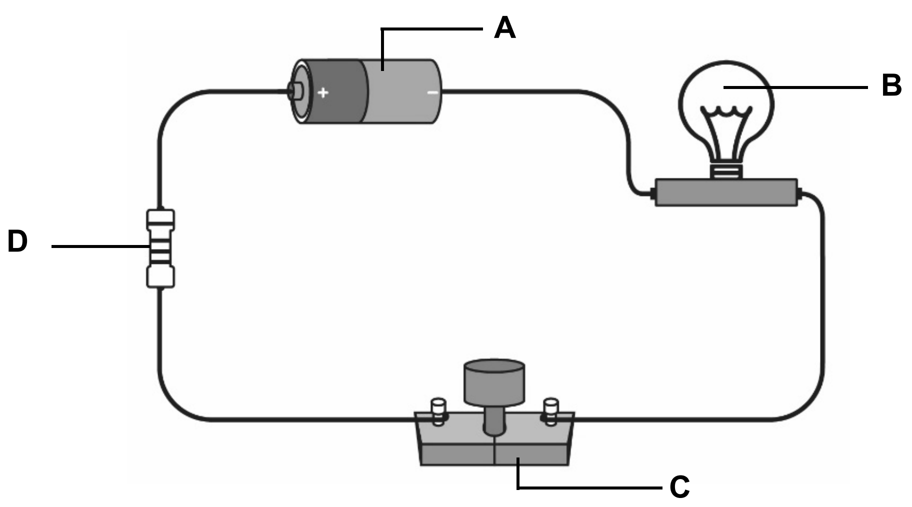


Fig. 1.1

Marks

(c) Which instrument is used to measure length?

A A ruler

B A clock

C A balance

D A thermometer

(d) Which one of the following is a non-polluting source of energy?

A Bagasse

B Diesel

C Wind

D Wood

(e) What is the function of a switch in an electrical circuit?

A It opens and closes the circuit.

B It carries electrical energy throughout the circuit.

C It is the source of energy in the circuit.

D It resists the flow of current in the circuit.

(f) Which one of the following is a scalar quantity?

A Acceleration

B Displacement

C Speed

D Velocity

E
TL
QC
CE

Marks

(g) What is a luminous object?

A An object that absorbs light.

B An object that reflects light.

C An object that refracts light.

D An object that produces light.

(h) What is the formula used to calculate the kinetic energy of a moving object?

A mgh

B $\frac{1}{2} mv^2$

C ma

D mv

(i) Fig. 1.2 shows the letter **F** in front of a plane mirror.

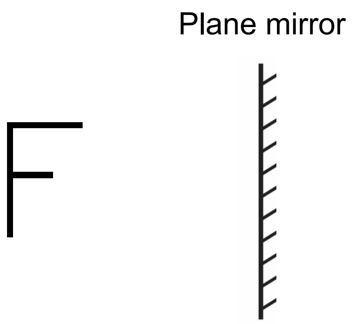
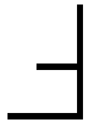
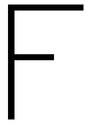
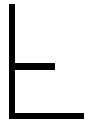


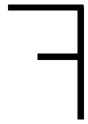
Fig. 1.2

Which one of the following is the image of the letter **F** formed in the plane mirror?

A 

B 

C 

D 

Marks

(j) Fig. 1.3 shows an athlete running.

Fig. 1.3

Which one of the following could be the average speed of the athlete?

A 0.05 m/s

B 5 m/s

C 50 m/s

D 500 m/s

E

TL

QC

CE

Marks

Question 2 (7 marks)

Fig. 2.1 shows a thermal power station.

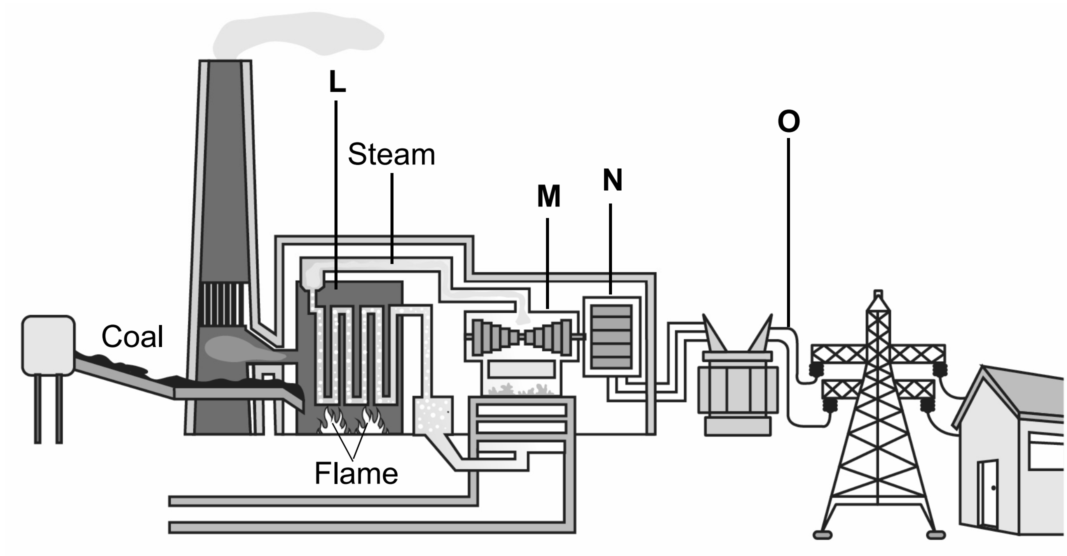


Fig. 2.1

(a) Choose the appropriate term from the list below to label parts **L**, **M**, **N**, and **O** of the power station.

Generator **Turbine** **Transformer**

Furnace **Power line**

(i) **L :** ………………………………..

(ii) **M :** ………………………………..

(iii) **N :** ………………………………..

(iv) **O :** ………………………………..

[4]

Marks

(b) Put a tick (✓) in the appropriate box to indicate the **main** energy conversion that takes place at **L** and at **N**.

(i) **At L:**

☐ Chemical energy to heat energy

☐ Heat energy to electrical energy

☐ Electrical energy to chemical energy

[1]

(ii) **At N:**

☐ Electrical energy to heat energy

☐ Heat energy to electrical energy

☐ Kinetic energy to electrical energy

[1]

(c) Give one advantage of producing electricity in thermal power stations.

....

.... [1]

E
TL
QC
CE

Marks

Question 3 (8 marks)

(a) Fig. 3.1 shows some water in a measuring cylinder.

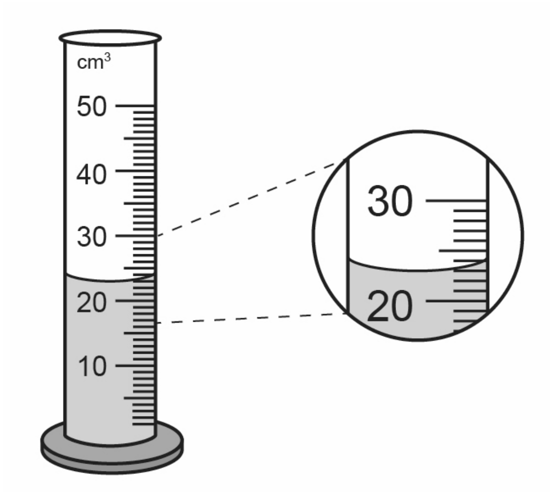


Fig. 3.1

(i) What is the volume of water in the measuring cylinder?

Tick (✓) the correct box.

☐ 22 cm^3 ☐ 23 cm^3 ☐ 24 cm^3

[1]

(ii) A stone is lowered completely into the measuring cylinder shown in Fig. 3.1. The level of water in the measuring cylinder rises to 28 cm^3.

Calculate the volume of the stone.

Volume of the stone = ………………………….……… cm^3 [2]

(b) Fig. 3.2 shows a Vernier caliper.

(i) On Fig. 3.2, mark the tail of the Vernier caliper with the letter **T**. [1]

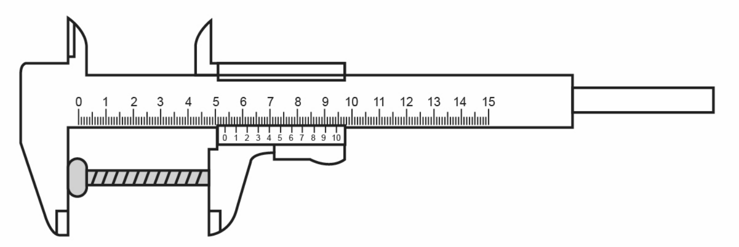


Fig. 3.2

(ii) What is the function of the tail of the Vernier caliper?

……………………………………………………………………………………….. [1]

(c) Tina measures the diameter of a ball using a Vernier caliper.

Fig. 3.3 shows the scale of the Vernier caliper which Tina uses.

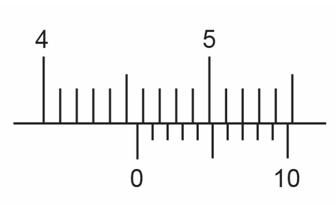


Fig. 3.3

(i) What is the **main scale** reading shown in Fig. 3.3?

Tick (✓) the correct box.

☐ 4.50 cm ☐ 4.60 cm ☐ 5.00 cm

[1]

(ii) What is the **Vernier scale** reading shown in Fig. 3.3?

Tick (✓) the correct box.

☐ 0.06 cm ☐ 0.07 cm ☐ 0.08 cm

[1]

(iii) Hence, calculate the diameter of the ball.

Diameter = ……………………………………. cm [1]

Marks

E
TL
QC
CE

Question 4 (7 marks)

Jamil investigates the refraction of light through a glass block.

He traces the outline of the glass block and the incident ray on a piece of paper as shown in Fig. 4.1.

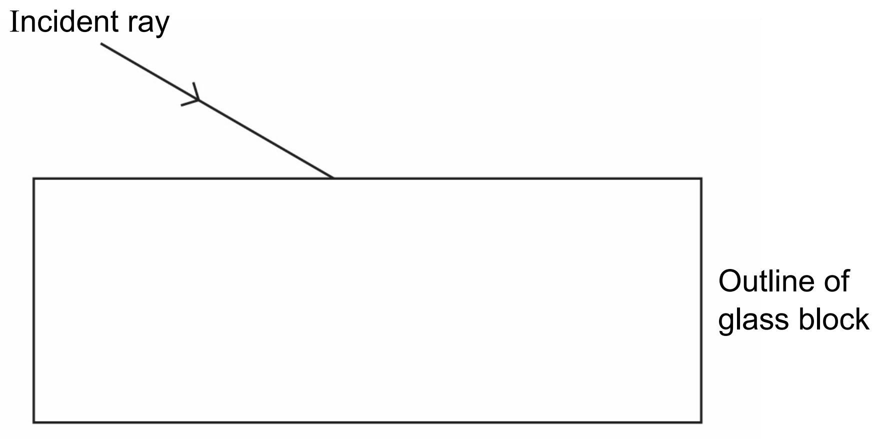


Fig. 4.1

He then places his protractor on the outline as shown in Fig. 4.2.

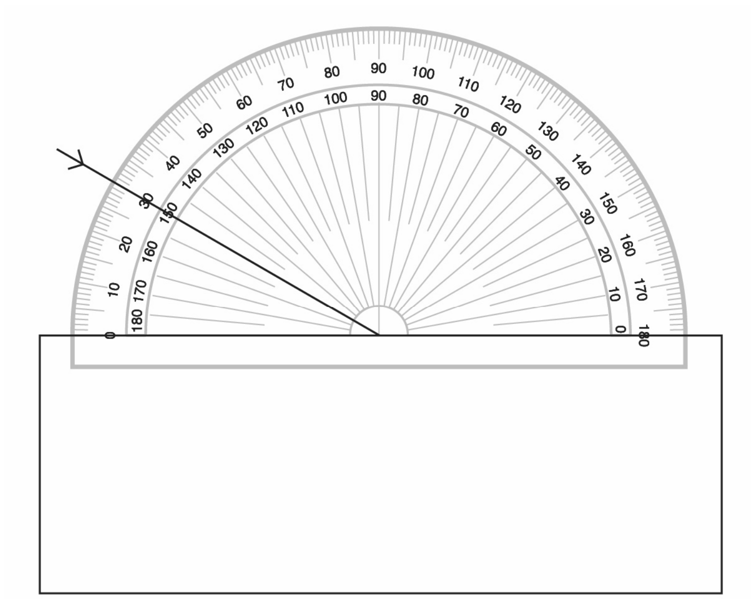


Fig. 4.2

Marks

(a) Draw the normal at the point of incidence on Fig. 4.2. [1]

(b) Measure and write down the angle of incidence.

Angle of incidence = ……………………………….……. ° [1]

(c) On Fig. 4.2,

(i) draw the refracted ray of light. [1]

(ii) mark the angle of refraction with the letter **r**. [1]

(d) (i) What could be the value of the angle of refraction, **r** ?

Tick (✓) the correct box.

☐ 35º ☐ 60º ☐ 65º

[1]

Give a reason for your answer.

……………………………………………………………………………………... [1]

(e) Give one precaution Jamil should take when using the protractor.

………………………………………………………………………………………….

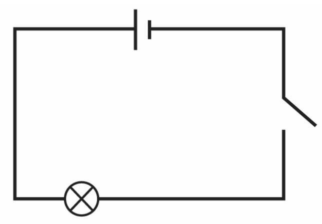
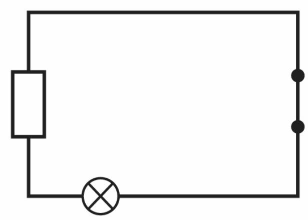
…………………………………………………………………………………………. [1]

E
TL
QC
CE

Marks

Question 5 (9 marks)

(a) The table below shows two electrical circuits.
The bulbs in both circuits do not light up.
Complete the table below to explain why.

Electrical circuit	Reason why the bulb does not light up
(i) 	....
(ii) 	....

[2]

(b) Fig. 5.1 shows an electrical circuit.

It consists of a cell of e.m.f. 3 V and two resistors of resistance 2 Ω and 6 Ω respectively.

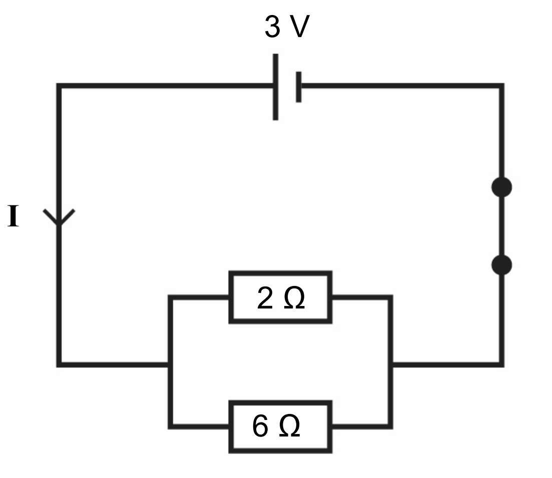


Fig. 5.1

Marks

Calculate

(i) the total resistance

Total resistance = ……………………………….. Ω [3]

(ii) the current, **I**, flowing in the circuit.

Current, **I** = ……………………………….. A [2]

(c) Another resistor is connected in series to the circuit as shown in Fig. 5.2.

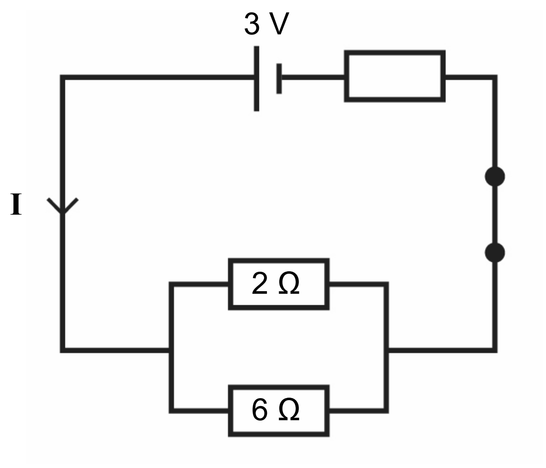


Fig. 5.2

State what happens to

(i) the total resistance of the circuit.

……………………………………………………………………………………... [1]

(ii) the current flowing in the circuit.

…………………………………………………………………………………… [1]

E

TL

QC

CE

Marks

Question 6 (9 marks)

Fig. 6.1 shows the speed-time graph of a car.

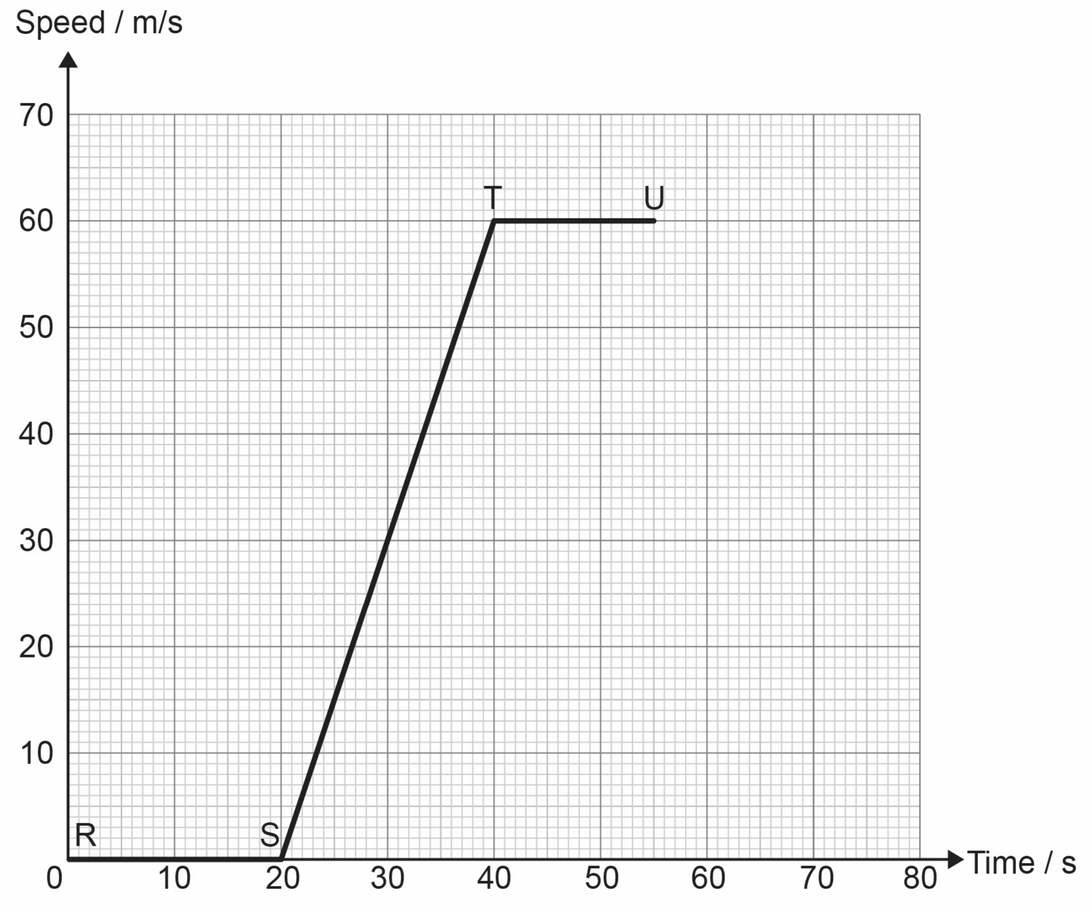


Fig. 6.1

(a) Which section of the graph shows the car when it is at rest?
Tick (✓) the correct box.

☐ **RS** ☐ **ST** ☐ **TU**

[1]

(b) For how long does the car accelerate? Tick (✓) the correct box.

☐ 20 s ☐ 40 s ☐ 50 s

[1]

Marks

(c) State

(i) the maximum speed of the car

Maximum speed = ………………………….. m/s [1]

(ii) the acceleration of the car in section **TU**

Acceleration = ……………………… m/s^2 [1]

(d) Calculate the distance the car travels **during the first 40 s**.

Distance = ……………………………… m [2]

(e) Calculate the average speed of the car **during the first 40 s**.

Average speed of the car = ……………………………… m/s [2]

(f) After 55 seconds, the car decelerates uniformly for 15 s until it reaches a speed of 30 m/s.

On the speed-time graph, draw a line to show the deceleration of the car.

[1]

END OF PAPER

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CE

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