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Physics 0625

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Light

CORE questions

Core 1

At night, the light beam from a torch is shone into a swimming pool along the line TSA. Instead of striking the bottom of the pool at A, the beam travels to B, as shown on Fig. 1.

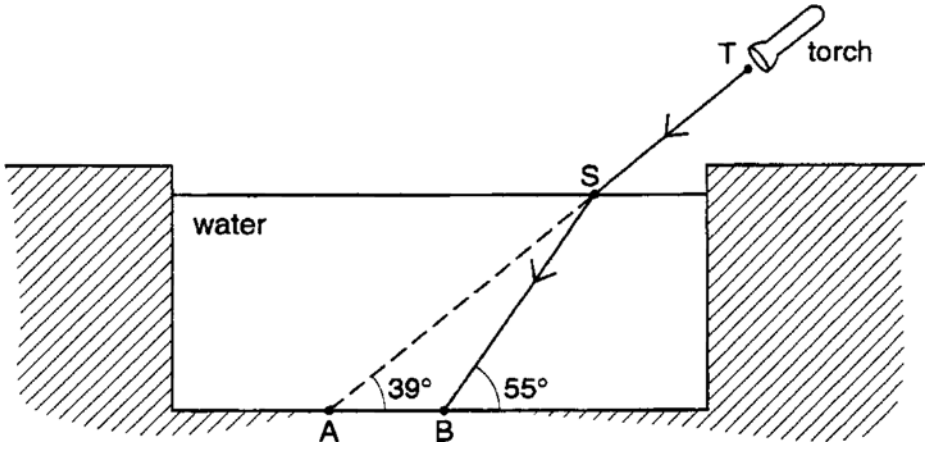


Fig. 1

(a) At S, the direction of the beam changes. State the name we use to describe this change.

.....[1]

(b) **(i)** On Fig. 1, draw the normal to the surface at S.

(ii) Clearly mark and label the angle of incidence. [2]

Core 2

(a) A ray of red light passes through a glass prism, as shown in Fig. 3.

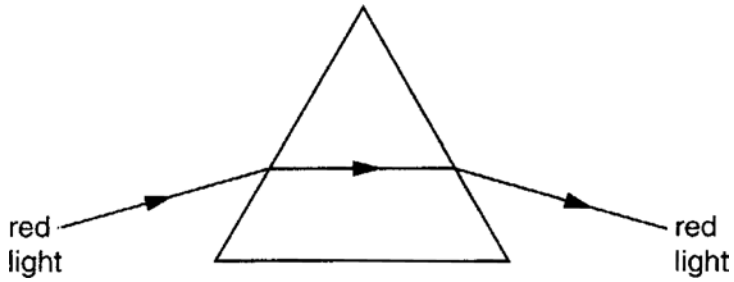


Fig. 3

What name do we use for the change of direction of the ray as it enters the glass?

.....[1]

(b) Fig. 4 shows the same prism, with white light passing through it.
The path of red light is shown.

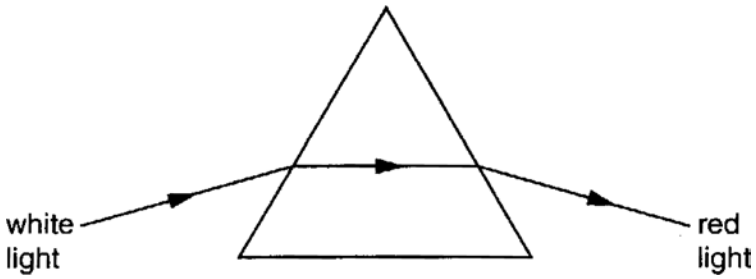


Fig. 4

(i) On Fig. 4, draw a possible path for blue light.

(ii) Something else is happening to the white light, in addition to what is shown in Fig. 3.

What name do we use for this?.....[5]

(c) Light from the Sun is now passed through the prism. The path of red light is shown in Fig. 5

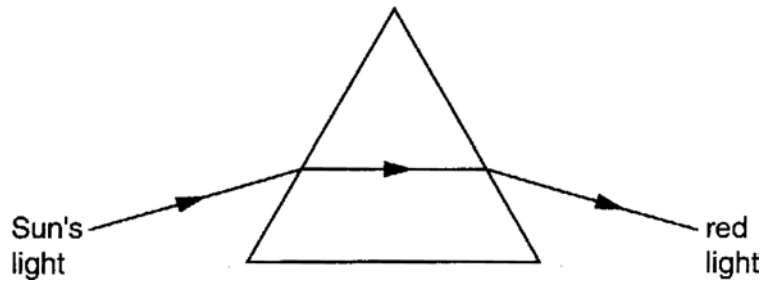


Fig. 5

We can detect infra-red rays using a thermocouple. On Fig. 5, mark with the letter **T** a position where the thermocouple could detect the infra-red rays after they have passed through the prism. [1]

Electricity 1

CORE questions

Core 1

A laboratory technician wants to make a resistor of value 64 Ω, using some resistance wire. He takes 1.0 m of this wire. The wire is shown in Fig. 1 as AC. He connects up the circuit shown.

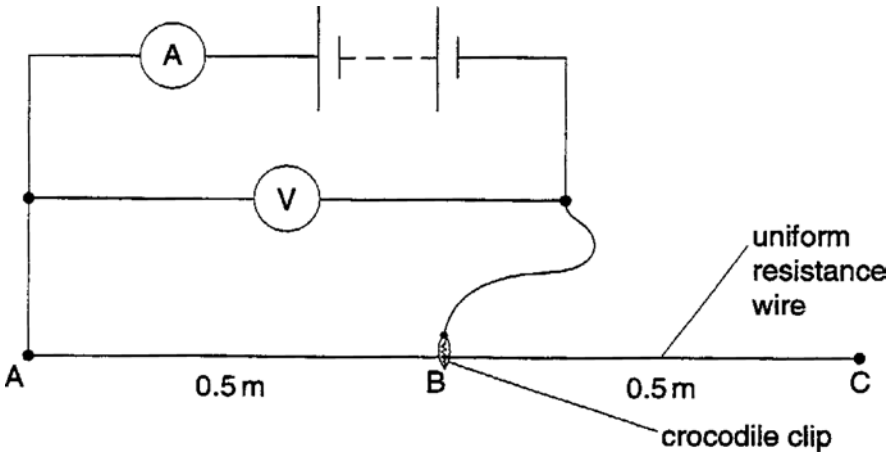


Fig. 1

(a) He connects the crocodile clip at B, which is 0.5 m from A.
Here are the readings he gets.

voltmeter reading 12 V

ammeter reading 1.5 A

Calculate the resistance of wire AB.

ANSWER: resistance of AB = ……..Ω [3]

(b) The laboratory technician now connects the crocodile clip to C, to measure the resistance of 1 m of the wire. The wire has constant thickness.

(i) In the spaces below, write the readings he obtains. Ignore the effects of the resistance of the ammeter, voltmeter and battery.

voltmeter reading ……. V

ammeter reading ……. A

ALTERNATIVE TO PRACTICAL questions

Alternative to Practical 1

Fig. 3 shows the top of a variable resistor that has a scale of resistance, which gives the resistance in use.

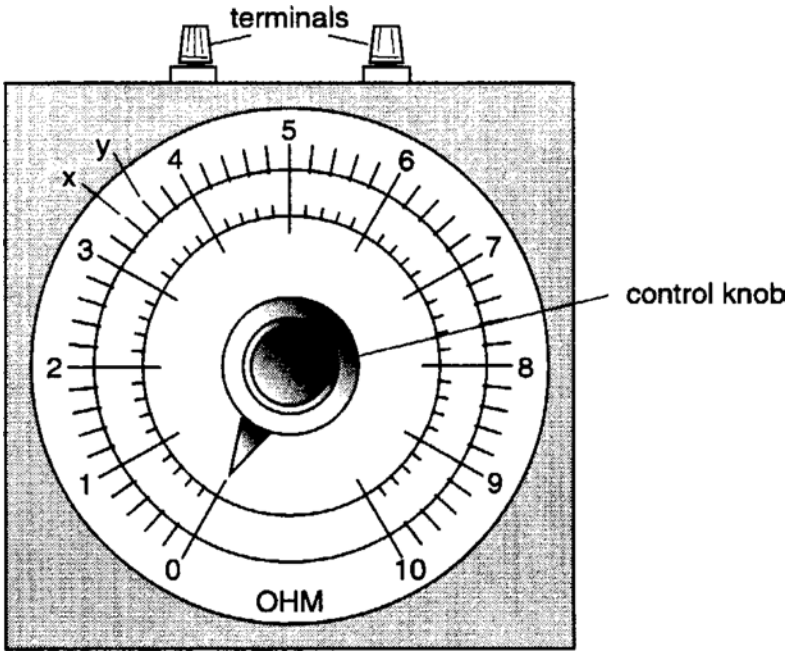


Fig. 3

(a) What range of values of resistance are available with this resistor?

range of values of resistance available = ... [1]

(b) On Fig. 3, draw a line representing the position of the pointer when the value of the resistance in use is 6.3 Ω. [1]

(c) Between the numbers 3 and 4, there are two letters x and y.

(i) What is the resistance when the pointer is at x?

resistance at x = ...

(ii) What is the *change* in resistance when the pointer moves from x to y?

change in resistance = ... [2]

(d) Draw the circuit symbol for a variable resistor.

[1]

Energy

CORE questions

Core1

A dish of hot food is put on a wooden table.

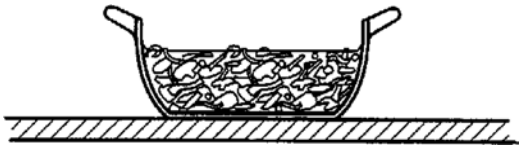


Fig. 1

(a) State three processes by which the dish and its contents could lose heat to the surroundings.

1. .....

2. .....

3. .....[3]

(b) **(i)** Describe one way of reducing the heat loss to the surroundings.

.....

.....

(ii) Which form of heat loss would this reduce?

.....[2]

Core 2

Here are some statements about energy. Complete the statements using words from the following list.

chemical, electrical, geothermal, heat, hydroelectric, light,

movement (kinetic), position (potential), strain, tidal, wave

(a) A coal fire converts ..... energy into

..... energy and ..... energy. [3]

(b) When a ball falls from rest, its ..... energy increases and its

..... energy decreases. [2]

(c) The source of energy, in which hot rocks under the Earth's surface heat water to produce

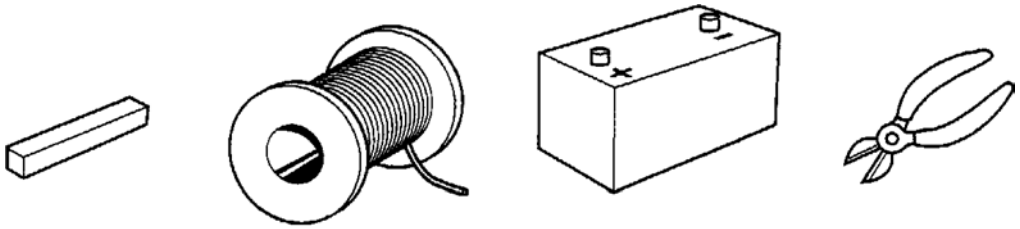
steam, is referred to as ..... energy. [1]

Electromagnetism

CORE questions

Core 1

You are given an iron bar, a reel of insulated wire, a battery and some wire cutters.



iron bar | reel of insulated wire | battery | wire cutters

(a) In the space below, describe how you would make an electromagnet. You may use a labelled diagram if it helps you to answer the question.

.....

.....

.....[3]

(b) How would you check that your electromagnet actually works?

.....

.....

.....[1]

Light – answers

Core 1

(a) refraction

(b) **(i)** the normal should be drawn at right angles to the surface of the water at S

(ii) the angle of incidence should be shown between the normal and the incident ray

(c) **(i)** the beam should be reflected away from the normal along ST

(ii) 1 total internal reflection

2 the angle in the water is greater than the critical angle

Core 2

(a) refraction or deviation

(b) **(i)** the blue path should show 2 downward refractions (i.e. below the path for red), one at each face

(ii) dispersion

(c) T should be shown just above the emergent red ray

Core 3

(a) **(i)** the normal should be shown at right angles to the mirror at P

(ii) the reflected ray should be shown at the same angle to the normal as the incident ray by eye

(ii) either angles *i* and *r* or the angles between the rays and the mirror

(b) the dot should be shown on the reflected ray as far from the mirror as L is

(c) **(i)** the ear on the right should be identified

(ii) 60 cm

Electricity 1 – answers

Core 1

(a) R = V / I
= 12 / 1.5
= 8 Ω

(b) **(i)** 12 V
0.75 A

(ii) 16 Ω

(c) **(i)** 16 Ω / m

4 m

Core2

(a) the graph should show a straight sloping line through the origin

(b) calculate the resistance or R = V / I

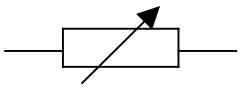
Alternative to Practical 1

(a) 0 – 10 Ω

(b) a line drawn between 6.2 and 6.4

(c) **(i)** 3.4 Ω

0.2 Ω

(d) 

(e) connect a variable resistor in series

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