To provide an idea about what this book contains, only few pages taken randomly from the book are shown here.

GCE 'O' Level (Pure) Physics (Yearly)

CONTENTS

JUNE 2009 PAPER 2

THEORY Section

Section A

Answer **all** the questions in this section.

Question 1

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Question 1

Solution

(a) As the paper falls, it accelerates and its speed increases till 0.5 seconds. After this it falls with a constant speed from 0.5 second to 2.0 second.

(b) $\text{Speed} = \dfrac{\text{distance fallen}}{\text{time taken}} = \dfrac{4.0 - 1.2}{1.5} = 1.87 \text{ ms}^{-1}$

(c) As the paper falls, its P.E. decreases but since its K.E. remains constant so the decrease in P.E. becomes the heat energy and the internal energy.

COMMENT on **ANSWER**

"**(a)** The gradient (slope) of a distance (height) - time graph is equal to speed. Since, the slope of the graph increases at the beginning so it shows that the speed increases till 0.5 second. After 0.5 s the slope becomes constant so, the speed becomes constant.

(c) During the fall of the paper, its height from the ground decreases so, its P.E. decreases. The K.E. of the paper remains constant because the speed of the paper is constant during this period."

Question 2

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Question 2

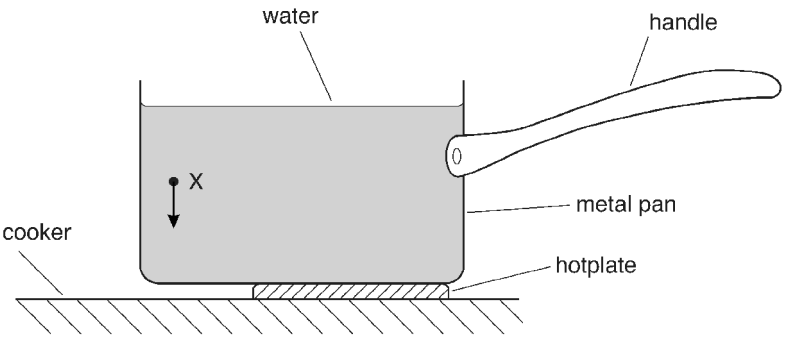
Questions are not shown in Preview

Solution

(a) (i) Conduction

(ii) On gaining heat from the hot plate, the molecules of the base of metal pan start vibrating more vigorously. This increase in vibrations is passed from the molecules of one layer to the molecules of the next layer by hitting until it reaches the water inside the pan.

(b) (i)



(ii) The water in the pan on its right gains heat from the hot plate. It becomes hot, less dense and rises up. The cold and denser water near the point X moves downwards to replace it. This sets up anticlockwise convection currents, which spread the heat energy throughout the water.

COMMENT on **ANSWER**

"(a) (i) The transfer of thermal energy in a solid takes place through conduction.

(ii) The transfer of heat energy in a metal also takes place by the diffusion of free electrons from the hot end towards the cold end."

Question 3

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Question 3

Solution

(a) $\mathrm{E} = \mathrm{Pt}$

$= 85 \times (2 \times 60)$

$= 10,200 \text{ J}$

(b) $\mathrm{E} = \mathrm{m}l$

$10200 = 31 \times l$

$l = 329 \text{ J/g}$

(c) Since some of the heat energy supplied by the heater is used to raise the temperature of ice to its melting point, so less heat energy is available to melt the ice.

COMMENT on **ANSWER**

"**(a)** *Note:* Don't forget to change the time in minutes into seconds.

(b) *Alternatively:* Change the value of m into kilograms.

So,

$\mathrm{E} = \mathrm{m}l$

$10200 = 0.031 \times l$

$l = 3.29 \times 10^5 \text{ J kg}^{-1}$"

NOVEMBER 2009 PAPER 2

THEORY Section

Section A

Answer **all** the questions in this section.

Question 1

A diver holds his breath and dives into the sea from a boat to a depth of

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Question 1

Questions are not shown in Preview

Solution

(a) (i) The weight of the water above the diver exerts extra pressure on him in addition to the atmospheric pressure.

(ii) Density of the sea-water.

(b) (i) Total pressure = Atmospheric pressure + Pressure due to sea-water

$$= (1.05 \times 10^5) + (2.55 \times 10^5)$$

$$= 3.60 \times 10^5 \text{ Pa}$$

(ii) $P_1 \times V_1 = P_2 \times V_2$

$$(1.05 \times 10^5) \times 6000 = (3.60 \times 10^5) \times V_2$$

$$V_2 = \frac{1.05 \times 10^5 \times 6000}{3.60 \times 10^5}$$

$$= 1750 \text{ cm}^3$$

COMMENT on **ANSWER**

❝ (a) (ii) *Alternative Answer:* Gravitational field strength. ❞

Question 2

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Question 2

Solution

(a) Work done = Force × distance moved

$= 1680 \times 50.0 = 84000$ J

(b) The work done by the men on the boat appears in the form of the kinetic energy of the boat but some of this energy is lost due to the resistance of water.

COMMENT on **ANSWER**

❝ **(b)** When moving through water, the boat has to overcome the water resistance (similar to air resistance). So, some of its energy is lost in the form of internal energy.

Note: The water resistance is also known as the fluid friction of water or the drag force of water. ❞

Question 3

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Question 3

Solution

(a) (i) When the player runs around on the nylon surface and his shoes rub against the surface, some electrons are transferred from his body to the nylon-fibre surface. So, he gains a net positive charge.

(ii) As the nylon-fibre surface gains negative charges from the players' body, it becomes negatively charged.

(b) (i) On touching the metal gate, he re-gains electrons from the metal gate into his positively charged body which causes an electric shock.

(ii) $Q = I \times t$

$= (1.6 \times 10^{-3}) \times (0.15 \times 10^{-3})$

$= 2.4 \times 10^{-7}$ C

Question 4

Fig. 4.1 shows an old coin displayed in a museum.

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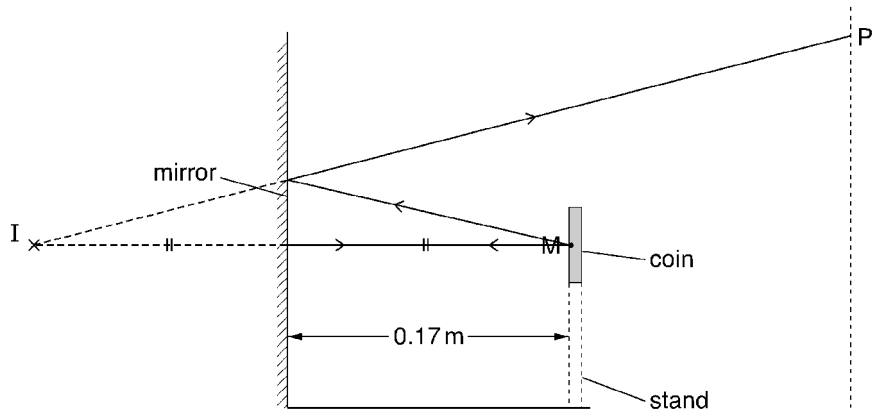
Question 4

Solution

(a) (i) & (ii)



(b) distance = 0.34 m