IGCSE Physics

Paper 6

Unsolved Topical

Past Papers with Marking Schemes

All Variants

2014-2021

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PREFACE

Excellence in learning cannot be claimed without application of concepts in a dexterous way. In this regard one of the logical approach is to start in chunks; like chapter wise learning and applying the concept on exam based questions.

This booklet provides an opportunity to candidates to practice topic wise questions from previous years to the latest. Extensive working of Team MS Books has tried to take this booklet to perfection by collaborating with top of the line teachers.

We have added answer key / marks scheme at the end of each topic for the candidate to compare the his/her answer to the best.

MS Books strives to maintain actual spacing between consecutive questions and within options as per CAIE format which gives students a more realistic feel of attempting question.

Review, feedback and contribution in this booklet by various competent teachers of a subject belonging to renowned school chains make it most valuable resource and tool for both teachers and students.
With all belief in strength of this resource material I can confidently claim that it is worth in achieving brilliance.

Our sincere thanks and gratification to **Mr. Mirza Irshad Baig** who took out special time to help compile and manage this booklet. We would also like to appreciate physics faculty for reviewing and indorsing it.

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Length and Time

Q1/P62/M/J/14

1 An IGCSE student is taking measurements of a pencil.

Fig. 1.1 shows the pencil, drawn full size.

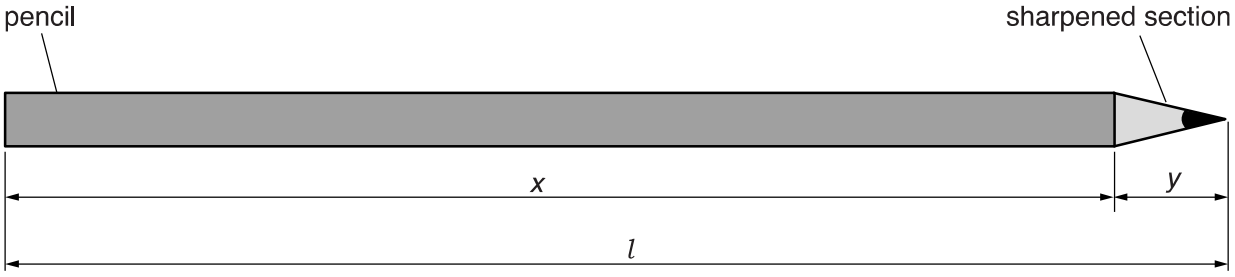

Fig. 1.1

(a) (i) On Fig. 1.1, measure, in cm, the total length l of the pencil.

l = ... cm

(ii) Measure, in cm, the length x of the unsharpened section of the pencil.

x = ... cm

(iii) Calculate the length y of the sharpened section of the pencil, using the equation $y = (l - x)$.

y = ... cm
[2]

(b) Describe how you would use a length of string and a rule to determine the circumference c of the unsharpened section of the pencil.

.....

.....

.....

.....

.....[2]

(c) The student's value for the circumference is $c = 2.4$ cm.

(i) Suggest a source of inaccuracy in determining the circumference of the pencil.

.....

.....[1]

(ii) Calculate the volume V of the unsharpened section of the pencil using the equation $V = \frac{c^2 x}{4\pi}$.

$V =$ ..... [1]

(iii) Estimate the volume V_E of the sharpened section of the pencil. Show your working or reasoning.

$V_E =$ ..... [2]

Q5/P61/O/N/14

2 An IGCSE student is taking measurements of a drinks cup.

Carry out the following instructions, referring to Fig. 5.1.

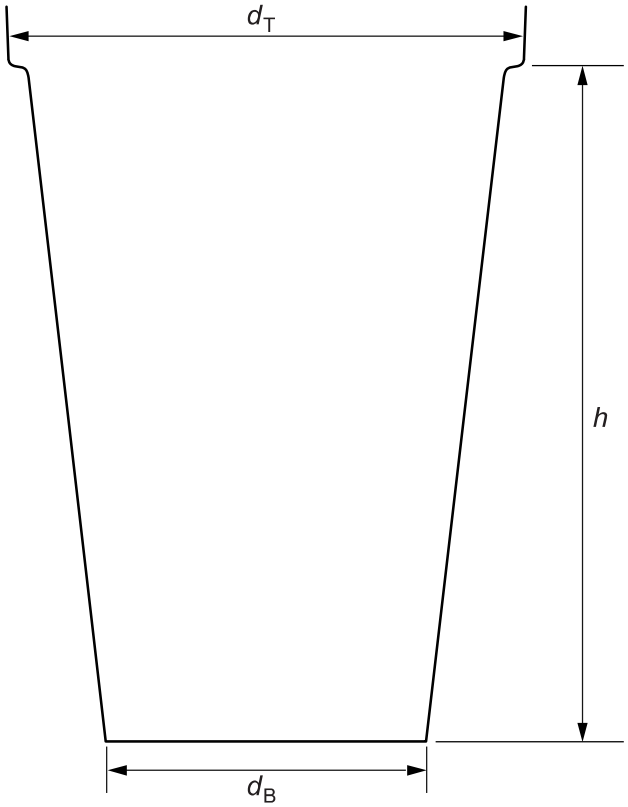

Fig. 5.1

(a) (i) On Fig. 5.1, measure the height h of the cup.

h = ... cm

(ii) On Fig. 5.1, measure the diameter d_T of the top of the cup.

d_T = ... cm

(iii) On Fig. 5.1, measure the diameter d_B of the bottom of the cup.

d_B = ... cm

(iv) Calculate the average diameter d_A, using the equation $d_A = \frac{d_T + d_B}{2}$.

d_A = ... cm

(v) Calculate an approximate value for the volume V of the cup, using the equation $V = \frac{\pi d_A^2 h}{4}$.

V = ...

[3]

(b) The student determines the average circumference of the cup, using a 50 cm length of string and a metre rule.

Fig. 5.2 shows how the student used the string to determine the average circumference.

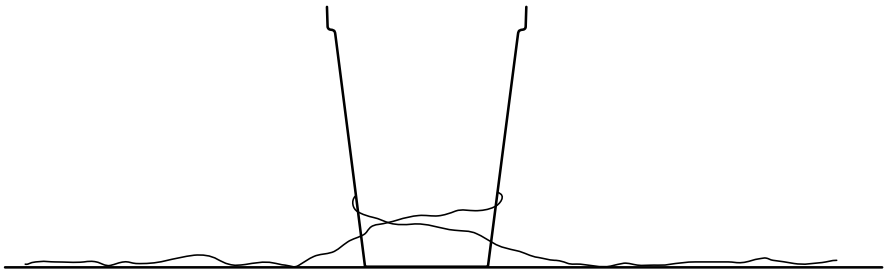

Fig. 5.2

Describe how you would use the string to obtain a more reliable value for the average circumference.

.....

.....

.....[2]

(c) The student fills a measuring cylinder to the 500 cm^3 mark. He pours water from the measuring cylinder into the cup until the cup is full. Fig. 5.3 shows the water remaining in the measuring cylinder.

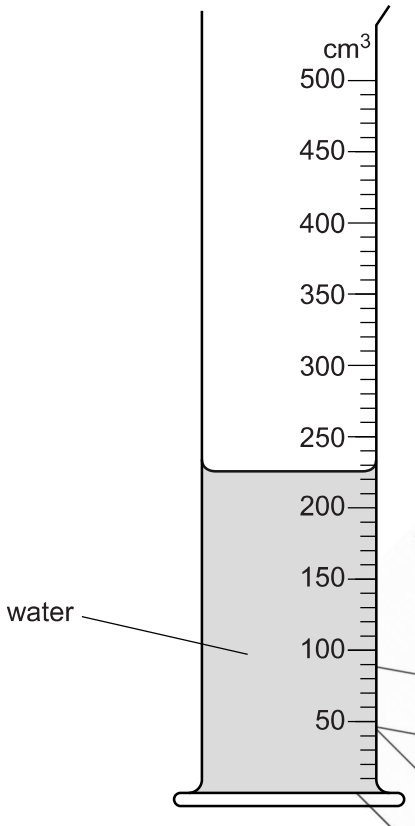

Fig. 5.3

(i) Record the volume of water V_R remaining in the measuring cylinder.

V_R = ...

(ii) Calculate the volume V_W of the water in the cup.

V_W = ...
[2]

(d) On Fig. 5.3, show clearly the line of sight required to take the reading of V_R. [1]

Q1/P62/O/N/14

3 An IGCSE student is taking measurements of a sample of modelling clay. She has moulded the sample of modelling clay into a cube, as shown in Fig. 1.1.

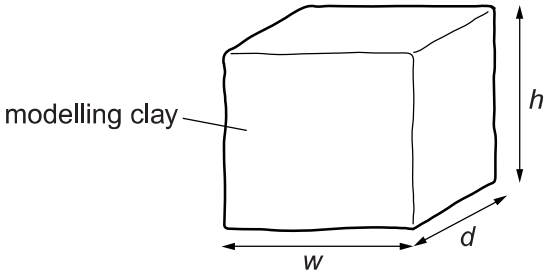

Fig. 1.1

(a) (i) On Fig. 1.2, measure the height h and width w of the piece of modelling clay.

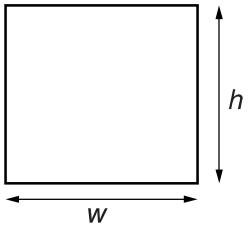

Fig. 1.2

h = ...cm

w = ...cm

(ii) On Fig. 1.3, measure the depth d of the piece of modelling clay.

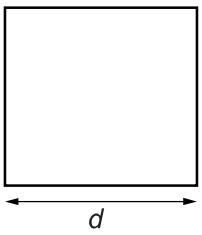

Fig. 1.3

d = ...cm

(iii) Calculate the volume V_A of the modelling clay using the equation $V_A = hwd$.

V_A = ... cm^3

(iv) The mass m of the piece of modelling clay is shown in Fig. 1.4.

Calculate the density ρ of the modelling clay using the equation $\rho = \frac{m}{V_A}$.

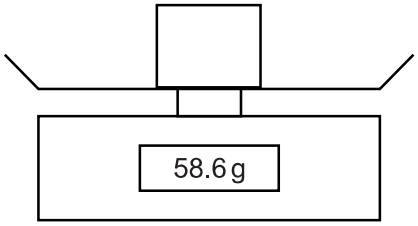

Fig. 1.4

ρ = ...

[3]

(b) The student moulds the piece of modelling clay into a spherical shape.

Draw a diagram to show how you would use two rectangular blocks of wood and a rule to measure the diameter of the sphere of modelling clay.

[1]

(c) The student pours water into a measuring cylinder, as shown in Fig. 1.5.

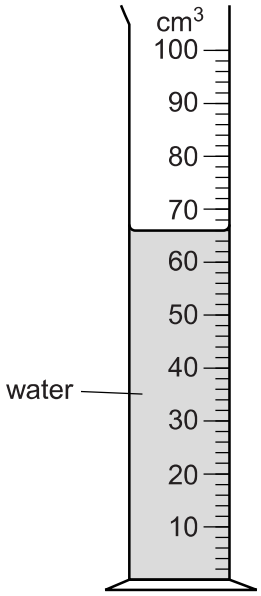

Fig. 1.5

(i) Record the volume V_1 of water shown in Fig. 1.5.

V_1 = ...[1]

(ii) On Fig. 1.5, show clearly the line of sight required to take the reading of V_1. [1]

(d) The student uses a piece of string to lower the sample of modelling clay into the measuring cylinder until it is completely covered with water. The new volume reading V_2 is 84 cm^3.

Calculate the volume V_B of the modelling clay using the equation $V_B = (V_2 - V_1)$.

V_B = ...[1]

(e) The student suggests that the volume of the modelling clay should not change when the shape is changed.

Assuming that the experiment has been carried out with care, suggest two reasons why the values V_A and V_B may not be the same.

1. .....

.....

2. .....

.....[2]

Q1/P62/M/J/14

1 **(a)** **(i)** l in range 17.1–17.2 (cm) [1]

(ii) x in range 15.5–15.6 (cm) **and** correct calculation of y (e.c.f. incorrect l) [1]

(b) use of at least 3 turns [1]

(mark string and) measure distance (between marks) **and** divide by number of turns [1]

(c) **(i)** any one from:
- stretching of string
- thickness of string
- thickness of mark
- gaps between turns
- winding of turns at an angle [1]

(ii) V = 7.1(0)–7.2(0) $\underline{\text{cm}^3}$ e.c.f. **(a)(ii)** [1]

(iii) V_E = 0.2–0.6 (cm^3) [1]
(expect estimate to nearest 0.1 cm^3)

sensible reasoning / working / method which takes account of sharpened shape and length [1]

Q5/P61/O/N/14

2 **(a)** h = 9.5cm d_T = 7.2 cm – 7.3 cm and d_B = 4.5 cm [1]

d_A = 5.85 / 5.9 cm (no mark), V rounds to 260 cm^3 (no ecf) [1]

2 or 3 significant figures and cm^3 [1]

(b) measurement of circumference half way up, or at top and bottom [1]

more than one revolution used for the measurement in at least one position, and divide [1]

(c) **(i)** 225 [1]

(ii) 275 (ecf 500 – candidate's **(c)(i)** [1]

(d) correct line of sight clearly shown at right angles outside measuring cylinder [1]

Q1/P62/O/N/14

3 **(a)** **(i)** h = 2.5, w = 2.7, and d = 2.7 [1]

(ii) V_A = 18.225 (cm^3) to 2 or more sig. figs. ecf **(i)** [1]

(iii) density = 3.22 $\underline{\text{g / cm}^3}$ to 2 or 3 sig. figs. ecf **(ii)** [1]
unit needed, penalise additional sig. figs.

(b) diagram showing blocks and rule correctly used – blocks touching the sphere, and rule spanning gap and touching blocks [1]

(c) **(i)** V_1 = 66 (cm^3) [1]

(ii) line of sight at right angles to measuring cylinder [1]

(d) V_B = 18 (cm^3) ecf from candidate's V_1 [1]

(e) any two from:
measuring cylinder not sensitive owtte
some clay left on fingers
cube not perfectly shaped / difficult to measure owtte
air bubbles clinging to modelling clay / within the modelling clay
volume of string
difficult to judge the bottom of the meniscus / bubble on meniscus [2]
ignore parallax
do not credit poor experimental practice e.g. spills or splashes