SMART EXAM RESOURCES
9702 PHYSICS TOPIC QUESTIONS
TOPIC: PHYSICAL QUANTITIES AND UNITS
SUB-TOPIC: PHYSICAL QUANTITIES AND UNITS
SUB-SUB-TOPIC:ESTIMATE OF PHYSICAL QUANTITIES
SET-1-QP-MS

1 **(a)** Make estimates of:

(i) the mass, in g, of a new pencil

mass = ... g [1]

(ii) the wavelength of ultraviolet radiation.

wavelength = ... m [1]

Mark Scheme:

(a)(i)	mass in range 1–20 g	**A1**
(a)(ii)	wavelength in range 1×10^{-8} m to 4×10^{-7} m	**A1**

2 **(a)** Make estimates of

(i) the mass, in kg, of a wooden metre rule,

mass = ... kg [1]

(ii) the volume, in cm^3, of a cricket ball or a tennis ball.

volume = ... cm^3 [1]

Mark Scheme:

(a)	**(i)**	$(50 \text{ to } 200) \times 10^{-3}$ kg or $(0.05 \text{ to } 0.2)$ kg	B1	[1]
	(ii)	$(50 \text{ to } 300)\,\text{cm}^3$	B1	[1]

3 Make estimates of the following quantities.

(a) the thickness of a sheet of paper

thickness = ... mm [1]

(b) the time for sound to travel 100 m in air

time = ... s [1]

(c) the weight of 1000 cm^3 of water

weight = ... N [1]

Mark Scheme:

(a) allow 0.05 mm → 0.15 mm B1 [1]

(b) allow 0.25 s → 0.5 s B1 [1]

(c) allow 8 N → 12 N B1 [1]

ignore number of significant figures

4 Titanium metal has a density of $4.5\,g\,cm^{-3}$.

A cube of titanium of mass 48 g contains 6.0×10^{23} atoms.

(i) Calculate the volume of the cube.

volume = ... cm^3 [1]

(ii) Estimate

1. the volume occupied by each atom in the cube,

volume = ... cm^3 [1]

2. the separation of the atoms in the cube.

separation = ... cm [1]

Mark Scheme:

(i) volume = $(\frac{48}{4.5}=)$ 10.7 cm^3 ..... A1 [1]

(ii) **1** volume = 10.7 / (6.0×10^{23})
= 1.8×10^{-23} cm^3 ..... A1 [1]
2 separation = $\sqrt[3]{(1.8 \times 10^{-23})}$
= 2.6×10^{-8} cm ..... A1 [1]

5 A double-slit interference experiment is set up using coherent red light as illustrated in Fig. 5.1.

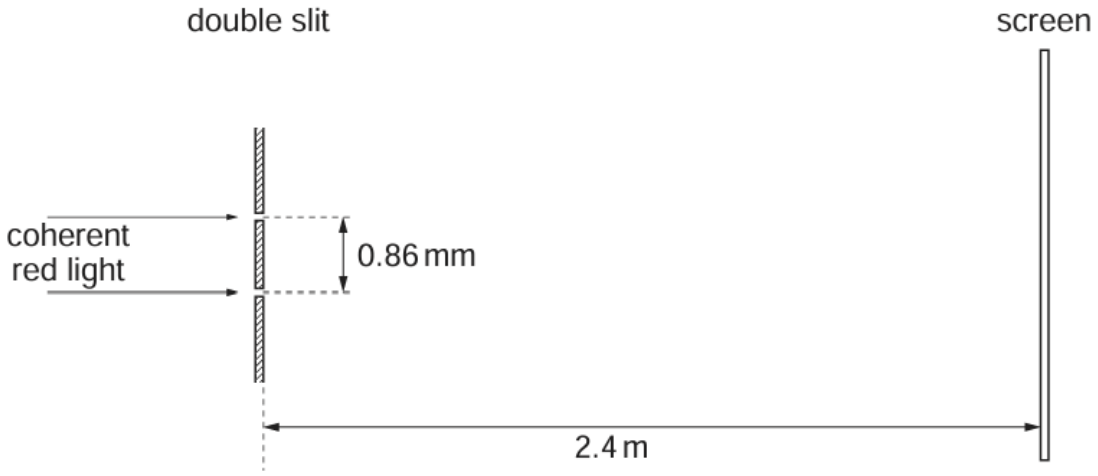

Fig. 5.1 (not to scale)

The separation of the slits is 0.86 mm.
The distance of the screen from the double slit is 2.4 m.
A series of light and dark fringes is observed on the screen.

Estimate the separation of the dark fringes on the screen.

separation = ... mm [3]

Mark Scheme:

)	path difference between waves from S_1 and S_2 = 28 cm	B1	
	wavelength changes from 33 cm to 8.25 cm	B1	
	minimum when λ = (56 cm,) 18.7 cm, 11.2 cm, (8.0 cm)	B1	
	so two minima	B1	[4]