A Level · OCR · Physics

9 mins 9 questions

Multiple Choice Questions

Use of Measuring Instruments & Electrical Equipment

Using Appropriate Instruments & Techniques / Analogue Apparatus & Interpolation / Use of Digital Instruments / Stopwatch & Light Gates / Calipers, Micrometers & Vernier Scales / Circuits / Signal Generators & Oscilloscope / Using a Laser or Light Source / Computer Modelling & Data Logger / Ionising Radiation & Detectors

Medium (5 questions)	/5
Hard (4 questions)	/4
Total Marks	**/9**

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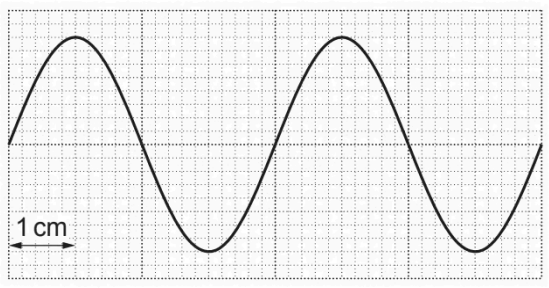
Medium Questions

1 The diagram below shows the oscilloscope trace for an electrical signal.



The time-base setting of the oscilloscope is 2 μs cm^{-1}.

What is the frequency of the signal?

A. 125 Hz

B. 250 Hz

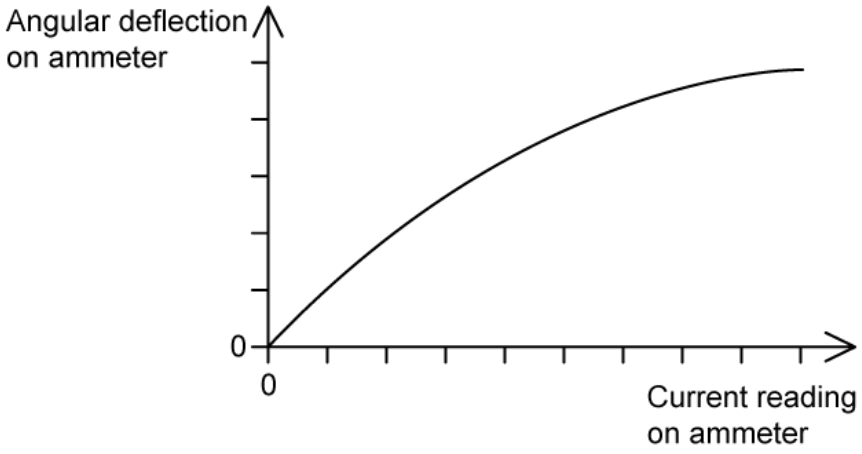
C. 125 kHz

D. 250 kHz

(1 mark)

2 A student is investigating the angular deflection with respect to the current. He plots the graph between angular deflection and current for an analogue ammeter as shown in the

graph



Which diagram(s) does not represent the appearance of the scale on these meters?

Diagram 1

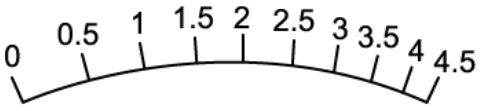


Diagram 2

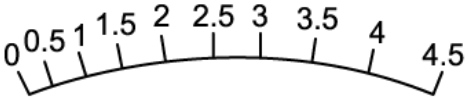


Diagram 3

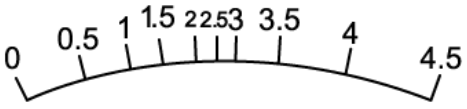
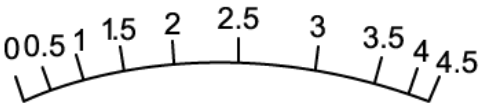


Diagram 4



A. 1, 2 and 3

B. 2,3 and 4

C. Only 2 and 3

D. Only 1

(1 mark)

3 A student is investigating the relationship between current and resistance.

He uses a variable resistor in his circuit to make changes in the current and resistance.

Fig.1 shows the top of a variable resistor with a scale of resistance, which gives the resistance in use.

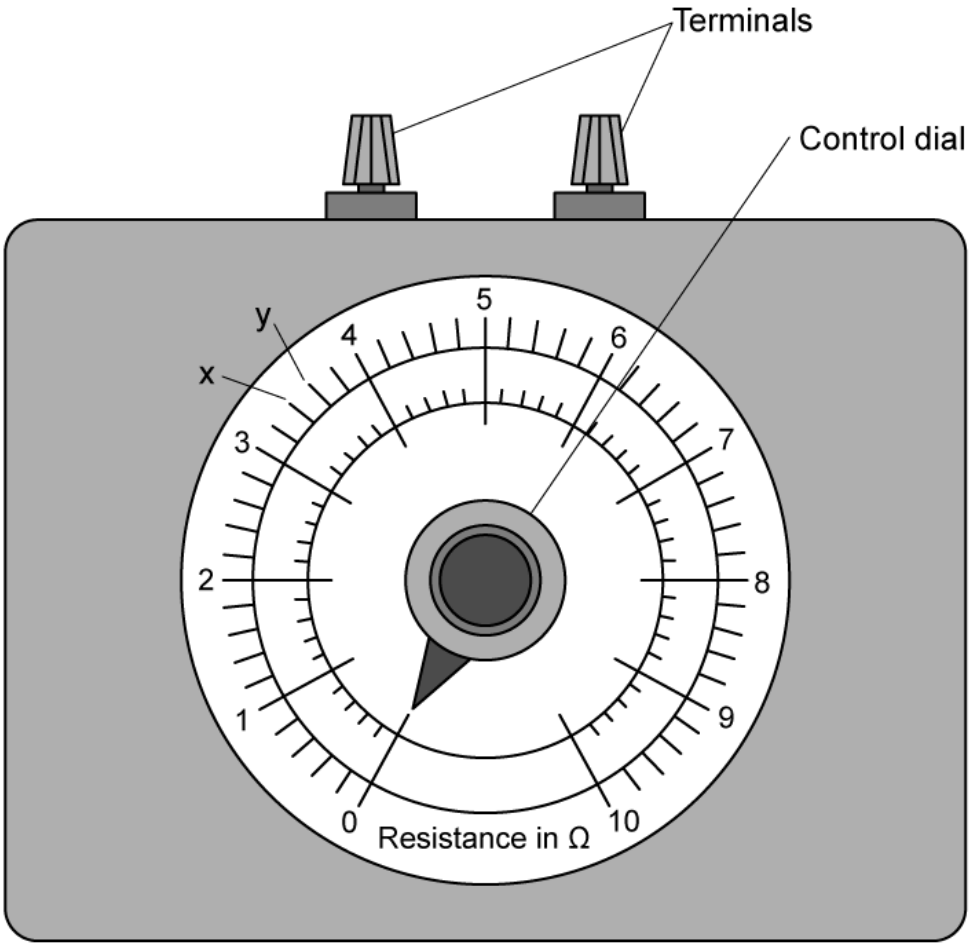


Fig. 1

What range of values of resistance are available with this resistor?

A. 0 – 5 Ω

B. 0 – 10 Ω

C. 0 – 8 Ω

D. 0 – 100 Ω

(1 mark)

4 A student uses a micrometer to measure the thickness *t* of tissue paper. The tissue paper is folded in half two times and the total thickness is measured. The micrometer is shown in Figure 3

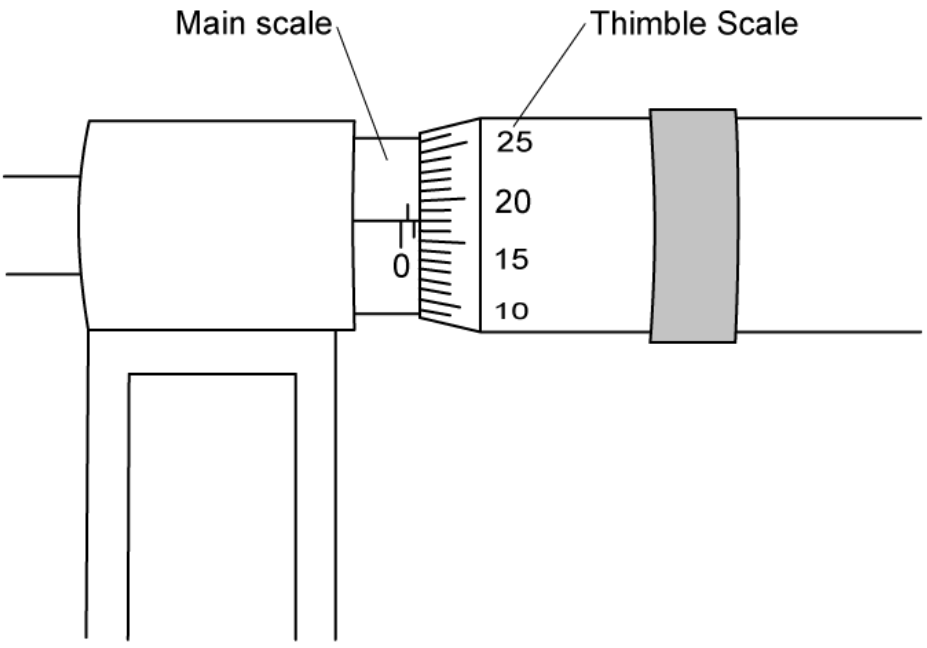


Fig. 3

What is the value of the thickness *t* ?

A. 0.295

B. 0.59

C. 1.18

D. 2.36

(1 mark)

5 A student uses a cathode-ray oscilloscope (c.r.o) to determine the frequency of the electric signal emitted by an AC generator. The trace produced on the screen of the c.r.o.

is shown in Fig. 4.

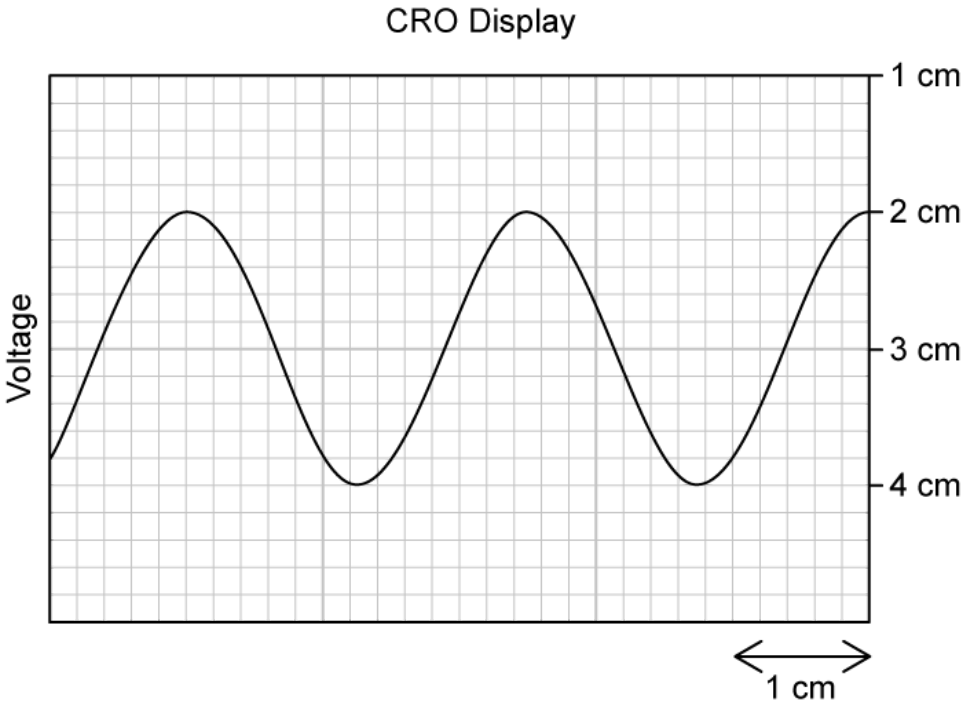


Fig. 4

The frequency of the electric signal is 2000 Hz

What is the time-base setting (μs cm^{-1}) of the c.r.o?

A. 0.0002

B. 0.2

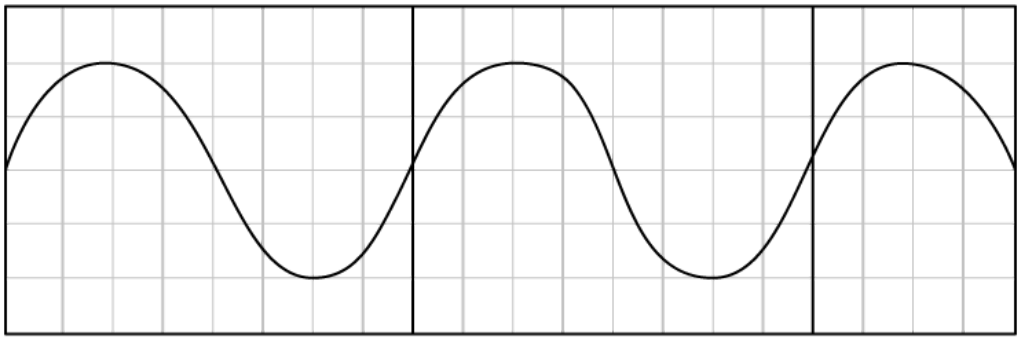
C. 200

D. 500

(1 mark)

Hard Questions

1 A wave travelling at a speed of 125 m s^{-1} with a wavelength of 20 cm is being measured by an oscilloscope. The reading from the oscilloscope is shown below.



What is the time base of the oscilloscope?

A. 1.6 ms div^{-1}

B. 6.25 s div^{-1}

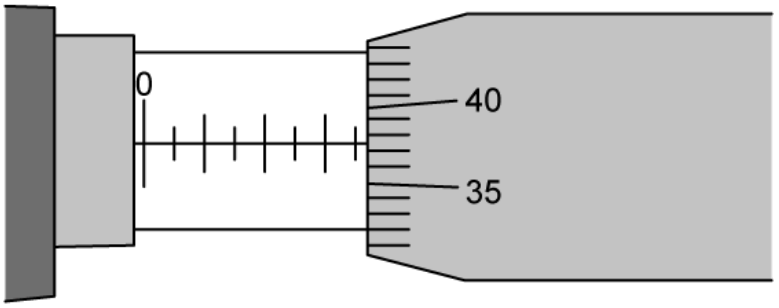
C. 0.2 ms div^{-1}

D. 12.8 ms div^{-1}

(1 mark)

2 A micrometre is used to measure the thickness of the wire and the reading is shown below. The resolution of the main scale and thimble scale is 0.5 mm and 0.01 mm

respectively.



What is the lowest possible value of the cross-sectional area of the wire?

A. $4.13 \times 10^{-5}\ m^2$

B. $1.35 \times 10^{-3}\ m^2$

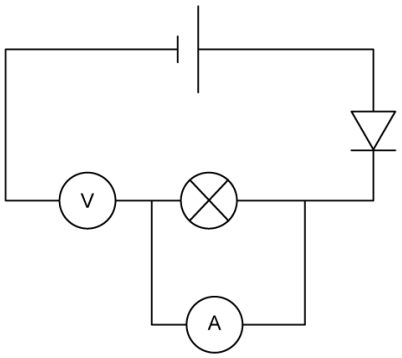
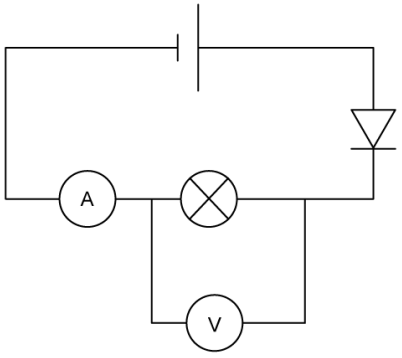
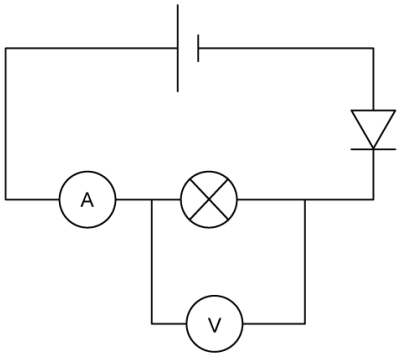
C. $1.18 \times 10^{-5}\ m^2$

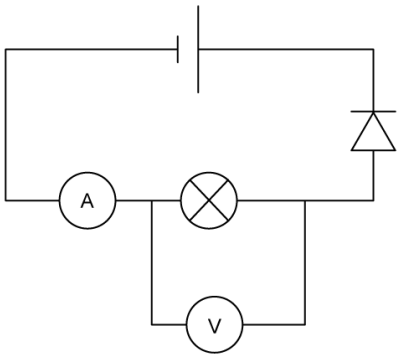
D. $1.03 \times 10^{-5}\ m^2$

(1 mark)

3 Below are four different circuit diagrams and a statement about the diagram. The potential difference of the cell is 10 V.

Which one of the statements is true?

A.		The bulb will not light up
B.		The potential difference of the diode is 10 V
C.		The bulb will light up

D.		The current through the diode is 0 A

(1 mark)

4 A student conducted an experiment to determine the acceleration due to gravity by dropping a ball from a height of 1.8 m. The time it took the ball to hit the floor was measured with a stopwatch and a light gate three times. The resolution of the light gate and the stopwatch is 0.01 s.

The results from the experiment are shown below.

	Component A *t* / s	**Component B *t* / s**
Reading 1	0.62	0.85
Reading 2	0.61	0.80
Reading 3	0.62	0.88

Which statement is **true**?

A. The readings from component B are neither precise or accurate

B. The readings from Component A are most likely from the stopwatch

C. Component B is more accurate than component A

D. The uncertainty in the readings from the stopwatch is ± 0.005 s

(1 mark)