Materials

Question Paper 1

Level	International A Level
Subject	Physics
Exam Board	Edexcel
Topic	Materials
Sub Topic	
Booklet	Question Paper 1

Time Allowed: **66 minutes**

Score: **/55**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 In an experiment to determine the Young modulus of a material in the form of a wire, which of the following instruments should be used to measure the diameter of the wire?

☒ **A** electronic balance

☒ **B** metre rule

☒ **C** micrometer screw gauge

☒ **D** vernier calipers

(Total for Question 1 = 1 mark)

2 Which of the following is a correct unit for stress?

☒ **A** m^{-2}

☒ **B** N

☒ **C** $N\ m^{-1}$

☒ **D** Pa

(Total for Question 2 = 1 mark)

3 In an experiment to determine the density of a liquid, 100 g of the liquid has a volume of 80 cm^3. What is the density of the liquid in $kg\ m^{-3}$?

☒ **A** 1.25×10^{-5}

☒ **B** 0.125

☒ **C** 1.25

☒ **D** 1250

(Total for Question 3 = 1 mark)

4 Which of the following is the SI unit for density?

☒ **A** $g\ cm^{-3}$

☒ **B** $g\ m^{-3}$

☒ **C** $kg\ m^{-2}$

☒ **D** $kg\ m^{-3}$

(Total for Question 4 = 1 mark)

5 A student carries out an experiment to determine the viscous drag on a sphere falling at constant speed through a liquid of known viscosity.

Which of the following quantities is **not** required?

☒ **A** diameter of sphere

☒ **B** height of fall

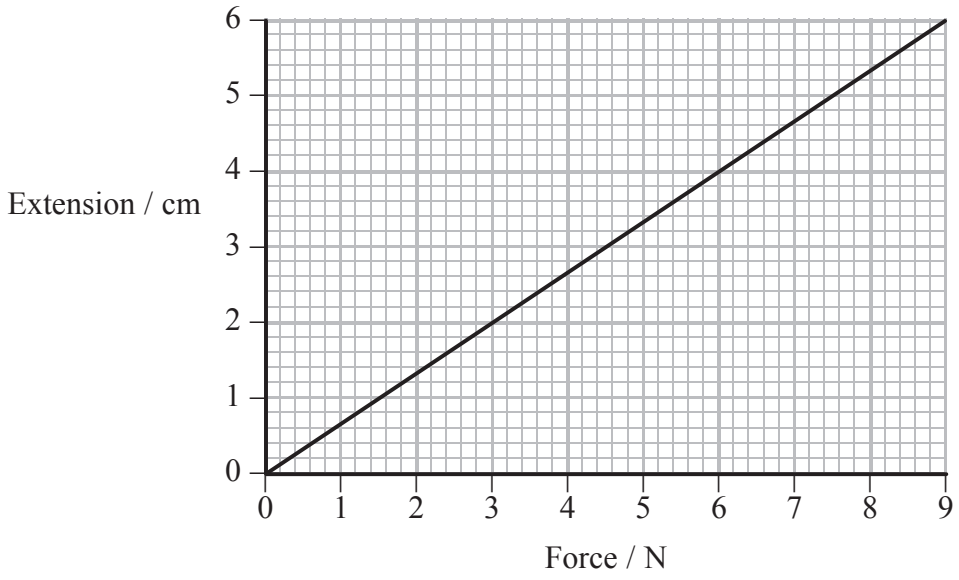
☒ **C** mass of sphere

☒ **D** time of fall

(Total for Question 5 = 1 mark)

Questions 6 and 7 refer to the graph below.

The graph shows how extension varies with applied force for a spring.



6 The force constant k for the spring is given by

☒ **A** half the area under the graph.

☒ **B** the area under the graph.

☒ **C** the gradient.

☒ **D** the inverse of the gradient.

(Total for Question 6 = 1 mark)

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7 The energy stored in the spring when it is stretched by 6 cm is given by

☒ **A** half the area under the graph.

☒ **B** the area under the graph.

☒ **C** the gradient.

☒ **D** the inverse of the gradient.

(Total for Question 7 = 1 mark)

8 A student is asked to determine the Young modulus of nylon in the form of a fishing line. He arranges the fishing line horizontally with one end over a pulley so that masses can be hung vertically from the end of the line.

Describe an experiment that uses this arrangement to determine the Young modulus by a graphical method.

You should:

(a) draw and label a diagram of the apparatus to be used,

(1)

(b) list any additional measuring instruments required that are not shown in the diagram,

(1)

(c) list the quantities to be measured,

(1)

(d) for two quantities explain your choice of measuring instrument,

(4)

(e) for one quantity comment on whether repeat readings are appropriate,

(1)

(f) state which is the independent variable and which is the dependent variable,

(2)

(g) explain how the data collected will be used to determine the Young modulus, include a sketch of the expected graph,

(4)

(h) comment on a main source of uncertainty and/or systematic error,

(2)

(i) comment on safety.

(1)

(Total for Question 8 = 17 marks)

9 A student is asked to plan an experiment to determine the energy stored in a stretched spring when it is extended by 300 mm. The student is told to use a graphical method.

For a 1 N load the extension of the spring is 40 mm.

Write a plan which could be used for this experiment.

You should:

(a) draw a labelled diagram of the experimental set-up and list any additional apparatus required,

(3)

(b) state which quantity is the independent variable and which quantity is the dependent variable,

(2)

(c) state and explain your choice of measuring instruments for the independent and dependent variables,

(4)

(d) describe how you would ensure that your measurement of the extension is as accurate as possible,

(2)

(e) comment on whether repeat readings are appropriate in this case,

(1)

(f) explain how the data collected will be used to determine the energy stored,

(4)

(g) explain the main source of uncertainty and/or systematic error,

(1)

(h) comment on safety.

(1)

(Total for Question 9 = 18 marks)

10 A student is asked to determine the spring constant of a spiral spring.

Write a plan for an experiment to do this using standard laboratory apparatus and a graphical method.

You should:

(a) draw a labelled diagram of the experimental set-up to be used,

(2)

(b) list any additional apparatus you might need,

(1)

(c) state what quantity is the independent variable and what quantity is the dependent variable,

(2)

(d) describe how you would take your measurements and explain your choice of measuring instruments,

(4)

(e) explain how the data collected will be used to find the spring constant,

(2)

(f) identify the main sources of uncertainty and/or systematic error,

(1)

(g) comment on safety.

(1)

(Total for Question 10 = 13 marks)