EDITION # 07

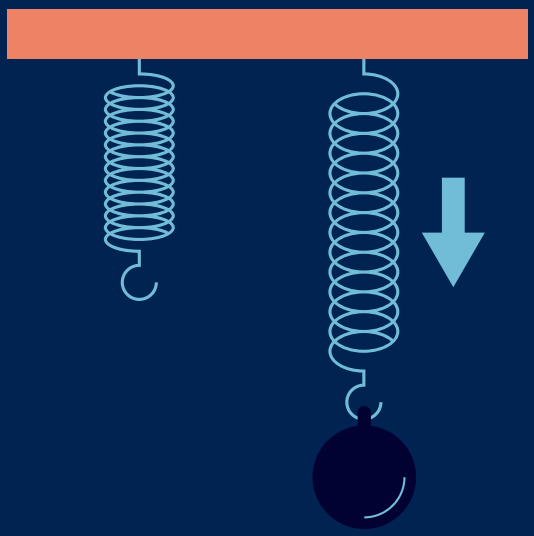
MAY 2025

EDEXCEL IAL PHYSICS

UNIT 1 - MATERIAL

Topical Past Paper MCQs

(2019 till May 2025)



WHAT'S INSIDE

- 6 Years of Past Papers: The complete collection (2019–2025).
- Sorted by Topic: Don't just practice—master one concept at a time
- Sample Assessment Papers: Includes the "hidden" questions often missed in standard revision.
- Exam-Ready: 50+ carefully curated questions to boost your grade.

EXAM PREP ARENA
HUB OF EXAM PREPARATION

1.4.23 (Density $\rho = \frac{m}{V}$)

1. **Jan 2024, Q8**

A solid cube of weight W is made from material with density ρ.
Which expression gives the length of each side of the cube?

- ☒ **A** $\left(\frac{\rho g}{W}\right)^3$
- ☒ **B** $\sqrt[3]{\frac{\rho g}{W}}$
- ☒ **C** $\left(\frac{W}{\rho g}\right)^3$
- ☒ **D** $\sqrt[3]{\frac{W}{\rho g}}$

(Total for Question 8 = 1 mark)

2. **May 2021, Q2**

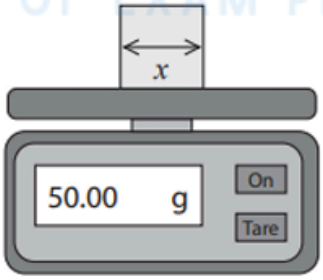
A cylinder of aluminium has a weight of 35.0N and a volume of $1.32 \times 10^{-3} m^3$.
Which of the following calculations gives the density of aluminium in kg m^{-3}?

- ☒ **A** $\frac{9.81 \times 1.32 \times 10^{-3}}{35.0}$
- ☒ **B** $\frac{1.32 \times 10^{-3}}{35.0 \times 9.81}$
- ☒ **C** $\frac{35.0}{9.81 \times 1.32 \times 10^{-3}}$
- ☒ **D** $\frac{35.0 \times 9.81}{1.32 \times 10^{-3}}$

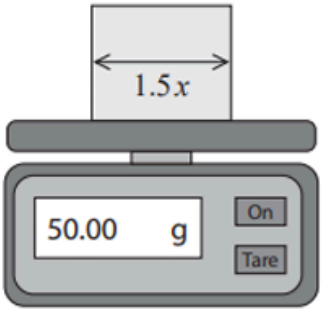
(Total for Question 2 = 1 mark)

3. **Jan 2019, Q10**

A student used a balance to measure the mass of a small cube with sides of length x



The student also measured the mass of a larger cube with sides of length 1.5 x.



Which of the following is the density ρ_L of the larger cube in terms of the density ρ_S of the smaller cube?

- ☒ **A** $\rho_l = 3.4\ \rho_s$
- ☒ **B** $\rho_L = 1.5\ \rho_s$
- ☒ **C** $\rho_L = 0.67\ \rho_s$
- ☒ **D** $\rho_L = 0.30\ \rho_S$

(Total for Question 10 = 1 mark)

1.4.24 (Upthrust = weight of fluid displaced)

4. **May 2025, Q1**

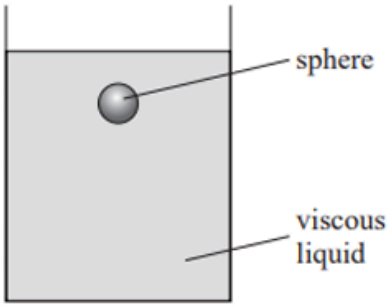
A cube of volume V is placed in a liquid of density ρ. The cube displaces a weight W of the liquid. Which of the following gives the magnitude of the upthrust acting on the cube?

- ☒ **A** $V \times W$
- ☒ **B** V
- ☒ **C** $V \times \rho$
- ☒ **D** W

(Total for Question 1 = 1 mark)

5. **May 2022, Q2**

A sphere falls through a viscous liquid as shown.



Which row of the table describes the upthrust and the viscous drag on the sphere as it accelerates downwards?

	Upthrust	Viscous drag
☒ **A**	increasing	increasing
☒ **B**	constant	increasing
☒ **C**	increasing	constant
☒ **D**	constant	constant

(Total for Question 2 = 1 mark)

6. **May 2019, Q3**

A sphere of weight 2.5 N floats m water with 1/2 of its volume the surface.
A force F is applied to the sphere, completely immersing it in the water as shown.

Which of the following is the minimum value of F?

- ☒ **A** $2 \times 2.5N$
- ☒ **B** $1 \times 2.5\ N$
- ☒ **C** $\frac{1}{2} \times 2.5\ N$
- ☒ **D** $\frac{1}{4} \times 2.5\ N$

(Total for Question 3 = 1 mark)

1.4.25.b (Stokes' Law conditions)

7. **MAY 2024, Q3**

An object is moving through a fluid.

Which row of the table states the conditions which must be met for Stokes' law

	Size of object	Shape of object	Type of flow
☒ A	any	any	turbulent
☒ B	any	spherical	turbulent
☒ C	small	spherical	laminar
☒ D	small	any	laminar

(Total for Question 3 = 1 mark)

8. **Oct 2022, Q3**

Which of the following best describes the situations in which Stokes' Law applies for objects moving in a fluid?

☒ **A** all spherical objects moving at low speeds
☒ **B** all spherical objects in a fluid with low viscosity
☒ **C** small spherical objects moving at low speeds
☒ **D** small spherical objects in a fluid with low viscosity

(Total for Question 3 = 1 mark)

9. **Oct 2021, Q9**

A student measured the terminal velocity of different objects as they fell through a liquid. The student used the measurements and Stokes' Law to calculate the viscosity of the liquid.

For which of the following conditions does Stokes' Law apply?

☒ **A** spherical objects and laminar flow
☒ **B** spherical objects and low viscosity
☒ **C** cylindrical objects and laminar flow
☒ **D** cylindrical objects and low viscosity

(Total for Question 9 = 1 mark)

10. **May 2019, Q5**

A sample of sea water is collected using a beaker. The sample contains some particles of sand which settle at the bottom of the beaker.

Which of the following would result in a decrease in the time taken for the sand to settle?

☒ **A** smaller particles of sand
☒ **B** lower temperature of the sea water
☒ **C** smaller terminal velocity of sand particles
☒ **D** lower viscosity of the sea water

(Total for Question 5 = 1 mark)

11. **Jan 2019, Q3**

Stokes' law can be used to determine the frictional force on an object moving through a fluid.

To which of the following would Stokes' law best apply?

☒ **A** A large sphere moving quickly through a fluid.
☒ **B** A large sphere moving slowly through a fluid.
☒ **C** A small sphere moving quickly through a fluid.
☒ **D** A small sphere moving slowly through a fluid.

(Total for Question 3 = 1 mark)

1.4.26 (CORE PRACTICAL 2: Determine viscosity)

12. **May 2023, Q9**

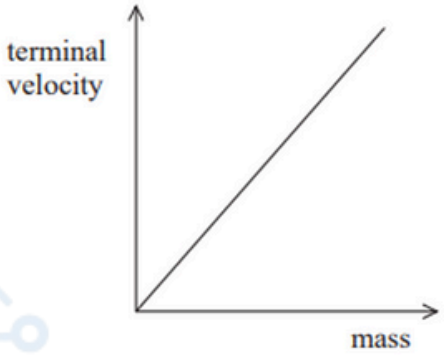
A ball bearing falls at terminal velocity through a liquid.
The temperature of the liquid increases and the ball bearing falls with a greater terminal velocity.
Which row of the table is correct as the temperature of the liquid increases?

	Viscous drag on ball bearing	Viscosity of liquid
☐ **A**	constant	increases
☐ **B**	constant	decreases
☐ **C**	decreases	increases
☐ **D**	decreases	decreases

(Total for Question 9 = 1 mark)

13. **Jan 2022, Q6**

The graph shows how terminal velocity varies with mass for small spheres of equal diameter falling through a viscous liquid.



Which of the following describes the gradient of the graph for a liquid of greater viscosity?

☐ **A** a greater gradient
☐ **B** a smaller gradient
☐ **C** a variable gradient
☐ **D** the same gradient

(Total for Question 6 = 1 mark)

14. **Jan 2021, Q7**

A student determines the terminal velocity of a ball bearing as it falls through oil. He releases the ball bearing at point V and measures the time taken for it to fall a measured distance.

Which two points should he use for the measured distance?

☐ **A** V and Y
☐ **B** W and Y
☐ **C** X and Y
☐ **D** W and Z

(Total for Question 7 = 1 mark)

15. **Sample Assess., Q2**

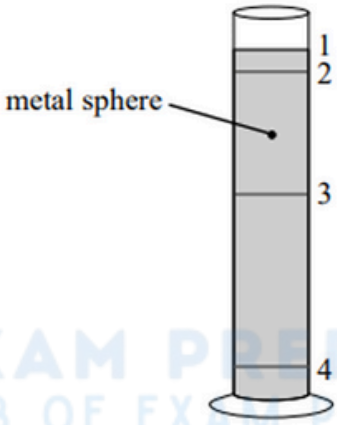
As lava leaves a volcano it cools down.
Select the row of the table that correctly describes the effect of a lower temperature on the viscosity and rate of flow of lava.

	Viscosity	Rate of flow
☐ **A**	decreases	decreases
☐ **B**	decreases	increases
☐ **C**	increases	increases
☐ **D**	increases	decreases

(Total for Question 2 = 1 mark)

16. **Sample Assess., Q9**

A student carries out a practical to determine the viscosity η of a liquid. A small metal sphere of radius r is dropped into a cylinder of the liquid.



Elastic bands are placed around the cylinder in the positions 1, 2, 3 and 4 as shown. The time taken for the sphere to fall between two of the elastic bands is going to be recorded.

Which of the following are the best two elastic bands to use?

☒ **A** 1 and 3
☒ **B** 2 and 4
☒ **C** 1 and 4
☒ **D** 3 and 4

(Total for Question 9 = 1 mark)

17. **Sample Assess., Q10**

The sphere is made from a metal of density ρ_M and the liquid has density ρ_L.
Which of the following expressions correctly gives the forces acting on the sphere when travelling at a terminal velocity v through the liquid?

☒ **A** $6\pi\eta rv + \frac{4}{3}\pi r^3\rho_L g + \frac{4}{3}\pi r^3\rho_M g = 0$
☒ **B** $6\pi\eta rv - \frac{4}{3}\pi r^3\rho_L g - \frac{4}{3}\pi r^3\rho_M g = 0$
☒ **C** $6\pi\eta rv - \frac{4}{3}\pi r^3\rho_L g + \frac{4}{3}\pi r^3\rho_M g = 0$
☒ **D** $6\pi\eta rv + \frac{4}{3}\pi r^3\rho_L g - \frac{4}{3}\pi r^3\rho_M g = 0$

(Total for Question 10 = 1 mark)

1.4.27 (Hooke's law $\Delta F = k\Delta x$)

18. **Jan 2025, Q6**

When a force F is applied to a spring of stiffness k, the extension of the spring is Δx.
A force 2F is applied to a second spring of stiffness 3k.
Which of the following expressions gives the extension of the second spring?

- ☒ **A** $\frac{2}{3}\Delta x$
- ☒ **B** $\frac{3}{2}\Delta x$
- ☒ **C** $\frac{1}{6}\Delta x$
- ☒ **D** $6\Delta x$

(Total for Question 6 = 1 mark)

19. **MAY 2024, Q5**

A student stretches a spring of original length p to a length q by applying an increasing force. The graph shows how the length of the spring changes as the student increases the force from zero to a magnitude R

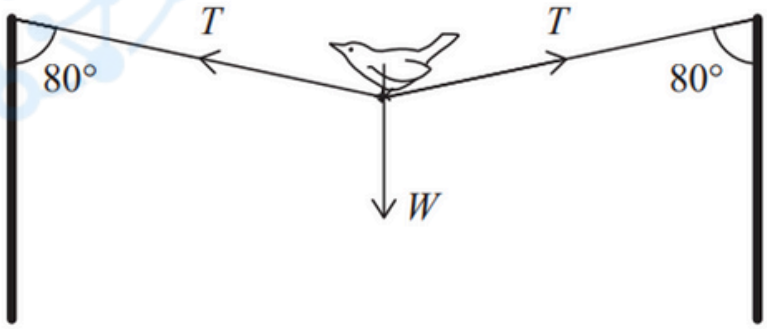
Which of the following expressions gives the stiffness of the spring?

- ☒ **A** $\frac{q-p}{R}$
- ☒ **B** $\frac{q}{R}$
- ☒ **C** $\frac{R}{q}$
- ☒ **D** $\frac{R}{q-p}$

(Total for Question 5 = 1 mark)

20. **Jan 2024, Q7**

A length of string is attached between two vertical posts. A bird of weight W stands on the middle of the string causing tension T in the string. The string makes an angle of 80° with each post, as shown.



Which of the following expressions is correct?

- ☒ **A** $T = \frac{W}{2\sin 80°}$
- ☒ **B** $T = W \times 2\sin 80°$
- ☒ **C** $T = \frac{W}{2\cos 80°}$
- ☒ **D** $T = W \times 2\cos 80°$

(Total for Question 6 = 1 mark)

21. **May 2023, Q10**

Two identical springs are arranged in series. A force of 45.0N is applied to the springs, as shown.

The springs extend a total distance of 15mm.

Which of the following expressions gives the stiffness of each spring in Nmm^{-1}?

- ☒ **A** $\frac{15}{2\times45}$
- ☒ **B** $\frac{45}{2\times15}$
- ☒ **C** $\frac{2\times15}{45}$
- ☒ **D** $\frac{2\times45}{15}$

(Total for Question 10 = 1 mark)

22. **May 2022, Q10**

When compressed by a force of 50N, a spring had a length of 12.0 cm.

When compressed by a force of 70N, the same spring had a length of 7.1 cm.

Which of the following expressions gives the stiffness k of the spring in Ncm^{-1}?

- ☒ **A** $\frac{70}{12.0}-\frac{50}{7.1}$
- ☒ **B** $\frac{(70-50)}{(12.0-7.1)}$
- ☒ **C** $\frac{50}{7.1}-\frac{70}{12.0}$
- ☒ **D** $\frac{(70-50)}{(12.0-4.9)}$

(Total for Question 10 = 1 mark)

23. **Jan 2021, Q5**

A student is investigating a material in the form of a wire.

Which of the following properties of the wire will change if a longer wire is used?

- ☒ **A** breaking stress
- ☒ **B** density
- ☒ **C** stiffness
- ☒ **D** Young modulus

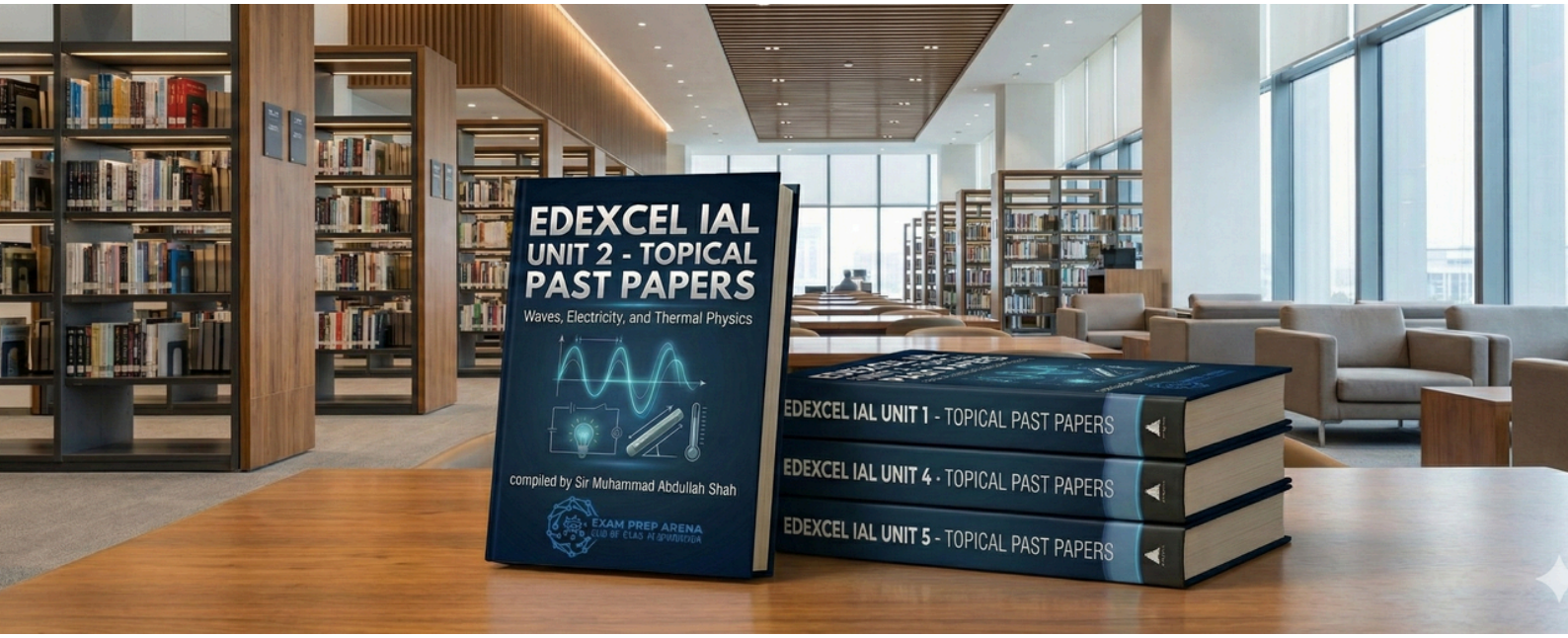
(Total for Question 5 = 1 mark)

24. **Oct 2019, Q10**

A force F was applied to compress a spring by a distance x.
A second spring of double the stiffness was compressed by the same distance x.
Which of the following gives the magnitude of the force applied to the second spring?

- ☒ **A** 4F
- ☒ **B** 2F
- ☒ **C** F
- ☒ D $\frac{F}{2}$

(Total for Question 10 = 1 mark)



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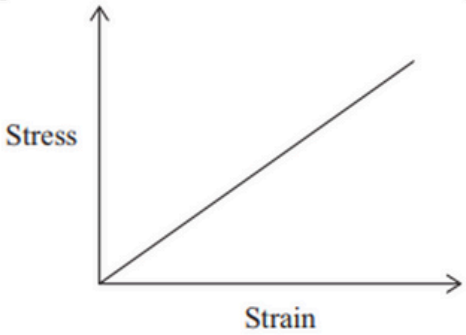
1.4.28 (Young modulus = stress / strain)

25. **Jan 2025, Q1**

Stress is applied to a sample of a material. The stress is increased until the sample breaks. The graph shows the relationship between stress and strain for the sample.



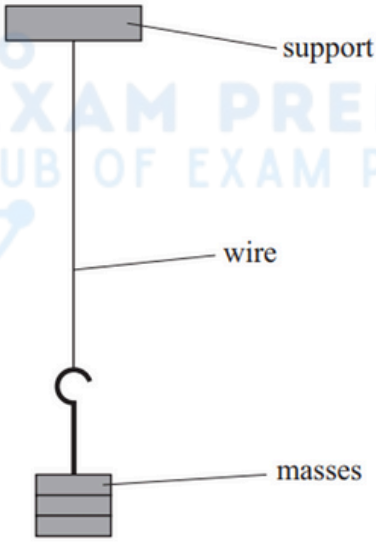
Which of the following gives the Young modulus of the material?

- ☒ **A** The area between the line and the strain axis.
- ☒ **B** The gradient of the graph.
- ☒ **C** The maximum stress multiplied by the maximum strain.
- ☒ **D** The maximum strain divided by the maximum stress.

(Total for Question 1 = 1 mark)

26. **MAY 2024, Q9**

A student attached one end of a wire to a support. The student added masses to the other end of the wire, as shown. The student measured the corresponding extension for each added mass.



The wire broke when the extension was small.

The student replaced the wire with a second wire made of the same material. The second wire had a larger extension before breaking.

Which of the following produced this result?

- ☒ **A** The second wire had a greater diameter.
- ☒ **B** The second wire had a longer length.
- ☒ **C** The second wire had a smaller diameter.
- ☒ **D** The second wire had a shorter length.

(Total for Question 9 = 1 mark)

27. **Jan 2024, Q1**

Which of the following is an SI unit for stress?

- ☒ **A** kgm^{-2}
- ☒ **B** $m^2 kg^{-2}$
- ☒ **C** $m^2 N^{-1}$
- ☒ **D** Nm^{-2}

(Total for Question 1 = 1 mark)

28. **Oct 2023, Q8**

A student applied a tensile force to a metal wire of length x and diameter d.

The length of the wire increased by Δx.

The student applied the same force to a second wire made of the same material.

The length of the second wire increased by 2Δx.

Which row of the table could show the length and diameter of the second wire?

		Length	Diameter
☒	**A**	$0.5x$	$0.5d$
☒	**B**	$0.5x$	$2d$
☒	**C**	$2x$	$0.5d$
☒	**D**	$2x$	$2d$

(Total for Question 8 = 1 mark)

29. **May 2023, Q3**

A student applies a force to a copper wire.

Which row of the table shows the length and diameter of wire that would produce the greatest extension?

		Length of wire	Diameter of wire
☒	**A**	x	D
☒	**B**	x	$2D$
☒	**C**	$2x$	D
☒	**D**	$2x$	$2D$

(Total for Question 3 = 1 mark)

30. **Oct 2022, Q5**

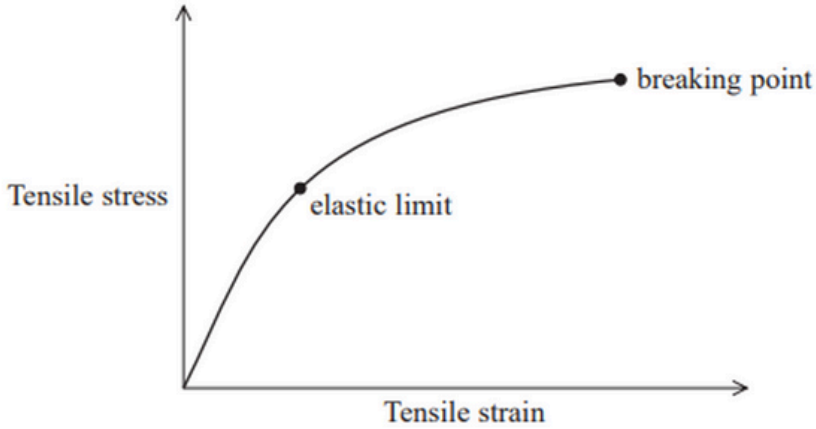
A sample of a material is in the form of a wire. The material has a large value of the Young modulus. Which of the following statements best describes the material?

- ☒ **A** large force per unit cross-sectional area is required to break the wire.
- ☒ **B** The mass per unit volume is large.
- ☒ **C** The ratio of tensile stress to tensile strain is large.
- ☒ **D** After removing a large stress the sample returns to its original length.

(Total for Question 5 = 1 mark)

31. **May 2022, Q4**

The graph shows the relationship between tensile stress and tensile strain for a material.



Which of the following gives the Young modulus of the material?

- **A** the area under the line up to the breaking point
- **B** the area under the line up to the elastic limit
- **C** the gradient of the tangent to the line at the origin
- **D** the stress divided by the strain at the breaking point

(Total for Question 4 = 1 mark)

32. **Jan 2022, Q8**

A wire breaks when a tensile force T is applied. A second wire, made of the same material, has twice the diameter.

Which of the following is the force required to break the second wire?

- **A** $4T$
- **B** $2T$
- **C** $\frac{T}{2}$
- **D** $\frac{T}{4}$

(Total for Question 8 = 1 mark)

33. **May 2021, Q5**

A compressive force F is applied to an object made of a material with Young modulus E. The original length of the object in the direction of the force is x, and its cross-sectional area is A.

Which expression gives the length of the object after the force is applied?

- **A** $x - \frac{AE}{Fx}$
- **B** $x + \frac{Fx}{AE}$
- **C** $x + \frac{AE}{Fx}$
- **D** $x - \frac{Fx}{AE}$

(Total for Question 5 = 1 mark)

34. **Jan 2019, Q7**

One end of a 50 cm length of wire is attached to a support. A load is attached to the free end of the wire, which extends by 2 mm.

Which of the following is the strain for the length of wire?

- **A** 0.004
- **B** 0.04
- **C** 25
- **D** 250

(Total for Question 7 = 1 mark)

35. **Jan 2019, Q9**

The stiffness constant and the Young modulus are terms used in physics.
Which row of the table shows the correct application of these terms?

	Stiffness constant applies to	Young modulus applies to
☒ A	materials	materials
☒ B	objects	objects
☒ C	materials	objects
☒ D	objects	materials

(Total for Question 9 = 1 mark)

1.4.29.b (Limit of proportionality, elastic limit, yield point, etc.)

36. **Oct 2024, Q7**

A student applies a force to stretch a thin metal wire.
Which of the following describes the wire at the elastic limit?

- ☒ **A** The wire is elastically deformed.
- ☒ **B** The wire is plastically deformed.
- ☒ **C** The wire is at its maximum extension.
- ☒ **D** The wire snaps.

(Total for Question 7 = 1 mark)

37. **Jan 2025, Q4**

A spring is stretched beyond its elastic limit. The applied force is then removed.
Which of the following describes the behaviour of the spring?

- ☒ **A** The extension of the spring is always proportional to the force applied.
- ☒ **B** Plastic deformation occurs until the spring reaches its elastic limit.
- ☒ **C** The spring only shows elastic deformation.
- ☒ **D** The spring does not return to its original length.

(Total for Question 4 = 1 mark)

38. **Oct 2023, Q3**

Which of the following could be used to describe the elastic limit of a material?

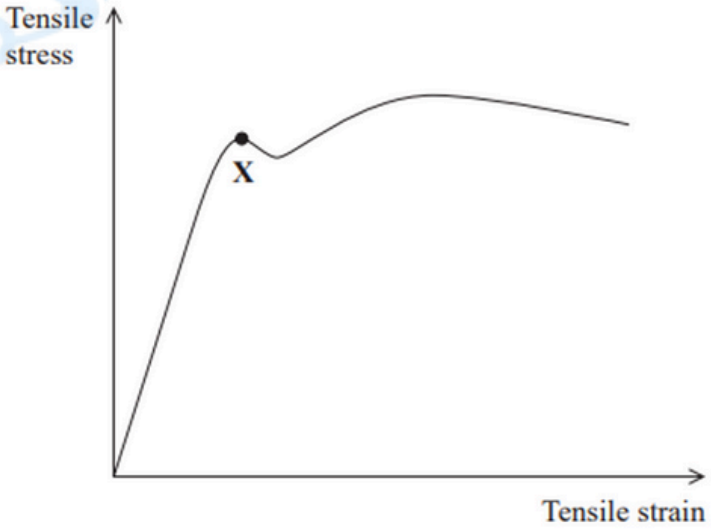
- ☒ **A** The stress above which the material will not obey Hooke's law.
- ☒ **B** The stress above which the material will be deformed when the stress is removed.
- ☒ **C** The stress at which the material undergoes a sudden increase in extension.
- ☒ **D** The stress at which the material breaks.

(Total for Question 3 = 1 mark)

39. **May 2021, Q9**

A copper rod was placed under tensile stress and the tensile strain in the rod was measured.

The graph shows how the tensile stress required to cause a tensile strain in the rod depends upon the tensile strain.



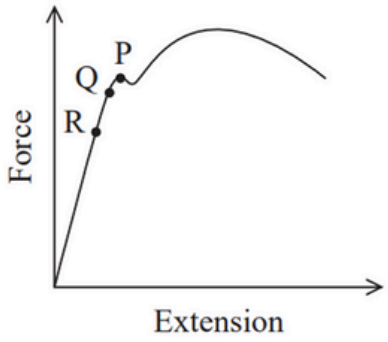
What does point X represent?

- ☒ **A** the fracture point of the rod
- ☒ **B** the limit of proportionality for copper
- ☒ **C** the maximum tensile stress in the rod
- ☒ **D** the yield point of copper

(Total for Question 9 = 1 mark)

40. **Jan 2020, Q9**

A length of steel wire is fixed at one end. An increasing force is applied to the other end of the wire. The force extension graph for the wire is shown.



Which row of the table identifies points P, Q and R on the graph?

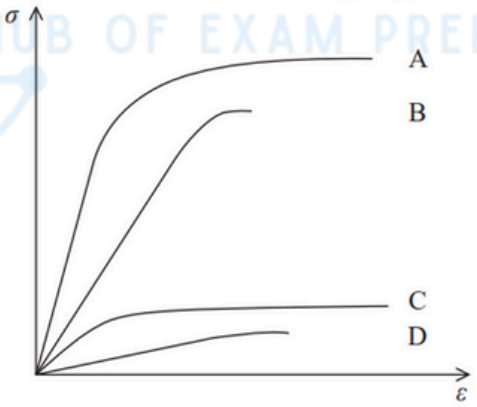
	P	Q	R
☒ **A**	elastic limit	limit of proportionality	yield point
☒ **B**	elastic limit	yield point	limit of proportionality
☒ **C**	yield point	elastic limit	limit of proportionality
☒ **D**	yield point	limit of proportionality	elastic limit

(Total for Question 9 = 1 mark)

41. **May 2019, Q6**

A graph of stress ı against strain İ, up to the breaking point, is drawn for four samples of wire, A, B, C and D.

Which sample of wire has both a low elastic limit and a large region of plastic deformation?



☒ **A**
☒ **B**
☒ **C**
☒ **D**

(Total for Question 6 = 1 mark)

42. **Sample Assess., Q7**

The point marked X is the elastic limit of the wire.

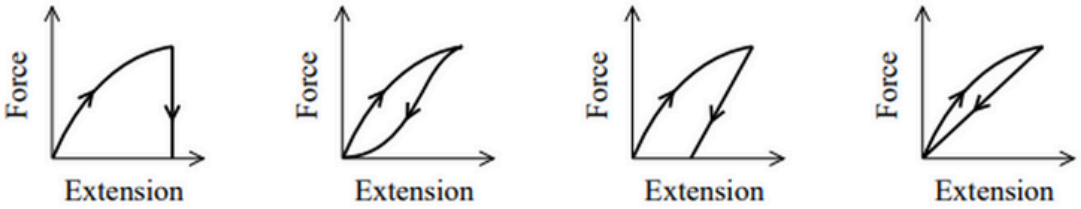
Which of the following statements is not correct?

☒ **A** F_e is the maximum force at which the wire behaves elastically.
☒ **B** F_e is the maximum force at which the wire obeys Hooke's law.
☒ **C** F_e is the minimum force at which the wire permanently deforms.
☒ **D** F_e is the minimum force at which the wire behaves plastically.

(Total for Question 7 = 1 mark)

43. **Sample Assess., Q8**

The force on the wire was then decreased and the corresponding extensions recorded.
The values were plotted onto the same axes.
Which of the following is the correct graph?



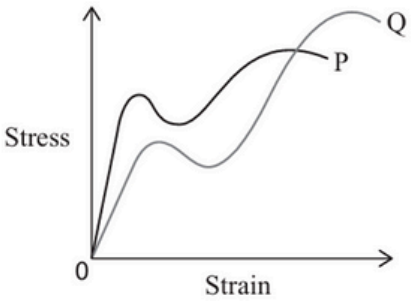
☐ **A** ☐ **B** ☐ **C** ☐ **D**

(Total for Question 8 = 1 mark)

1.4.30 (Interpret stress-strain graphs)

44. **Jan 2024, Q9**

A force is applied to stretch two wires, P and Q, until the wires break.
Each wire is made of a different metal.
The stress-strain graph for each wire is shown



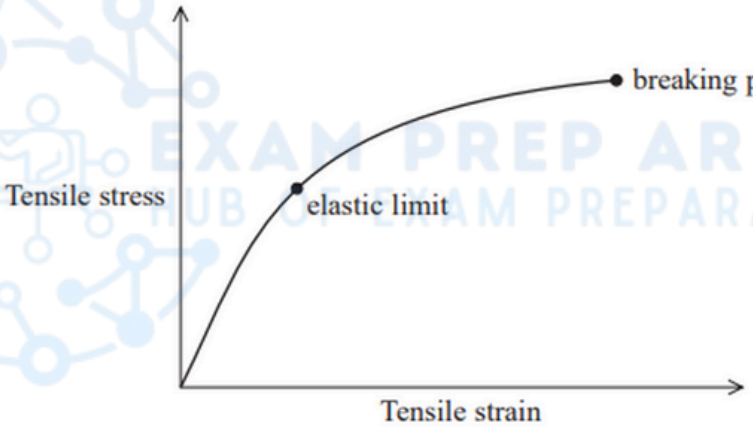
Which of the following statements is correct?

- ☒ **A** P has a greater breaking stress than Q.
- ☒ **B** P has a greater breaking strain than Q.
- ☒ **C** P has a greater yield stress than Q.
- ☒ **D** P has a lower Young modulus than Q.

(Total for Question 9 = 1 mark)

45. **May 2022, Q4**

The graph shows the relationship between tensile stress and tensile strain for a material.



Which of the following gives the Young modulus of the material?

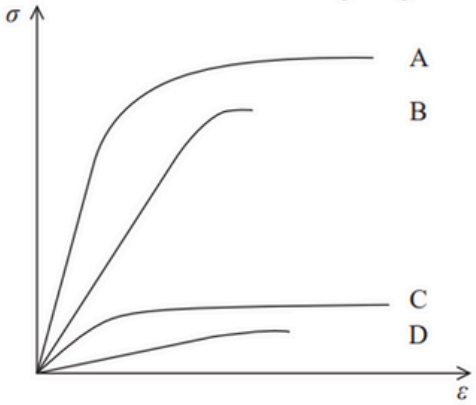
- ☐ A the area under the line up to the breaking point
- ☐ B the area under the line up to the elastic limit
- ☐ C the gradient of the tangent to the line at the origin
- ☐ D the stress divided by the strain at the breaking point

(Total for Question 4 = 1 mark)

46. **May 2019, Q6**

A graph of stress ı against strain İ, up to the breaking point, is drawn for four samples of wire, A, B, C and D.

Which sample of wire has both a low elastic limit and a large region of plastic deformation?



- ☒ **A**
- ☒ **B**
- ☒ **C**
- ☒ **D**

(Total for Question 6 = 1 mark)

1.4.31 (CORE PRACTICAL 3: Determine the Young modulus)

47. **Jan 2023, Q9**

A student carries out an experiment to determine the Young modulus of copper.
The student adds known masses to a copper wire and measures the corresponding extensions of the wire.
Which other quantities should the student measure directly?

- ☒ **A** diameter and mass of the wire
- ☒ **B** diameter and original length of the wire
- ☒ **C** radius and mass of the wire
- ☒ **D** radius and original length of the wire

(Total for Question 9 = 1 mark)

48. **Oct 2019, Q3**

A student measured the diameter of a length of wire in order to determine its cross-sectional area. The following measurements were taken at various positions along the wire and at various orientations around the wire. All measurements are in mm.

1.57	1.36	1.54	1.55	1.58

Which of the following expressions should the student use to determine the cross-sectional area of the wire in mm?

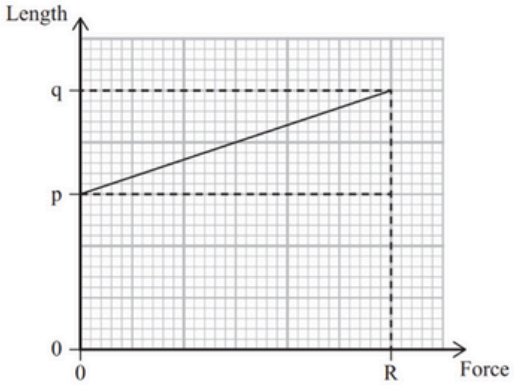
- ☒ **A** $\pi(1.56)^2$
- ☒ **B** $\pi(1.52)^2$
- ☒ **C** $\pi(0.78)^2$
- ☒ **D** $\pi(0.76)^2$

(Total for Question 3 = 1 mark)

49. **MAY 2024, Q6**

A student stretches a spring of original length p to a length q by applying an increasing force. The graph shows how the length of the spring changes as the student increases the force from zero to a magnitude R

Which of the following expressions gives the work done stretching the spring from its original length p to length q?



- ☒ **A** $\frac{p \times R}{2}$
- ☒ **B** $\frac{(q-p) \times R}{2}$
- ☒ **C** $\frac{(q+p) \times R}{2}$
- ☒ **D** $(q - p \times R)$

(Total for Question 6 = 1 mark)

50. **Jan 2024, Q3**

A spring is stretched by applying a force of 3.0N. The elastic strain energy stored by the spring is 0.04J.

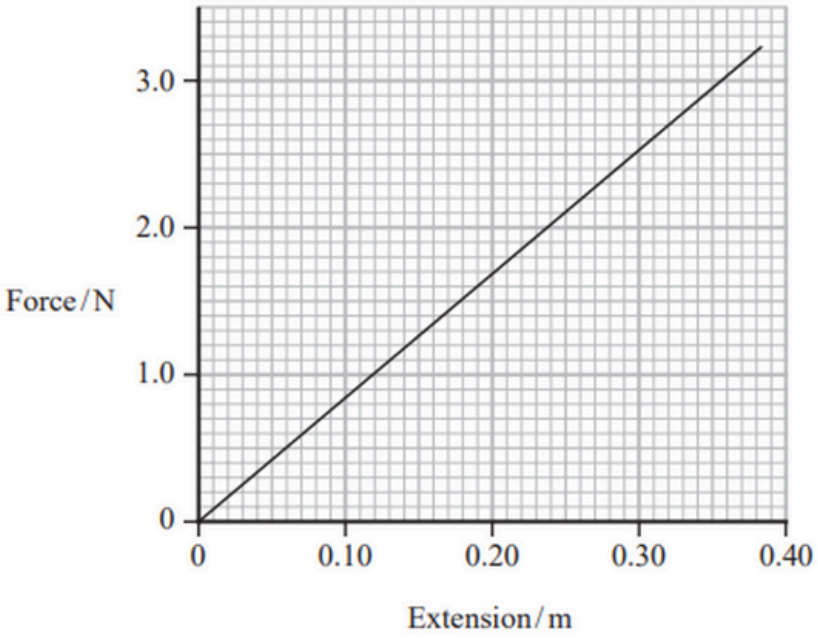
Which of the following expressions gives the extension, in m, of the spring?

- ☒ **A** $\frac{2 \times 0.04}{3.0}$
- ☒ **B** $\sqrt{\frac{2 \times 0.04}{3.0}}$
- ☒ **C** $\sqrt{\frac{3.0}{2 \times 0.04}}$
- ☒ **D** $\frac{3.0}{2 \times 0.04}$

(Total for Question 3 = 1 mark)

51. **May 2023, Q4**

A force-extension graph for a spring is shown.



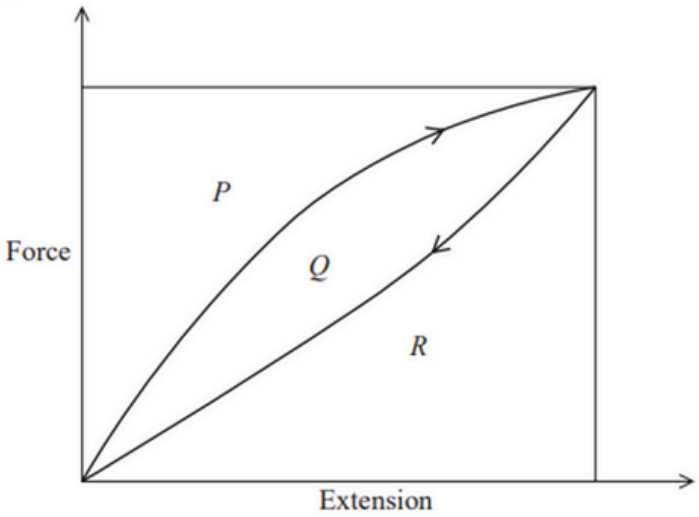
Which of the following gives the work done, in joules, to extend the spring by 0.30m from its original length?

- ☒ **A** 0.30×2.5
- ☒ **B** $0.5 \times 0.30 \times 2.5$
- ☒ **C** $\frac{2.5}{0.30}$
- ☒ **D** $\frac{0.30}{2.5}$

(Total for Question 4 = 1 mark)

52. **Oct 2022, Q6**

A rubber band is initially stretched by an increasing force.
When the force is gradually decreased, the rubber band returns to its original length.
The force-extension graph for the rubber band is shown.



P, Q and R represent different areas of the graph.

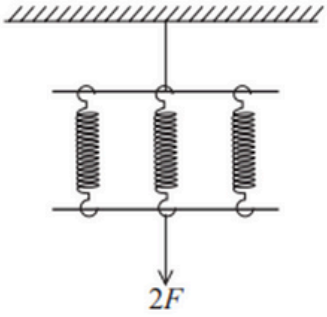
Which of the following gives the work done in stretching the rubber band up to its maximum extension?

- **A** P + Q
- **B** Q + R
- **C** R
- **D** Q

(Total for Question 6 = 1 mark)

53. **Oct 2022, Q8**

When a certain spring is stretched by a tensile force F, the elastic energy stored in the spring is E.
Three of these springs are arranged in parallel and stretched by a tensile force of 2F, as shown.



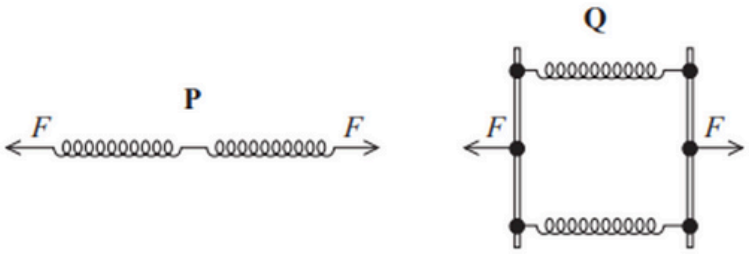
Which of the following expressions gives the elastic energy stored in the parallel system?

- **A** $\frac{1}{3}E$
- **B** $\frac{2}{3}E$
- **C** $\frac{4}{3}E$
- **D** $2E$

(Total for Question 8 = 1 mark)

54. **May 2022, Q7**

Two arrangements, P and Q, of identical springs are subjected to the same tensile force F as shown.



When one spring is subjected to a tensile force F, the elastic strain energy for the springis E.

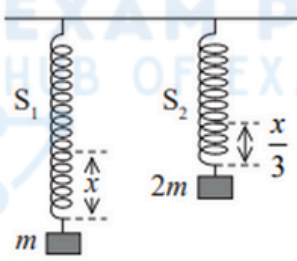
Which row of the table gives the total elastic strain energy for each arrangement?

	P	Q
☒ A	½E	2E
☒ B	½E	½E
☒ C	2E	2E
☒ D	2E	½E

(Total for Question 7 = 1 mark)

55. **Oct 2021, Q3**

Two different springs, S_1 and S_2, are suspended from a fixed support. Masses are attached to the bottom of S_1 and S_2 as shown.



The extension of S_1 is x, and the extension of S_2 is $\frac{x}{3}$. The elastic strain energy in spring S_1 is E.

Which of the following is the elastic strain energy in spring S_2?

☒ **A** $6E$

☒ **B** $\frac{3E}{2}$

☒ **C** $\frac{2E}{3}$

☒ **D** $\frac{E}{6}$

(Total for Question 3 = 1 mark)

56. **Oct 2020 (May), Q8**

A stress σ is applied across the ends of a wire of cross-sectional area A.
Work W is done to extend the wire by Δx.
Which of the following could be used to determine W?

☒ **A** $W = \frac{1}{2} \times \frac{\sigma}{A} \times \Delta x$

☒ **B** $W = \frac{1}{2} \times \frac{\sigma}{A} \times \Delta x^2$

☒ **C** $W = \frac{1}{2} \times \sigma \times A \times \Delta x$

☒ **D** $W = \frac{1}{2} \times \sigma \times A \times \Delta x^2$

(Total for Question 8 = 1 mark)

Miscellaneous (e.g., SI Units, General Graph Properties)

57. **Jan 2022, Q10**

Which row of the table contains two units that are not equivalent?

	Unit 1	Unit 2
☒ A	Js^{-1}	W
☒ B	$kgms^{-2}$	Ns
☒ C	Nkg^{-1}	ms^{-2}
☒ D	Nm	J

(Total for Question 10 = 1 mark)

58. **Oct 2019, Q1**

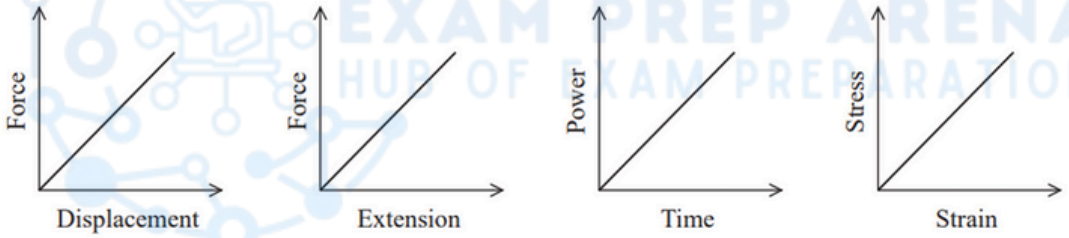
Which row of the table gives the meaning of the stated unit prefixes?

	micro	centi
☒ A	10^{-6}	10^{-2}
☒ B	10^{-9}	10^{2}
☒ C	10^{-9}	10^{-2}
☒ D	10^{-6}	10^{2}

(Total for Question 1 = 1 mark)

59. **Oct 2019, Q4**

The area under each of the following graphs represents a physical quantity.
For which graph is the area under the graph not equal to work done?



☒ A ☒ B ☒ C ☒ D

(Total for Question 4 = 1 mark)