Revision test 2

To support your revision, this Workbook contains revision questions to help you revise the skills that might be needed in your exam. The details of the actual exam may change so always make sure you are up to date. Ask your tutor or check the Pearson website for the most up-to-date Sample Assessment Material to get an idea of the structure of your exam and what this requires of you.
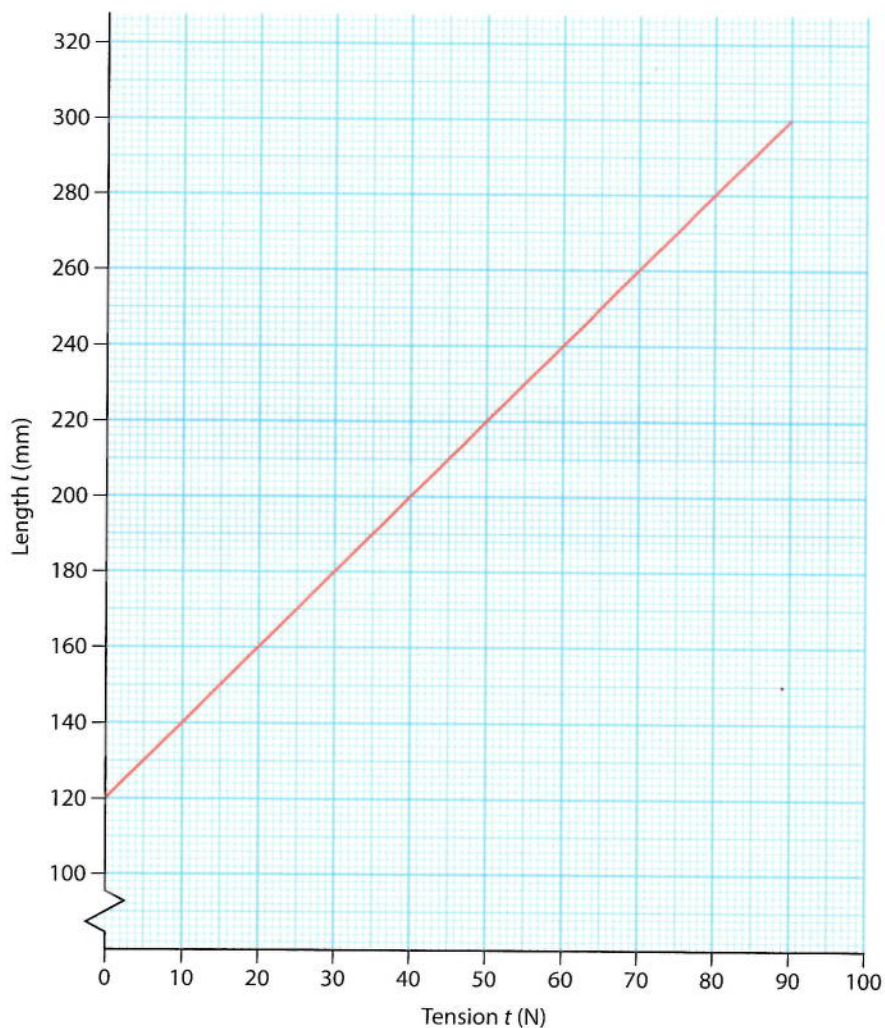
SECTION A: Applied mathematics

Answer ALL questions. Write your answers in the spaces provided.

Be sure to make use of the information booklet containing formulae and constants on pages 47–51.

1   As part of quality control checks a manufacturer of tension springs carries out experimental testing on samples from each batch manufactured.

The results for one such test have been plotted as a graph of spring tension, T, versus overall length, l, as shown.

Graph of spring tension versus overall spring length

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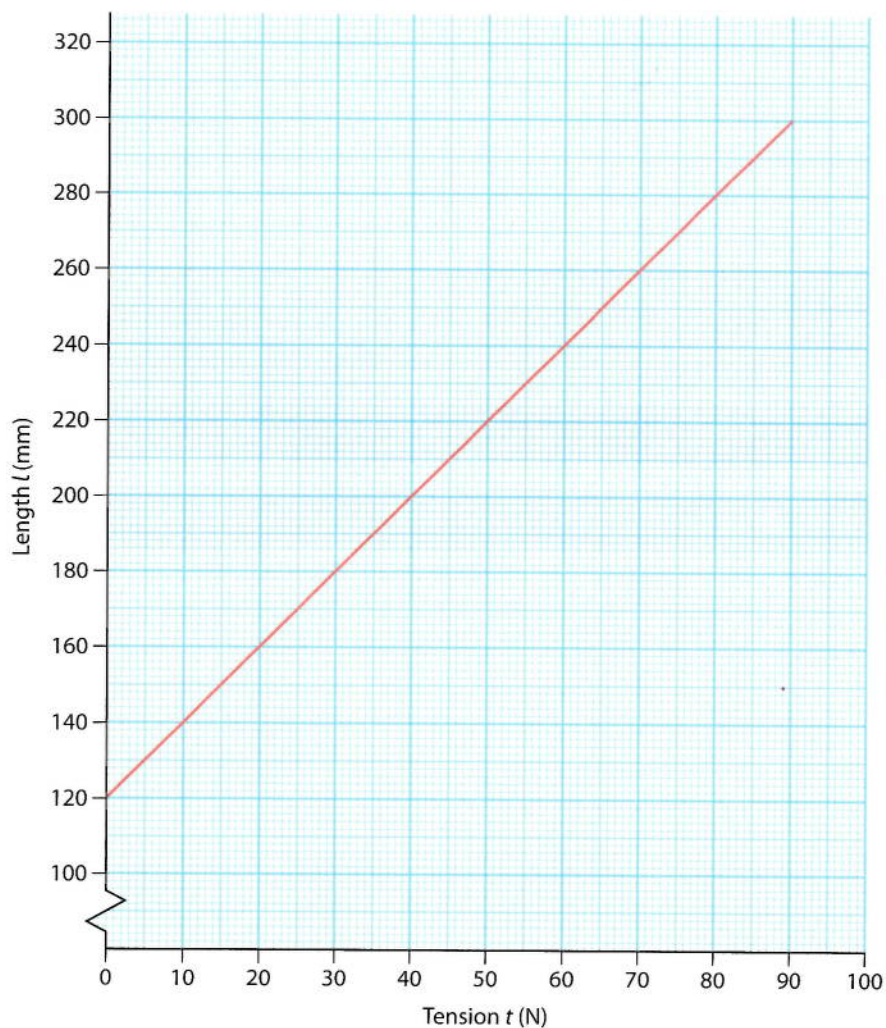
SECTION A: Applied mathematics

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Graph of spring tension versus overall spring length

Find the linear equation that represents the relationship between the spring tension, T, and overall length, l.

Answer..

See page 4 of the Revision Guide to revise the equations of lines.

Total for Question 1 = 2 marks

2 A projectile is fired vertically upwards.
The vertical height, h, of the projectile as a function of time, t, is given by the equation $h = t^2 - 6t + 11$.

Find, using factorisation, the values of t when $h = 3$.

Answer...

See pages 7–8 of the Revision Guide to revise quadratic equations.

Total for Question 2 = 2 marks

3 A cylindrical oil storage tank has diameter 2.2 m.

The tank is filled to a depth of 0.7 m.

Calculate the volume of oil contained in the tank.

When answering 'Calculate' questions you need to find the number or amount of something using the information provided in the question. This might involve applying a particular technique, mathematical method or formula.

Answer...

Links See page 14 of the Revision Guide to revise surface area and volumes.

Total for Question 3 = 2 marks

4 The time constant, τ, of a discharging capacitor can be represented by the equation:

$2.5 = 12\,e^{-\tau}$

Solve the equation to find the time constant, τ. Show evidence of the use of the laws of logarithms in your answer.

Remember to use natural logarithms here and that $\ln e = 1$.

When answering 'Solve' questions, you need to determine the solution to a given equation. This might involve applying the particular technique or mathematical method mentioned in the question.

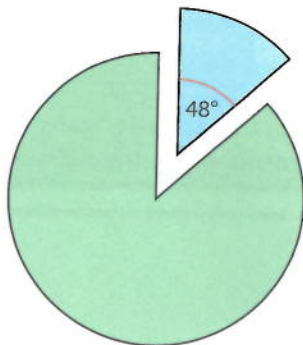Answer...

Total for Question 4 = 3 marks

5 A circular steel plate has circumference 2.2 m.
A sector of the circular plate with a subtended angle of 48° is removed by a plasma cutter.

48°

Remember that angles must be in radians when using the standard formulae for arc length and the area of a sector.

Calculate the remaining area of the steel plate.

Answer...

Links See page 9 of the Revision Guide to revise radians, arcs and sectors.
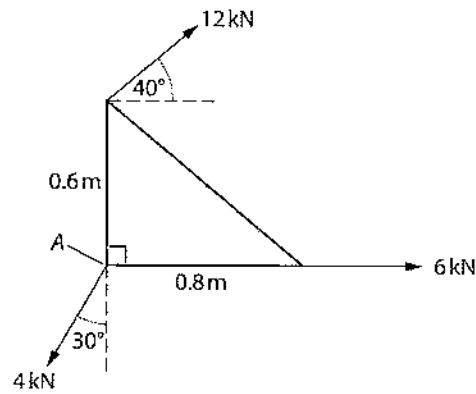
Total for Question 5 = 2 marks

END OF SECTION TOTAL FOR SECTION A = 11 MARKS

SECTION B: Mechanical and electrical, electronic principles

Use appropriate units in your answers.

Be sure to make use of the information booklet containing formulae and constants on pages 47–51.

6 The diagram represents the forces acting on the corners of a triangular steel plate.

(a) Calculate the magnitude of the resultant force for the system of coplanar non-concurrent forces.

4 marks

Answer ....

(b) Calculate the direction of the resultant force (from the horizontal).

3 marks

Answer..

(c) Calculate the perpendicular distance from corner A to the line of action of the resultant force.

3 marks

Answer..

Links See pages 15 and 17 of the Revision Guide to revise systems of forces and moments.

Total for Question 6 = 10 marks