Science Revised Syllabus
Junior Certificate
Higher Level

Past Exam Questions on
P Force and Moments

Q7 Part (h) 2013

(*h*) When one surface in contact with another surface moves, frictional forces arise. Friction makes movement more difficult. Sometimes friction is useful, other times it is unhelpful.

(*i*) Give one example where friction can be useful.

Example ____

(*ii*) Give one example where friction can be unhelpful.

Example ____

(*iii*) How can unhelpful friction be reduced?

How? ____

(*iv*) How can friction between air and a moving vehicle be reduced?

How? ____

Q8 Part (a) 2013

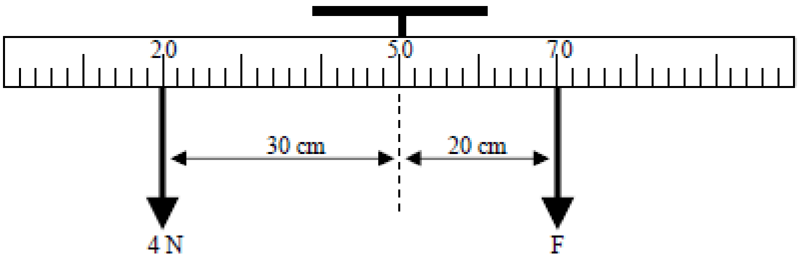
(*a*)(*i*) Distinguish between mass and weight. (6)

Mass ____

Weight ____

(*ii*) Define moment of a force. (6)

Definition ____



The diagram shows a metre stick suspended from its centre of gravity.
A force of 4 N acts on the stick at the 20 cm mark and a force of F N acts on the stick at the 70 cm mark. The metre stick is balanced horizontally.
Calculate force F. (6)

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(*iii*) Give one everyday application of levers. (3)

Application ____

Q7 Part (b) 2011

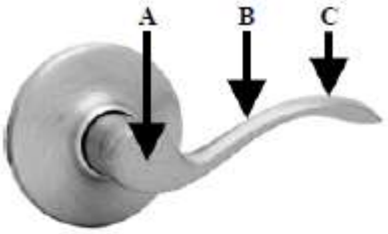
(*b*) The door handle is an application of a lever.

The labels and arrows show three points.

Which of the points **A**, **B** or **C** represent

(*i*) the fulcrum (turning point),

(*ii*) the point where the smallest force will open the door lock.



(*i*) ________________ (*ii*) ______________

Q7 Part (c) 2011

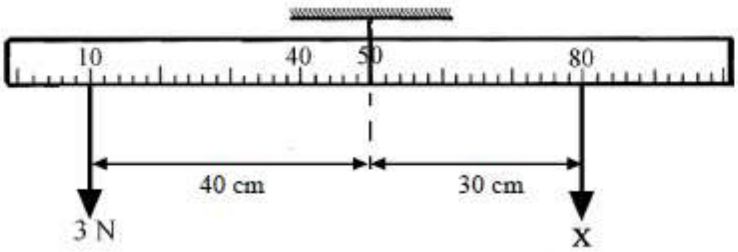
(*c*) Explain the term *friction*. How can friction be reduced?

Explain ____

How? ____

Q7 Part (g) 2010

(*g*)

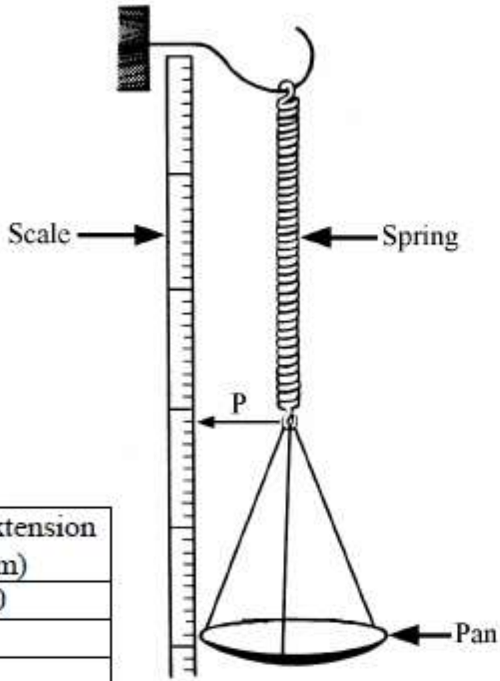


A uniform metre stick, suspended at its mid-point is balanced as shown.
Calculate *force* X.

Calculate ____

Q8 Part (a) 2010

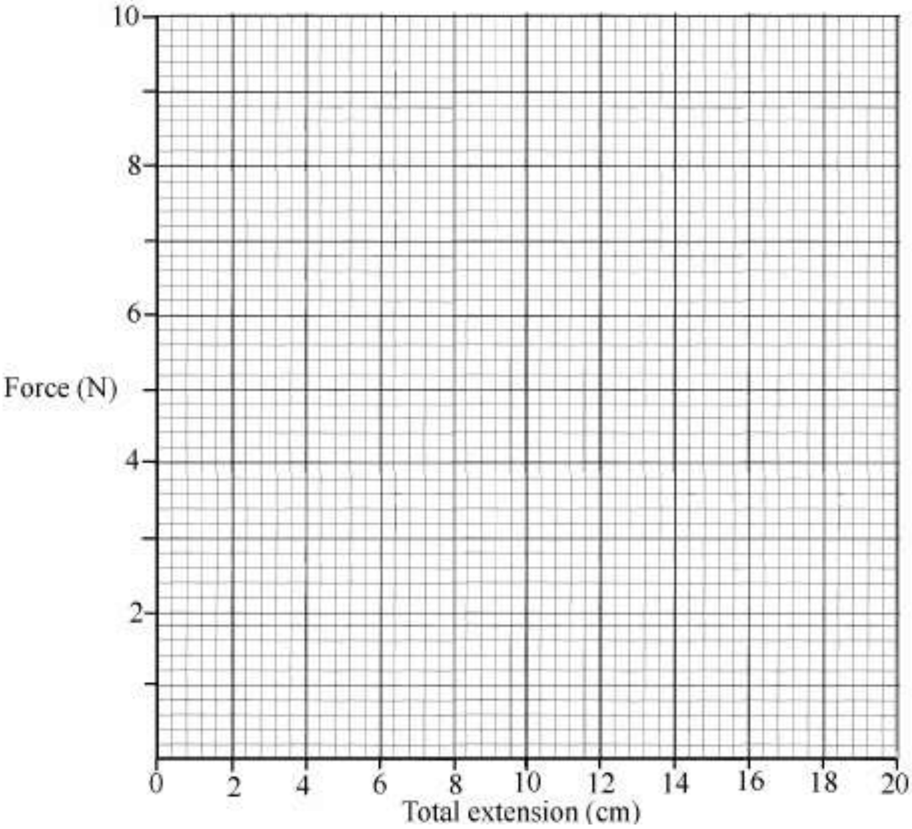
(*a*) A pupil used the apparatus shown in the diagram to investigate the relationship between the force applied and the extension produced in the spring by that force.
Pointer, P, was used to read the scale.
Weights were added to the pan to apply forces to the spring.
The data recorded is in the table.



(*i*) Calculate the ***total extension*** for each force and enter them in the table. (6)

Force (N)	Scale reading (cm)	Total extension (cm)
0	31.0	0
2	35.0	
4	39.0	
6	43.0	
8	47.0	
10	51.0	

(*ii*) Draw a ***graph*** of force against total extension in the grid below. (6)



(*iii*) What *conclusion* can be drawn from the graph regarding the relationship between the force applied to the spring and the extension produced by it? (6)

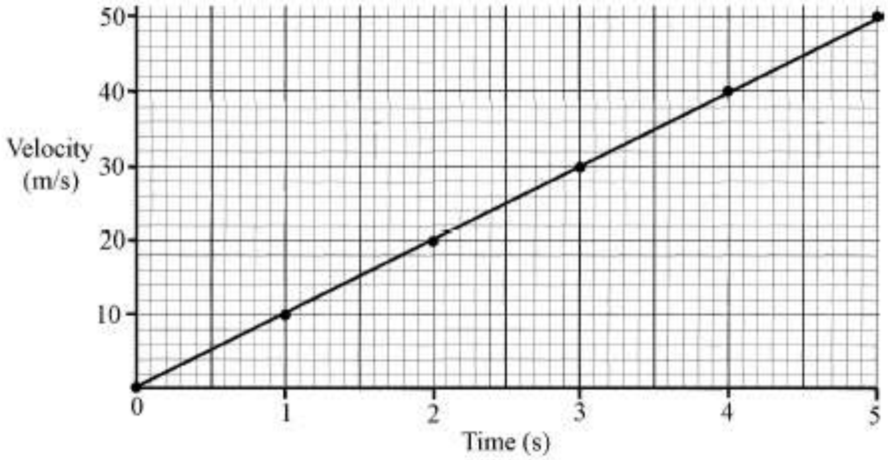
What? ____

(*iv*) Use the graph to *determine the weight* of a stone that produced an extension of 14 cm in the spring. (3)

Use ____

Q9 Part (c) 2009

(*c*) A stone was dropped from the top of a tall cliff. The stones approximate velocity was measured each second as it fell. The data collected during this experiment is given in the graph.



(*i*) Define ***velocity***. (6)

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(*ii*) Use data from the graph to ***estimate the acceleration of the stone*** as it fell. Give the ***units of acceleration*** with your answer. (6)

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(*iii*) Name the ***force*** that caused the stone to fall. (3)

Name ____

(*iv*) The stone had a mass of 2 kg.
What was the ***weight*** of the stone on earth? Give the unit. (6)

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Q7 Part (b) 2008

(*b*) State the *law of the lever*.

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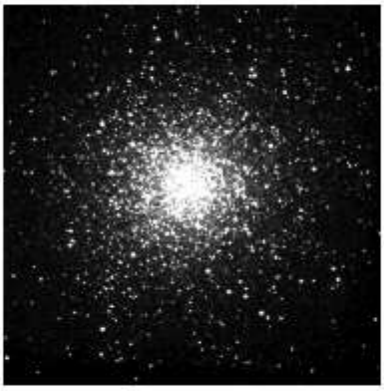
Q7 Part (c) 2008

(*c*) The globular cluster shown is a group of stars (like a small galaxy). *Gravity is the force that holds the stars together* in this formation.



Give two *effects* that gravity has on your everyday life.

1 ______________________________

2 ______________________________

Q8 Part (b) 2007

(*b*) The driver of a moving car applied the brakes. The brakes produced an average stopping force of 8 kN (8000 N) and the car stopped having travelled 20 m after the brakes were applied. Calculate the *work done* in stopping the car.
(6)

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When work is done energy is converted from one form to another.
Identify one *energy conversion* that occurred when the car braked. (6)

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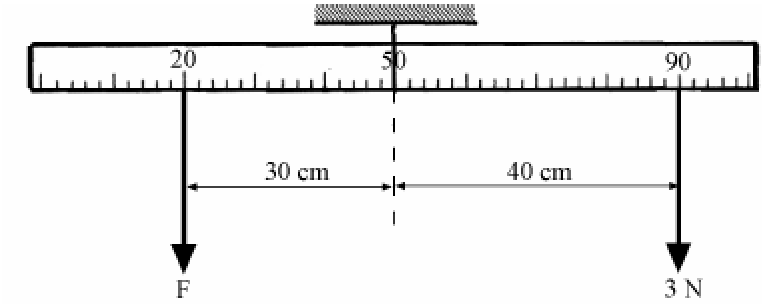
Q8 Part (c) 2007

(*c*) Define *moment of a force*. (6)



The diagram shows a metre stick suspended from its centre of gravity.
A force of 3 N acts on the stick at the 90 cm mark and a force of **F** N acts on the stick at the 20 cm mark. The metre stick is balanced horizontally.
Calculate *force F*. (6)

Give an *everyday example of an application of the lever*, using a labelled diagram, showing the *fulcrum* and at least *one force* acting on the lever.
Use the box provided for your labelled diagram. (6)

Q7 Part (a) 2006

(*a*) A pupil measured the ***weight*** of an apple of ***mass*** 0.2 kg using a spring balance and got a reading of 2 N.

Distinguish between ***weight*** and ***mass***.

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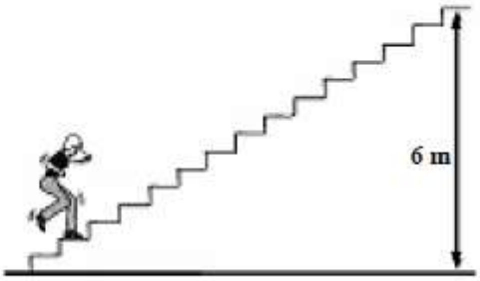
Q7 Part (c) 2006

(*c*) A girl of mass 60 kg (weight 600 N) climbed a 6 m high stairs in 15 seconds.

Calculate the ***work*** she did and the average ***power*** she developed while climbing the stairs.



Work ____

Power ____

Q9 Part (a) 2006

(*a*) Robert Hooke (1635-1703) made a number of discoveries including the effect of force on elastic bodies now known as Hooke's law. ***State Hooke's law.*** (6)

Hooke's law ______________________________

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A student was given a box of identical springs and asked to analyse them so that they could be used as newton meters.

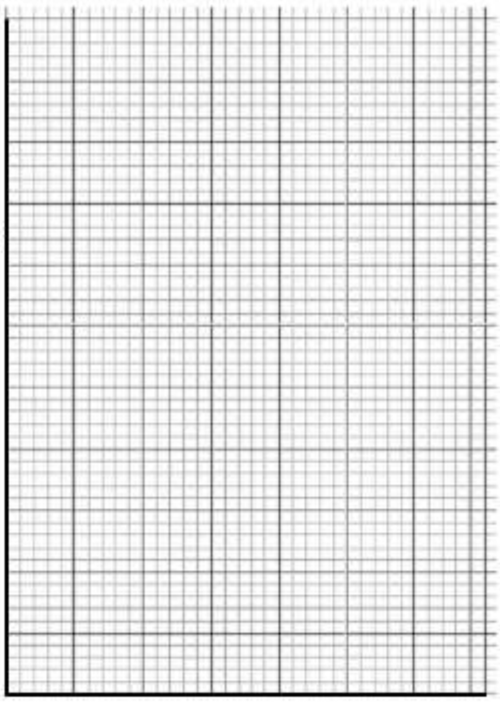
The student performed an experiment, using the apparatus shown in the diagram, on one of the springs.

In the experiment the student measured the increase in length of the spring caused by a number of weights. The spring was tested to destruction (that is weights were added until the spring was damaged).

The data from the experiment is given in the table.

Weight (N)	0.0	0.4	0.8	1.2	1.6	2.0	2.4
Extension (cm)	0.0	2.0	4.0	6.0	8.0	8.5	8.6

(*i*) Plot a *graph of extension* (increase in length) *against weight* (x-axis). in the grid provided on the right. (9)



(*ii*) Use the graph to find the *weight* that would produce an *extension* of 5 cm in the spring. (3)

Weight ______________

(*iii*) Study your graph carefully. The spring obeys Hooke's law for the earlier extensions and then when the spring becomes damaged it does not appear to do so. Estimate, from your graph, *the weight after the addition of which the law seems no longer to apply.* (3)

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