Physics Past Exam Questions

Measurement and Units

1. [2010 OL]
   (i) Which of the following is the unit used to measure mass?
   (ii) Which of the following is the unit used to measure time?

2. [2006 OL]
   Find the area of the rectangle drawn on the right using the measurements given.
   In what unit is the area measured?

3. [2007 OL]
   A block of metal has the measurements shown on the right.
   Calculate the volume of the block.

4. [2008 OL]
   Name and give one use for the piece of equipment shown in the diagram.

5. [2008 OL][2006 OL]
   (i) Name the piece of equipment drawn on the right.
   (ii) Give one use for this piece of equipment.

6. [2008]
   (i) Give one safety precaution taken by the pupil, shown in the photograph, while doing an experiment in a school laboratory.
   (ii) Describe a precaution, not shown in the photograph that you would take when heating a substance in a test tube in a school laboratory.

7. [2009]
   Name any two items of laboratory equipment shown in the diagram.

8. [2007 OL] [2007]
   (i) What is the name the piece of equipment shown on the right?
   (ii) Name a second item of laboratory equipment which enables more accurate measurements of volume to be made.
9. [2011 OL][2009 OL][2006 OL]
   (i) The diagram shows a piece of equipment, labelled A, containing water. Name A.
   (ii) A stone was then added and a new volume was recorded as shown in B.
   What was the volume of the stone in cm$^3$?

10. [2009]
   A pupil measured the volume of a potato using the items of laboratory equipment, labelled A and B as shown in the diagram.
   (i) Name the items labelled A and B.
   (ii) What was the volume of the stone in cm$^3$?

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**Magnetism Exam Questions**

1. [2010 OL]
   The diagram shows the north pole of one magnet being brought up to the north pole of a freely suspended magnet.
   (i) What would you expect to happen to the freely suspended magnet?
   (ii) What does this tell us about like poles?

2. [2007 OL]
   The diagram shows a magnet freely suspended from a wooden stand.
   Complete the statements below using the correct word from the list on the right in each case.
   (i) When the north pole of another magnet is brought close to the north pole of the hanging magnet they will ____________ each other.
   (ii) When the south pole of another magnet is brought close to the north pole of the hanging magnet they would ____________ each other.

3. [2006 OL][2009 OL]
   The diagram shows a bar magnet.
   (i) Draw the pattern made if iron filings or plotting compasses were placed around the bar magnet.
   (ii) Give one use of a magnet.

4. [2007]
   The diagram shows the outline of a bar magnet.
   (i) Draw two magnetic field lines one on each side of the bar magnet.
   (ii) What are the parts labelled N and S in the diagram called?

5. 2011 [OL]
   The diagram shows a bar magnet
   (i) What does the letter N on the magnet mean?
   A student wanted to show the pattern of the magnetic field around a bar magnet.
   (ii) Name a substance or a piece of equipment used in the laboratory to show the pattern of the magnetic field around a magnet.
   (iii) Write the letter P below the pattern you would expect
6. [2008 OL]
Describe, with the help of a labelled diagram, how you could carry out an experiment to plot the magnetic field of a bar magnet.
Use the following headings: Labelled diagram, Equipment, Procedure, Result.

7. [2011]
(i) What causes the iron filings to form the pattern around the magnet seen in the photograph?
(ii) How would you determine the position of the north pole of the magnet?

8. [2010]
The diagram shows a bar magnet with magnetic field lines on both sides.
(i) Label the north pole (N) or the south pole (S) of the magnet in the diagram.
(ii) What information is given by the arrows on the magnetic field lines?
(iii) Describe, using a labelled diagram in the box provided, a simple experiment to show that like magnetic poles repel each other.
(iv) Name a material that is attracted by magnets.
(v) How would you show that the Earth exerts magnetic forces?

### Work Energy and Power - Exam questions

1. [2007]
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.

2. [2006]
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.

### Energy Conversions

3. [2006 OL]
Energy cannot be created or destroyed but it can be changed from one form to another e.g. chemical energy can be converted into heat energy.
Describe an experiment you could carry out to show the conversion of chemical energy to heat energy.
Draw a labelled diagram of any equipment used.

4. [2008 OL]
The diagram shows a common light bulb.
List the two main energy changes that take place when the bulb is in use.

5. [2011 OL] [2010 OL]
When each of these appliances is used energy conversions take place.

<table>
<thead>
<tr>
<th>Electric kettle</th>
<th>Bunsen burner</th>
<th>Battery powered radio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical to heat</td>
<td>Electrical to sound</td>
<td>Chemical to electrical</td>
</tr>
<tr>
<td>Chemical to heat</td>
<td>Heat to light</td>
<td>Potential to kinetic</td>
</tr>
</tbody>
</table>
Copy the table into your copy and correctly match an appliance with an energy conversion that takes place when it is used. [Note: An appliance may be used more than once.]

6. [2006 OL]
   Give an example from everyday life where electrical energy is converted to kinetic energy.

7. [2009]
   Give two useful energy conversions that occur when a drill is being used.

8. [2008]
   Fill in the missing words in both sentences.
   (i) The stretched rubber chord has ______________ energy.
   (ii) If the stone is released it will have ____________ energy.

9. [2007]
   When work is done energy is converted from one form to another.
   Identify one energy conversion that occurred when a car brakes.

10. [2011]
    Give two examples showing that the sun is our primary source of energy.

11. [2001 OL][2008 OL]
    Pick two forms of renewable energy from the list on the right.

12. [2009 OL]
    Pick two forms of non-renewable energy from the list on the right.

13. [2007 OL][2007]
    Nuclear energy could be used to solve Ireland’s energy shortage.
    Give one advantage and one disadvantage of using nuclear energy to generate electricity.

14. [2008]
    Some equipment can convert the energy of waves in seas into electrical energy.
    Give one advantage and one disadvantage of generating electrical power in this way.

15. [2009]
    Give one advantage or one disadvantage of fitting solar panels to your home.

16. [2006]
    Suggest two alternative sources of energy (instead of fossil fuels) for the generation of electricity in Ireland.

17. [2008]
   (i) Name the energy from the sun that the solar panel changes into electricity.
   (ii) The electrical energy is then changed into a form of energy that can be stored in a battery. Name the form of energy that can be stored in a battery.
   (iii) In winter it may be dark when the pupils are going to or coming from school.
Give two energy conversions that occur to produce the flashes of light warning motorists approaching the school on dark mornings.

18. [2010]
Light, from the sun, is a renewable source of energy.
Ireland only uses about 2% renewable sources to meet current energy needs.
(i) Name two renewable energy sources, excluding sunlight, that are available in Ireland.
(ii) Give two benefits that Ireland would get from increasing the use of renewable energy sources to meet our energy requirements.

19. [2011]
Compact fluorescent lamps (CFLs), shown in the photograph, have a Grade A rating (efficiency rating). Electrical energy is converted into light and one other form of energy in bulbs.
(i) Name this second form of energy.
(ii) Which form of energy does the more efficient bulb produce more of?
(iii) Name another electrical appliance where checking the energy efficiency rating would be important to save money on running costs.

Light - Exam questions

Reflection

1. [2006 OL] [2010 OL]
An experiment on light was set up as shown.
Answer the questions that follow.
(i) What would a person see if the three cards were set up as shown?
(ii) What would a person see if the middle card was moved sideways?
(iii) What does this experiment tell us about light?

2. [2007 OL]
Describe, with the help of a labelled diagram, how you could carry out an experiment to show that light travels in straight lines.
Use the following headings: Equipment: Result: Labelled diagram

3. [2008 OL] [2010 OL]
The diagram shows a ray of light striking a plane mirror.
(i) Complete the path taken by the ray in the diagram.
(ii) Name the property of light shown.
(iii) Name an instrument that is based on the use of reflection of light from mirrors.

4. [2007 OL] [2010]
The diagram shows a ray of light shining onto a plane mirror in a periscope.
(i) Complete the path taken by the ray in the diagram.
(ii) Give one use for a periscope.

5. [2011 OL]
The diagram shows a ray of light striking a plane mirror
(i) Complete the diagram to show what happens to the ray when it strikes the mirror.
(ii) What word describes this?
A student set up the equipment shown in the diagram in an investigation on the use of mirrors.
Answer the questions below about this investigation.
(iii) Name the piece of equipment the student has constructed.
(iv) What happens to the light rays when they shine on mirror A?
(v) Give one use for the device made by the student.

6. [2006]
   A pupil made a simple periscope using two plane (flat) mirrors.
   The mirrors were arranged as shown in the diagram.
   The pupil looked through the periscope at the word ‘Science’
   written on a card pinned to the laboratory wall.
(i) Did the pupil see first image or the second image when she
    looked through the periscope?
(ii) Give a reason for your answer.

7. [2006]
   Why is the word Ambulance painted in reverse on the front of many ambulances?

8. [2008]
   The photograph shows a wader i.e. a bird that feeds in shallow water.
   (i) Is the image of the bird produced by reflection or by refraction?
   (ii) Give a reason for your answer.

   Refraction

9. [2006][2007]
   What is refraction of light?

10. [2007] [2008]
    Give an application of this bending of light.

11. [2007]
    Name another way in which the direction of a light ray can be changed apart from
        refraction.

12. [2007]
    A glass block like the one shown in the diagram was used in an experiment in which a
        narrow beam (ray) of light was shone through it. The light passed from air to glass, on
        entry, and glass to air, on exit.
        The path of this light ray is shown in the second diagram.
        The light ray from A bends both on entering and on leaving the glass block.
        Pick, from ‘rays’ P, Q, R or S the path taken by the light ray leaving the glass.

13. [2011]
    A narrow beam (ray) of white light is directed onto a triangular glass prism as shown in the diagram.
    The paths of four rays: R₁, R₂, R₃ and R₄ produced from this ray
    of white light are shown in the diagram.
    (i) What word is used to describe the deflection of ray one (R₁)?
    (ii) Rays two, three and four (R₂, R₃ and R₄) enter and leave the
         prism and change direction each time.
         What is this change of direction of light called?
(iii) A single ray of white light enters the prism and a band of light of many colours leaves the prism.
    Just three of the emergent rays are shown in the diagram.
    The coloured rays are produced from the white light.
    What is this separation of white light into coloured light called?
(iv) Give the colour of light that can be seen at the extreme ends A and B on the white screen.
(v) Name a natural phenomenon that produces a band of coloured light from sunlight.

14. [2010]
    The diagram shows three narrow beams of light (rays) hitting a lens.
    Draw one ray that passes through the lens without refraction and one ray that is refracted by the
    lens in the diagram.

**Dispersion**

15. [2010 OL] [2008 OL]
    The equipment shown in the diagram was set up and used in an experiment
    on light.
    The light passes through A to form a band of colours.
    (i) Name the piece of equipment labelled A.
    (ii) Name the colour labelled B.

16. [2008]
    The diagram shows a ray of white light entering a triangular glass prism.
    The light passes through the prism and emerges as a band of coloured
    light.
    (i) What does this experiment show about the composition of white light?
    (ii) What is this separation of white light into different colours called?
    (iii) What name is given to the band of coloured light produced?
    (iv) State the colour of the light labelled X and the colour of the light
        labelled Y at the extreme ends of the band of light illustrated in the
        diagram.

17. [2010][2008 OL] [2007]
    Thunder and lightning occur during electric storms.
    (i) Which is detected first, the flash of lightning or the clap of thunder?
    (ii) What does this tell us about the speed of light?

**Velocity and Acceleration - Exam Questions**

1. [2009]
    Define velocity.

2. [2007 OL]
    The speed of a car is 15 m s\(^{-1}\).
    (i) What distance will the car travel in 5 seconds?
    (ii) What word describes what happens when the speed of a car increases?

3. [2009 OL]
    (i) A cyclist moves 20 metres along a track in 4 seconds.
        Calculate the speed of the cyclist.
    (ii) Calculate the distance the cyclist will travel in 2 seconds.

4. [2011 OL]
    A cyclist moved along a straight track. A student measured the time taken by the cyclist to travel various
distances.
The data collected is shown in the table. The student then drew the graph shown below. Answer the questions that follow about this investigation.

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (s)</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

(i) Name an instrument used to measure the distance in this investigation.
(ii) Name an instrument used to measure the time in this investigation.
(iii) Use the graph to estimate the distance travelled by the cyclist in 5 seconds.
(iv) Calculate the speed of the cyclist in m s\(^{-1}\) (m/s).
(v) Is the cyclist accelerating?
(vi) Give a reason for your answer.
5. [2008 OL]
A cyclist moved along a track.
The distance travelled by the cyclist was measured every 2 seconds.
The data collected is presented in the table below.

<table>
<thead>
<tr>
<th>Distance travelled (m)</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (s)</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

(i) Use this data to draw a graph of distance travelled (y-axis) against time (x-axis) using the grid provided below.
(ii) Use the graph to estimate the distance travelled by the cyclist in 5 seconds.
(iii) Calculate the speed of the cyclist in m s\(^{-1}\) (m/s).
6. [2011]
A stone was dropped from the top of a cliff and the distance that it fell was measured at the intervals of time as given in the table below.

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>0</th>
<th>5</th>
<th>20</th>
<th>45</th>
<th>80</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (s)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4.5</td>
</tr>
</tbody>
</table>

(i) Draw a graph of distance against time in the grid below.
   A smooth curve through the plotted points is required.
(ii) Use the graph to find how far the stone had fallen in 3.5 s.
(iii) Calculate the average speed of the falling stone between the second and the fourth second. Give the unit with your answer.
(iv) In this experiment is distance fallen directly proportional to time?
   Justify your answer.
Acceleration

7. [2009]
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.
Use data from the graph to estimate the acceleration of the stone as it fell.
Give the units of acceleration with your answer.

Heat - Exam Questions
1. [2006]
Define temperature and give a unit used to express temperature

2. [2008][2010]
Give two differences between heat and temperature.

3. [2007][2010 OL][2007 OL]
The diagram shows a piece of equipment that can be used to investigate the effect of heat on a metal.
The ball will pass through the ring when it is cold.
When the ball is heated it will no longer pass through the ring.
Answer the following questions about this investigation.
(i) Explain why the ball does not pass through the ring when it is heated.
(ii) How would you get the ball to fit through again?
(iii) What does this investigation tell us about the effect of heat on metals?

4. [2009 OL]
Describe, with the help of a labelled diagram, how you could carry out an experiment to show that metals expand when heated.
Use the following headings: Labelled diagram, Equipment, Procedure, Result.

5. [2011 OL]
Electric cables made from copper sag or droop in summer as shown in the diagram.
What property of metals does this demonstrate?

6. [2008 OL]
The diagram shows a round-bottomed flask full of coloured water.
(i) What would you expect to notice if the flask is heated gently?
(ii) Give a reason why this should happen.
(iii) Why is coloured water used during this investigation?
7. [2010 OL][2007 OL]
   In an investigation to see the effect heating had on gases, a student heated a round-bottomed flask containing air using a hairdryer as shown in the diagram.
   (i) What would you expect the student to have seen when the flask was heated?
   (ii) What conclusion can you draw from this investigation?

8. [2010]
   The apparatus shown in the diagram was used to investigate the expansion and contraction of a gas.
   (i) What is observed when the flask is heated?
   (ii) Explain your observation when the flask is heated?
   (iii) What is observed when the flask is allowed to cool?
   (iv) Explain what you observe as the flask cools.

9. [2006]
   Describe an experiment to show the expansion of water when it freezes.
   You may include a labelled diagram if you wish.

10. [2009]
    The boiling point of water can be determined using the apparatus shown in the diagram.
    (i) Why are boiling (anti-bumping) chips added to the water?
    (ii) At what temperature does water boil, at standard (normal) atmospheric pressure?
    (iii) What effect does the raising of pressure have on the boiling point of water?
    (iv) What effect does the lowering of pressure have on the boiling point of water?

Conduction, Convection and Radiation

11. [2011 OL][2007 OL]
    Heat is transferred in different ways.
    In each case use a word from the list on the right to correctly complete each sentence below.
    (i) Heat travels through solids by ___________________.
    (ii) Heat travels through liquids and gases by ___________________.
    (iii) Heat travels from the Sun to the Earth by ___________________.

12. [2006 OL]
    Heat may be transferred from hot to cold places by the three methods listed on the right.
    Choose the method of heat transfer that occurs in each of the following.
    (i) The boiling of water in a kettle. ___________________________
    (ii) The heating of the Earth by the Sun. ___________________________

13. [2006]
    Name the mode of heat transfer from the hot liquid, through the spoon, to the hand.
14. [2009]

Copper, aluminium and iron rods are set-up as shown in the diagram. A metal ball is attached by wax to the end of each rod. Hot water is poured into the beaker. The ball falls from the copper rod first. What conclusion can be drawn from this observation?

15. [2011 OL]

A student set up the investigation shown in the diagram. The apparatus consisted of a metal box that was filled with boiling water.

A piece of candle wax was placed on the top end of each rod.

The piece of wax on top of the copper rod melted first and the piece of wax on top of the glass rod melted last.

Answer the following questions about this investigation.

(i) What does the result of this investigation tell us about copper, iron and glass?
(ii) Why was it important to use rods of the same length and thickness and that they dipped into the boiling water to the same depth?

16. [2011]

The experiment shown in the photograph was set up by a student.

(i) What changes take place to the water in the beakers A and B as time passes?
(ii) Explain why these changes occur.
(iii) What instrument would be used, in this experiment, to monitor the changes?
(iv) Name a material to replace copper in this experiment that will not allow these changes to occur

17. [2007]

(i) What does the experiment shown in the diagram tell us about the transfer of heat energy in water?
(ii) If you wanted to warm all of the water why would the bottom of the test tube be the best place to heat with the Bunsen flame?

18. [2006]

Heat moves in liquids by convection. Give one difference between convection and conduction.

19. [2009]

The photograph shows a solar panel being installed. Water passing through the panel is heated by the sun.

(i) How does heat from the sun travel, through the vacuum of space, to the earth?
(ii) Give one advantage or one disadvantage of fitting solar panels to your home?
20. [2009 OL]
   The diagram shows two metal cans equal in size and filled with the same amount of water at 100 °C. Can A is wrapped in cotton wool and can B has no wrapping.
   (i) After 15 minutes, which can, A or B, would you expect to have the higher temperature?
   (ii) Give a reason for your answer.

21. [2006]
   The graph is a cooling curve. The substance used in this experiment was naphthalene. Naphthalene has a melting point of 80 °C.
   The rate of heat loss was constant throughout the experiment.
   (i) What is happening to the naphthalene on the horizontal section of the graph?
   (ii) What is the heat loss on the horizontal section of the curve called?

22. [2010]
   A substance that is a solid at room temperature was heated above its melting point and then allowed to cool at a steady rate. The temperature was taken at regular intervals. The data is in the graph.
   Why is there no drop in temperature between B and C?

23. [2008]
   A pupil heated some lauric acid, which is a solid at room temperature, until it turned into a liquid. The lauric acid was then allowed to cool at a uniform rate. The temperature of the lauric acid was taken every minute.
   The data from this experiment is given in the table.

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>75</th>
<th>64</th>
<th>54</th>
<th>43</th>
<th>43</th>
<th>43</th>
<th>43</th>
<th>43</th>
<th>32</th>
<th>22</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (minutes)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>
(i) Draw a graph, using this data, of temperature against time (x-axis) in the grid provided below.

(ii) Explain the shape of the graph that you obtain.

(iii) Use the graph to estimate the melting point of lauric acid.

Forces - Exam questions

1. [2007 OL]
   Different units are used to measure different physical quantities.
   (i) Pick the unit of length from the table on the right.
   (ii) Pick the unit of weight from the table on the right.

2. [2011]
   (i) Explain the term friction.
   (ii) How can friction be reduced?

3. [2009 OL]
   Friction can be useful when driving a car.
   (i) Name one way in which friction is useful when driving a car.
   (ii) Name one possible way to reduce friction.

4. [2006 OL]
   Friction is an example of a force.
   (i) Give another example of a force.
   (ii) Give one way to reduce friction.
   (iii) After what scientist is the unit of force named?

5. [2008]
   Give two effects that gravity has on your everyday life.

6. [2009]
   (i) A stone was dropped from the top of a tall cliff. Name the force that causes the stone to fall downwards.
   (ii) The stone had a mass of 2 kg. What was the weight of the stone on earth? Give the unit.

8. [2006]  
*State Hooke’s law.*  
{This isn’t on the syllabus and shouldn’t have got asked, so presumably won’t appear again – but you never know}  

9. [2009 OL]  
A student investigated the relationship between the extension of a spring and the force applied to it.  
The equipment shown in the diagram was used.  
The data collected is shown in the table.  
The student then drew the graph shown.  
Answer the questions that follow about this investigation.  

(i) Name an instrument used to measure the force in this investigation.  
(ii) Describe how the student could have measured the extension of the spring.  
(iii) What conclusion would you draw from this investigation?  

10. [2006 OL]  
A student carried out an investigation to examine the relationship between the extension (increase in length) of a spring and the force applied to it.  
The diagram shows the apparatus used.  
The table shows the data collected by the student.
(i) Describe how the student could have taken any one of these measurements.

(ii) Draw a graph of the extension (y-axis) against the force in the grid provided on the right.

(iii) What force results in a 6 cm extension of the spring?
11. [2006]
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.

<table>
<thead>
<tr>
<th>Weight (N)</th>
<th>0.0</th>
<th>0.4</th>
<th>0.8</th>
<th>1.2</th>
<th>1.6</th>
<th>2.0</th>
<th>2.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension (cm)</td>
<td>0.0</td>
<td>2.0</td>
<td>4.0</td>
<td>6.0</td>
<td>8.0</td>
<td>8.5</td>
<td>8.6</td>
</tr>
</tbody>
</table>

(i) Plot a graph of extension (increase in length – y-axis) against weight (x-axis) in the grid provided.

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

(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.
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.

<table>
<thead>
<tr>
<th>Force (N)</th>
<th>Scale reading (cm)</th>
<th>Total extension (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>31.0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>35.0</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>39.0</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>43.0</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>47.0</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>51.0</td>
<td></td>
</tr>
</tbody>
</table>

(i) Calculate the total extension for each force and enter them in the table.
(ii) Draw a graph of force against total extension in the grid below.
(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?
(iv) Use the graph to determine the weight of a stone that produced an extension of 14 cm in the spring.
Pressure - Exam Questions

1. [2006 OL] [2009 OL][2010 OL]
   Use the box on the right to give the formula for pressure.

2. [2006 OL][2010 OL]
   Name an instrument used to measure atmospheric pressure.

3. [2009 OL]
   If a metal block applies a force of 20 N on an area of 5 cm$^2$, find the pressure being applied by the block.

4. [2010 OL]
   If the area of the face of a metal block is 30 cm$^2$ and the force (weight) of the block is 90 N, find the pressure being applied by the block.

5. [2010]
   The diagram shows a tank full of water. The mass of the water in the tank is 48 000 kg. Calculate the approximate pressure that it exerts on the base of the tank. Give the units of pressure with your answer.

6. [2009 OL]
   The diagram shows a container with three spouts. The container is filled with water. Jets of water pour out of the spouts. Why does the jet of water from the bottom spout travel the furthest out from the container?

7. [2010 OL]
   A household water supply has a water tank in the attic. The water pressure at the upstairs tap is lower than at the downstairs tap. Give a reason why this is the case.

Atmospheric Pressure

8. [2011]
   The Earth’s atmosphere seen from space is the thin curve at the top of the photo.
   (i) Name the force that holds the atmosphere to the Earth.

   This force gives the atmosphere weight and causes atmospheric pressure.
   (ii) Define pressure and give the unit for pressure.
   (iii) Why does atmospheric pressure decrease with height?

9. [2007]
   The diagram is an Atlantic weather chart.
(i) Use the chart to predict two weather conditions that you might expect for Ireland.
(ii) Explain why low atmospheric pressure causes one of the weather conditions that you have given.

10. [2010]
The apparatus shown in the diagram was used to investigate the expansion and contraction of a gas.
(i) What is observed when the flask is heated?
(ii) Explain your observation when the flask is heated?
(iii) What is observed when the flask is allowed to cool?
(iv) Explain what you observe as the flask cools.

11. [2009]
The diagram shows a model of the human breathing system.
(i) Name the part of the breathing system represented by the balloons.
(ii) What is the part of the breathing system represented by the bell-jar?

Centre of Gravity Test Questions

1. Define the term ‘Centre of Gravity’.
2. Give two ways in which an object can be made stable.
3. What factor determines whether an object which has been tilted will fall over?
4. Describe briefly how to find the exact centre gravity of an irregular-shaped piece of cardboard (make sure you include a diagram in your answer).
5. Explain why the centre of gravity of a double-decker bus should be as low as possible.

Moments - Exam Questions

1. [2010 OL]
(i) Which of the following items does not involve a lever?
(ii) Give a reason for your answer.

2. [2007]
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.
3. [2011 OL]
   The diagram shows a spanner and a nut. Complete the sentences below:
   (i) The further away from the fulcrum (turning point) you apply a ______ the easier it is to turn a nut.
   (ii) The use of a spanner to turn a nut is an everyday example of using a ________.

4. [2011]
   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.

5. [2008 OL]
   The crowbar in the diagram acts as a lever
   and applies a turning force on the boulder
   (large rock).
   Answer the questions which follow with
   reference to the points A, B and C in the
   diagram.
   (i) Which of the three points, A, B or C, is the
       fulcrum (the point about which the turning force acts)?
   (ii) At which of the three points, A, B or C, will the least force be needed to move the boulder?
       Give a reason for your answer.

6. [2007]
   Define moment of a force.

7. [2008]
   State the law of the lever.

8. [2010]
   A uniform metre stick, suspended at its mid-point is
   balanced as shown.
   Calculate force X.

9. [2007]
   A metre stick is suspended from its centre of gravity which is at its midpoint.
   A force of 3 N acts on the stick at the 90 cm mark and a force of F newtons acts on the stick at the 20 cm
   mark. Calculate force F.

Sound - Exam Questions

1. [2011]
   Describe a simple experiment to show that sound is a form of energy.

2. [2007 OL][2009 OL]
   A student set up the following experiment to investigate how sound travels
   through air.
   An electric bell was placed inside a bell-jar as shown in the diagram.
   The bell rang and it could be heard clearly.
   When the pump was switched on it started to pump the air out of the bell-
   jar and a vacuum was created.
   At that stage the bell could no longer be heard but it could still be seen
   ringing.
   (i) What conclusion could be drawn from this investigation?
   (ii) When the air was pumped out, the bell could still be seen even though it
       could not be heard. What difference between light and sound does this
(iii) During an electric storm lightning is usually seen before thunder is heard. What does this tell us about light and sound?

3. [2007]
Describe, using a labelled diagram in the box, an investigation you could carry out to show that sound requires a medium in which to travel.

4. [2007][2008 OL][2010]
The picture shows a flash of lightning.
(i) Which is detected first, the flash of lightning or the clap of thunder?
(ii) What does this tell us about the speed of light?

5. [2010 OL]
Copy the sentences below into your copy and complete them using words from the list on the right.

| (i) Sound is a form of ______________. |
| (ii) A reflected sound is called an ______________. |
| (iii) Sound is produced by _____________. |

6. [2006] [2009]
How are echoes produced?

7. [2009 OL]
(i) The soldier in the diagram has safety goggles on his hat. Give one reason why safety goggles should be used in the laboratory.
(ii) The sign on the right is found displayed at shooting ranges and in many factories. What instruction does this sign give?
(iii) Why is it important to obey the instruction given by this sign?

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**Static Electricity - Exam Questions**

1. [2006 OL]
A student set up the circuit drawn on the right to investigate different materials to see which were electrical conductors and which were electrical insulators.
(i) What would you expect to observe when an electrical conductor is connected between the contact points A and B? Give a reason for your answer.
(ii) What would you expect to observe when an electrical insulator is connected between the contact points A and B? Give a reason for your answer.

2. [2008]
Two rods A and B, made from different plastics, were given the static electrical charges shown in the diagram. How could you have charged the rods as shown?

3. [2008]
Describe with the help of a labelled diagram how the force between the two charged rods A and B could be investigated. What result would you expect from this investigation?
4. [2011 OL]
The diagram shows a freely suspended charged rod.
(i) What happens when a similarly charged rod is brought close to the suspended rod?
(ii) What does this tell us about like charges?

5. [2008]
In dry weather you can sometimes get an electric shock from a supermarket trolley. This is caused by the build-up of static electricity on the trolley. Explain clearly why this only happens in dry weather.

6. [2009]
A plastic pen when rubbed with a dry cloth can attract small pieces of paper which ‘stick’ to it.
(i) Why does this happen?
(ii) Explain why the pieces of paper fall from the pen after some time.

7. [2011]
The boy in the photo is touching a charged globe that is at high voltage. He is insulated from the earth. What property of electric charge causes the boy’s hair to stand on end and apart?

8. [2006 OL]
(i) What type of energy generates lightning?
(ii) The flash of lightning is seen before the thunder is heard. What does this tell us about the speed of light?

Current Electricity Exam questions

1. [2008 OL]
The diagram shows a simple electrical circuit. Complete the table below correctly matching each of the names of the components in the circuit with one of the labels A, B, C or D.

<table>
<thead>
<tr>
<th>Label</th>
<th>Circuit component</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bulb</td>
</tr>
<tr>
<td></td>
<td>Power supply</td>
</tr>
<tr>
<td></td>
<td>Resistor</td>
</tr>
<tr>
<td></td>
<td>Switch</td>
</tr>
</tbody>
</table>

2. [2008 OL]
You are given a piece of copper metal and a piece of timber. Which piece, metal or wood, should you connect between X and Y in order that the bulb would light when the switch is closed? Give a reason for your choice.

3. [2007 OL]
A student set up the circuit shown to investigate the relationship between the potential difference (voltage), the current and the resistance of a wire conductor.
Gaps are left in the diagram in the places where the ammeter and voltmeter should be placed. The symbols for these devices are given on the right.
Complete the circuit inserting the symbols for the ammeter and the voltmeter in their correct positions.

4. [2007]
The symbols for two electrical meters are given in the diagram. The symbol \( \boxed{V} \) is for a meter that measures potential difference, often called ‘voltage’.
What electrical quantity can be measured using the meter with the symbol \( \boxed{A} \)?
5. [2006][2011 OL]
   Components, e.g. bulbs, in electrical circuits can be connected in series or in parallel.
   It is noticed that, when one headlight fails (blows) in a car, the second remains lighting.
   (i) State the way the headlights are connected and give a reason why this mode of connection is
       used.
   (ii) All of the bulbs go out in an old set of Christmas tree lights, when one of bulbs fails (blows).
       In what way are the bulbs connected in this set of lights?
   (iii) Explain why, when one bulb blows, they all go out.

6. [2006]
   Calculate the resistance of the filament of a car headlamp when 12 V produces a current of 5 A in it.
   In what unit is resistance measured?

7. [2007 OL]
   The student used the variable voltage supply to apply different voltages across the resistor. She measured the
   voltage across the resistor and the current passing through it several times. She collected the following data.
   (i) Draw a graph of the voltage (y-axis) against the current (x-axis).
   (ii) What conclusion can you draw from the graph about the relationship
       between the potential difference (voltage) and the current passing
       through the wire conductor?

8. [2010 OL]
   A student carried out an investigation of the relationship between current flowing through a wire resistor and the
   voltage across it.
   The data collected is presented in the table below.
   | Current (A) | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 |
   | Voltage (V) | 1   | 2   | 3   | 4   | 5   |
   (i) Use this data to draw a graph of voltage (y-axis) against current (x-axis) using the grid provided below
   Use the graph to estimate the current at 3.5 V.
   (ii) Name the instrument used by students to measure voltage.
   (iii) Name the instrument used by students to vary the current.
   (iv) What is the relationship between voltage and current in this investigation?

9. [2007]
   Meters and are used in the circuit shown.
   Enter ‘A’ into the appropriate circle of one of the meter symbols in the circuit diagram so as to clearly identify its
   correct position.
10. [2007]
A pupil used the circuit above to get a set of readings from both meters for different values and then plotted this data in the graph shown. Use this graph to calculate the resistance of resistor R shown in the diagram. Give the unit of resistance with your answer.

11. [2007]
Give one application of the magnetic effect and one application of the chemical effect of electric current.

12. [2011 OL]
The diagram shows an electric current passing through a coil of wire in a beaker of water.
(i) After 15 minutes, what effect would you expect the current passing through the coil to have on the water?
(ii) Name a household appliance that uses this effect of an electric current.

13. [2008]
Distinguish between alternating and direct current.

14. [2008]
What is the average voltage of domestic alternating current in Ireland?

15. [2006]
Explain, clearly, the safety role of fuses in household electrical circuits.

16. [2011 OL][2008] [2008 OL] [2007 OL] [2006 OL]Wiring a plug correctly is most important.
(i) Give the names of the wires labelled A, B and C.
(ii) Give the colours of the plastic insulations on the wires labelled A, B and C.
(iii) Give one reason why the back covering (casing) of a plug is made from plastic.
(iv) Which wire is the fuse is connected to?
(v) What is the function of the fuse in a plug?

17. [2008 OL]
(i) Write the letter C beside the unit of electric current.
(ii) Write the letter E beside the unit of electricity used by the ESB for costing.

18. [2006 OL]
Appliances vary in the amount of electricity they use depending on their power rating.
A tumble drier has a high power rating of 2.5 kW.
(i) Name another appliance found in the home that has a high power rating.
(ii) Name an appliance found in the home that has a low power rating.

19. [2010]
(i) Name the unit of electrical energy that companies supplying electricity use to bill their consumers.
(ii) Calculate the cost of using of using the electric kettle, shown in the diagram, for ten hours if a unit of electricity costs 15 cent.

20. [2011]
A 20 W (0.02 kW) CFL bulb is equivalent to 115 W (0.115 kW) incandescent bulb.
Electricity costs 15 cent per kWh.
Calculate the cost of using each of these bulbs for 100 hours.

21. [2007 OL]
An electric cooker has four hot plates. The total power rating of the four hot plates is 7 kW.
All four are used for a total of 2 hours each day.
(i) How many units of electricity (kWh) are used in 1 week?
(ii) If electricity costs 11 cent per unit how much does this cost?

22. [2006 OL]
The ESB charges for electricity at a rate of 12 cent per kW h.
A tumble drier of power rating 2.5 kW is used for 2 hours each week for 4 weeks.
(i) How many units of electricity are used?
(ii) What is the cost, in cent, of using the tumble drier?

Electronics - Exam questions

Diodes

1. [2007 OL]
(i) Identify device labelled A on the right.
(ii) Complete the circuit inserting the symbol for the device A so that the buzzer would sound if the switch were closed.

2. [2007]
(i) Look carefully at the circuit diagram and then state which bulb/s, if any, light when the switch is closed.
(ii) Give a reason for your answer.

Light Emitting Diodes

3. [2008]
Identify the devices shown in the diagram.

4. [2008][2010 OL]
Leds are often used instead of bulbs. Give a reason for this wide application.

5. [2006 OL]
The diagram shows the symbol of a LED.
(i) Complete the circuit on the right by drawing in the LED so that the LED will light when the switch is closed.
(ii) Why is there a resistor connected in series with the LED?
6. [2010 OL]
The electrical circuit symbol for a light emitting diode (LED) is shown on the right. LEDs are used in some flashlights (torches).
The circuit on the right includes a resistor, a switch and an LED.
(i) Will the LED light if the switch is closed?
(ii) Give a reason for your answer.
(iii) Why is it necessary to place a resistor in series with the LED?

7. [2006]
A pupil carried out an investigation into the effect of a diode on d.c. and on a.c. circuits using an LED.
The following circuits were initially set up.
(i) What is observed in circuit A (the first circuit) and in circuit B (the second circuit)?
(ii) When the batteries in circuits A and B were replaced by 6 V a.c. supplies the LEDs glowed dimly in both circuits. Explain this observation.

8. [2010]
Look carefully at circuits A and B, then answer the questions.
(i) In which circuit does the red LED light up?
(ii) Give a reason for your answer to (i) above.
(iii) Why is the resistor ‘R’ needed in both circuits?

9. [2009]
(i) The diagram shows a light dependent resistor (LDR) and a graph of the resistance of the LDR against the brightness of light falling on it. Give an everyday use for an LDR.
(ii) Describe an experiment to measure the resistance of an LDR under varying degrees of brightness of light.
(iii) Draw the circuit diagram in the box provided.
(iv) Explain how you would vary the brightness of the light. You do not have to state how the brightness of the light was measured.

Light Dependent Resistors

Density - Exam Questions:
11. [2008 OL]
(i) Complete the equation in the box below using the words on the right.
Density =
(ii) If the mass of a stone is 20 g and the volume of the stone is 10 cm³, find the density of the stone.

12. [2007 OL]
A block of metal has the measurements shown on the right.
The mass of the metal block is 21 g.
(i) Calculate the volume of the block.
(ii) Calculate the density of the block.

13. [2011 OL]
A student set up the equipment shown to measure the volume of an irregular shaped object e.g. a stone.
When the stone was carefully dropped into the graduated cylinder containing water, arrangement B resulted.
(i) Calculate the volume of the stone from the information shown.
(ii) If the mass of the stone was 40 g, calculate the density of the stone.
(iii) What is the unit of density?

14. [2009 OL]
The mass of a metal block is 14.7 g. It has a volume of 7 cm$^3$.
(i) Name the instrument you would use in the laboratory to find the mass of the block.
(ii) Calculate the density of the block.
(iii) What is the unit of density?

15. [2009]
A pupil measured the volume of a potato using the items of laboratory equipment, labelled A and B as shown in the diagram.
(i) Name the items labelled A and B.
(ii) The potato had mass 175 g and volume 125 cm$^3$.
   Calculate the density of the potato.
   Give the units of density with your answer.
(iii) Why did the potato sink in the water?

5. [2011]
The photo shows a hot air balloon.
Why does the balloon rise when the air inside is heated?

6. [2010]
Why do icebergs float on water?

7. [2007]
Ice floats on water but ice sinks in ethanol (an alcohol).
Use this information to compare the density of ice with
(i) the density of water;
(ii) the density of ethanol.