

Centre No.						Surname	Initial(s)
Candidate No.						Signature	

Paper Reference(s)

**4420/1F**

**London Examinations IGCSE**

**Physics**

**Paper 1F**

**Foundation Tier**

**Wednesday 4 May 2005 – Morning**

**Time: 1 hour 30 minutes**

Examiner's use only

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Team Leader's use only

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Question Number	Leave Blank
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14	
15	
16	
Total	

**Materials required for examination**

Nil

**Items included with question papers**

Nil

**Instructions to Candidates**

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.

The paper reference is shown at the top of this page. Check that you have the correct question paper. Answer **ALL** the questions in the spaces provided in this question paper.

Show all the steps in any calculations and state the units.

Calculators may be used.

**Information for Candidates**

The total mark for this paper is 100. The marks for parts of questions are shown in round brackets: e.g. (2).

Useful formulae are given on page 2.

This paper has 16 questions. There are no blank pages.

**Advice to Candidates**

Write your answers neatly and in good English.

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**Turn over**



## FORMULAE

You may find the following formulae useful.

$$\text{power} = \frac{\text{work done}}{\text{time taken}}$$

$$P = \frac{W}{t}$$

$$\text{power} = \frac{\text{energy transferred}}{\text{time taken}}$$

$$P = \frac{W}{t}$$

$$\text{frequency} = \frac{1}{\text{time period}}$$

$$f = \frac{1}{T}$$

Where necessary, assume the acceleration of free fall,  $g = 10 \text{ m/s}^2$ .

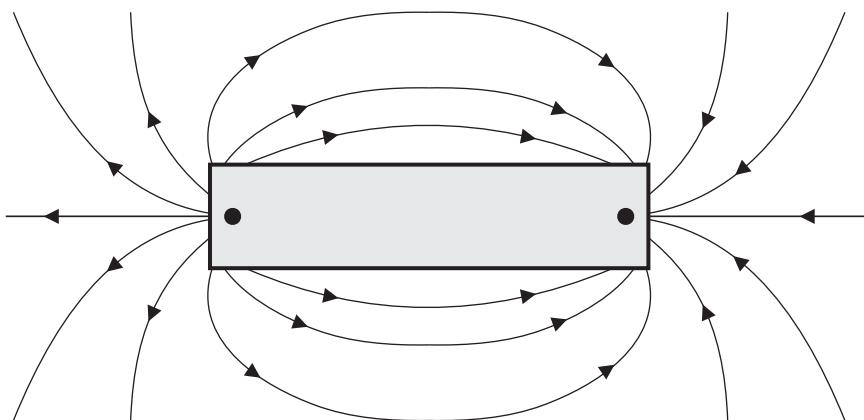


1. (a) Circle the names of two materials which are attracted to magnets.

aluminium    brass    copper    iron    steel    tungsten

(2)

(b) The diagram shows a pattern of lines around a magnet.



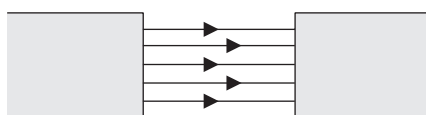
Name:

(i) this shape of magnet ..... (1)

(ii) the points marked ● ..... (1)

(iii) the lines ..... (1)

(c) Two magnets, like the magnet shown above, were used to get the pattern of lines shown below.



Describe what you would do with the two magnets so that you got this pattern.

.....  
.....  
.....

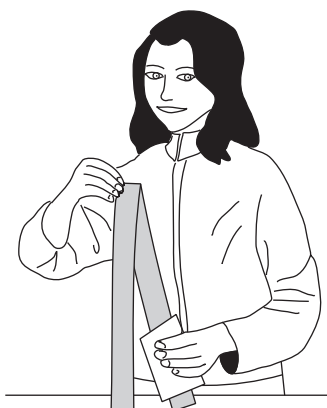
(2)

Q1

(Total 7 marks)



2. A girl rubbed two strips of polythene with a dry cloth. When she held the tops of the strips together, the bottom ends moved apart.



(a) Why did the bottom ends of the strips move apart?

.....  
.....  
.....

(2)

(b) Complete the sentences.

Each strip is given a negative charge. The cloth is left with a .....  
charge. This is because particles called ..... have been transferred  
from the ..... to the .....

(3)

(c) The girl tried the experiment using two strips of aluminium. The bottom ends of the strips did not move.

Complete the sentences.

(i) Materials such as aluminium, which electricity will pass through easily, are  
called .....

(1)

(ii) Materials such as polythene, which electricity will not pass through easily, are  
called .....

(1)

Q2

(Total 7 marks)

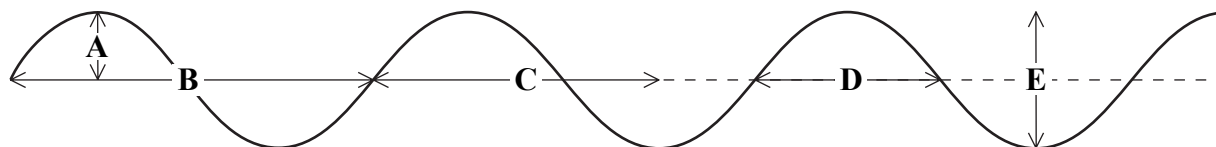


3. (a) Complete the sentence.

Waves can transfer energy and allow the transfer of .....  
without transferring .....

(2)

(b) The diagram shows five distances, A, B, C, D and E, on a wave.



Complete the sentence.

Distance A shows the ..... of the wave and distance .....  
shows the wavelength.

(2)

(c) What is meant by the frequency of a wave?

.....  
.....

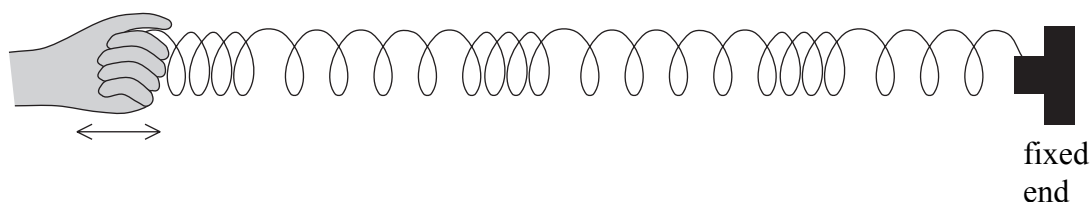
(1)

(d) What is special about sounds in the frequency range 20 Hz to 20 000 Hz?

.....  
.....

(1)

(e) The diagram shows a long spring which is fixed at one end. The spring is moved backwards and forwards at the other end. A wave goes through the spring.



(i) What type of wave is this?

.....

(1)

(ii) Give another example of a wave of this type.

.....

(1)

(Total 8 marks)

Q3



4. A worker cuts through a steel girder. His cutting torch heats some of the girder until it melts.



- (a) The table describes the movement and position of the particles in a solid and in a liquid.

Choose words from the box to complete the table. You may use the same words more than once.

**close to    far from    random    regular    rotate    vibrate**

	Particles in a solid	Particles in a liquid
<b>Movement</b>	They ..... about a fixed position.	Their motion is .....
<b>Position</b>	They are ..... each other.	They are ..... each other.

(4)

- (b) Complete the sentence.

A substance can change state from a liquid to a gas by boiling or by

.....

(1)

- (c) Name the process which is the opposite of melting.

.....

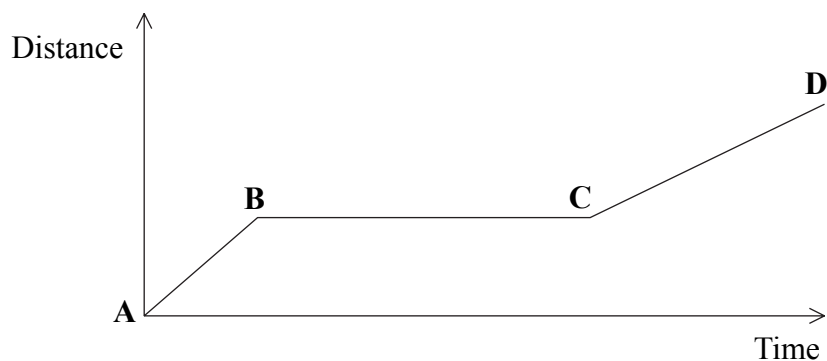
(1)

(Total 6 marks)

Q4



5. A girl walked a short distance to the market. The distance–time graph represents her walk.



(a) Choose phrases from the box to complete the sentences.

- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| <b>standing still</b>                | <b>walking at a constant speed</b>   |
| <b>walking with decreasing speed</b> | <b>walking with increasing speed</b> |

(i) Between **A** and **B** she was ..... (1)

(ii) Between **B** and **C** she was ..... (1)

(b) Complete the sentence.

You can tell that the girl's speed between **A** and **B** was ..... than her speed between **C** and **D** because ..... (2)

(c) State the equation which relates average speed, distance, and time.

..... (1)

(Total 5 marks)

Q5



6. There are different types of energy. The useful output energy of a tractor is kinetic energy.



(a) Complete the sentence.

Something has kinetic energy when it is ..... (1)

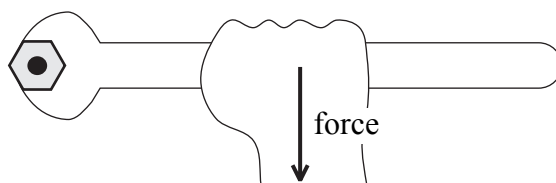
(b) The tractor has a diesel engine. What type of energy does diesel fuel have?

..... (1)

(c) Apart from kinetic energy, give two other types of energy output from a tractor.

..... and ..... (2)

(d) The diagram shows someone using a spanner to tighten a nut on a tractor.



Give two ways in which the person can increase the turning effect.

1 .....  
.....

2 .....  
.....

(2)





Leave  
blank

(e) The tractor is fitted with wide tyres. The wide tyres help to prevent the tractor from sinking into soft ground.

Use the words **area**, **force** and **pressure** to explain this.

.....

.....

.....

.....

.....

**(3)**

**Q6**

**(Total 9 marks)**



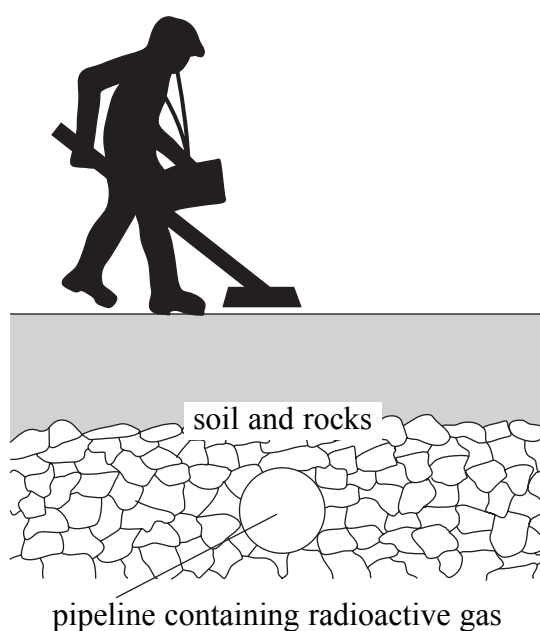
7. Radioactive materials can be dangerous.

(a) Complete the sentence.

Radioactive materials can emit alpha particles, ..... particles  
or ..... radiation.

(1)

(b) The diagram shows a method for finding a gas pipeline. Some radioactive gas is added to the pipeline. A worker has a Geiger-Muller tube and a counter. He can hear the clicks from the counter.



(i) What happens to the frequency of the clicks when he gets above the pipeline?

.....  
(1)

(ii) There are three types of radioactive emission but only one of them is suitable for use in the pipeline.

Which one is suitable?

.....  
(1)

Why is this type of emission the only suitable one?

.....  
.....  
(1)



Leave  
blank

(c) Which part of the atom of a radioactive isotope emits radiation?

.....  
(1)

(d) State a danger to health of radioactive emissions.

.....  
.....  
(1)

(e) State a way in which people can protect themselves against radioactive emissions.

.....  
.....  
(1)

**(Total 7 marks)**

Q7



Leave blank

8. A lorry is travelling on a straight and level road. There is no wind. The forces on the lorry are balanced.

(a) Circle the word which describes the speed of the lorry.

**constant      decreasing      increasing      high      low**

**(1)**

(b) Name the force which opposes the motion of the lorry.

.....  
**(1)**

(c) The lorry driver suddenly sees that the road is blocked by a fallen tree. He brakes.

What word is used to describe the time between the driver seeing the fallen tree and applying the brakes?

.....  
**(1)**

(d) After the brakes have been applied, the lorry travels a distance before it stops.

(i) Complete the sentence.

For a lorry of greater mass this braking distance is likely to

be .....  
**(1)**

(ii) State two other factors which will affect this braking distance.

1 .....

2 .....

**(2)**

**Q8**

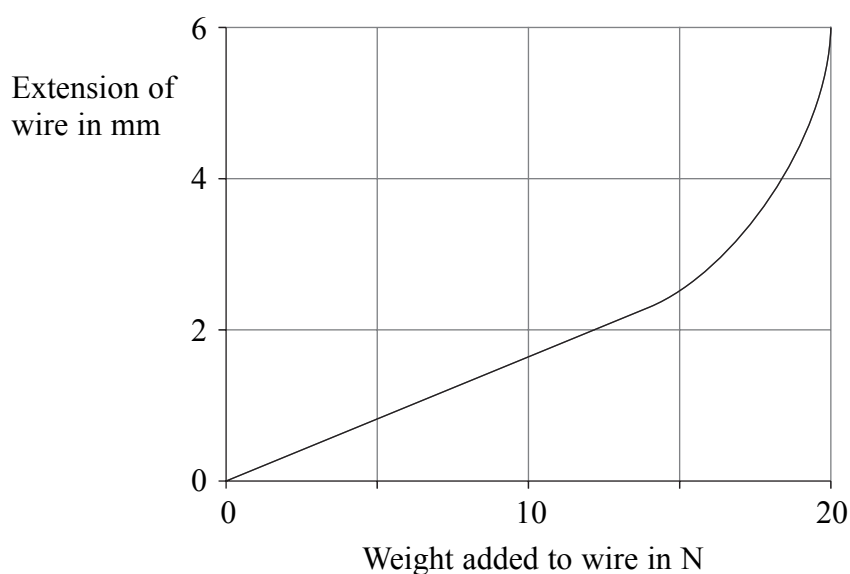
**(Total 6 marks)**



9. (a) A student wants to use metal wire as part of a model bridge that she is building. To test if a wire is suitable she hangs a mass of 0.5 kg from it and measures its extension. Calculate the weight in newtons of the 0.5 kg mass.

.....  
 ..... Weight = .....N  
**(2)**

- (b) She continues to add masses to the end of the wire. The graph shows the results of her experiment.



- (i) Indicate on the graph the region associated with Hooke's law. **(1)**

- (ii) Explain your answer.

.....  
 .....  
**(1)**

- (c) The student thinks the wire is too weak and decides to replace it with a thicker wire of the same material and length. She tests it in the same way as before by hanging masses from its end. Show her possible results on the axes above.

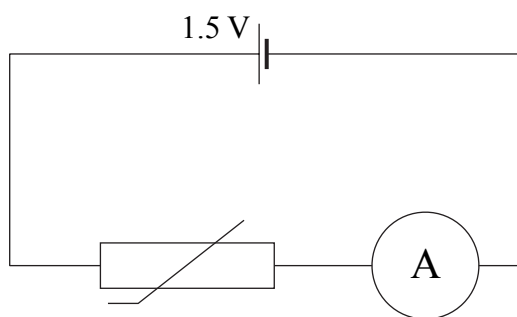
**(2)**

**Q9**

**(Total 6 marks)**



10. The circuit below contains a 1.5 V dry cell, an ammeter and a thermistor at room temperature.



(a) At room temperature, the resistance of the thermistor is  $1000\ \Omega$ . Calculate the current, in amps.

.....  
 ..... Current = ..... A  
**(3)**

(b) What happens to the resistance of the thermistor as its temperature increases?

.....  
**(1)**

(c) What happens to the current as the temperature of the thermistor increases?

.....  
**(1)**

**(Total 5 marks)**

**Q10**



11. The diagram represents the electromagnetic spectrum.

Gamma-rays	X-rays	Ultraviolet	Visible	Infra-red	Microwaves	Radio waves
------------	--------	-------------	---------	-----------	------------	-------------

(a) Which of X-rays and radio waves has the longer wavelength?

..... (1)

(b) Which of X-rays and radio waves has the higher frequency?

..... (1)

(c) State one use of X-rays.

..... (1)

(d) State one property that all electromagnetic waves have in common.

..... (1)

(e) State the law of reflection.

.....  
 ..... (1)

(f) A teacher wants to demonstrate the law of reflection to his class.  
 Suggest two reasons why he should use visible light rather than X-rays.

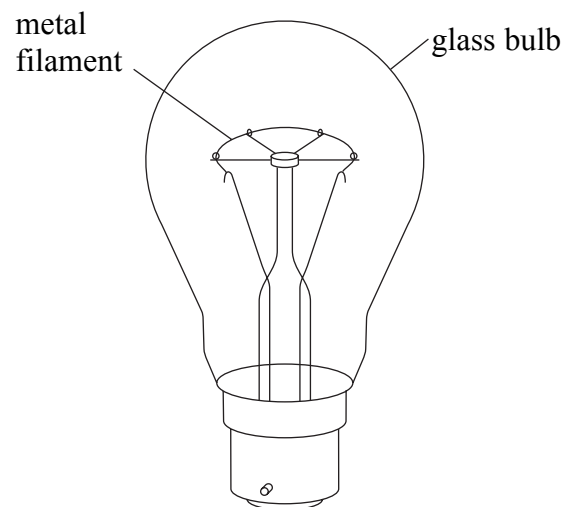
1 .....  
 2 ..... (2)

(Total 7 marks)

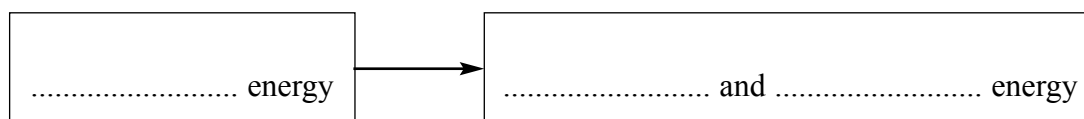
Q11



12.



- (a) A metal filament lamp is switched on.  
Complete the boxes to show the energy transfer that occurs.



(3)

- (b) The lamp is rated at 100 W and is left on for 30 seconds.  
How much energy, in joules, is transferred to the lamp?

.....  
.....

Energy transferred .....J

(2)

- (c) The lamp is only 5% efficient. What does this mean?

.....  
.....  
.....

(2)

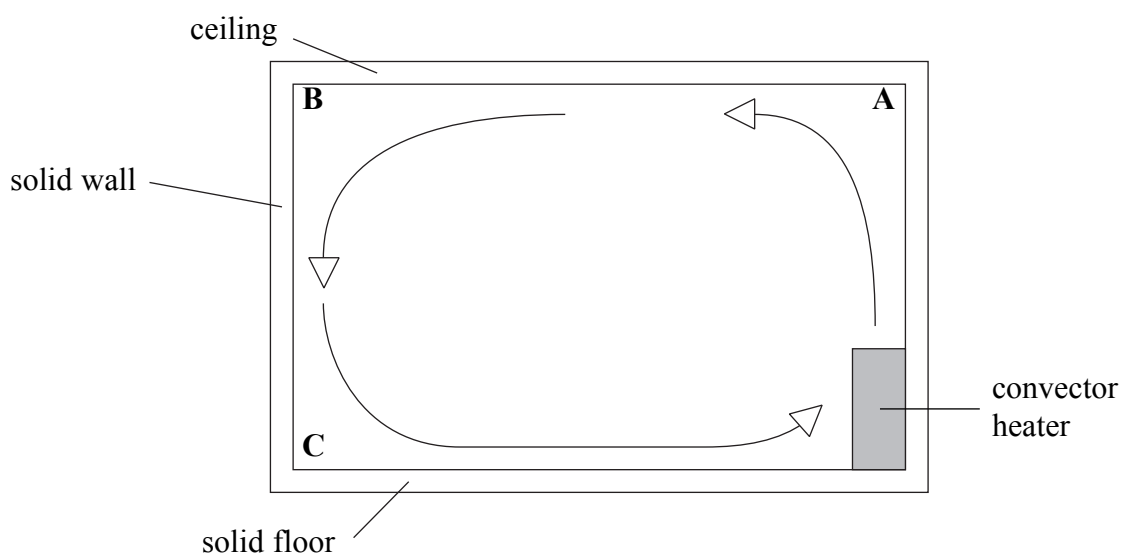
Q12

(Total 7 marks)





13.



- (a) The room shown is heated by a convective heater. The arrows show the direction of movement of the air within the room.  
Is the highest temperature at **A** or **B** or **C**?

.....  
**(1)**

- (b) The room has a floor area of  $20 \text{ m}^2$ . The height of the room is 3 m and it contains air of mass 72 kg.  
Calculate the density, in kilograms per cubic metre, of the air in the room.

.....  
.....  
..... Density = .....  $\text{kg/m}^3$   
**(3)**

- (c) The density of air changes with temperature.  
Is the density of air lowest at **A** or **B** or **C**?

.....  
**(1)**

- (d) Some heat energy within the room is transferred through the solid floor.  
Name the energy transfer process taking place.

.....  
**(1)**

**(Total 6 marks)**

**Q13**



N 2 1 1 6 0 A 0 1 7 2 0

Leave  
blank

**14.** A technician measures the activity of a radioactive source.  
The activity is 400 Bq. After 20 minutes the activity decreases to 100 Bq.

(a) Calculate the half-life, in minutes, of the radioactive source.

.....  
.....  
.....

Half-life = ..... minutes  
**(2)**

(b) Why is this source unsuitable for dating archaeological specimens?

.....  
**(1)**

(c) The technician continues measuring the activity from the source. The measured activity does not drop below a certain value due to background radiation.  
Name two sources of background radiation.

1 .....

2 .....

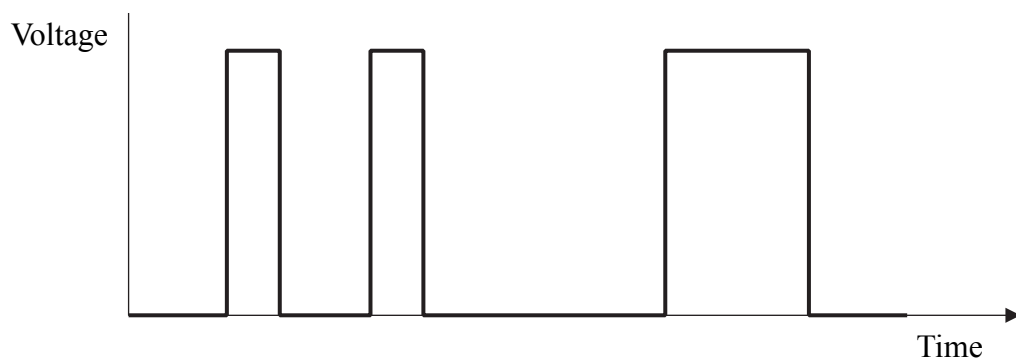
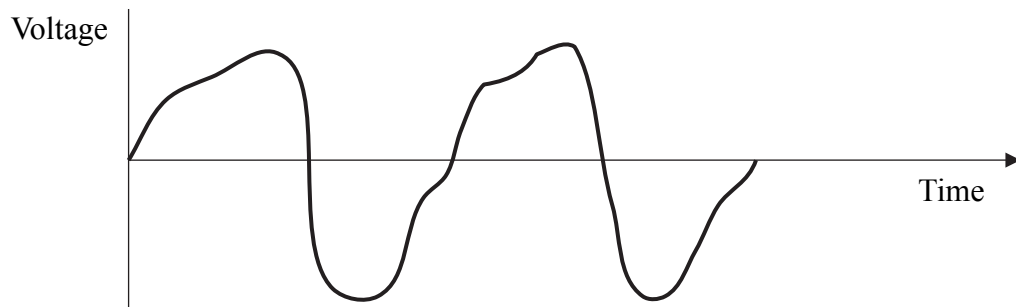
**(2)**

**Q14**

**(Total 5 marks)**



15. The diagram shows an example of an analogue signal and an example of a digital signal.



Complete the sentences.

(a) The analogue signal varies ..... between a maximum and minimum value. (1)

(b) The digital signal only has two values. These are 1 which corresponds to ..... and ..... which corresponds to ..... (3)

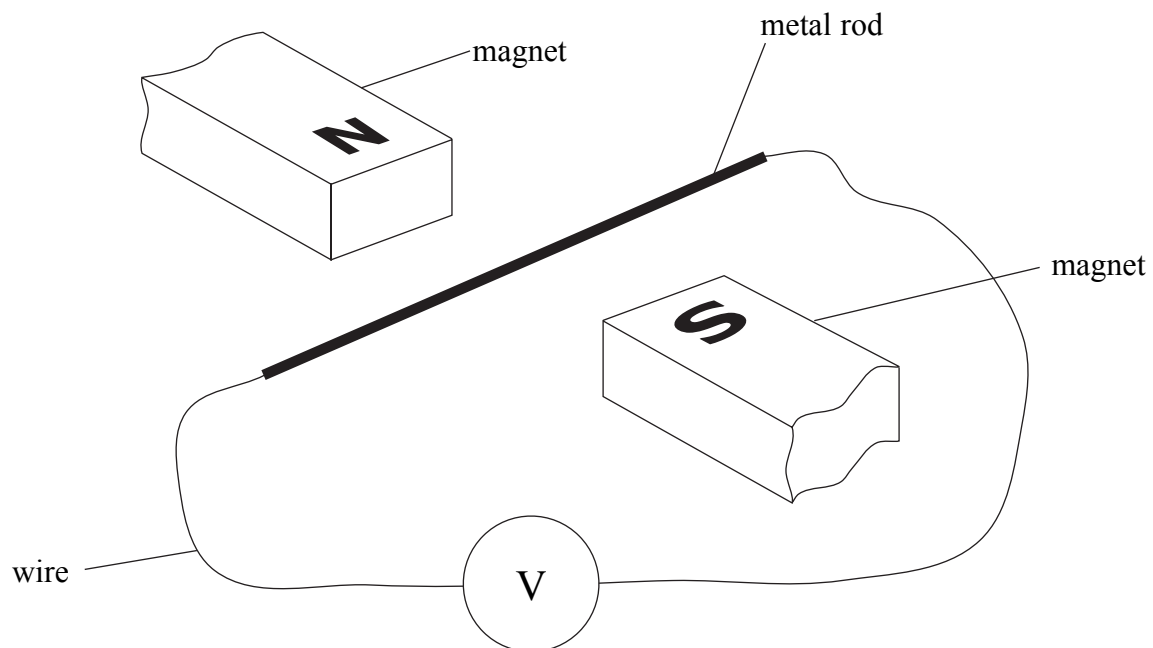
(Total 4 marks)

Q15

TURN OVER FOR QUESTION 16



16. A physics teacher uses the apparatus shown in a demonstration to her class.



She moves the metal rod upwards and the voltmeter briefly shows a small reading.

(a) Why does the voltmeter show a reading?

.....  
.....  
.....

(3)

(b) A boy standing at the back of the class complains that he cannot read the voltmeter. Suggest two ways in which the teacher could use the same apparatus to produce a bigger reading on the voltmeter.

1 .....  
2 .....

(2)

Q16

(Total 5 marks)

TOTAL FOR PAPER: 100 MARKS

END

