



Centre Number

71

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Forces and Energy

End of Module Test

Foundation Tier

C

[GDC01]



THURSDAY 11 NOVEMBER 2010, AFTERNOON

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper. Answer **all twelve** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 50.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

For Examiner's
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

Total
Marks



1 Many power stations in the UK use fossil fuels such as natural gas.

(a) Give the names of two **other** fossil fuels.

1. _____ and 2. _____ [2]

In recent years scientists have been developing renewable energy resources such as solar energy.

(b) Give the names of two **other** renewable energy resources.

1. _____ and 2. _____ [2]

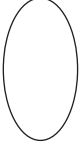
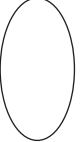
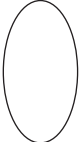
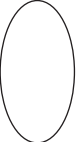
(c) State a reason, other than cost, for developing renewable energy resources.

_____ [1]

2 A giraffe runs 48 metres in 8 seconds. Calculate the average speed of the giraffe.

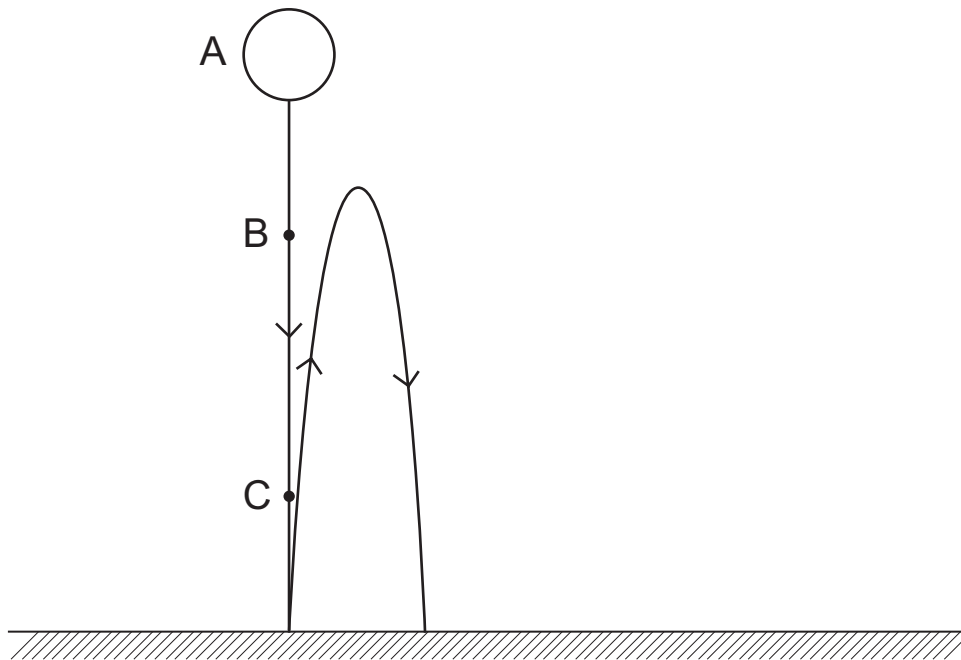
You are advised to show your working out.

Average speed = _____ m/s [3]

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Marks	Remark
	
	

3 A ball is dropped from rest and allowed to bounce on a hard floor.

The diagram below shows its motion.



(a) (i) What type of energy does the ball have at its starting point A?

_____ energy [1]

(ii) What type of energy does the ball lose as it moves from B to C?

_____ energy [1]

(iii) What type of energy is at a maximum just before the ball hits the floor?

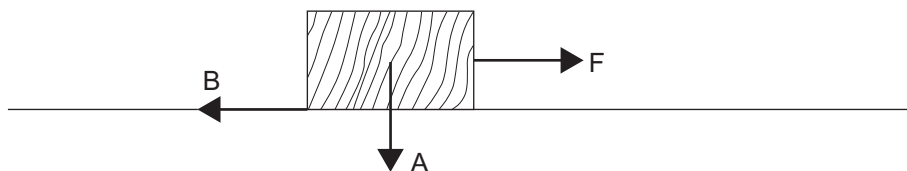
_____ energy [1]

(b) What type of energy is lost when the ball hits the ground?

_____ [1]

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Marks	Remark
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4 Kevin pulls a block of wood over rough surface with a force F.



Other forces act on the block. One force acts in a downward direction and the other in a horizontal direction.

(a) Give the names of the downward force A and the horizontal force B.

Downward force A _____

Horizontal force B _____ [2]

The block is accelerating.

(b) What must happen if it is to move at **constant speed** to the right?

Tick (✓) the correct box.

Force B must become greater than force F.

Force B must become equal to force F.

Force B must become zero.

[1]

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Marks	Remark
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5 A pot of cold water is heated on a gas ring.



The base of the pot is made of copper and the handle is made of wood.

(a) (i) What is the method of heat transfer through the base of the pot?

_____ [1]

(ii) What is the method of heat transfer through the water?

_____ [1]

(b) What particle is responsible for heat transfer through the wooden handle?

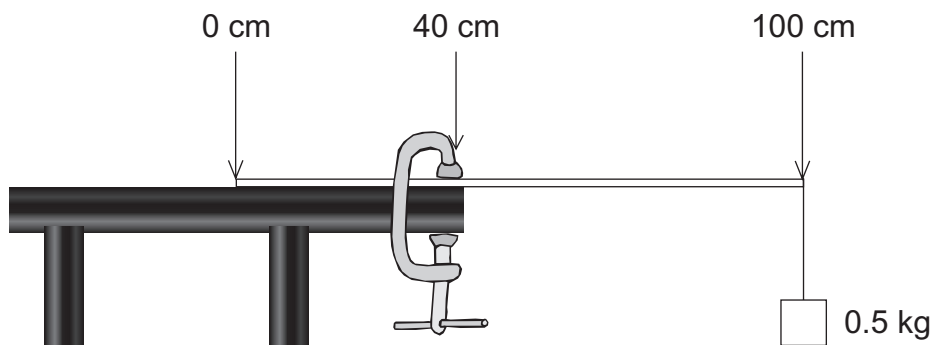
_____ [1]

(c) What method of heat transfer is reduced by making the outside surface of the copper pot shiny?

_____ [1]

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Marks	Remark
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- 6 A metre stick is clamped to a laboratory bench and a 0.5 kg load is suspended from the metre stick as shown.



The edge of the bench corresponds with the 40 cm mark on the metre stick.

- (a) What is the weight of the 0.5 kg load?

Weight = _____ N [2]

- (b) (i) Calculate the moment exerted by the load in N cm.

You are advised to show your working out.

Moment = _____ N cm [3]

- (ii) What is the direction of this moment.

Tick (✓) the correct box.

Clockwise

Anticlockwise

Down

[1]

Examiner Only	
Marks	Remark
○	○

7 Flora lifts a bag of potatoes onto a shelf 200 cm high. The bag weighs 80 N.

Calculate the amount of work Flora does in joules.

You are advised to show your working out.

Work = _____ J [4]

8 A jeep and a sports car are shown.



© Hemera/Thinkstock



© Hamann Mot

Give two reasons why the sports car is more stable than the jeep.

1. _____ [1]

2. _____ [1]

Examiner Only	
Marks	Remark
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9 A loudspeaker changes energy from one type to another.



© CVR - Audio

The loudspeaker shown produces 3 J of sound energy for every 75 J of electrical energy input.

(i) Calculate the efficiency of the loudspeaker.

You are advised to show your working out.

Efficiency = _____ [3]

(ii) Circle the unit, if any, for efficiency from the following list.

joule

newton

no unit

watt

[1]

(iii) Why can the efficiency of the loudspeaker never be greater than 1?

_____ [1]

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Marks	Remark
○	○

10 A cyclist rides around a bend as shown.



© Cycle Logic Racing

(a) What force allows the cycle to go round the bend?

_____ [1]

The total mass of cyclist and cycle is 115 kg and he goes around the bend at a constant speed of 6 m/s.

(b) Calculate their total momentum.

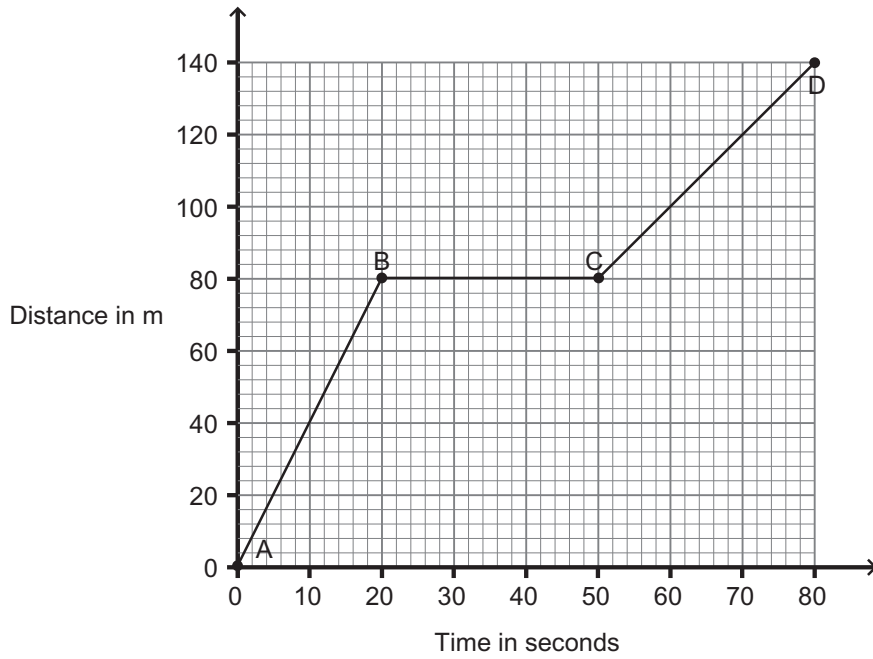
Remember to include the correct unit.

You are advised to show your working out.

Momentum = _____ [4]

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Marks	Remark
○	○

11 The distance-time graph for an athlete is shown.



- (a) During which region **AB**, **BC**, or **CD** is the athlete running fastest?
Give a reason for your answer.

Region _____ [1]

Reason _____

_____ [1]

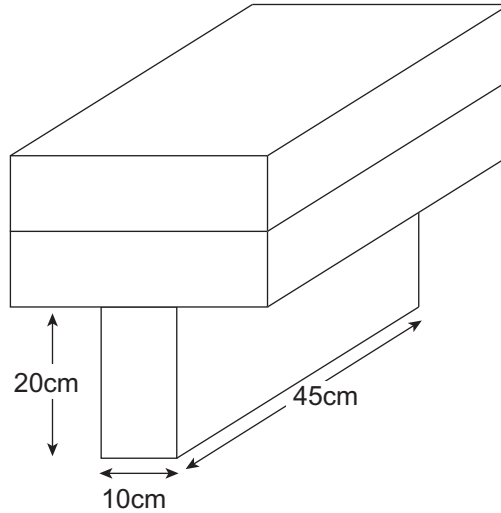
- (b) Calculate the athlete's speed during the region **CD**.

You are advised to show your working out.

Speed = _____ m/s [3]

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○	○

- 12 The diagram shows three stacked building blocks. Each block has a weight of 300 N.



- (a) With the help of the figures on the diagram, calculate the pressure exerted on the ground in N/cm^2 .

You are advised to show your working out.

Pressure = _____ N/cm^2 [3]

It is possible to change the bottom block so that the pressure exerted is greater than the value you have calculated.

- (b) Suggest how the bottom block should be arranged to give this greater pressure.

_____ [1]

THIS IS THE END OF THE QUESTION PAPER

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Marks	Remark
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