

	Cer	itre N	umber

C	andid	ate Nu	ımber

General Certificate of Secondary Education 2014

GCSE Physics

Unit 1

Foundation Tier



[GPH11]

THURSDAY 12 JUNE, MORNING

GPH11

TIME

1 hour 15 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.

Complete in blue or black ink only. **Do not write in pencil or with a gel pen**. Answer **all six** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 80.

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

Quality of written communication will be assessed in Question 1(a)(iii).

8585.04**R**



1	(a)	(i)	In 2009 the sprinter Usain Bolt ran the 100 m sprint in a time of 9.58 s.	Examiner Only Marks Remark
			Calculate his average speed during this race.	
			You are advised to show clearly how you get your answer.	
			Average speed = m/s [2]	
		(ii)	Explain why your answer is an average speed.	
			[1]	
8585	.04 R			

20 06 GGE-DO GE G93 DO GE G G G G D CE G93) D CE GOD 20 00 G93 D CE G33 20 GE G33 D GE **C** D G GEE D GE G G G PO GE G9Ð DO CE G T DO CE G G G G D C GT DO GG3 D CE G G G DO GE GGG D GE COD D GE G G 20 00 **G9**3 DO GG

Reserving Learning

Properties Leaving



ii) To detect speed	ding motorists speed came	eras are located on	Examiner On
speed of a motorists	ne type of speed camera porist. Is who exceed this average below represents the layout	e speed are prosecuted.	Marks Rem
3	,	,	
	Speed camera 1	Speed camera 2	
Direction in which car travels	—		
	y and in detail how this sy overage speed of a car.	stem of speed cameras	
	n you will be assessed on skills including the use		
		[6]	

20 03 - 333 20 GE COD DO GE CEE DO CE **G9**3 D C 693 20 GE **G9**3 DO GE **GG** 20 GE 633 D CE G33 D GE COD D GE GG 3 PO GE COD 20 66 COD DO CE GG3 D CE G93 DO GE CET DO CE 699 20 06 GGT D G GG3 DO GE GG3

20 00

GGG Reversing Learning

Researching Learning

Page Company

Researching Learning

Researching Learning

Researching Learning

Researching Learning

Researching Learning

Researching Learning

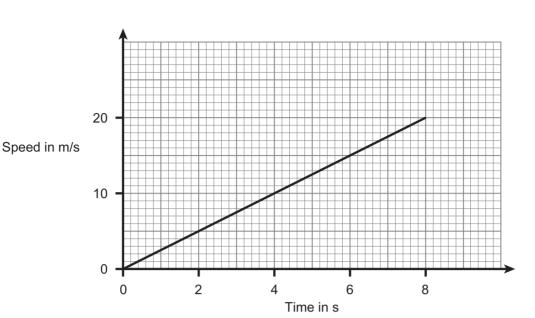
Powerthy Learning

Powerthy Committee

8585.04**R**



(b) The speed–time graph for the motion of a car is shown below.



(i) Using the graph calculate the total distance travelled by the car in 8.0s.

You are advised to show clearly how you get your answer.

Distance = _____ m [3]

8585.04**R**



20 00 DO GE E CE E CE E CE E CE E CE ED CE G93)

Examiner Only Marks Remark

> E CE CET E CE

G33 E CE E CE

E CE

G9Ð E CE

G G G G G RO CE

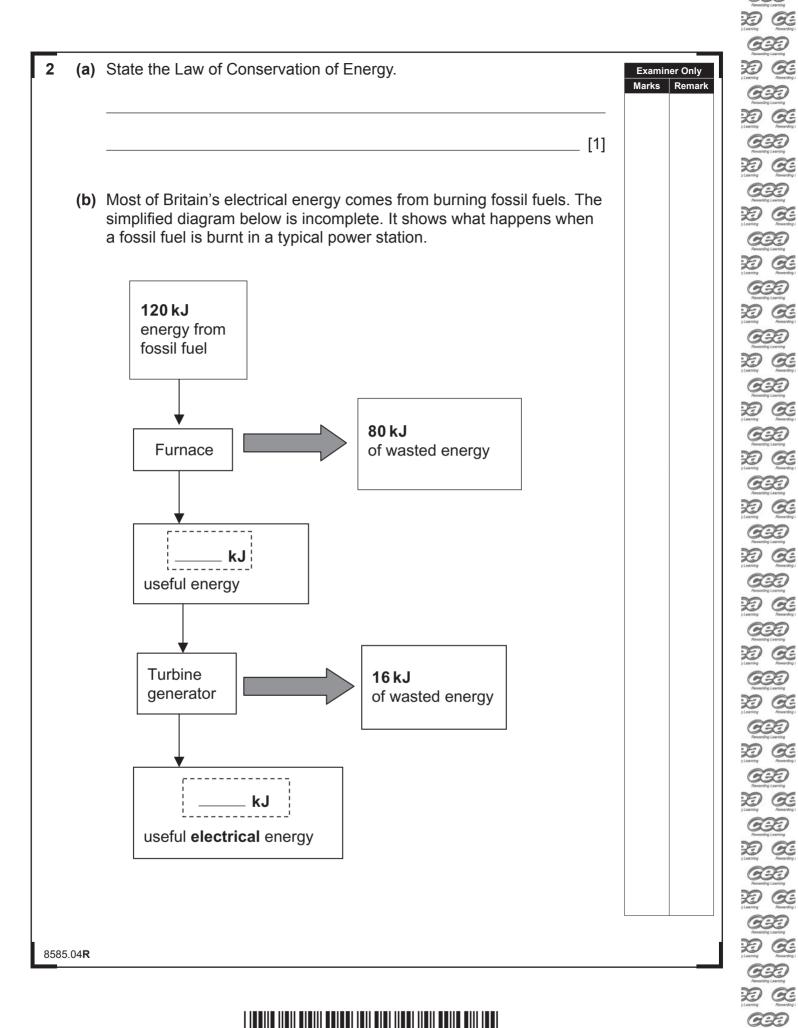
E CE GGG

E CE GGGE CE

Reserving Learning DO GE 1 Learning Rewarding I		
Researching Learning Describing Researching	(ii) Calculate the acceleration of the car.	Examiner Only
COD Rowerling Learning	Remember to give the unit for acceleration.	Marks Remark
J. Learning Researcing I COO Receasting Learning J. Learning Researcing I	You are advised to show clearly how you get your answer.	
Researching Learning DO GC J. Learning Researching I		
Researching Learning		
y Learning Remarking I		
D GG 7 Learning Property of 1		
Reserving Learning	Acceleration = [3]	
COD Roserting Learning	/teoeleration [o]	
y Leaning Remarking I		
Powerding Learning Powerding I		
Researching Learning DOGS		
Reserving Rewarding I		
James Researching I		
Rowarding Learning D G y Learning Researcing 1		
COO Rowarding Learning DO COC 1 Learning Remarking 1		
GGG Researching Learning		
Descring Remarking I		
DO GE		
Reserving Learning Describing Company Learning Researcing I		
GGG Researching Learning		
De GE 7 Leaning Rewarding I		Total Question 1
DO GG		
Researching Learning Day College Learning Reveaucing	8585.04 R	[Turn over
GGG Rewarding Learning		
PD GG 7 LOUNING REWARDS		
Researching Learning Company Researching I		



The Researching Learning Learning Learning Learning



20 00

E CE G G G G

E CE GGG-D CE



	(i) What type of input energy is used in a fossil fuel power station? Choose your answer from the types of energy listed below.	Examiner O
	electrical: nuclear: heat: chemical: gravitational potentia	
		1]
	(ii) Use the Law of Conservation of Energy to calculate the numbers missing from the small dotted boxes. Write these numbers in the appropriate boxes. Use the space below for any calculations.	
	[3]
	(iii) In the box below write down the equation you would use to find	
	the efficiency of a device.	
	(iv) Use your equation to calculate the efficiency of the turbine generator.	
	You are advised to show clearly how you get your answer.	
	Efficiency = [3]
	(v) What resource do fossil fuel power stations need that makes it desirable for them to be close to a river, or a lake or to be built or	ı
	the coast?	Total Questi
	[1]
8585.04 R		[Turn o



7 Learning Researching |

COD
Rowarding Learning

DO CO
2 Learning Researching |

3	(a)	(i)	Lisa has a mass	of 55 kg. Calcula	te her w	eight in newtons.	Exar Mark	miner Only s Remark
					We	eight =		
		(ii)		t are two terms the gred in newtons and ay of distinguishing	nd mass	in kilograms.		
							[1]	
	(b)		e diagram below s e place when mat		s of mat	ter and the chang	es that	
		(i)	Label each diag	ram with the state	of matte	er it represents.	[3]	
		:	state 1	state 2		state 3		
			A		В			
		(ii)	Name the proces	sses happening a	ıs showr	n by the arrows.		
			A =		B =		[2]	
		(iii)	How does the dedensity in state 2	?? Explain your a	nswer.	compare with the		
							[2]	

20 06 COE PO GE **G**33 DO GE **GG** DO GE COD D GE GG3 DO GE G93 DO GE COD DO GE GG 3 DO GE COD 20 GG GGG20 00 GG3 20 00 G93 20 06 GG3 D GE **G**GT 20 66 GGGDO GE GG3 20 GE **GG** DO GE **G3** 20 06 GGGDO GE CEE 20 06

COD Researching Learning

Reserving Learning

Reserving Reserving

Reserving Learning

Reserving Learning

Reserving Learning

Reserving Learning

PO GG

8585.04**R**



(c) (i)	The density of aluminium is 2.7 g/cm³. Explain, without giving a formula, what this means.	Exami Marks
	[1]	
(ii)	You are given a block of metal as shown in the diagram below.	
	î ÂÔÔÒŒ List the measurements you would make and the calculations you	
	would carry out to find the density of the metal. Measurements	
	1. 2.	
	3. 4.	
	1	
	2 [4]	
		Total C
		[Tu
8585.04 R		

DO GE

SEE GE



8585.04**R**



24GPH1110

20 00 GGG 20 GE G33 20 GE COD 20 00 GG3 20 GE G G G G 20 GE GG3 RO GE CO 3 DO GE GG3 20 66 CBD RO GE GG3 **20** GE G G G G G E CE GEE DO GE **GET** DO GE GG3 20 GE GGG20 00 GGGDO GE GGGDO GE GGG20 06 **C** 20 00 CEE DO GE G G G G G DO GE GGG

Page GG Rewarding I

Partie George

CORT

Research Learning

DO GE

De Rowarding I		
Frewarding Learning		
DO GE 1 Loaning Rewarding I		
GGG Reserving Learning		
J. Learning Rewarding I		the diagram shows an athlete who is moving a hammer in a circle. The hammer is a heavy metal ball attached to a steel wire. The athlete
Rewarding Learning		rips the steel wire at the other end as shown below.
y Learning Researching I		
Rewarding Learning		
2 Learning Researching I		
Paramong Learning		
2 Learning Rewarding I		
Paraming Learning		
7 Learning Rewarding I		
Rewarding Learning TO GE		© nickp37/iStock/Thinkstock.com
(COD)	/:). What name is given to the force that keeps chiects moving in a
DO GG	(i	What name is given to the force that keeps objects moving in a circle?
GGG Researcing Learning		
DE GG		[1]
GGG Rewarding Learning		
DO GE y Learning Annuarding I	(i	i) In what direction does this force act?
GGG Rewarding Learning		[1]
) Learning Rewarding I		
Researching Learning	(i	ii) In the case shown in the diagram what provides this force?
7 Learning Rewarding I	, ,	n) in the sace thewirth the diagram what provides the force.
Rewarding Learning		[1]
y Learning Researching I		
Rewarding Learning	(i	v) The hammer moves in a circle with constant speed.
7 Learning Rewarding I		Explain why it would be incorrect to say it moves with a constant velocity.
Researching Learning		velocity.
COD		
DO GE		
GGG Rewarding Learning		
DO GE		[1]
GGG Rewarding Learning		
DO GG 7 Learning Rewarding I		
GGG Researching Learning		
The CE		
Rowarding Learning		
y Learning Remarking I	8585.04 R	
Roserding Leeming		
DE GE		
Passerting Learning		
g Learning Rewarding i		

[1]
[1]
[1]
[1]
[1]
[Turn over

Examiner Only

Marks Remark

(v) The table below shows some of the factors that may affect the size of the force needed to move an object in a circle. Complete the table using the terms increases, decreases or has no effect. You should assume that only one factor at a time is changing.

er Only
Remark

Factor being changed	The effect on the size of the force
The speed is increased, the mass and radius remain constant	
The radius is increased, the mass and speed remain constant	
The direction of rotation is reversed, the speed, mass and radius remain constant	

[3]

(b) Golfers when hitting a golf ball sometimes want it to go as far as possible.

They achieve this by following through. This means the golf club exerts a force on the ball for as long as possible.



© iStock / Thinkstock

(i) Write down the equation that connects the momentum change that the ball experiences, the force acting on the ball and the time for which the force acts.

_ [1]

8585.04**R**



Tenning Tenning

Reserving Learning

Page Reserving Company

Page Reserving

Page Reserving

Page Reserving

Page Reserving

Reserving

Reserving

Reserving

Reserving

Reserving

Reserving

Reserving

Reserving

E GE

Research Res

Research Learning

Research Learning

Research Learning

Research Learning

Research Learning

Reserving Learning

Reserving Reserving

Reserving Reserving

Reserving Learning

Reserving Reserving

Reserving Reserving

Researcing Learning

DO GG
(Learning Researcing)

Researcing Learning

DO GG

Researcing Learning

Reserving Learning

Post Reserving Learning

Reserving Learning

Reserving Learning

Reserving Learning

The entity of th

30 CE

Remarking Learning D GG 2 Learning Remarking GGG Remarking Learning		_
Proposition of Propos	(ii) At a particular point in its motion, the golf ball of mass 0.06 kg is moving with a velocity of 50 m/s. Calculate its momentum.	Examiner Only Marks Remark
D GE Remedity	You are advised to show clearly how you get your answer.	
THE PROPERTY OF THE PROPERTY O		
Annual Parameter Annual Parame	Mamantura kara/a [2]	
Describing (sensing) Constitution (sensing) Describing (sensing) According (sensing) Researching (sensing)	Momentum = kg m/s [2]	
D GG New New Stop 1 GG D New Stop 1 Reserving Learning D GG New Stop 1 Reserving 1		
Towarding Learning Towarding I Towarding I		
ng Rewarding I		
Describig Learning Describig Learning Researching I Describig Learning Describing Learning Describing Learning Describing Learning Describing Learning		
Comming Learning Comming Comming Comming Comming Comming Co		Total Question 4
Reserving Learning Reserving Reserving	8585.04 R	[Turn ove
Committing Learning		



PLearning Rewarding |
Reserving Learning
Reserving Rewarding |
Rewarding |

5	(a)	(i)	Write down the equation for calculating the moment of a force. Examiner Only Marks Remark
			[2]
		(ii)	In what unit is the moment of a force measured?
			[1]
	(b)		diagram below represents a crane lifting a small submarine. submarine weighs 10 000 N.
			5 m 8 m
			pivot
		(weight (W)
			dockside
			10 000 N
		(i)	State the direction of the moment of the weight of the submarine about the pivot.
			Moment is [1]

20 06 GGG DO GE G93 DO GE GG3 DO GE GG3 D CE GOD 20 GE G93 20 GE GG3 20 GE GG3 D CE **C** DO GE GEE D GE **G3** RO GE G93 DO CE G T DO CE G G G G 20 GE GT DO CO T DO CE GGÐ DO GE G93 DO CE GGGDO GE CED 20 00

Rewarding Learning

Rewarding Rewarding

Reserving Learning

Properties Leaving



8585.04**R**

You are advised to show clearly how you get your answer. Moment produced by submarine =	(ii) Calculate the moment produced by the submarine.	Examiner Only Marks Rema
(iii) Calculate a value for the counterbalance weight, W, needed to prevent the crane toppling over. You are advised to show clearly how you get your answer. Counterbalance weight W = N [3] (iv) To allow the crane to lift boats of different weights out of the water, the counterbalance weight can be moved to the left or right. If a boat heavier than 10 000 N is to be lifted by the crane, in what direction should the counterbalance weight be moved? Explain your answer. Direction of movement is Explanation		You are advised to show clearly how you get your answer.	
You are advised to show clearly how you get your answer. Counterbalance weight W = N [3] (iv) To allow the crane to lift boats of different weights out of the water, the counterbalance weight can be moved to the left or right. If a boat heavier than 10 000 N is to be lifted by the crane, in what direction should the counterbalance weight be moved? Explain your answer. Direction of movement is Explanation		Moment produced by submarine = [1]	
Counterbalance weight W = N [3] (iv) To allow the crane to lift boats of different weights out of the water, the counterbalance weight can be moved to the left or right. If a boat heavier than 10 000 N is to be lifted by the crane, in what direction should the counterbalance weight be moved? Explain your answer. Direction of movement is Explanation	(ii	·	
(iv) To allow the crane to lift boats of different weights out of the water, the counterbalance weight can be moved to the left or right. If a boat heavier than 10 000 N is to be lifted by the crane, in what direction should the counterbalance weight be moved? Explain your answer. Direction of movement is Explanation		You are advised to show clearly how you get your answer.	
the counterbalance weight can be moved to the left or right. If a boat heavier than 10000N is to be lifted by the crane, in what direction should the counterbalance weight be moved? Explain your answer. Direction of movement is Explanation		Counterbalance weight W = N [3]	
Explanation	(iv	the counterbalance weight can be moved to the left or right. If a boat heavier than 10000N is to be lifted by the crane, in what direction should the counterbalance weight be moved? Explain	
Tatal Outstian			
Total Outsides			
			Total Ougation
			[Turn ov

20 00 - 333

G93 DO CE **GG** 20 00

- 333 20 00



6	(a)	The diagram shows the particles that make up the atom of an isotope of nitrogen.	Examiner Only Marks Remark
		© Science Photo Library	
		5 coons	
		(i) Name the particle marked by the arrow. Write the name in the box provided. [1]	
		(ii) Name the part of the atom inside the dashed circle.	
		(iii) Why are atoms electrically neutral?	
		[1]	
		(iv) Using information from the diagram above and your knowledge of the structure of a nucleus, complete the symbol below to show the composition of this nucleus of nitrogen.	
		15 N	
8585.0)4 R		

20 06 GGG DO GE **C**33 DO GE CEE DO GE **G**33 D CE GG3 20 00 G93 D CE GG3 20 GE G33 D CE **C** D GE GEE DO GE G G G PO GE G93 DO CE GGT) DO CE G G G G D CE GT DO **G**33 20 06 GGÐ DO GE G93 D GE GGG20 GG GGG20 00 **G93** DO GG

Reserving Learning

Properties Leaving

(v) \	What does the number 15 represent?
-	[1]
(vi) l	How many neutrons are to be found in this nucleus of nitrogen?
	[1]
	Which one of the particles that make up an atom does not have an electrical charge?
	[1]
	diagram shows a radioactive nucleus. This nucleus can tegrate by emitting different types of radiation.
(Complete the diagram by naming the radiations that may be emitted. Write their names in the box describing each of the radiations emitted.
	an electromagnetic wave
a high spo	a helium nucleus
	© CCEA [3]
(ii) \	Which radiation is stopped by a thin sheet of paper?
	[1]
	[1]



(iii) Which radiation can pass through the sheet of paper but is stopped by a thin sheet of aluminium? ———————————————————————————————————	Examiner Only Marks Remark [1]
(c) The graph below shows how the activity of a radioactive substance changes with time.	
Counts per minute 40 30 20 10 0 1 2 3 4 5 6 7 8 9 10 Time (Days)	→
(i) What is the half-life of this radioactive substance?	
(ii) What would be the counts per minute after 2 half-lives have passed?	[1]
8585.04 R	

20 06 GGG 20 GE G93 20 06 GG3 DO GE **C**33 D CE GOD 20 00 G33 D CE G33 20 GE G33 D CE **C** D CE GEE **20 CE** G G G PO GE GGGDO CE GGT) DO CE G G G G D CE GTT DO GGGDO GE GGÐ DO GE G93 20 06 COD D CE GEE 20 00 **G** DO GE

Reserving Learning

Parameter Learning

Parameter Learning



Researching Learning Researching Researching		
Researching Learning Researching I Researching I	(d) The diagram below illustrates a nuclear reaction that takes place in a nuclear reactor.	Examiner Or Marks Ren
A CONTROL OF THE PROPERTY OF T	2	
Reserving Learning		
Revending I	î ÁÚ^♂¦P^¦{ ^•Ø"¦ãæ} ÆÙq &\ÐV@\$ \•q &\Èq[{	
Anexandra I	(i) What is the name of this nuclear process?[1]	
Post Control of Contro	(ii) Name the particle marked 1 [1]	
POOD Alexandry Learning Alexandry I Alexandry I Alexandry I	(iii) Particle 1 is absorbed by nucleus 2. State what nucleus 2 is and explain how nucleus 3 is formed.	
Rewarding I	[2]	
Marsing Learning According Learning According Learning Marsing Learning		
Providing I		
Security Described Learning Rewarding 1		
Country Learning Revealing I	8585.04 R	[Turn c
DEED CONTROL CARTERY DESCRIPTION OF CONTROL C		



DO GE

				_ [1]	
THIS IS	THE END OF	THE QUESTIC	ON PAPER		

20 06 GGE-DO GE **G**33 D GE G33 DO GE **G9**3 D GE G33 20 GG G93 DO GE GG 3 20 GE G G G G D C COD DO GE G33 20 03 G33 DO GE G93 20 06 G G G G DO CE GG3 20 66 G T 20 06 GG3 20 00 GGD DO GE GG3 DO CE GGGDO CE GGG20 00 **G93** DO GG

Reserving Learning

Properties Leaving



DO NOT WRITE ON THIS PAGE 8585.04**R**

20 03 - 333 20 GE G93 20 00 633 20 GE CEE DO CE G93 20 GE G93 D GE COD 20 GE GG3 20 66 COD DO GE COD

DO GE GG3 PO GE GEE DO GE CEE 3 DO GE GEE 20 GE G93 20 GE GG3 DO GE GG3 DO CE 693 20 GE GGG20 GE **GEE** D CE

GGA Remarking Learning

COD Passerby Learning TOD COD 1 Learning Researcing 1

Research Community Communi





8585.04**R**



24GPH1122

20 06 GGG PO GE COD DO GE **GG** DO GE GG3 20 GE GG3 20 06 G93 DO GE COD 20 06 **GG** 20 66 CO T **20** GG GGG20 00 G93 20 00 GGG20 06 GGGD GE **G**GG **20 C**C GGGDO GE GG3 20 GE **GG** DO GE GGG20 06 GGGDO GE **GEE** 20 06 GGGDO GE GGG

DE GE Rewarding I

Parting George

CORT

Research Learning

DO GE

DO NOT WRITE ON THIS PAGE 8585.04**R**

20 03 - 333 20 06 G93 20 00 633 20 GE CEE DO CE G93 20 GE G93 D GE COD 20 GE GG3 20 66 COD DO GE COD

DO GE GG3 PO GE GEE DO GE GGT) DO GE GEE 20 GE G93 20 GE GG3 DO GE **GG** DO CE GGG 20 GE GGG20 GE **GEE** D CE

GGA Remarking Learning

COD Passerby Learning TOD COD 1 Learning Researcing 1

Research Community Communi



24GPH1123

	NOT	WDITE	ONIT	FLUC	DACE
UU	NUI	WRITE	UN	і піэ	PAGE

For Examiner's use only			
Question Number	Marks		
1			
2			
3			
4			
5			
6			

Total Marks

Examiner Number

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA will be happy to rectify any omissions of acknowledgement in future if notified.

178006



24GPH1124

20 03 20 00 E CE DO GE RO GE E GE E GE DO GE E CE GEE E CE CEE . D CE DO GE

DO GE

E GE

GGG Rowarding Learning

RD GE

ED CE

Reserving Learning

Day GC

PLEAVING RESERVING

CONTROL

E CE

D CE