Centre No.						Paper Reference (complete below)								Surname	Initial(s)
Candidate No.										H	/	1	H	Signature	

Paper Reference(s)

5020H/1H 5048H/1H

Edexcel GCSE

Additional Science (5020H)

Physics (5048H)

P2 – Topics 9 to 12

Higher Tier

Monday 16 November 2009 – Morning

Time: 30 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
Total	

Materials required for examination
Calculator

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, and complete the paper reference.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
Do not use pencil. Use blue or black ink.
Show all stages in any calculations and state the units. Calculators may be used.
Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 5 questions in this question paper. The total mark for this paper is 30.
There are 12 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

You are reminded of the importance of clear English and careful presentation in your answers.

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FORMULAE

You may find the following formulae useful.

$\text{average velocity} = \dfrac{\text{displacement}}{\text{time}}$	$v = \dfrac{s}{t}$
$\text{acceleration} = \dfrac{\text{change in velocity}}{\text{time}}$	$a = \dfrac{(v-u)}{t}$
force = mass × acceleration	$F = m \times a$
momentum = mass × velocity	$\rho = m \times v$
change in potential energy = mass × gravitational field strength × change in height	$PE = m \times g \times h$
kinetic energy = ½ × mass × (velocity)^2	$KE = ½ \times m \times v^2$
electrical energy = voltage × current × time	$E = V \times I \times t$
$\text{power} = \dfrac{\text{work done}}{\text{time taken}}$	$P = \dfrac{W}{t}$
work done = force × distance moved in the direction of the force	$W = F \times s$

Leave blank

1. Some foods last longer if they are irradiated with gamma radiation.

The gamma radiation kills some of the bacteria which cause food to 'go off'.

Center for Consumer Research

(a) Gamma radiation is one of the three types of radiation shown in the table.

Complete the table.

type of radiation	what it is	charge	ionising ability	stopped by
alpha	helium nucleus		strongest	thin paper
beta		negative	medium	a few mm of aluminium
gamma	electromagnetic wave		weakest	thick lead

(3)

(b) Alpha and beta radiations are more ionising than gamma rays.
However, gamma rays are used to irradiate the food.
Give **two** reasons why.

Reason 1 .....

.....

.....

Reason 2 .....

.....

.....

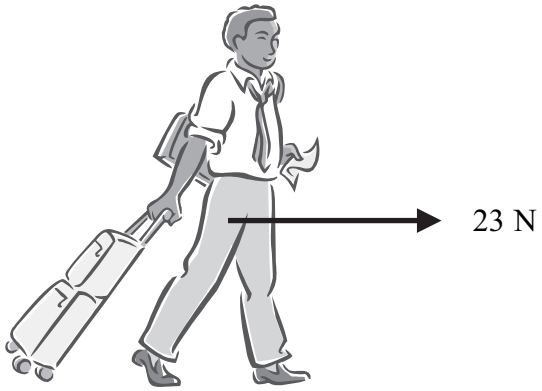
(2)

Q1

(Total 5 marks)

Leave blank

2. Asum is going on holiday.
He pulls his suitcase 50 m through the airport terminal.
He uses a horizontal force of 23 N.



(a) Calculate the work done by this force on the suitcase.

work done = ... J
(2)

(b) Asum takes 28 s to walk the 50 m.
Calculate the power used to pull the suitcase by the force of 23 N.
State the unit in your answer.

power = ...
(3) **Q2**

(Total 5 marks)

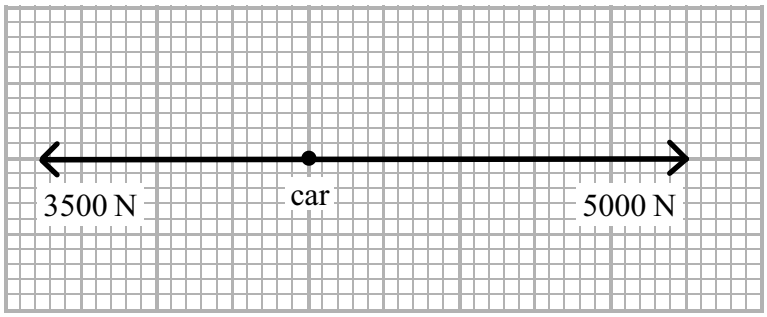
Leave blank

3. Editha has a new car.
Its engine provides a driving force of 5000 N.
At one speed, the drag force acting on it is 3500 N.

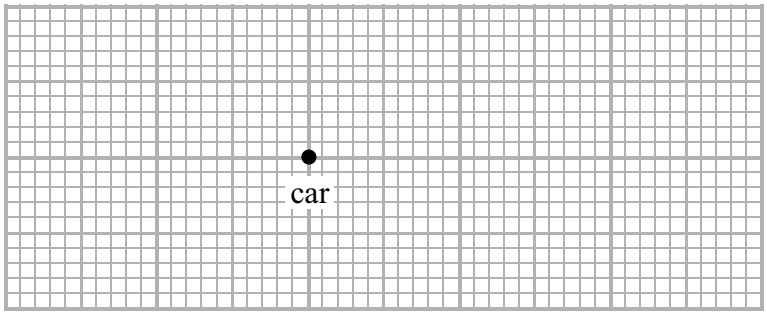
(a) Calculate the resultant force.

resultant force =..... N
(1)

(b) This free-body force diagram shows the forces acting on the car.



Draw the resultant force to the same scale on the diagram below.



(1)

(c) The car has a mass of 1350 kg.
Calculate the acceleration of the car produced by this resultant force.

acceleration =..... m/s^2
(3)

(Total 5 marks)

Q3

Leave blank

4. The world's first full-scale nuclear power station was opened in 1956 in England.

(a) At that time, scientists and politicians believed that every new power station built after 1965 would be nuclear.

In fact, by the 1990s

- only 16 nuclear power stations had been built in the UK
- politicians were encouraging scientists to find alternatives to nuclear power

(i) State **one** disadvantage of nuclear power stations which could have caused this change in thinking.

.....

.....

(1)

(ii) By 2007, opinion had changed again.
Nuclear power stations appeared to be back in favour.

State **one** advantage of nuclear power stations which could have caused this change in thinking.

.....

.....

(1)

Leave blank

(b) The reaction which is used in nuclear power stations is **fission**.
This releases energy by the splitting of uranium nuclei by neutrons.

Nuclear **fusion** is another type of nuclear reaction.

Describe the process of **nuclear fusion**.

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(3)

(c) Explain why there are no nuclear fusion power stations yet.

.....

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.....

.....

.....

(2)

Q4

(Total 7 marks)

Leave blank

5. Usma is working on some facts about raindrops.
She wants to find out about the energy changes of a falling raindrop.

raindrop facts	
diameter	= 0.40 cm
mass	= 0.035 g
distance it falls	= 1200 m

(a) Calculate the change in gravitational potential energy (GPE) of a raindrop when it falls 1200 m to the ground.

Gravitational field strength = 10 N/kg

GPE =.....J
(2)

(b) State the kinetic energy of a raindrop just before it hits the ground.
You may assume that none of the energy changes to thermal energy.

KE =.....J
(1)

(c) Show that the theoretical velocity of the raindrop just before it hits the ground is between 150 m/s and 160 m/s.

(3)

Leave blank

(d) Measurements show that the actual velocity at which the raindrop hits the ground is 8.8 m/s.
Explain why the measured value of the velocity is much lower than the theoretical velocity.

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(2) **Q5**

(Total 8 marks)

TOTAL FOR PAPER: 30 MARKS

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