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

Paper Reference(s)

5020F/1F 5048F/1F

Edexcel GCSE

Additional Science (5020F)

Physics (5048F)

P2 – Topics 9 to 12

Foundation Tier

Tuesday 7 June 2011 – Afternoon

Time: 30 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
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 black ink.
Some questions must be answered with a cross in a box (☒). If you change your mind about an answer, put a line through the box (~~☒~~) and then mark your new answer with a cross (☒).
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 6 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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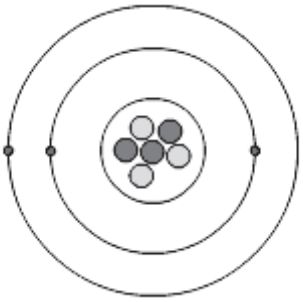
FORMULAE

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	$F = m \times a$
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. The diagram shows a lithium atom.



(a) Use words from the box to complete the sentences.
Each word may be used once, more than once or not at all.

electrons	ions	neutrons	protons

The particles in orbit around the nucleus are called .....

This nucleus contains ..... and .....

(3)

(b) Complete the sentence by putting a cross (☒) in the correct box.

The charge on this nucleus is

- negative ☒
- neutral ☒
- positive ☒

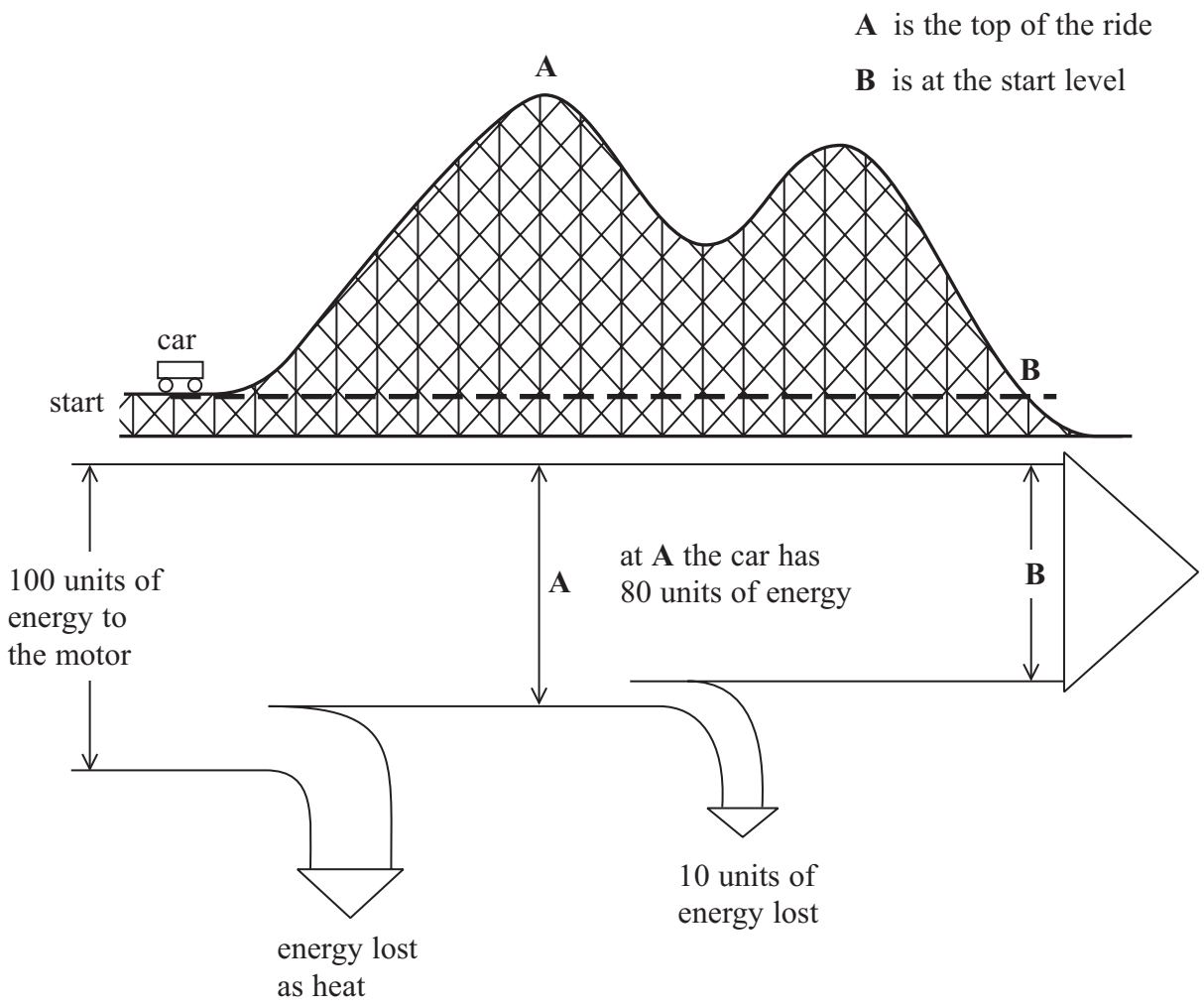
(1)

Q1

(Total 4 marks)

Leave blank

2. The figure shows a roller coaster ride and the energy flow diagram for the roller coaster car.



(a) 100 units of energy are supplied to the motor which lifts the car up to **A**. How many units of energy are lost as heat before the car reaches **A**?

number of units lost before **A** = ...

(1)

(b) At **A**, the motor is switched off and the car carries on moving along the ride. Complete the sentence by putting a cross (☒) in the correct box.

At **A**, the roller coaster car has gained

- gravitational potential energy only ☒
- kinetic and gravitational potential energy ☒
- kinetic energy only ☒

(1)

Leave blank

(c) The car loses 10 units of energy as it goes between **A** and **B**.
How many units of energy does the car still have at **B**?

number of units of energy at **B** = ...

(1)

(d) How does the roller coaster car lose energy between **A** and **B**?
Explain your answer.

.....

.....

.....

.....

.....

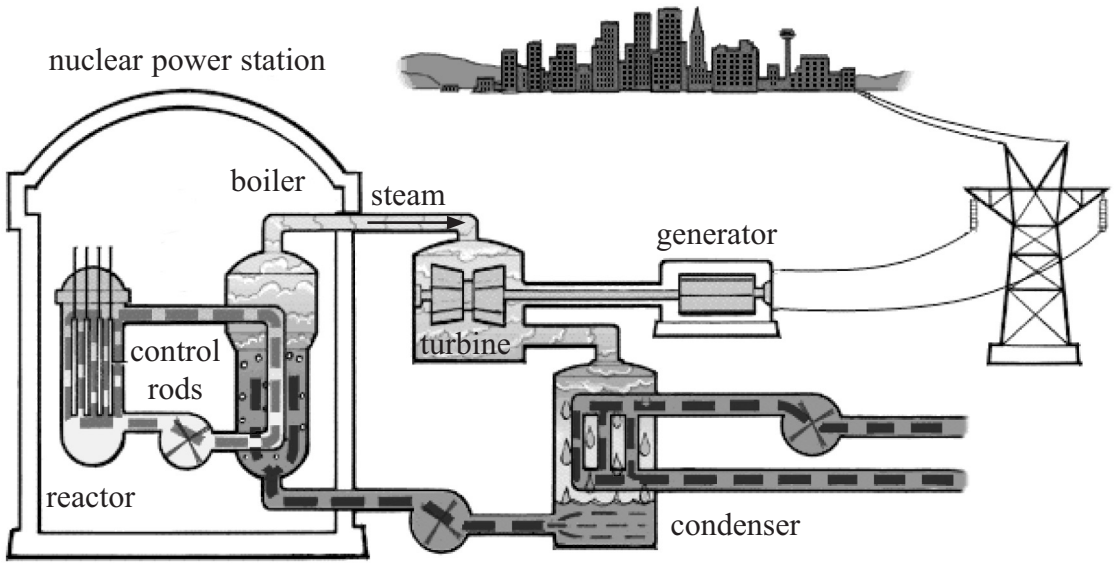
.....

(2) **Q2**

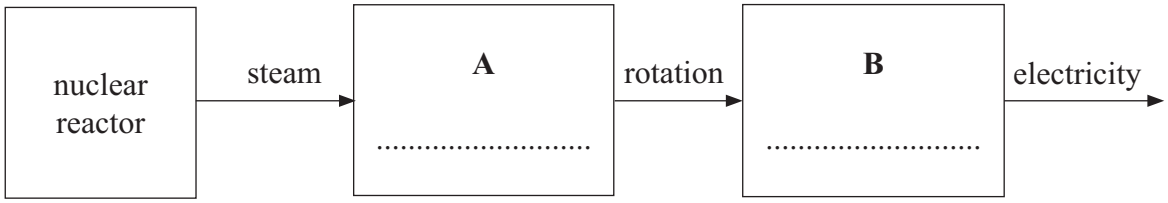
(Total 5 marks)

Leave blank

3. The diagram shows stages in electricity generation at a nuclear power station.



(a) Use a word or words from the diagram to complete each of the boxes **A** and **B**.



(2)

(b) State one **advantage** a nuclear power station has over a fossil fuel power station.

.....

.....

(1)

Leave blank

(c) Inside the nuclear reactor, a chain reaction produces heat and some waste products. These waste products will remain dangerous for many years.

(i) The splitting of a uranium-235 nucleus in this process is called

.....

(1)

(ii) Why are the waste products dangerous?

.....

.....

(1)

(iii) Why will the waste products remain dangerous for many years?

.....

.....

.....

(1)

Q3

(Total 6 marks)

Leave blank

4. Alex flies a Boeing 777 over a city at night.
The plane's anti-collision lights flash once every second.
The photograph shows several seconds of his flight from left to right.

(a) (i) The plane's average speed between **A** and **B** is 220 m/s.
Use the equation below to calculate how far Alex's plane travels from **A** to **B**.

distance = average speed × time

distance = ... m
(2)

(ii) The photograph shows the plane as it accelerates from left to right.
State **two** pieces of evidence in the photograph which suggest that the plane is accelerating.

1 .....

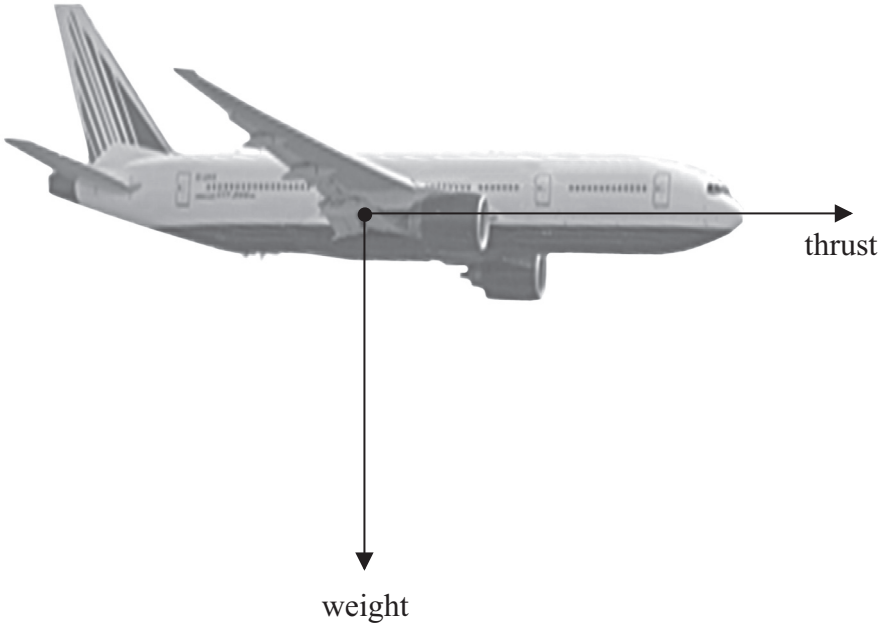
.....

2 .....

.....
(2)

Leave blank

(b) The photograph below shows Alex's plane as it flies at **constant speed** and **constant height**.



Two of the forces acting on the plane are shown.
The other two forces acting on the plane are lift and air resistance.

Complete the photograph **accurately** to the same scale by adding

(i) a force arrow for the lift, labelled **L**.

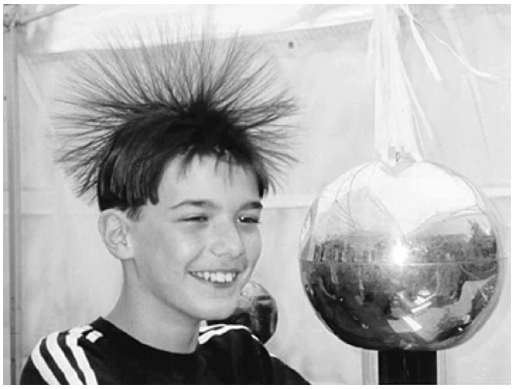
(ii) a force arrow for the air resistance, labelled **R**.

(2) **Q4**

(Total 6 marks)

Leave blank

5. (a) Darren has been charged up using a Van de Graaff generator.
His teacher tells him he is negatively charged.



State why his hair stands on end.

.....

.....

(1)

(b) Bev combs her hair with a plastic comb.
Bev's hair also gains a negative charge and her hair stands on end.

Explain how Bev's hair gains a negative charge.

.....

.....

.....

.....

.....

.....

(3) **Q5**

(Total 4 marks)

Leave blank

6. Safety engineers investigate car crashes.

(a) First the safety engineers accelerate a car.
The car contains a test dummy which has a mass of 80 kg.
The average acceleration of the test dummy is 7.5 m/s^2.

Calculate the average accelerating force acting on the test dummy.
State the unit.

force = ... unit = ...

(3)

(b) Next the safety engineers crash the car into a wall.

The car hits the wall at 25 m/s.
The car takes 0.12 s to stop.
Calculate the average acceleration of the car.

acceleration = ... m/s^2

(2) **Q6**

(Total 5 marks)

TOTAL FOR PAPER: 30 MARKS

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