

Write your name here

Surname

Other names

Edexcel BTEC
Level 1/ Level 2
First Award

Centre Number

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Learner Registration Number

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Applied Science

Unit 1: Principles of Science

Tuesday 18 June 2013 – Morning
Time: 1 hour

Paper Reference
20460E

You will need a calculator and a ruler.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 54.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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PEARSON

Some questions must be answered with a cross ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

SECTION A: Physics

Answer ALL questions.

- 1 (a) (i) Waves from the electromagnetic spectrum have many uses.

Draw a line to match each wave to its correct use.

(2)

	Television remote controls
	Detecting forged bank notes
infrared waves	Broadcasting
x-rays	Seeing internal structure of the body
	Satellite transmissions

- (ii) Give **one** use of gamma rays.

(1)

- (b) State **one** harmful effect of exposure to ultraviolet waves.

(1)



(c) The position of waves in the electromagnetic spectrum changes according to their frequency.

Frequency is measured in

(1)

- A** Hertz
- B** Joules
- C** Metres
- D** Seconds

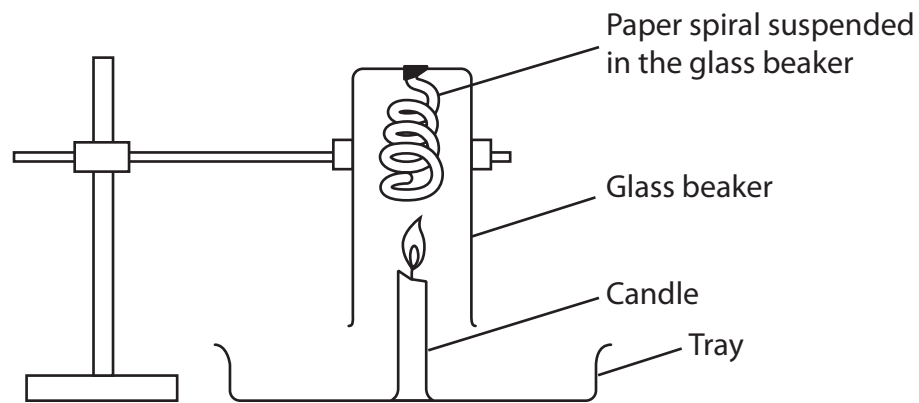
(Total for Question 1 = 5 marks)



P 4 3 9 8 9 A 0 3 1 6

2 (a) Ade suspends a spiral piece of paper over a candle flame.

Energy from the flame of the candle makes the spiral paper spin.



(i) Give the type of energy the spiral paper has when it is spinning.

(1)

- A Electrical
- B Light
- C Mechanical
- D Nuclear

(ii) How is energy transferred from the candle flame to the spiral paper?

(1)



(b) (i) A battery powered torch gives off useful light energy. Some energy is also wasted.

Name the type of energy wasted.

(1)

(ii) The torch bulb is supplied with 120 joules of energy.

The bulb is 40% efficient.

How much useful light energy does the bulb produce?

$$\text{efficiency} = \frac{\text{useful energy}}{\text{total energy supplied}} \times 100\%$$

Show your working.

(2)

..... J

(Total for Question 2 = 5 marks)



3 Jane is buying a new hairdryer.

(a) (i) One hairdryer has this label on it.



How many watts does the hairdryer use?

(1)

- A 2
- B 20
- C 200
- D 2000

(ii) Heat energy is produced by the hairdryer.

Name **one** other form of energy produced by the hairdryer.

(1)



(b) Jane chooses a hairdryer that uses 750 watts.

energy = power x time

(i) Calculate how much energy is used when Jane dries her hair for 5 minutes.

(2)

..... J

(ii) Jane uses her hairdryer 4 times a week for half an hour each time.

The electricity to use her hairdryer each week costs Jane 45p.

Calculate how much 1kWh of electricity will cost Jane.

(4)

Cost p

(Total for Question 3 = 8 marks)

TOTAL FOR SECTION A = 18 MARKS



SECTION B: Chemistry

Answer ALL questions.

4 Rani is a trainee lab technician.

(a) She is setting up equipment for an experiment and needs to label the elements to be used as metal or non-metal.

(i) Give the pair of elements that are both metals.

(1)

- A** Carbon and oxygen
- B** Aluminium and potassium
- C** Calcium and carbon
- D** Aluminium and hydrogen

Chlorine is an element in group 7 of the periodic table.

(ii) Give the chemical symbol for chlorine.

(1)

(iii) How can you tell chlorine is a non-metal from its position in the periodic table?

(1)

(b) Rani needs to understand the particles in the structure of an atom.

The table gives a description of different particles.

Complete the table by adding the name of the correct particle.

(3)

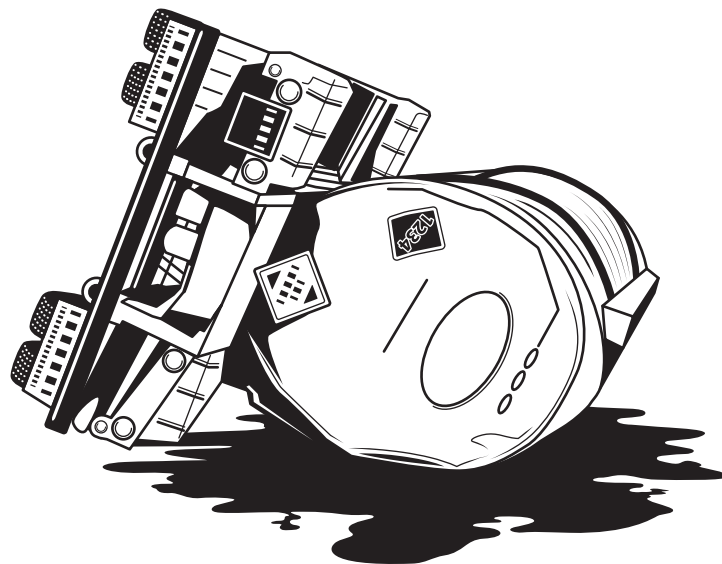
Description	Particle
in nucleus positive charge	
in shell negative charge	
in nucleus no charge	

(Total for Question 4 = 6 marks)



- 5 A lorry transporting oven cleaner, which contains concentrated sodium hydroxide, overturns on a motorway.

The concentrated sodium hydroxide spills onto the road surface.



- (a) The symbol shown is on the container of concentrated sodium hydroxide.

State the meaning of this symbol.

(1)



(b) Firefighters add hydrochloric acid to the spill to clear it up safely.

(i) Give the correct pH for hydrochloric acid.

(1)

A 1

B 7

C 9

D 14

(ii) What type of chemical is sodium hydroxide?

(1)

(iii) Name the type of reaction that takes place when the firefighters add hydrochloric acid to the spill.

(1)

(iv) Write the word equation for the reaction.

(2)

..... + → +

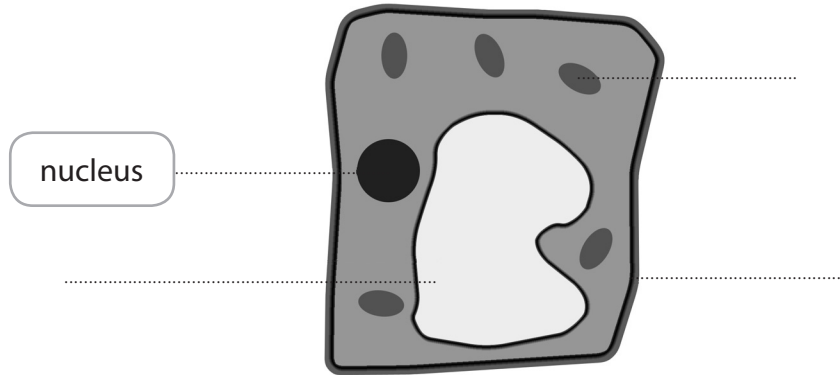
(Total for Question 5 = 6 marks)



SECTION C: Biology

Answer ALL questions.

7 This is a diagram of a plant cell.



(a) Label the components of the plant cell.
One has been done for you.

(3)

(b) Give **one** function of the nucleus.

(1)

(Total for Question 7 = 4 marks)



8 Doctors need to understand how our bodies are controlled.

(a) Our bodies respond to stimuli. Some actions are voluntary and some are involuntary.

(i) Identify the involuntary action.

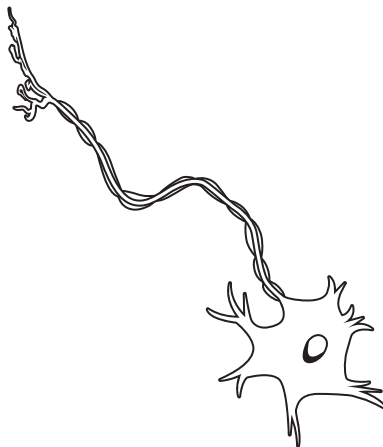
(1)

- A Eating
- B Scratching an itch
- C Walking
- D Increasing heart rate when running

(ii) Give the name of the system in the body that controls our voluntary and involuntary actions.

(1)

(b) This is a diagram of a motor neuron.



(i) Label the cell body.

(1)

(ii) Label the axon.

(1)



(c) Some responses in your body are controlled by hormones.

Explain how the hormone insulin lowers and the hormone glucagon raises the concentration of glucose in the blood stream.

(4)

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(Total for Question 8 = 8 marks)





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