Paper Reference(s) 5BI1H/01
Edexcel GCSE

Biology / Science
Unit B1: Influences on Life
Higher Tier

Monday 20 May 2013 – Afternoon
Time: 1 hour plus your additional time allowance

INSTRUCTIONS TO CANDIDATES
Write your centre number, candidate number, surname, initials and your signature in the boxes below. Check that you have the correct question paper.

Centre No.							
Candidate No.							
Surname							
Initial(s)							
Signature							
Paper Reference	5	B	I	1	H	/	0	1

X41931A

PEARSON

- **Use BLACK ink or ball-point pen.**
- **Answer ALL questions.**
- **Answer the questions in the spaces provided – there may be more space than you need.**

MATERIALS REQUIRED FOR EXAMINATION
Calculator, ruler

ITEMS INCLUDED WITH QUESTION PAPERS
Nil

INFORMATION FOR CANDIDATES
- **The total mark for this paper is 60.**
- **The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.**
- **Questions labelled with an ASTERISK (*) are ones where the quality of your written communication will be assessed – you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.**

ADVICE TO CANDIDATES
- **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.**

Answer ALL questions.

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 ☒.

GENETIC DISORDERS

1 The images show a normal red blood cell and a red blood cell from someone who has sickle cell disease. Sickle cell disease is a genetic disorder caused by two recessive alleles.

Normal red blood cell

Red blood cell from someone who has sickle cell disease

(Question continues on next page)

(a) (i) Complete the sentence by putting a cross ☒ in the box next to your answer.

An individual with sickle cell disease is said to be

(1 mark)

- ☐ **A** a carrier for sickle cell disease
- ☐ **B** heterozygous
- ☐ **C** homozygous dominant
- ☐ **D** homozygous recessive

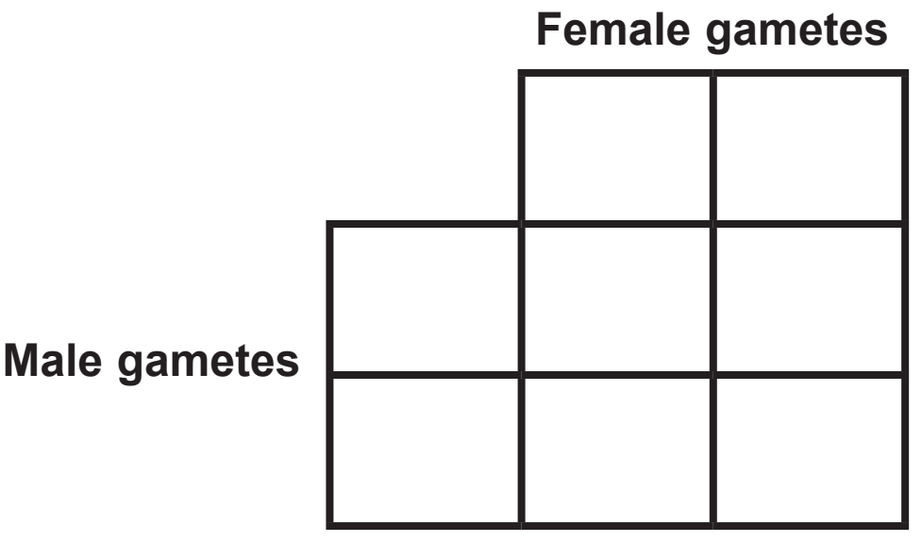
(Question continues on next page)

(ii) Describe the main symptoms of sickle cell disease. (3 marks)

(Question continues on next page)

(b) (i) **A female with the genotype (Dd) and a male with the genotype (DD) for sickle cell disease are about to start a family.**

Complete the Punnett square to show the possible genotypes of their offspring for sickle cell disease. (2 marks)



(Question continues on next page)

(ii) State the percentage chance that a child from these individuals will be

(2 marks)

1. a carrier of sickle cell disease

_____ %

2. an individual with sickle cell disease

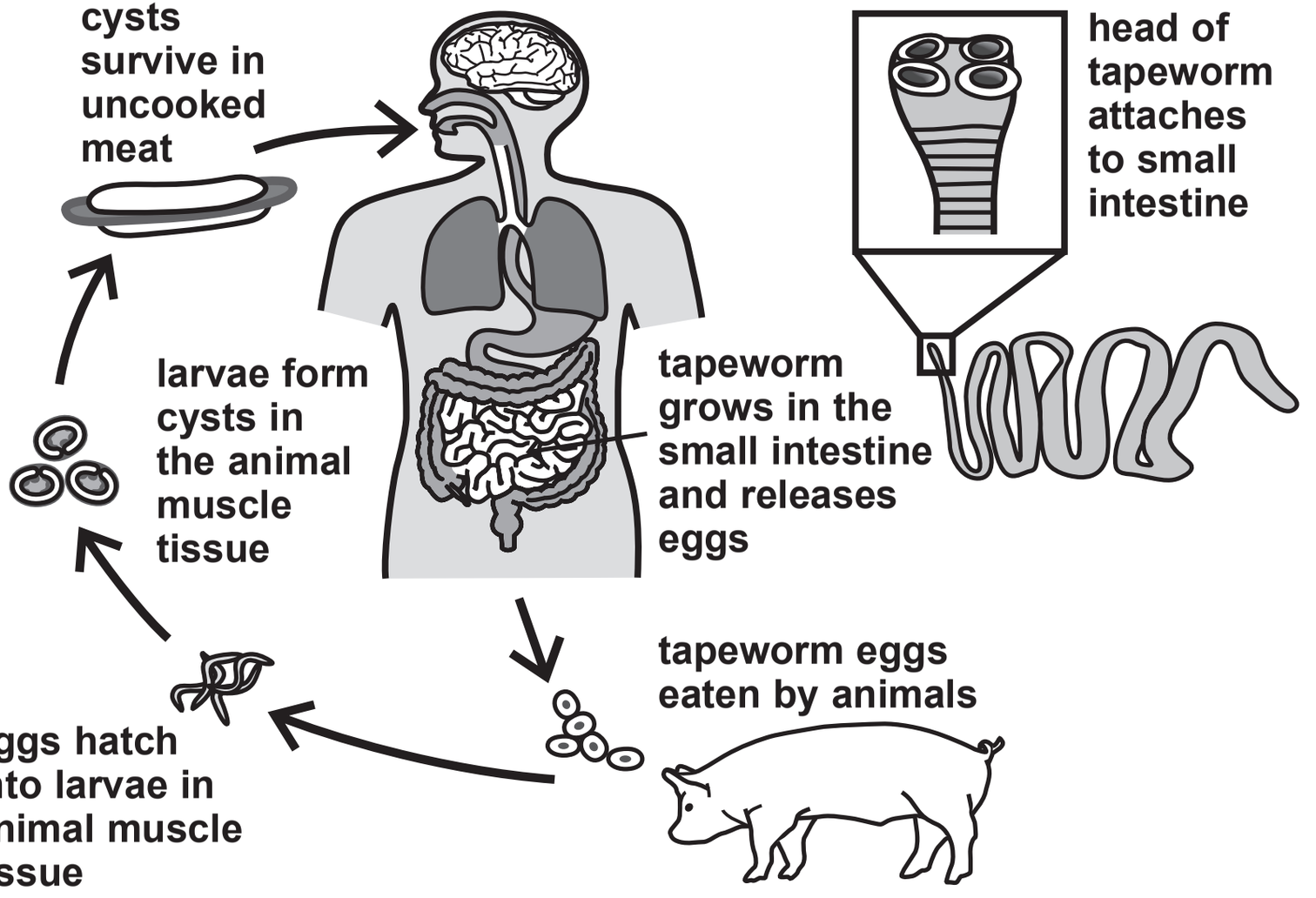
_____ %

(Total for Question 1 = 8 marks)

(Questions continue on next page)

WORMS

2 (a) The diagram shows the life cycle of the human tapeworm.



(Question continues on next page)

(Turn over)

(i) The tapeworm absorbs food in the human intestine.

Complete the sentence by putting a cross ☒ in the box next to your answer.

A tapeworm is an example of a

(1 mark)

- ☐ **A** living indicator
- ☐ **B** mutualist
- ☐ **C** parasite
- ☐ **D** producer

(Question continues on next page)

(ii) Use information in the diagram to describe how an adaptation of the tapeworm enables it to live in the human intestine. (2 marks)

(iii) Using information in the diagram, suggest how humans could avoid becoming infected with tapeworms. (2 marks)

(Question continues on next page)

(b) The photograph shows another type of worm.

These are tube worms that live near hydrothermal vents.

Explain the relationship between these tube worms and chemosynthetic bacteria. (3 marks)

(Total for Question 2 = 8 marks)

(Questions continue on next page)

VARIATION

3 The dodo was a flightless bird which is now extinct.

The photograph shows the skeleton of a dodo.

(a) (i) Explain why the dodo was placed in the kingdom Animalia. (2 marks)

(ii) The dodo was classified as a chordate.

Using the information in the photograph, explain why scientists classified the dodo into the phylum Chordata. (1 mark)

_____

_____

_____

(iii) The binomial name for the dodo is Raphus cucullatus.

Complete the sentence by putting a cross ☒ in the box next to your answer.

The name Raphus refers to the dodo's

(1 mark)

☐ A family

☐ B genus

☐ C order

☐ D phylum

(b) The dodo lived on the small island of Mauritius. It became extinct in 1681.

Using your knowledge of natural selection, suggest why the dodo may have become extinct. (3 marks)

(Question continues on next page)

(c) Complete the sentence by putting a cross ☒ in the box next to your answer.

The formation of a new species due to geographical isolation is called

(1 mark)

☐ **A** adaptation

☐ **B** competition

☐ **C** hybridisation

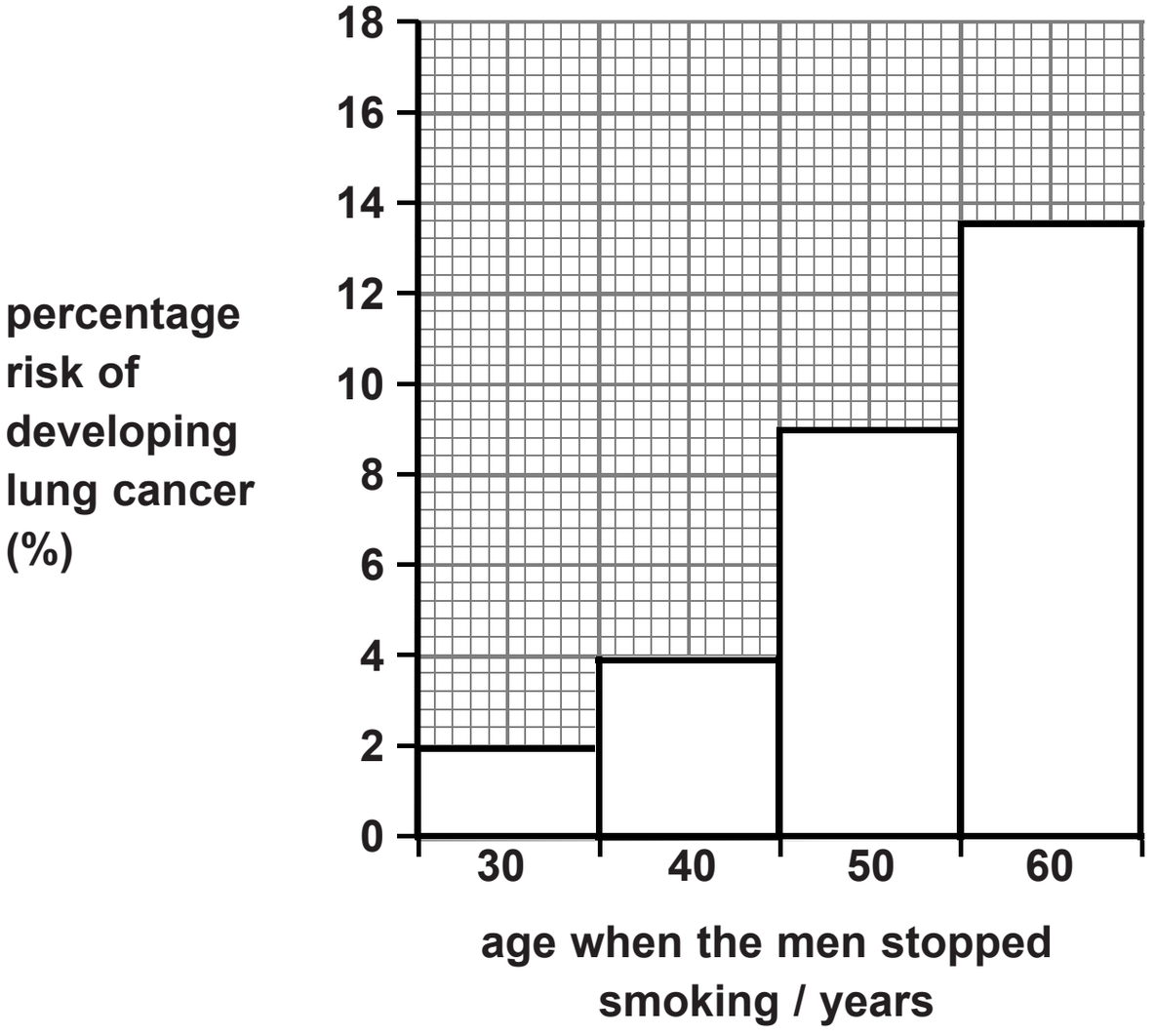
☐ **D** speciation

(d) Describe the causes of variation in a population. (2 marks)

(Total for Question 3 = 10 marks)

DRUGS

4 (a) The graph shows the percentage risk of developing lung cancer for 75-year-old men who gave up smoking tobacco at an earlier age.



(Question continues on next page)

(i) Describe the trend shown in the graph.
(1 mark)

_____

_____

_____

(ii) State the percentage risk of lung cancer for a man who gave up smoking at 50 years of age.
(1 mark)

_____%

(iii) For a population of 500 000 men, how many would be likely to develop lung cancer if they stopped smoking at the age of 50? (2 marks)

_____men

(Question continues on next page)

(b) (i) Explain why smoking tobacco increases the risk of developing lung cancer. (2 marks)

(ii) Complete the sentence by putting a cross ☒ in the box next to your answer.

Smoking tobacco reduces the oxygen carrying ability of the blood because it contains

(1 mark)

- ☐ A carbon monoxide
- ☐ B carbon particles
- ☐ C nicotine
- ☐ D tar

(Question continues on next page)

(c) A chemical in tobacco acts as a stimulant.

Explain how stimulants affect neurotransmission.
(3 marks)

(Total for Question 4 = 10 marks)

(Questions continue on next page)

THERMOREGULATION

5 The temperature of Rebecca's brain and of one of her fingers was recorded at six different external temperatures.

TEMPERATURE / °C		
EXTERNAL	BRAIN	FINGER
20	36·9	37·0
15	37·0	36·8
10	36·7	36·5
5	36·9	36·2
0	36·8	35·6
–5	37·0	34·3

(a) (i) Calculate the maximum temperature range for Rebecca's finger. (1 mark)

answer _____ °C

(Question continues on next page)

(ii) Compare the temperature of Rebecca's brain and her finger as the external temperature decreased. (2 marks)

(Question continues on next page)

(iii) Explain why the temperature of Rebecca's finger showed this response to the decrease in the external temperature. (3 marks)

*(b) Explain how the human body responds to an external temperature of 40 °C. (6 marks)

(Continue your answer on next page)

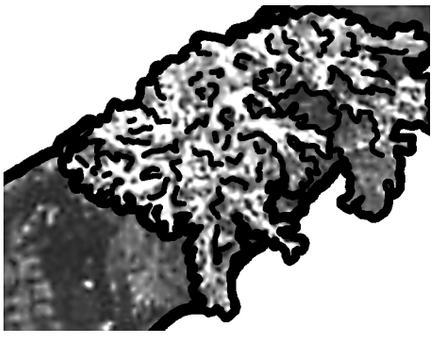
(Total for Question 5 = 12 marks)

(Questions continue on next page)

POLLUTION

6 (a) The photographs show three species of lichen.

Each species can tolerate different concentrations of pollutants present in the air.

species 1	species 2	species 3
		
tolerant to oxides of nitrogen	tolerant to oxides of sulfur	not tolerant to oxides of nitrogen or sulfur

(i) Complete the sentence by putting a cross ☒ in the box next to your answer.

Lichens are examples of

(1 mark)

☐ A living indicators

☐ B pathogens

☐ C pollutants

☐ D vectors

(Question continues on next page)

(ii) Explain which one of these species is most likely to be found near a coal-burning power station. (2 marks)

(Question continues on next page)

(b) Plants cannot use nitrogen directly from the air but need it to make proteins.

Explain how plants get the nitrogen they need to make protein. (3 marks)

(Question continues on next page)

*(c) Explain how an increase in the production of pollutants can be due to an increase in human population.

Include both air and water pollution in your answer. (6 marks)

(Continue your answer on next page)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

END