Edexcel, BTEC and LCCI qualifications

Edexcel, BTEC and LCCI qualifications are awarded by Pearson, the UK’s largest awarding body offering academic and vocational qualifications that are globally recognised and benchmarked. For further information, please visit our qualification websites at www.edexcel.com, www.btec.co.uk or www.lcci.org.uk. Alternatively, you can get in touch with us using the details on our contact us page at qualifications.pearson.com/contactus

About Pearson

Pearson is the world’s leading learning company, with 40,000 employees in more than 70 countries working to help people of all ages to make measurable progress in their lives through learning. We put the learner at the centre of everything we do, because wherever learning flourishes, so do people. Find out more about how we can help you and your learners at qualifications.pearson.com

References to third-party material made in this specification are made in good faith. We do not endorse, approve or accept responsibility for the content of materials, which may be subject to change, or any opinions expressed therein. (Material may include textbooks, journals, magazines and other publications and websites.)

All information in this document is correct at time of publication.

All the material in this publication is copyright
© Pearson Education Limited 2015
Health and Social Care

Unit 3: Anatomy and Physiology for Health and Social Care
Extended Diploma in Health and Social Care

Sample Assessment materials for first teaching September 2016
Time: 1 hour 30 minutes
You do not need any other materials.

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 90.
- The marks for each question are shown in grey boxes.
  – use this as a guide as to how much time to spend on each question.
- You may use a calculator.

Advice
- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
Answer ALL questions. Write your answers in the spaces provided.

Questions 1–3 are about the heart.

1. The diagram shows a section through a human heart as positioned in the body.

(a) Which letter points to the left ventricle?

1 mark

(b) State the name of structures A, F and G.

3 marks

A
F
G
These are descriptions of blood carried by vessels.

A  deoxygenated with a high level of carbon dioxide
B  oxygenated with a high level of carbon dioxide
C  deoxygenated with a low level of carbon dioxide
D  oxygenated with a low level of carbon dioxide

(c) Which statement describes blood vessel G?

.....................................................................................................................................................................................................................................

Total for Question 1 = 5 marks
In a condition called hypertrophic cardiomyopathy (HCM) heart muscle becomes thickened. This leads to a reduction in the size of the lumen of chamber \( C \), a narrowing of the opening of blood vessel \( A \) and a leaky heart valve \( B \).

(a) Explain how HCM leads to lightheadedness.  

(b) HCM is an inherited condition. Define the term *inherited condition*. 

Total for Question 2 = 5 marks
The graph shows changes in blood pressure, from it leaving the heart to arriving at the vena cava.

(a) Explain why blood pressure fluctuates only along the aorta, arteries and arterioles.

(b) State the names of the blood vessels at A and B.
Questions 4–6 are about the respiratory system.

4 The diagram shows the human thorax.

State the names of structures A and B.

A

B

Total for Question 4 = 2 marks
5 The diagram shows some cells from the lining of the trachea. These are labelled A and B.

(a) To which kind of epithelium do the cells labelled B in the diagram belong to?

1 mark

(b) Outline why both cells A and B have many mitochondria.

3 marks

Total for Question 5 = 4 marks
Asthma is a common disorder of the respiratory system. The symptoms of asthma are wheezing and shortness of breath.

(a) Explain what happens in asthma to cause these symptoms.

2 marks

A study was done on the probability of children living at different distances from major roads being asthmatic. The results are shown in the table.
(b) By how many times has the probability of getting asthma increased for children living by the major road (0 m), compared with children living 400 m away from it?

Answer


(c) To what extent do these data support the conclusion that traffic pollution causes asthma?


Total for Question 6 = 7 marks
Question 7 is about energy in the body.

7 (a) Define catabolism.

....................................................................................................................................................................................................................................
.....................................................................................................................................................................................................................................
One use that the body makes of energy is to produce heat when blood temperature falls. This is part of the process of thermoregulation. The diagram shows the main parts of the thermoregulatory system.

(b) State the location of thermoreceptors for detecting blood temperature and external temperature on the diagram.

2 marks

(c) Identify how the system would react to a fall in blood temperature by completing the diagram. One has been done for you.

4 marks

Total for Question 7 = 7 marks
Questions 8–11 are about the reproductive system.

8 Gamete mother cells give rise to sperm cells in the testis and to eggs cells in the ovary. The graph shows the quantity of DNA at various stages in this process.

(a) Explain the change in DNA amount between each stage. 

4 marks

Gamete mother cells to P

Q to gametes
Questions 8–11 are about the reproductive system.

Gamete mother cells give rise to sperm cells in the testis and to eggs cells in the ovary. The graph shows the quantity of DNA at various stages in this process.

8. Explain the change in DNA amount between each stage.

- From Gamete mother cells to P: ...........................................................................................................................................................................................................................................................................................

- From Q to gametes: ...........................................................................................................................................................................................................................................................................................

9. Turn over

(b) State the type of cell division that occurs after fertilisation.

1 mark

............................................................................................................................................................................................................................................................................................

(c) Describe the events that occur during prophase of cell division.

4 marks

............................................................................................................................................................................................................................................................................................

............................................................................................................................................................................................................................................................................................

............................................................................................................................................................................................................................................................................................

............................................................................................................................................................................................................................................................................................

............................................................................................................................................................................................................................................................................................

............................................................................................................................................................................................................................................................................................

............................................................................................................................................................................................................................................................................................

Total for Question 8 = 9 marks
Pregnancy is divided into stages called trimesters.

(a) In which trimester is the woman likely to first feel the foetus moving?  

(b) In which trimester does the most development occur?  

A number of problems can occur during birth.

Define the term *breech birth*.
11 Amniocentesis and chorionic villus sampling are methods used in prenatal tests.

(a) Compare and contrast the procedures used in amniocentesis and in chorionic villus sampling to obtain foetal cells in prenatal tests.

3 marks

(b) A woman is 12 weeks pregnant and wants to use one of these prenatal tests. Explain the issues she needs to consider before deciding which prenatal test to use.

4 marks

Total for Question 11 = 7 marks
Questions 12–13 are about the urinary system.

12 The diagram shows the excretory or urinary system of a human.

(a) State the letters that label the ureter and renal artery.

2 marks

<table>
<thead>
<tr>
<th>Ureter</th>
<th>Renal artery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A healthy person’s kidney deals with these substances in one of four ways:

A filters out and then reabsorbs all
B filters out and then reabsorbs some of them
C does not filter out
D filters out and then reabsorbs none

(b) Complete the table with the relevant letter for each substance.

<table>
<thead>
<tr>
<th>Substances in blood</th>
<th>Size</th>
<th>Needed by body?</th>
<th>How substance is treated by kidney (A, B, C or D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>water</td>
<td>small</td>
<td>some</td>
<td></td>
</tr>
<tr>
<td>glucose</td>
<td>small</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>amino acids</td>
<td>small</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>protein</td>
<td>large</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>salts</td>
<td>small</td>
<td>some</td>
<td></td>
</tr>
<tr>
<td>urea</td>
<td>small</td>
<td>no</td>
<td></td>
</tr>
</tbody>
</table>

Total for Question 12 = 8 marks
13 Over the last 40 years, doctors have noted an increase in the incidence of diabetes. This condition can cause extreme thirst.

(a) Explain why type 1 diabetes causes extreme thirst.

...........................................................................................................................................................................................................................................
...........................................................................................................................................................................................................................................
...........................................................................................................................................................................................................................................
...........................................................................................................................................................................................................................................
...........................................................................................................................................................................................................................................
...........................................................................................................................................................................................................................................
...........................................................................................................................................................................................................................................
...........................................................................................................................................................................................................................................

4 marks
(a) Explain why type 1 diabetes causes extreme thirst.

There has also been a rise in the occurrence of a condition called proteinuria, which is protein in the urine, at the same time as diabetes has been on the rise.

(b) Explain why some doctors think that diabetes may be a cause of proteinuria.

Total for Question 13 = 8 marks
Questions 14–16 are about the nervous system.

14 Nerve impulses travel along neurons (nerve cells) as electrical impulses and across synapses as chemicals called neurotransmitters to the next neuron in sequence. The diagram shows a synapse.

State the letters that label the neurotransmitter receptor and a calcium channel.

Neurotransmitter receptor .................................................................
Calcium channel ............................................................................

Total for Question 14 = 2 marks
Questions 14–16 are about the nervous system.

14

State the letters that label the neurotransmitter receptor and a calcium channel.

Neurotransmitter receptor .................................................................
Calcium channel ................................................................................

Total for Question 14 = 2 marks

Nerve impulses travel along neurons (nerve cells) as electrical impulses and across synapses as chemicals called neurotransmitters to the next neuron in sequence.

BLANK PAGE
Parkinson’s disease can be treated in a number of ways. A study was carried out to compare the success of two treatment types: medical therapy (MT) and surgery (deep brain stimulation (DBS)). Patients were assessed at the beginning of the study using the Parkinson’s Disease Questionnaire (PDQ-39), which consists of 39 questions to score the quality of life. The questionnaire covers eight areas of health status:

- mobility
- ADL
- emotions
- stigma
- social
- cognitions
- communication
- body pain.

After one year of either MT and DBS or just MT, patients were reassessed and the differences in PDQ-39 scores calculated.

The data are shown. The larger the score, the less improvement the patient showed. Therefore, highly negative scores show a great improvement and positive ones show a worsening condition.
The researchers concluded that at one year, MT and DBS improved patient quality of life more than MT alone.

To what extent does the data support this conclusion?

Total for Question 15 = 8 marks
Parkinson’s disease (PD) is caused by a reduction in the levels of a neurotransmitter called dopamine. This reduction is due to death of the cells which make it, the neurons of the substantia nigra. Most treatments only reduce the symptoms, but a goal of recent research has been to find ways to protect against this cell death.

### Models of cell death

- Normal ageing
- Rapid exponential cell loss
- Accelerated ageing model of PD
- Toxic agent followed by normal ageing loss

Toxic agent followed by normal ageing loss

(a) Using all the information given, provide a key for the graph. One has been done for you.

2 marks

<table>
<thead>
<tr>
<th>Key</th>
<th>Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal ageing W</td>
<td>W</td>
</tr>
<tr>
<td>Rapid exponential cell</td>
<td></td>
</tr>
<tr>
<td>Accelerated ageing model of PD</td>
<td>X</td>
</tr>
<tr>
<td>Toxic agent followed by normal ageing loss</td>
<td>Y, Z</td>
</tr>
</tbody>
</table>
(b) All the people in the models shown in the graph, except those showing normal ageing, would start to show Parkinson’s symptoms at age 60. What is the percentage of dopamine making neurons lost before symptoms appear (the symptom threshold)?

Answer........................................................................................................................................................................................................................................

Total for Question 16 = 3 marks
Question 17 is about human genetics.

17 Studies of a family with a genetically inherited condition, Huntington’s chorea, revealed a family tree as shown below.
Deduce the probability of an individual with C's genotype being born to parents A and B. You must include a suitable genetic diagram in your answer.
Unit 3: Anatomy and Physiology for Health and Social Care - sample mark scheme

General marking guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Learners must be rewarded for what they have shown they can do rather than be penalised for omissions.
- Examiners should mark according to the mark scheme, not according to their perception of where the grade boundaries may lie.
- All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the learner’s response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a learner’s response, the team leader must be consulted.
- Crossed-out work should be marked UNLESS the learner has replaced it with an alternative response.

Specific marking guidance for levels-based mark schemes*

Levels-based mark schemes (LBMS) have been designed to assess learners’ work holistically. They consist of two parts: indicative content, and levels-based descriptors. Indicative content reflects specific content-related points that a learner might make. Levels-based descriptors articulate the skills that a learner is likely to demonstrate in relation to the assessment outcomes being targeted by the question. Different rows in the levels represent the progression of these skills. When using a levels-based mark scheme, the ‘best fit’ approach should be used.

- Examiners should first make a holistic judgement on which band most closely matches the learner’s response and place it within that band. Learners will be placed in the band that best describes their answer.
- The mark awarded within the band will be decided based on the quality of the answer in response to the assessment focus/outcome and will be modified according to how securely all bullet points are displayed at that band.
- Marks will be awarded towards the top or bottom of that band depending on how they have evidenced each of the descriptor bullet points.
<table>
<thead>
<tr>
<th>Question number</th>
<th>Answer</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1(a)</td>
<td>C</td>
<td>(1)</td>
</tr>
</tbody>
</table>
| 1(b)            | A – aorta (1)  
F – atria/atrium/atriums (1)  
G – vena cava/superior vena cava (1)  
Do not accept inferior vena cava. | (3)  |
| 1(c)            | A – deoxygenated with a high level of carbon dioxide                                         | (1)  |
| 2(a)            | Award 1 mark for identification of the fact that: light-headedness is due to the lack of oxygen to the brain. Award 1 mark for each extension that includes the symptoms of HCM listed below, up to a maximum of 3 marks:  
- chamber C/left ventricle pumps blood to the brain and if the lumen is small, less blood is pumped out (1)  
- narrowing of A/aorta leads to it being able to carry less blood (1)  
- leaky B/heart valve/L atrioventricular valve mean when blood is pumped out of C some goes back into F/L atrium (1).  
Learners can be awarded marks for explanations that do not refer to a lack of oxygen. | (4)  |
| 2(b)            | The condition is passed from parents to offspring via genes/DNA (1).  
Do not accept answers that do not mention genes/DNA. | (1)  |
| 3(a)            | Each time the heart muscles contract, blood pressure rises and when the muscles relax, blood pressure falls (1) but this is damped by elastic artery/arteriole walls by the time A is reached (1). | (2)  |
| 3(b)            | A – capillaries (1)  
B – venules (1)                                                   | (2)  |
<table>
<thead>
<tr>
<th>Question number</th>
<th>Answer</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>A – trachea/windpipe (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B – bronchiole (1)</td>
<td></td>
</tr>
<tr>
<td>5(a)</td>
<td>D – ciliated</td>
<td></td>
</tr>
<tr>
<td>5(b)</td>
<td>Award 1 mark for each reason why the cells have many mitochondria up to a maximum of 3 marks. Mitochondria supply energy (1). A needs it to make mucus (1). B needs it to move cilia (1). Accept any other appropriate answers.</td>
<td>(3)</td>
</tr>
<tr>
<td>6(a)</td>
<td>Smooth muscle can contract in tubes called (bronchi/bronchioles)/The lining of the tubes becomes (inflamed/more mucus) is produced (1). This causes the tubes to become narrow making it harder to get air in and out of the lungs (1).</td>
<td>(2)</td>
</tr>
<tr>
<td>6(b)</td>
<td>$\frac{0.19}{0.075} = 2.53 \times$ or 253% (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Learners will still be awarded full marks for a correct answer without showing workings.</td>
<td></td>
</tr>
<tr>
<td>6(c)</td>
<td>There is correlation between asthma risk and distance (1) and it is only up to 200 m (1). Data doesn’t tell us anything about the cause (1).</td>
<td>(3)</td>
</tr>
<tr>
<td>7(a)</td>
<td>The breakdown of substances in the body which usually releases energy (1).</td>
<td></td>
</tr>
<tr>
<td>Question number</td>
<td>Answer</td>
<td>Mark</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>7(b)</td>
<td>Award 1 mark for each correctly stated location of thermoreceptors.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><img src="https://via.placeholder.com/150" alt="Diagram" /></td>
<td>(2)</td>
</tr>
<tr>
<td>7(c)</td>
<td>Award 1 mark for each correctly identified system reaction to a fall of blood temperature.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><img src="https://via.placeholder.com/150" alt="Diagram" /></td>
<td>(4)</td>
</tr>
<tr>
<td>Question number</td>
<td>Answer</td>
<td>Mark</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------</td>
<td>------</td>
</tr>
</tbody>
</table>
| 8(a)            | Gamete mother cells to P:  
• DNA replicates (1)  
• but stays all in one cell at P (1).  
Q to gametes:  
• the daughter cells divide again to give gametes/haploid cells (1)  
• the sister chromatids go to separate gametes thus halving the DNA quantity (1). | (4) |
| 8(b)            | Mitosis | (1) |
| 8(c)            | Award answers which include any four of the following:  
• chromatin/DNA condenses (1)  
• chromosomes condense/become visible (1)  
• idea of nuclear membrane/envelope breaking down (1)  
• nucleolus disappears (1)  
• reference to centrioles moving to poles or opposite ends of cell (1)  
• reference to formation of spindle (1). | (4) |
| 9(a)            | Second | (1) |
| 9(b)            | First | (1) |
| 10              | Legs/buttocks first through vagina (1).  
Do not accept answers that say upside down. | (1) |
| 11(a)           | Award answers that makes reference to the following:  
• foetal cells obtained from amniotic fluid in amniocentesis/foetal cells obtained from placental cells in chronic villus sampling (CVS) (1)  
• use of needle in both amniocentesis and CVS (1)  
• amniocentesis via abdomen and CVS either via abdomen or vagina (1). | (3) |
<table>
<thead>
<tr>
<th>Question number</th>
<th>Answer</th>
<th>Mark</th>
</tr>
</thead>
</table>
| 11(b)           | Award answers that include an explanation that makes reference to two of the following:  
- CVS can be performed earlier/amniocentesis is later (1). CVS allows {earlier decision to abort/termination is less physically traumatic}/with amniocentesis {later decision to abort/termination is more physically traumatic} (1)  
- CVS results are available sooner/amniocentesis results are not available until 2–3 weeks after the test (1), so CVS less stressful for parents (1)  
- with CVS there is {greater risk/risk is between 1–2% of miscarriage}/with amniocentesis there is a {lower risk (1% risk of miscarriage} (1) less {chance of loss of a healthy foetus/risk of miscarriage complications} (1)  
- CVS cannot detect gene problems on X chromosomes (because they are inactivated in foetal placental cells) (1), so may lead to false negatives (1). | (4) |
| 12(a)           | Ureter E  
Renal artery B | (2) |
| 12(b)           | water B  
glucose A  
amino acids A  
protein C  
salts B  
urea D | (6) |
| 13(a)           | An explanation of why type 1 diabetes increases thirst, which includes the following points causally linked in a logical order.  
- Increases osmotic potential in the blood (1) detected by osmoreceptors (1), increasing water intake (1) to reduce osmotic potential (1).  
- Lack of hormone insulin (1), which stops a person being able to regulate blood glucose level (1), leading to glucose being excreted (1), the glucose is excreted in solution in water (1).  
Accept any other appropriate answers, up to a maximum of 4 marks. | (4) |
| 13(b)           | Because there is a correlation between the two rising (1), diabetes leads to increased filtering of blood (1), damages the filtering membrane/Bowman’s capsule/glomerulus (1), which leads to loss of large protein molecules (1). | (4) |
Question 14

Neurotransmitter receptor – C
Calcium channel – A

Mark (2)

Question number | Indicative content
---|---
15 | Answers will be credited according to the learner’s demonstration of knowledge and understanding of the material using the indicative content and levels descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but should be rewarded for other relevant answers.

- 103 show improvement with both, 73 with MT alone.
- Total score of improved is \((-1850/1340/830)\) with both, \((-910/645/280)\) with MT.
- 56 worse with both, 77 with MT.
- Total score of worse is \((820/675/260)\) with MT alone \((1090/705/370)\).
- Overall improvement is \((-1850/1340/830)\) minus \((-645/910/280)\) (ignore sign).
- So with both, more patients show a greater improvement.
- Might want to know what type of improvement and in which of the 8 areas it was most/least.
- Want to know risk/safety of surgery in relation to MT alone.
- Were there any negative consequences of surgery or MT?

Mark scheme (award up to 8 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.

<table>
<thead>
<tr>
<th>Level</th>
<th>Mark</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>No rewardable material.</td>
</tr>
</tbody>
</table>
| Level 1 | 1–2 | Demonstrates isolated knowledge and understanding of relevant information; there may be major gaps or omissions.  
Provides little evidence of application and links between relevant information. Response likely to consist of basic description of information.  
Arguments may be presented, but are likely to be generic assertions rather than supported by evidence.  
Meaning may be conveyed but in a non-specialist way; response lacks clarity and fails to provide an adequate answer to the question. |
| Level 2 | 2–5 | Demonstrates accurate knowledge and understanding of relevant information with a few omissions.  
Evidence of application demonstrating some linkages and interrelationships between factors leading to a judgement/judgements being made.  
Arguments are presented leading to conclusions being arrived at, but some may be lacking support.  
Demonstrates the use of logical reasoning, clarity, and appropriate specialist technical language. |
<table>
<thead>
<tr>
<th>Level</th>
<th>Mark</th>
<th>Descriptor</th>
</tr>
</thead>
</table>
| Level 3 | 6–8  | ● Demonstrates accurate and thorough knowledge and understanding of relevant information; any gaps or omissions are minor.  
  ● Evidences thorough application containing linkages and interrelationships between factors leading to a judgement/judgements being made.  
  ● Displays a well-developed and balanced argument leading to rationalised conclusions.  
  ● Demonstrates the use of logical reasoning, clarity, and appropriate specialist technical language. |

<table>
<thead>
<tr>
<th>Question number</th>
<th>Answer</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>16(a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal ageing</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td>Rapid exponential cell loss</td>
<td>Z</td>
</tr>
<tr>
<td></td>
<td>Accelerated ageing model of PD</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Toxic agent followed by normal ageing loss</td>
<td>X</td>
</tr>
</tbody>
</table>

Award:  
3 right for 2 marks  
2 right for 1 mark  
0 or 1 right for 0 marks

<table>
<thead>
<tr>
<th>Question number</th>
<th>Answer</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>16(b)</td>
<td>60%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question number</th>
<th>Answer</th>
<th>Mark</th>
</tr>
</thead>
</table>
| 17              | Answers which use the pedigree diagram to work out C’s genotype and the probability of him being born with that genotype will be awarded 1 extra mark.  
C’s genotype is Hh (1) because he has children who are unaffected (1). A and B are both Hh (1) because they have a daughter (D) who is unaffected (1), therefore the gene for Huntington’s chorea must be dominant (1). Parents of genotype Hh could have children of genotypes HH, Hh and hh (1) in the ratio 1 : 2 : 1, so C had a probability of 50% of being born to these parents (1). | (8) |
Question number Answer Mark

(a) Normal ageing W
Rapid exponential cell loss Z
Accelerated ageing model of PD Y
Toxic agent followed by normal ageing loss X

Award: 3 right for 2 marks 2 right for 1 mark 0 or 1 right for 0 marks

(b) 60%

Question number Answer Mark

Answers which use the pedigree diagram to work out C’s genotype and the probability of him being born with that genotype will be awarded 1 extra mark.

C’s genotype is Hh (1) because he has children who are unaffected (1).

A and B are both Hh (1) because they have a daughter (D) who is unaffected (1), therefore the gene for Huntington’s chorea must be dominant (1).

Parents of genotype Hh could have children of genotypes HH, Hh and hh in the ratio 1:2:1, so C had a probability of 50% (1) of being born to these parents (1).