www.dynamicpapers.com



Mark Scheme (Standardisation)

Summer 2019

Pearson Edexcel International
GCSE Human Biology (4HB1)
Paper 02R

www.dynamicpapers.com

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2019
Publications Code 4HB1_02R_msc_20190822
All the material in this publication is copyright
© Pearson Education Ltd 2019

www.dynamicpapers.com

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. 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 candidate'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 candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

www.dynamicpapers.com

Paper 2: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
1(a)	line labelled A pointing to retina; line labelled B pointing to ciliary muscles; line labelled C pointing to iris; line labelled D pointing to optic nerve; line labelled E pointing to eyelid;		5

Question Number	Answer	Additional guidance	Mark
1(b)	bending at cornea; bending at lens; image formed on retina;		**3**

Question Number	Answer	Additional guidance	Mark
1(c)	long sight/myopia; short sight/hypermetropia; astigmatism;		3

Total 11 marks

www.dynamicpapers.com

Paper 2: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
2(a)	A; (1 and 3) (1)		**(1)**

Question Number	Answer	Additional guidance	Mark
2(b)(i)	D spongy bone; (1)		**(1)**

Question Number	Answer	Additional guidance	Mark
2(b)(ii)	B compact bone; (1)		**(1)**

Question Number	Answer	Additional guidance	Mark
2(b)(iii)	cartilage;		**(1)**

Question Number	Answer	Additional guidance	**Mark**
2(b)(iv)	shock absorber/cushions; allows free movement of joint/prevents grinding/reduces friction;		**(2)**

Question Number	Answer	Additional guidance	Mark
2(c)	• Ca^{2+}needed; • forms part of bone structure / provides strength to bone/no calcium bones are less dense/weaker; • protein required; • for muscle development/component • of muscle; • vitamin D needed; • to allow uptake of Ca^{2+};		**(6)**

Total 12 marks

www.dynamicpapers.com

Paper 2: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
3(a)(i)	B 3.2 - 3.5 kg;		**(1)**

Question Number	Answer	Additional guidance	Mark
3(a)(ii)	(94 / 210) x 100 ; 45%; (2)	Ecf allow correct answer to incorrect figures used in calculation Allow 44.76%/ 44.8% for correct final answer	**(2)**

Question Number	Answer	Additional guidance	Mark
3(b)	smoking appears to lower birth mass; more higher birth mass babies born to non-smokers;	ORA for both mp's	**(2)**

Question Number	Answer	Additional guidance	Mark
3(c)	• cigarette smoke contains CO; • combines with haemoglobin instead of oxygen/forms carboxyhaemoglobin; • less oxygen to fetus; • less respiration in fetus; • lower growth rate/cell division; • causes lower birth mass;		**(5 max)**

Total 10 Marks

www.dynamicpapers.com

Paper 2: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
4(a)(i)	¼/25%/1:4/0.25;		**(1)**

Question Number	Answer	Additional guidance	Mark
4(a)(ii)	½/50%/1:2/0.5/2/4;		**(1)**

Question Number	Answer	Additional guidance	Mark
4(b)	head decreases (in proportion); legs increase (in proportion);		**(2)**

Question Number	Answer	Additionalguidance	Mark
4(c)	• allowance for babies of different height; • allows comparison to norm (in population); • determine changes in proportion; • over time / indicates/shows which parts of body are developing/growing;		**Max (2)**

Total 6 Marks

www.dynamicpapers.com

Paper 2: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
5(a)	movement of a substance against a concentration gradient/low to high concentration; using energy/ATP;		**(2)**

Question Number	Answer	Additional guidance	Mark
5(b)	• cut pieces of potato to same size/length/mass; • weigh each piece; • place into different solutions; • leave for at least 30 minutes; • remove and dry; • re-weigh/re-measure length; • determine which concentration has no / least change in mass/length;		**(5)**

Question Number	Answer	Additional guidance	Mark
5(c)(i)	0.10 × 100; 7.90 1.3;	Ecf allow correct answer to incorrect figures used in calculation Allow 1.26 / 1.27 for final correct answer	**(2)**

www.dynamicpapers.com

Question Number	Answer	Additional guidance	Mark
5(c)(ii)	initial mass/volume/size varies; greater change in mass/volume if potato is bigger; provides a standardised result; allows comparison;		**(2)**

Question Number	Answer	Additional guidance	Mark
5(c)(iii)	• plot a graph; • concentration vs percentage change; • find (from graph) concentration at which percentage change is zero/lowest change; • this is the concentration of the contents;		**(4)**

Total 15 Marks

www.dynamicpapers.com

Paper 2: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
6(a)	short term is recent event/long term goes back many years; short term very little processing, long term has more processing;		**(2)**
Question Number	Answer	Additional guidance	Mark
6(b)	cerebral hemispheres/cerebral cortex/frontal lobe/cerebrum;		**(1)**
Question Number	Answer	Additional guidance	Mark
6(c)	• language/speaking/talking problems / repetitive actions/confusion; • loss of voluntary muscle function; • loss of intellectual capacity/function; • deterioration in social behaviour;		**(2 max)**
Question Number	Answer	Additional guidance	Mark
6(d)	• blocks synapse/cleft/build-up of plaques; • prevents diffusion of acetylcholine / transmitter/neurones communicating; • blocks post-synaptic receptors/prevents generation of new impulse; • death of neurones;		**(3 max)**

Question Number	Answer	Additional guidance	Mark
6(e)	• inhibits/prevents breakdown of acetylcholine / transmitter; • increases chance of synaptic transmission / neurones communicating/generating new impulse; • reduces death of neurones;		**(2)**
Question Number	Answer	Additional guidance	Mark
6(f)	formation of β-amyloid is caused by incorrect breakdown of APP; build-up/formation of β-amyloid (in neurones);		**(2)**

Total 12 Marks

www.dynamicpapers.com

Paper 2: Subject Human Biology

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional guidance</th><th>Mark</th></tr>
<tr><td>7(a)</td><td>
<table>
<tr><th>Description</th><th>Letter</th></tr>
<tr><td>stores sperm</td><td>G; (1)</td></tr>
<tr><td>produces sperm</td><td>H; (1)</td></tr>
<tr><td>produces fluid to help sperm move</td><td>C; (1)</td></tr>
<tr><td>contains cells dividing by meiosis</td><td>H; (1)</td></tr>
</table>
</td><td></td><td>(4)</td></tr>
<tr><td>Question Number</td><td>Answer</td><td>Additional guidance</td><td>Mark</td></tr>
<tr><td>7(b)(i)</td><td>progesterone;
increases in level;</td><td></td><td>(2)</td></tr>
<tr><td>Question Number</td><td>Answer</td><td>Additional guidance</td><td>Mark</td></tr>
<tr><td>7(b)(ii)</td><td>egg not released until day 14;
sperms may not still be active (at day 14)/sperm can’t fuse with ovum/sperm cant fertilise ovum;</td><td>reference to sperm must be made</td><td>(2)</td></tr>
<tr><td>Question Number</td><td>Answer</td><td>Additional guidance</td><td>Mark</td></tr>
<tr><td>7(c)(i)</td><td>will be digested/broken down (in duodenum/ ileum/intestine);
by lipase;
can't be absorbed into blood in active form;</td><td></td><td>(2)</td></tr>
<tr><td>Question Number</td><td>Answer</td><td>Additional guidance</td><td>Mark</td></tr>
<tr><td>7(c)(ii)</td><td>no chance of becoming pregnant for a seven day period/menstruation occurring/lining being shed;</td><td></td><td>(1)</td></tr>
</table>

Total 11 Marks

www.dynamicpapers.com

Paper 2: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
8(a)(i)	broken down in liver; by deamination; to form urea; used to make new protein/amino acids;		**(3)**

Question Number	Answer	Additional guidance	Mark
8(a)(ii)	poor/restricted movement of synovial joints pain in joint; backflow of blood in heart; poor/inefficient blood circulation/oxygenation; less energy/tired;		**(3 max)**

Question Number	Answer	Additional guidance	Mark
8(b)(i)	• not sex-linked; • more females affected than males/more males would be affected; • only females would be carriers (if sex-linked); • male 1/3/11 would show condition if sex-linked; • but these males are carriers;		**(4)**

Question Number	Answer	Additional guidance	Mark
8(b)(ii)	• probability that child has condition is ¼ /1:3 / 1 in 4/25%/0.25; • probability that child is male is ½/1 in 2/1:1 / 50%/0.5; • so probability that it is affected male is 12.5%/0.125/$\frac{1}{8}$;		**(3)**

Total 13 Marks

Paper Total 90 Marks

www.dynamicpapers.com

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London, WC2R 0RL, United Kingdom