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Mark Scheme (Results)

Summer 2015

Pearson Edexcel International GCSE in Human Biology (4HBO) Paper 01

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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.

Question Number	Answer	Notes	Marks
1 (a)	A placenta		(1)
(b)	B 		(1)
(c)	C progesterone and oestrogen		(1)
(d)	C sulphur dioxide		(1)
(e)	B mitosis		(1)
(f)	A antibiotics		(1)
(g)	D genotype		(1)
(h)	D renal artery		(1)
(i)	B relax/relaxes		(1)
(j)	D produces lactic acid		(1)

Total for Question 1 = 10 marks

Question Number	Answer	Notes	Mark
2(a)(i)	C		(1)

Question Number	Answer	Notes	Mark
2(a)(ii)	A description including four from: • premolars/molars; • grinding/crushing /chewing food; • increase the surface area (of food); • mix food with saliva; • (faster/more efficient) digestion by amylase/enzymes; • of carbohydrates/starch; • to maltose/sugar;	Ignore reference to any other enzymes Ignore glucose	(4)

Question Number	Answer	Notes	Mark
2(b)	A suggestion including two from: • (molars) contain ridges/cusps / crevices; • that trap food/food stuck in teeth; • formation of plaque/tartar; • bacteria breakdown food/sugar; • (bacteria) produce acid; • tooth enamel dissolved/eroded / broken down; • difficult to reach with toothbrush;	Allow sugar left on / coating teeth Allow bacteria feed on sugar / glucose/food Ignore attacks enamel	(4)

Question Number	Answer	Notes	Mark
2(c)	calcium/ fluoride/ phosphate;	Reject fluorine Allow calcium phosphate	(1)

Total for Question 2 = 10 marks

Question Number	Answer	Notes	Mark
3(a) (i)	hinge/synovial joint;		(1)

Question Number	Answer	Notes	Mark
3(a) (ii)	An explanation including four from: • ball and socket joint; • allows 360° movement / moving in 3 planes; • cartilage (at the ends of bones); • synovial fluid; • reduces friction / smooth movement;	Allow prevents bones rubbing / grinding against each other	(4)

Question Number	Answer	Notes	Mark
3(a)(iii)	3 marks for four correct rows 2 marks for three correct rows 1 mark for two correct rows		(3)

	Axial skeleton	**Appendicular skeleton**
vertebral column	✓	
humerus		✓
skull	✓	
pelvis		✓

Question Number	Answer	Notes	Mark
3(b)	voluntary; tendons; antagonistic; contracts; relaxes; pulled; mitochondria;	Either way round	(7)

Total for Question 3 = 15 marks

Question Number	Answer	Notes	Mark
4	A suggestion including four from: • measure out known volume of starch solution; • measure out known volume of amylase/enzyme solution; • warm amylase/starch solution prior to mixing; • add iodine <u>solution</u>; • to starch solution before adding amylase; • test a greater range of temperatures; • repeat tests; • use of control;	Allow amount for volume Allow a specific volume / description of how volume is measured Allow one mark for control volumes of solutions	(4)

Total for Question 4 = 4 marks

Question Number	Answer	Notes	Mark
5(a)(i)	A do not cause disease		(1)

Question Number	Answer	Notes	Mark
5(a) (ii)	An explanation including two from: • higher temperature/warmer (in summer months); • reference to increase in enzyme activity/optimum temperature for enzymes / speed up chemical reactions / increase respiration; • bacteria multiply (more rapidly); • <u>larger/bigger/greater population/more</u> bacteria to break down organic matter;	Allow optimum temperature for bacteria/bacteria more active	(2)

Question Number	Answer	Notes	Mark
5(a)(iii)	A suggestion including three from: • mixes organic matter (with bacteria)/bacteria exposed to more organic matter; • introduces air/oxygen; • as bacteria carry out <u>aerobic</u> respiration; • distributes thermal energy evenly;	Allow heat/temperature for thermal energy	(3)

Question Number	Answer	Notes	Mark
5(a)(iv)	An explanation including two from: • (products of composting) contain nutrients/minerals/ ions; • named nutrient e.g. nitrates; • for plant growth/ manufacture of proteins;	Ignore nitrogen	(2)

Question Number	Answer	Notes	Mark
5(b)(i)	2/two		(1)

Question Number	Answer	Notes	Mark
5(b)(ii)	An explanation that includes three from: • fewer millipedes/less food for ground beetle; • ground beetle decrease; • earwigs increase as more leaf litter/less ground beetles; • earwig number decreases because ground beetle eats more earwigs;		(3)

Total for Question 5 = 12 marks

Question Number	Answer	Notes	Mark
6(a)(i)	A description that includes four from: • measure out a known volume of water; • take the starting temperature of the water; • burn food; • use the heat released to heat the water/temperature of water rises; • measure the temperature once the food has stopped burning/after a set amount of time; • calculate temperature change/increase; • greater temperature change/increase indicates more energy in food;		(4)

Question Number	Answer	Notes	Mark
6(a)(ii)	Any one from: • volume of water; • mass of food; • distance of food from water; • length of time food is burning for;		(1)

Question Number	Answer	Notes	Mark
6(b)(i)	axes labelled correctly(food type vs energy available); units for axes labels (kJ); correct scale; bars drawn correctly; bars label correctly;	Max 3 marks if line graph drawn	(5)

Question Number	Answer	Notes	Mark
6(b)(ii)	An suggestion that includes three from: • more energy available in butter; • butter contains the most fat; • fat has a high energy content; • bread is a good source of carbohydrate; • carbohydrates contain energy; • broccoli/vegetables/oranges/fruit are a poor sources of energy/ correct statement about other food shown; • as they contain little/no fat/carbohydrates/contain cellulose;	Ignore chicken Allow more kiloJoules	(3)

Question Number	Answer	Notes	Mark
6(c)	An explanation including two of the following: • teenage males need more energy; • as they are more active; • higher metabolism; • still growing; • greater muscle:fat ratio;	Accept reverse argument	(2)

Total for Question 6 = 15 marks

Question Number	Answer	Notes	Mark
7 (a) (i)	19000 – 7000; 12000;	two marks for final correct answer on its own.	(2)

Question Number	Answer	Notes	Mark
7(a) (ii)	• overall decrease in both; • fluctuations in rate of deforestation / comment on the lack of relationship/peak in deforestation between 2007 and 2008; • CO_2 emissions drop more that deforestation rate; • rate of deforestation roughly constant between 2009-2011	No ORA in this question	(2)

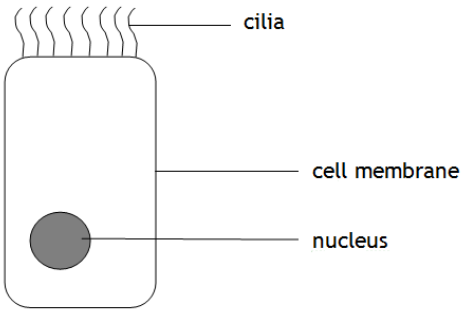
Question Number	Answer	Notes	Mark
7(b)(i)	A description including two of the following: • less photosynthesis; • less carbon dioxide removed from the atmosphere; • less oxygen produced / released into the atmosphere; • burning trees increases CO_2 in atmosphere;		(2)

Question Number	Answer	Notes	Mark
7(b)(ii)	A description including three of the following: • more water reaches soil; • less roots to hold soil stable; • less water taken in from soil; • water moves more quickly from land to rivers; • more soil washed away/ mud slides; • desertification;		(3)

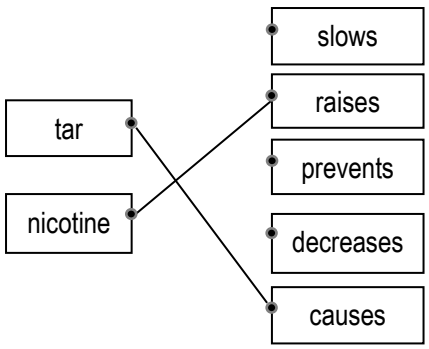
Question Number	Answer	Notes	Mark
7(c)	A description including three from the following: • icecaps/glaciers melting; • increase in sea levels; • flooding of land / destruction of habitats; • extinction/migration of species; • change in weather patterns/climate; • increasing acidity of sea water is destroying coral reef;		(3)

Question Number	Answer	Notes	Mark
7(d)	A description including two from: • sewage/excess fertiliser (used on land/crops); • containing nitrates / phosphates; • leaches into water;		(2)

Total for question 7 = 14 marks

Question Number	Answer	Notes	Mark
8(a)(i)	• correctly drawn diagram; • nucleus labelled; • cell membrane labelled; • cilia labelled; 		(4)

Question Number	Answer	Notes	Mark
8(a)(ii)	An explanation including three of the following: • cilia reduced / paralysed/damaged/ unable to beat to and fro; • unable move mucus (to back of throat)/coughing to remove mucus; • mucus drops into lungs / increase of mucus in trachea/bronchi; • greater risk of lung infections / bronchitis;	Ignore cilia die	(3)

Question Number	Answer	Notes	Mark
8(b)(i)		One mark for each correct line drawn. Reject more than one line from each substance.	(2)

Question Number	Answer	Notes	Mark
8(b)(ii)	An explanation that includes three from: • cigarette smoke contains carbon monoxide; • formation of carboxyhaemoglobin/ combines with haemoglobin; • less oxygen carried (by red blood cells)/fetus receives less oxygen; • less aerobic respiration (by fetus); • less energy; • less growth;		(3)

Total for question 8 = 12 marks

Question Number	Answer	Notes	Mark
9(a)(i)	A = pituitary gland; B = cerebral cortex/hemisphere /cerebrum; C = cerebellum;		(3)

Question Number	Answer	Notes	Mark
9(a)(ii)	B/cerebral cortex / cerebral hemisphere/cerebrum;		(1)

Question Number	Answer	Notes	Mark
9(b)(i)	A description including five from: • receptors/rods/cones; • in retina; • convert light to electrical / nerve impulses; • (impulses travel) along sensory neurones / optic nerve; • chemicals/neurotransmitters • across a synapse; • to a relay neurone;		(5)

Question Number	Answer	Notes	Mark
9(b)(ii)	<table><tr><th></th><th>**Radial muscles**</th><th>**Circular muscles**</th></tr><tr><td>bright light</td><td>relax</td><td>contract</td></tr><tr><td>dim light</td><td>contract</td><td>relax</td></tr></table>	One mark for each correct row	(2)

Question Number	Answer	Notes	Mark
9(c)	A description including three from: • thermoregulatory centre; • detects changes in body temperature/blood; • sends impulses along motor neurones • to effector organs; • correctly named effector / effect e.g. sweat glands/erector muscles / shivering/ vasodilation / vasoconstriction;		(3)

Total for question 9 = 14 marks

Question Number	Answer	Notes	Mark
10(a)	800 000; (800 000 ÷ 15 600 000); x 100 = 5.1 (%);	Full marks for correct final answer on its own. ECF max 2 mark (correct calculation using wrong starting figure)	(3)

Question Number	Answer	Notes	Mark
10(b)	**Communicable disease** / **Nutritional disease** *diarrhoea* / *anaemia* tuberculosis; / malnutrition; malaria; HIV/AIDS; typhoid;	Minus one for each incorrect answer	(3)

Question Number	Answer	Notes	Mark
10(c)	A explanation including three from: • diarrhoea causes water loss from body; • body becomes dehydrated/malnourished / loss of salts/electrolytes; • affects metabolism/enzymes / chemical reactions/osmotic balance/cell death; • water/fluids given; • containing salts/named salt/electrolytes; • after every watery stool;	Ignore sugar/named sugar	(4)

Total for question 10 = 10 marks

Question Number	Answer	Notes	Mark
11	A description including four from: • mutation introduces variation into a species; • which gives more favourable / better characteristic; • survive to breed/survival of the fittest; • less adapted organisms die; • alleles/genes/genetic mutation passed to offspring;	Allow specific examples e.g. sickle - cell	(4)

Total for question 11 = 4 marks

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