Pearson Edexcel

Mark Scheme (Results)

Summer 2022

Pearson Edexcel International GCSE

In Human Biology (4HB1) Paper 02R

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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)	• apparatus in correct order with T piece connected to both flasks; • long tubes in indicator; • short tubes above indicator;		3
(b)	limewater;	Allow sodium hydrogen carbonate	1
(c)	any four from: • breathe through mouth piece; • in and out; • 10 times/max of one minute; • compare contents of flasks; • exhaled flask should go cloudy if more carbon dioxide exhaled;		4
(d)	sterilise mouth piece/breath gently;		1
(e)	same volume of indicator in each flask;		1

Total 10 marks

Question number	Answer	Notes	Marks
2 (a) (i)	• a tube containing inhibitor and substrate; • but no enzyme;		2
(ii)	any three from • concentration of enzyme; • concentration of inhibitor; • temperature; • pH; • same filter in colorimeter;		3
Clip (b) (i) (i) (ii) (iii)	axes labelled with units; axes correct way round; plots;		3
(ii)	suitable curve;		1
(iii)	similar shaped curve; reaching maximum sooner;		2
(c)	same maximum never reached; despite increase in substrate concentration;		2

Total 13 marks

Question number	Answer	Notes	Marks
3 (a) (i)	arrow from top to bottom;		1
(ii)	• A is an artery, thicker muscle wall; • to pump blood from heart/to body; • B is a vein with a valve present; • to control direction of blood flow/to prevent backflow;	If no other marks scored award one for correct identification of both vessels	4
(iii)	capillary;		1
(b) (i)	• decrease in deaths; • in both sexes/males and females; • between 2005 - 2014/over whole range;		3
(ii)	• 60 000 000 ÷ 100 000 = 60; • 60 × 640; • = 38 400;		3

Total 12 marks

Question number	Answer	Notes	Marks
4 (a)	• IUD; • hormonal/pill; • barrier/named;		3
(b) (i)	4.35 - 0.65; 3.7 mm;		2
(ii)	• increase in thickness/width; • if fertilisation occurs; • allows implantation to occur;		3
(iii)	days 0 - 6;		1
(iv)	• endometrium line would remain high/level off/plateau; • oestrogen line would level off; • at a lower level;		3

Total 12 marks

Question number	Answer	Notes	Marks
5 (a)	• two monosaccharides; • joined together;		2
(b)	molecule too large;		1
(c) (i)	• transcription (of lactase gene) does not occur; • RNA is not produced/synthesised; • lactase/protein/enzyme not produced;		3
(ii)	• lactose can't be digested; • into components to be absorbed;		2
(d)	• they eat more dairy produce; • being able to digest it would give them an advantage;		2
(e)	• water passes from cells; • into gut; • diarrhoea causes poor absorption of vitamin D and Ca^{2+}; • as they are water soluble;		4

Total 14 marks

Question number	Answer	Notes	Marks
6 (a) (i)	• prevent excess blood loss; • prevent entry of pathogens/bacteria/microorganisms;		2
(ii)	V = platelets; W = thrombokinase enzyme; Y = fibrinogen; Z = fibrin;		4
(b) (i)	• carried on X chromosome; • male must be X^hY; • female must be X^HX^h; • as allele is recessive; • but appears in next generation;		5
(ii)	any four from • female has X^hX^h genotype; • so male offspring must be X^hY; • probability of a boy is 0.5; • probability of haemophilia is 1.0; • so probability of a boy with haemophilia is 1.0 × 0.5 = 0.5		4

Total 15 marks

Question number	Answer	Notes	Marks
7 (a) (i)	C; (ureter) *A is a blood vessel* *B is a blood vessel* *D is not attached to kidney*		1
(ii)	A; (bladder) *B is part of the reproductive system* *C is part of the reproductive system* *D leads from the bladder*		1
(b)	• more oxygen; • less carbon dioxide; • more urea;	accept reverse for blood leaving kidney	3
(c) (i)	16.8 - 3.6 = 13.2; 13.2 ÷ 3.6 =3.66; 3.66 × 100 = 366.7%;		3
(ii)	• urea; • large/significant increase in protein-rich diet;		2
(iii)	Any four from • urea, uric acid and ammonia masses are different between the two diets; • ref. creatinine; • amount same/nearly same; • in both diets; • possible result of muscle breakdown;		4

Total 14 marks

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