Pearson Edexcel

Mark Scheme (Results)

Summer 2022

Pearson Edexcel International GCSE

In Human Biology (4HB1) Paper 02

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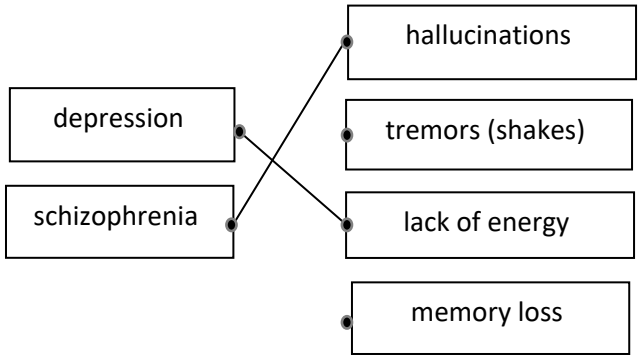
General Marking Guidance

- 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)	pulmonary artery;		1
(b)	In the following order: • oxygenated; • lungs; • atrium; • ventricle; • body;		5
(c)	• blood vessel X has a thicker wall; • blood vessel X has a smaller lumen; • blood vessel X does not contain valves	Allow the reverse argument for blood vessel Y	3
			Total 9

Question number	Answer	Notes	Marks
2 (a) (i)	2002;		1
(ii)	2005 (1.4)		1
(iii)	2.75:2.6; 1.1/1.06 :1;		2
(iv)	low income/low self esteem/(domestic) violence/low social status/substance abuse;		1
(b)			2
(c)	**A** alcohol and heroin; B antibiotics have no effect on mental health C paracetamol has no effect on mental health D antibiotics have no effect on mental health		1
(d)	Any two from the following brain/skin/sweat glands/muscles/blood vessels/arterioles;;		2
			Total 10

Question number	Answer	Notes	Marks
3 (a)	In the following order: • receptors; • sensory; • relay; • motor;		4
(b) (i)	synapse;		1
(ii)	• chemicals/neurotransmitters; • diffuse across synaptic clef/gap;		2
(c)	• 60 × 5; • 300 x 120 = 36 000;		2
			Total 9

Question number	Answer	Notes	Marks
4 (a)	Iodine (solution);		1
(b)	protein;		1
(c)	• add Benedict's/solution B to food in a test/boiling tube; • heat; • using a water bath; • wear goggles;		4
			Total 6

Question number	Answer	Notes	Marks
5 (a) (i)	A = eardrum; B = cochlea;		2
(ii)	Any two from the following • collects sound waves/vibrations/determines direction of sound; • directs them through the auditory / ear canal; • to the eardrum;		2
(b) (i)	• axes labels; • units; • bars correctly plotted; • scale;		4
(ii)	• (20 – 14) 6; • (6 ÷20) -0.30; • (x100) -30.00%	Allow ecf is minus symbol not given (Max 2 marks)	3
(c) (i)	Any two from the following • gender variation; • some people may have an ear defect;		2
(ii)	EITHER • check results; • with (data) from another group; OR		2

	• repeat the experiment; • calculate mean;		
			Total 15

Question number	Answer	Notes	Marks
6 (a)	(type of) antibacterial cleaner;		1
(b)	Any two from the following • use sterilised equipment/named equipment; • heat the inoculating loop (in a Bunsen flame); • do not open the lid of the Petri dish too much; • seal the lid of the Petri dish; (with tape)	Named equipment must be hardware	2
(c)	• to prevent growth/reproduction; • of pathogen/harmful microorganism;		2
(d)	it is a control;		1
			Total 6

Question number	Answer	Notes	Marks
7 (a) (i)	Any two from the following • causes cancer; • gene mutation; • incorrect protein made/shape of protein incorrect;		2
(ii)	• changing the way free radicals behave; • to allow normal flow of substances/named substance in and out of cells;		2
(iii)	• 40g = 60% of daily requirement; • $\frac{40 \times 100}{60}$; • = 67g;	Allow 66.7g	3
(b)	• add fresh orange juice to a test tube/named suitable container; • add DCPIP drop by drop until it no longer decolourises; • record the volume of DCPIP added; • repeat with the same volume of boiled orange juice; • compare volumes;		5
			Total 12

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>8 (a)</td><td>any 4 from

• change in base sequence produces different mRNA;
• altered codon (or codons);
• so different amino acids coded;
• incorrect protein made;
• could produce a stop codon so no protein made/faulty protein made;</td><td></td><td>4</td></tr>
<tr><td>(b) (i)</td><td>• faulty allele present on one chromosome only;
• effects overridden by a dominant allele;</td><td></td><td>2</td></tr>
<tr><td>(ii)</td><td>• one male in generation 1 has DMD;
• (faulty) allele must be on X chromosome;
• male is XY/does not carry dominant allele on Y chromosome;
• carriers present;</td><td></td><td>3</td></tr>
<tr><td>(iii)</td><td>• correct parental genotypes;
• correct genotypes for generation 1;

<table><tr><td></td><td>X^D</td><td>Y</td></tr><tr><td>X^D</td><td>X^D X^D</td><td>X^DY</td></tr><tr><td>X^d</td><td>X^d X^D</td><td>X^dY</td></tr></table></td><td></td><td>2</td></tr>
<tr><td></td><td></td><td></td><td>Total 11</td></tr>
</table>

Question number	Answer	Notes	Marks
9 (a)	Any three of the following • causes scarring/cirrhosis; • unable to detoxify substances / produce bile; • gene mutation; • leading to cancer;		3
(b)	Any six from the following • virus attaches to (host) cell; • DNA injected into cell; • DNA becomes incorporated into host cell DNA; • viral DNA replicated along with host cell DNA; • protein synthesis; • new virus produced; • lysis of host cell; • new viruses released (to infect new cells);		6
(c)	• antigens injected; • white cells/lymphocytes produce antibodies; • memory cells produce antibodies faster;		3
			Total 12

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