Pearson Edexcel

Mark Scheme (Results)

November 2023

Pearson Edexcel International GCSE In Human Biology (4HBI) 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.

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>1 (a)</td><td>
<table>
<tr><th>Feature</th><th>red b c</th><th>phagocyte</th><th>lymphocyte</th><th>platelet</th><th>plasma</th></tr>
<tr><td>transports oxygen</td><td>✓;</td><td></td><td></td><td></td><td></td></tr>
<tr><td>contains haemoglobin</td><td>✓;</td><td></td><td></td><td></td><td></td></tr>
<tr><td>is a fluid</td><td></td><td></td><td></td><td></td><td>✓;</td></tr>
<tr><td>produces antibodies</td><td></td><td></td><td>✓;</td><td></td><td></td></tr>
<tr><td>engulfs pathogen</td><td></td><td>✓;</td><td></td><td></td><td></td></tr>
</table>
</td><td>if more than required ticks no marks</td><td>5</td></tr>
<tr><td>(b)</td><td>any four from

• forms a plug/mesh;
• to prevent loss of (excess) blood;
• prevents entry of bacteria/pathogens/microorganisms;
• prevents infection/disease;
• protects skin whilst healing;</td><td>R scab</td><td>4</td></tr>
</table>

Total 9 marks

Question number	Answer	Notes	Marks
2 (a) (i)	• axes labelled with units; • axes correct way round and suitable scale; • points plotted correctly;; • straight lines joined; • lines identified;	time without with 0 65 110 30 120 215 60 130 230 90 95 200 120 80 190 150 65 180 180 65 170 don't include in published version	6
(ii)	• without = 65 mg per 100cm^3; • with = 120 mg per 100cm^3;		2
(iii)	any three from • without, level starts lower/level lower throughout; • smaller difference between highest and lowest values; • rises to lower levels/rise less quickly; • returns to normal (quicker)/same level 150-180;	ORA for person with diabetes	3
(b)	• sample in a test/boiling tube; • add Benedict's reagent/solution; • heat in a water bath; • wear goggles; • brick red colour if glucose present; if candidate uses glucose testing sticks • sample in a test/boiling tube; • use of testing stick; • dip into urine; • compare colour with chart; • use of goggles;	Accept yellow/green/orange	5

Total 16 marks

Question number	Answer	Notes	Marks
3 (a) (i)	250:750; 1:3;	full marks for correct answer with no working	2
(ii)	17 500 - 5600 = 11900; $\frac{11\,900 \times 100}{5\,600}$; = 210%;	full marks for correct answer with no working 213/212.5 = two marks	3
(iii)	• other parts of the body/organs; • liver/kidney/lungs/arteries/veins; • needs some blood supplied/blood flows to these organs;		3
(b) (i)	• large/big/huge increase in total flow; • large/big/huge increase in flow skeletal muscles/skin; • decrease for gut;		3
(ii)	• heat generated(body) temperature increases during exercise; • from respiration; • carried by blood/more blood to skin; • (heat) lost through skin/by radiation;		4

Total 15 marks

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

(ii)

(iii)</td><td>A; (chromosomes)

B/C/D do not contain DNA

RNA/mRNA/tRNA;

<table>
<tr><th>Differences</th><th>DNA</th><th>Named nucleic acid</th></tr>
<tr><td>1</td><td>double stranded</td><td>single stranded</td></tr>
<tr><td>2</td><td>contains deoxyribose</td><td>contains ribose</td></tr>
<tr><td>3</td><td>contains thymine</td><td>contains uracil</td></tr>
</table>
</td><td></td><td>1

1

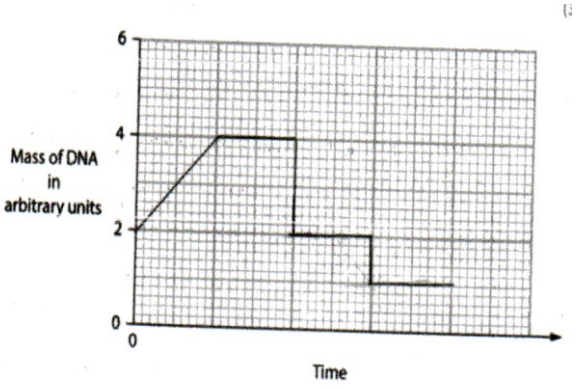
3</td></tr>
<tr><td>(b) (i)

(ii)

(iii)</td><td>• replication;
• formation of a new strand (of DNA);
• by complementary base pairing;
• double the original mass of DNA;

• cell dividing;
• cytokinesis;

• line starting at two;
• increases to four;
• ends at one;

 
</td><td></td><td>4

2

3</td></tr>
</table>

Total 14 marks

Question number	Answer	Notes	Marks
5 (a)	4^3; = 64;	Full marks for correct answer	2
(b) (i)	• change in order/sequence; • of bases; • different protein may be formed;		3
(ii)	uv light/λ rays/ionising radiation/X-rays;	accept any suitable example	1
(iii)	• can't catalyse reaction/slows reaction/activity; • because can't form E-S complexes/substrate can't bind with active site/active site not complementary;		2
(iv)	doesn't affect working of enzyme/mutation does not change amino acid/doesn't affect structure/shape of enzyme/different coding for same amino acid;		1

Total 9 marks

Question number	Answer	Notes	Marks
6 (a)	L = Bowman's capsule; M = glomerulus; N = collecting duct; 0 = loop of Henlé ;		4
(b) (i)	• ultrafiltration; • high blood pressure in B/glomerulus; • forces fluid/water into L/Bowman's capsule/out;		3
(ii)	• blood cells/named; • proteins;		2
(iii)	line labelled G pointing to proximal convoluted tubule;		1
(c)	any five from • more sweat; • hypothalamus detects decreased water potential of blood; • ADH secreted; • increases permeability of collecting duct; • causes more reabsorption of water; • volume of <u>filtrate</u> reduced; • concentration of filtrate/urine increased;		5

Total 15 marks

Question number	Answer	Notes	Marks
7 (a)	pulmonary artery;		1
(b)	• Y is thicker; • blood pumped into aorta; • takes/distributes blood to organs/tissues/whole body; • requires high pressure • thicker wall means more muscle for stronger contraction;	ORA for each point	5
(c)	any three of • heart muscle deprived of oxygen; • insufficient energy for muscle contraction/less aerobic respiration/(more) anaerobic respiration; • heart stops pumping blood/pumps less blood; • heart attack;		3
(d)	• transfers CO_2 (from muscle cells) to blood capillary; • transfers oxygen from blood/capillary (to muscle cells); • transfers glucose from blood/capillary (to muscle cells);		3

Total 12 marks

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