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Mark Scheme (Results)

Summer 2024

Pearson Edexcel International GCSE
In Human Biology (4HB1) Paper 01R

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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.

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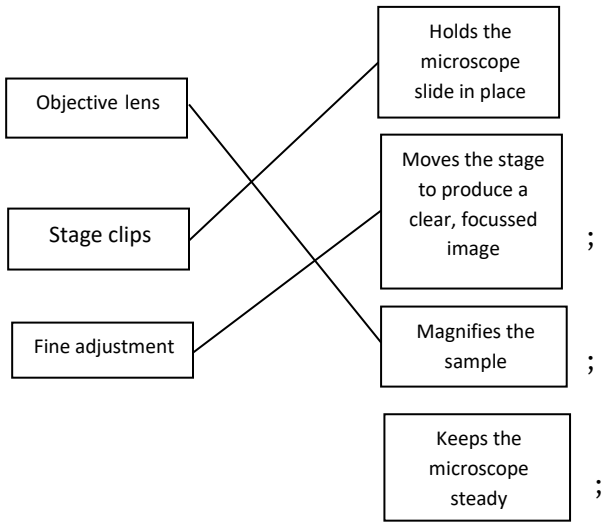
Question number	Answer	Notes	Marks
1 (a) (i)	**Any two from:** • (both) have a cell membrane; • (both) have cytoplasm; • (both) have genetic material/DNA; • (both) contain ribosomes;		(2)
(a) (ii)	**Any two from:** • bacterial cell has a cell wall / an animal doesn't; • bacterial cell has no nucleus /an animal cell does; • bacterial cell has a plasmid /the animal cell doesn't; • bacterial cell has a flagellum/ the animal cell doesn't; • bacterial cell has pili /the animal cell doesn't; • bacterial cell has no mitochondria /the animal cell does; • bacterial cell has slime capsule / the animal cell doesn't;		(2)
(b) (i)	 ; ; ;	Reject more than one line from each part	(3)
(b) (ii)	• substitution, 5 ÷ 50 000 = 0.0001(cm); • conversion to mm – 0.0001 x 10; • 0.001 mm/1×10^{-3}; or • 5×10=50mm; • 50÷50000; • 0.001mm/1×10^{-3}	ecf for mp 2 and 3 Full marks for correct final answer	(3)

Total for Question 1 = 10 marks

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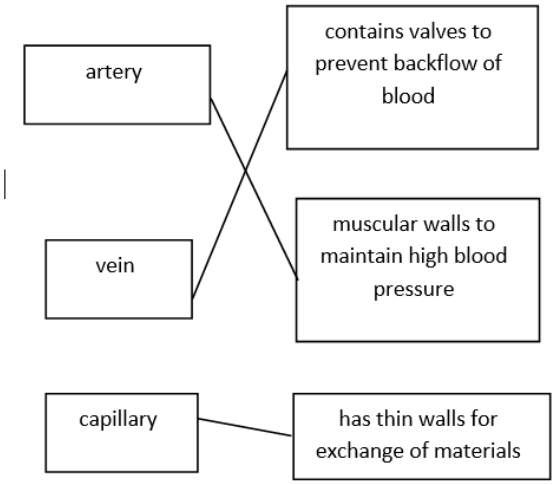
Question number	Answer	Notes	Marks
2 (a) (i)	X = plasma; Y = red blood cell; Z = white blood cell/phagocyte;	Accept named phagocyte	(3)
(a) (ii)	• transports oxygen; • to body/ cells/tissues/organs;		(2)
(a) (iii)	the patient has an infection/leukaemia/allergy/ blood cancer, inflammation;	Accept pathogens in body	(1)
(b)		Reject more than one line from each blood vessel 3 correct=2marks 1 or 2 correct= 1mark	(2)
(c) (i)	left ventricle;		(1)
(c) (ii)	• into right ventricle; • through pulmonary artery; • to the lungs; • (from the lungs) into the pulmonary vein;		(4)

Total for Question 2 = 13 marks

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Question number	Answer	Notes	Marks
3 (a) (i)	contains all nutrients needed/ correct balance of nutrients needed/ correct proportion of nutrients; to maintain health;	If groups of nutrients given all must be named	(2)
(ii)	males need more energy than females; 3000 kJ; greater muscle mass; males are likely to be more active/ higher metabolic rate:	Allow reverse for female	(3)
(iii)	iron needed to form haemoglobin; to replace haemoglobin lost during menstruation/red blood cells are lost during menstruation;		(2)
(iv)	vitamin A;		(1)
(v)	In 250g red meat – 2.5 x 2.5 = 6.25; In 200g broccoli – 2 x 0.7 = 1.4; 12 – 7.65; 4.35 (mg);	Full marks for correct final answer ecf for mp3 and mp4	(4)
(b) (i)	bleeding gums/anaemia/bruising/poor wound healing;	Allow other valid symptoms	(1)
(ii)	more fruit/vegetables eaten in diet/increased intake of vitamin C/ vitamin c supplement;		(1)

Total for Question 3 = 14 marks

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Question number	Answer	Notes	Marks
4 (a) (i)	• axes labels and units and right way around; • linear scale and at least half grid; • correctly plotted points to half square tolerance;		(3)
(ii)	• curve of best fit;	do not accept straight line going through all points	(1)
(iii)	6		(1)
(iv)	• time taken to digest starch decreases until pH 6; • time taken to digest starch increases (from/after PH6) to pH10;	Allow 1 mark for decrease and then increase in time as pH increases	(2)
(v)	• reference to pH2 not being optimum/best pH for **enzyme** (activity)/pH6 being (closer to) optimum pH for enzyme; • enzymes denatured / active site changes shape/deformed (at pH2); • less/no binding to substrate/ substrate cannot fit into active site/ fewer enzyme -substrate complex;		(3)
(vi)	small intestine/ mouth/duodenum;		(1)
(b)	• add iodine solution; • blue-black/blue/black colour indicates the presence of starch;		(2)

Total for Question 4 = 13 marks

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Question number	Answer	Notes	Marks
5 (a) (i)	Joint A = ball and socket; Joint B = hinge joint;		(2)
(ii)	• joint A has movement with 3 degrees of freedom/3 planes of movement/ rotational ; • joint B can only move in one plane/ backwards and forwards;	Allow description	(2)
(b) (i)	(ligament) holds bones together;		(1)
(ii)	cartilage) reduces friction between bones / prevents bones rubbing together/ shock absorber;		(1)

Total for Question 5 = 6 marks

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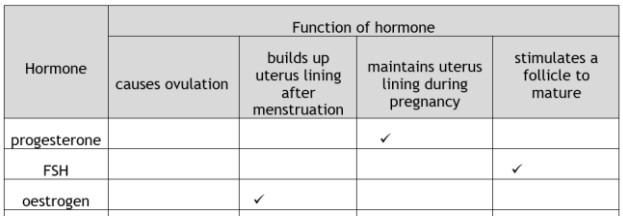
Question number	Answer	Notes	Marks
6 (a)		One mark for each row Reject more than one tick in each row	(3)
(b)	condom/ diaphragm/femidom/cap;		(1)
(c)	Any four from the following • female given FSH and LH; • egg and sperms collected/extracted/removed; • egg fertilised by sperm in laboratory/ glass dish/petri dish.; • embryo formed/ develops; • embryo inserted into uterus;		(4)
(d)	Any two from the following • passive immunity/antibodies passed from mother to baby/less chance of infection (for baby); • increases (emotional)bonding; • breast milk contains a balance/composition/combination of nutrients; • contains hormones to help development (of baby);		(2)

Total for Question 6 = 10 marks

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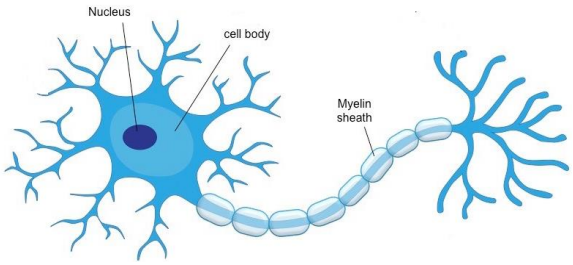
Question number	Answer	Notes	Marks
7 (a) (i)	receptor (cell)		(1)
(ii)	sensory neurone		(1)
(b) (i)	a cell that has particular features/adaptations/structures; to carry out a certain/specific function in the body;		(2)
(ii)	diagram; to include cell body at one end, with dendrites and an elongated axon twice the length of the cell body and axon ending; nucleus; cell body; myelin sheath;  	Label marks can be awarded if they draw a sensory or relay neurone	(4)
(iii)	transmits electrical impulses from the brain/CNS/spinal cord/ relay neurone; to effecter organs/muscle/gland;		(2)
(c)	$100/4.0 \times 10^{6}$; = 0.000025 (s); = 0.025 (ms); $= 2.5 \times 10^{-2}$;	ecf for mps 2,3 and 4 Allow full marks for correct final answer	(4)

Total for Question 7 = 14 marks

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Question number	Answer	Notes	Marks
8 (a) (i)	Bacteria;		(1)
(ii)	Contaminated water/food;		(1)
(b)	• oral rehydration(therapy)/ oral rehydration (solution); • reference to electrolytes/ions/named electrolytes (mixed) in water; • Reference to clean/boiled water; • Reference to antibiotics ;		(3)

Total for Question 8 = 5 marks

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Question number	Answer	Notes	Marks
9	Any 5 from • (Change in the water) potential/concentration/water level of blood detected by osmoreceptors/hypothalamus; • (when water potential/eq of blood) is low the pituitary gland releases/produces more ADH; • ADH travels through the blood/plasma; • ADH makes the kidney tubules/collecting duct more permeable; • More water reabsorbed/less water absorbed into the blood; • Production of small volume/concentrated urine;	Accept converse for mps 2,4,5 and 6	(5)

Total for Question 9 = 5 marks

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