

Mark Scheme (Results)

November 2024

Pearson Edexcel International GCSE
In Human Biology (4HB1) Paper 02

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November 2024
Question Paper Log Number P75959A
Publications Code 4HB1_02_ 2411_MS
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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)	• oviduct; • uterus; • ovary; • cervix; • progesterone; • oxytocin;		6
(b) (i)	• condom/cap/diaphragm/femidom; • rhythm; • pill/ oestrogen and progesterone pill/progesterone pill;	Mp2- accept withdrawal	3
(ii)	sterilisation/ IUD;	Accept vasectomy Accept tubal ligation	1

Total 10 marks

Question number	Answer	Notes	Marks
2 (a)	• all components/all nutrients/all required nutrients/all food groups/protein, carbohydrates, fats, vitamins, minerals ; • in the correct quantity/correct proportion/ recommended intake;		2
(b) (i)	Protein/ /vitamins/named vitamin/minerals / named mineral/starch/fibre;		1
(ii)	• $\frac{100}{4}$ = 25; • 25 × 2.4; • = 60 g; **60 = 3 marks**	ECF for mp 2 and 3	3
(iii)	• 4 slices = 470 (kJ)/1 slice = 118 (kJ); • $\frac{11\,800}{118}$ = 100.4 slices; ***2 marks for 100.4 or 101or 100.43***	1 mark for 11800÷470 **or** 1 mark for 100	2
(iv)	• break up/chop meat/ liquidise/small pieces; • place in test/boiling tube; • add alcohol/ethanol; • add water; • milky/cloudy/ milky white colouration shows presence of fat;	Apply the marking points independently Award mp3 and mp4 in any order. Accept mp3 and 4 in any order	5

Total = 13 marks

Question number	Answer	Notes	Marks
3 (a) (i)	Synapse/synaptic cleft;		1
(ii)	arrow pointing from top to bottom;		1
(iii)	any six from • vesicles; • contain neurotransmitter/ named neurotransmitter; • (vesicles)fuse/binds/attaches with pre-synaptic membrane/(vesicles) moves to pre-synaptic membrane; • exocytosis/release of neurotransmitter; • which diffuses (across the gap/synapse)/description of diffusion; • binds/attaches with receptors on post-synaptic membrane; • (initiates)new impulse;		6
(iv)	• neurotransmitter only released from pre-synaptic membrane/ neurone A/first neurone/(vesicles) with neurotransmitter in pre-synaptic knob/neurone A/first neurone; • diffuses down a concentration gradient/description of concentration gradient; • receptors only on post-synaptic membrane/neurone B/ second neurone;		3
(b)	any two from • addiction; • stroke/heart problems/high blood pressure; • steal to fund habit; • anxiety; • depression; • hallucinations; • memory loss; • brain damage/ damage nerve cells; • paranoia; • overdose/death;		2

Total 13 marks

Question number	Answer	Notes	Marks
4 (a)	• diarrhoea by clean water/safe water/ bottled water/boiled water/ sewage treatment/chlorination/good sanitation/not mixing sewage with drinking water/washing hands/good hygiene/ cooking food thoroughly; • malaria by nets/draining swamps/insecticides/ insect repellent's/wearing clothing to cover arms (and legs/mosquito coils/anti-malarial/vaccination ;	Ignore ORT	2
(b) (i)	antibiotics;		1
(ii)	• elderly have weakened/lowered immune system/immunocompromised; • indoor spaces makes transmission easier/reduced air flow/ reduced ventilation/build- up of air droplets with pathogens/ people closer together;		2
(c) (i)	• diet; • exercise; • smoking: • drinking alcohol: • stress	Accept drugs	2
(ii)	• $\frac{5\,000\,000}{100\,000} = 50$; • 50 × 445 = 22 250; • 22 300; ***22,250 scores 2 marks*** ***22,300 scores 3 marks***	***1 mark for ×445 if there are no other marks***	3
(iii)	• use of 445 and 185; • $\frac{445}{185}$; • 2.41:1/2.405:!/2.4:1= 3 marks;	ecf from mp1 **if they have done the correct calculation and 2:1 is on the answer line they score** 2 marks	3
(iv)	• people live longer/elderly population; • these diseases are more common in older people; • less likely to die younger from infectious diseases/better medical facilities/treatment; • different diet/ more meat/saturated fats/processed food; • drinking more alcohol;	People live longer so there is more cancer and dementia/these diseases= 2 marks	2

Total 15 marks

Question number	Answer	Notes	Marks
5 (a) (i)	• change in nucleotide/base/codon sequence; • of DNA;		2
(ii)	• new/different (sequence of) amino acids; • different protein / enzyme / different polypeptide • different phenotype/enzyme does not bind to substrate;		3
(b) (i)	• allele for haemophilia on X chromosome/ not on Y chromosomes; • hairy ears could only be males / haemophilia could occur in females (and males);		2
(ii)	• 1 = XX; • 2 = XY^H;		2
(iii)	• chance of being a girl = 50%/ this can be indicated in a punnet square; • girl will have XX genotype / girl indicated as XX from punnet square/ girls have two X; • no Y chromosome so no chance of hairy ears;		3

Total 12 marks

Question number	Answer	Notes	Marks
6 (a) (i)	• 1 = artery/ aorta/arterioles/named artery; • 2 = vein/ venules/vena cava; • 3 = capillary; • 4 = vein;		4
(ii)	• 1 = thick wall/muscular wall/elastic wall/fixed/rigid shape/small lumen; • 2 = thin wall/little muscle/little elastic tissue/ irregular shape/large lumen; • 3 = one cell thick/pores/gaps; • 4 = valves;		4
(b)	• M = (left) ventricle/heart; • N = arteries/arterioles/aorta/named artery; • O = capillaries; • P = veins/venules/vena cava;		4

Total 12 marks

Question number	Answer	Notes	Marks
7 (a)	• body temperature; • optimum/enzyme is not denatured;	Accept alimentary for MP1	2
(b)	• effect of pH/to see if pH affects enzyme activity; • range of pH used/different pH used/ pH is the independent variable;	***Effect of different pH on enzyme activity = 2 marks***	2
(c)	Any four from: Answers about validity(MP1-4) • The same temperature; • The same volume of enzyme/suspension; • not (valid) because different time used; • the same enzyme is used; Answers about accuracy(MP 5-7) • as difficult to judge endpoints/ when it goes clear; • students' judgement of endpoint may vary/ subjective/ not standardised/ did not use a colorimeter; • timing is too short to reach endpoint/ cannot tell it will go clear if left for longer;	They do not have to mention validity/accuracy to score marks. Must have at least one mark from each section to score 4. Maximum of 3 if answers are from one section	4
(d)	• tube with no enzyme/ denatured enzyme/boiled enzyme; • same volume of boiled enzyme/water /5cm^3 of water/boiled enzyme; • same volume of suspension/same overall volume/ same volume of substrate (in test tube);		3
(e)	• optimum pH; • fastest between 2 and 4;		2
(f)	• stomach; • acidic/low pH/pH2-4/pH2;		2

Total 15 marks

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