



Pearson
Edexcel

Mark Scheme (Results)

November 2020

Pearson Edexcel International GCSE
In Biology (4BI1) Paper 2B

Question Number	Answer	Mark
1(a)	<p>C ultrafiltration</p> <p><i>A is incorrect because digestion is not a process in the kidneys</i></p> <p><i>B is incorrect because mutation is not a process in the kidneys</i></p> <p><i>D is incorrect because vaccination is not a process in the kidneys</i></p>	1 comp

Question Number	Answer	Additional guidance	Mark
1(b)	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • stay out of water / wear waterproof clothes / eq (1) • treat drinking water / boil water (before drinking) / do not drink water / drink bottled water / eq (1) • sanitation / no faeces in water / no urine in water /eq (1) • remove snails /eq (1) • vaccination (1) 	<p>Allow do not go in infected rivers or lakes / cover skin when in water / avoid contact with affected water / only wash in clean water</p> <p>Allow filter water / do not drink river water / lake water</p> <p>Allow use sewage treatment system / use toilet with septic tank</p> <p>Allow don't touch snails</p>	3 exp

Question Number	Answer	Mark
1(c)	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • red blood cells / rbc (1) • white blood cells / wbc (1) • lymphocytes (1) • phagocytes / macrophages (1) 	2 grad

Question Number	Answer	Mark
1(d)	<p>D 4 800</p> <p><i>A is incorrect because it is the wrong value</i> <i>B is incorrect because it is the wrong value</i> <i>C is incorrect because it is the wrong value</i></p>	1 comp

Question Number	Answer	Additional guidance	Mark
1(e)	<ul style="list-style-type: none"> • $8 \times 10^{-4} = 0.0008$ • $\times 240 \text{ million} = 192$ $000 \div 100 = 1920$ (2) 	<p>Allow 1 mark for: 19200000 / 1920000 / 192000 / 19200 / 192 / 19.2 / 1.92 / 0.192 / 0.0192</p> <p>Award full marks for correct numerical answer without working</p>	2 grad

Question Number	Answer	Mark
1(f)	<p>A a circle of DNA</p> <p><i>B is incorrect because it is not RNA</i> <i>C is incorrect because it is not a protein</i> <i>D is incorrect because it is not RNA</i></p>	1 comp

Question Number	Answer	Mark
1(g)	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • antigen (1) • memory cells / lymphocytes (1) • (secondary) immune response (1) • more antibodies / antibodies made sooner / faster / faster immune response / eq (1) 	3 exp

Question Number	Answer		Mark
1(h)(i)	<ul style="list-style-type: none"> • (a treatment with) no plasmid / no protein / only water / saline / eq (1) 	<p>Allow placebo vaccine / a placebo / plasmid with no gene / plasmid with no DNA / different DNA</p>	1 exp

Question Number	Answer	Additional Guidance	Mark
1(h)(ii)	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • reduced numbers / eq (1) • by 19 or by 47% / about 50% • schistosomes / worms, still present in body (1) • no idea of group size / needs to be repeated (1) • no idea of age / sex / health (1) 	<p>Allow reduces numbers of worms / worms decrease / lower number of worms after vaccine</p> <p>Allow more worms in control group</p> <p>Allow does not completely get rid of them</p> <p>Allow more testing / more people tested</p>	3 exp

Total = 17 marks

Question Number	Answer	Mark
2(a)(i)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • prevent loss of blood / stops bleeding (1) • prevent entry of pathogens / microbes / bacteria / viruses / fungi / eq / prevent infections (1) 	2 grad

Question Number	Answer	Mark
2(a)(ii)	<p>An answer that makes reference to the following point:</p> <ul style="list-style-type: none"> • graph showing drop at 37 °C then increase 	1 grad

Question Number	Answer	Mark
2(b)(i)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • (have been given) genetic material / gene / allele / DNA / genetically alter (1) • from human / different species (1) 	2 grad

Question Number	Answer	Additional guidance	Mark
2(b)(ii)	<p>An answer that makes reference to six of the following points:</p> <ul style="list-style-type: none"> • use enucleated egg / empty egg / remove nucleus from egg / eq (1) • nucleus from body cell / diploid nucleus (placed into empty egg) / fuse adult cell with empty egg (1) • use of electricity / shock (1) • cell division / mitosis (1) • embryo (1) • uterus / womb (1) • surrogate mother (1) 	Ignore DNA	6 exp

Total 11 marks

Question Number	Answer	Mark
3(a)	spinal cord / chord	1 cler

Question Number	Answer	Mark
3(b)(i)	<p>C 0.5</p> <p><i>A is incorrect because 0.5 is the answer</i> <i>B is incorrect because 0.5 is the answer</i> <i>D is incorrect because 0.5 is the answer</i></p>	1 comp

Question Number	Answer	Mark
3(b)(ii)	<p>A diagram that makes reference to the following points:</p> <ul style="list-style-type: none"> • one circle and one square shown (1) • two shapes unshaded (1) 	2 grad

Question Number	Answer	Additional guidance	Mark
3(c)	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • prevents translation / no translation (1) • prevents ribosomes attaching (to mRNA) (1) • prevents / no, codon binding to anticodon (1) • prevents amino acids joining / amino acid chain not made (1) • huntingtin / protein / polypeptide not made (1) 	<p>Allow tRNA does not bind to mRNA</p> <p>Allow less huntingtin / protein made</p>	3 exp

Total 7 marks

Question Number	Answer	Additional guidance	Mark
4(a)	An answer that makes reference to the following points: $6\text{CO}_2 + 6\text{H}_2\text{O} \longrightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ (2)	Allow 1 mark for unbalanced but correct formula No marks for word equation	2 grad

Question Number	Answer	Additional guidance	Mark
4(b)(i)	<ul style="list-style-type: none"> • $84 + 80 \div 2$ • 82 (2) 	Allow 1 mark for 70 or 70.3 or 70.33 etc Allow one mark for 164 or $80 + 84$ Award full marks for correct answer	2 grad

Question Number	Answer	Additional guidance	Mark
4(b)(ii)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • no filter has highest rate of photosynthesis / bubbling / oxygen (1) • (because) all light colours / wavelengths are present / has more light energy / most amount of light that can be absorbed / eq (1) • green has low(est) rate of photosynthesis, because green light is not absorbed / eq (1) • blue / red has a medium rate of photosynthesis because light is, absorbed / not reflected / eq (1) • chlorophyll / chloroplast absorbs red / blue light / does not absorb green light / eq (1) 	<p>Allow no bubbling / 8 bubbles / no oxygen production because green light is reflected / passes through</p> <p>Allow causes photosynthesis / produces bubbles because light is, absorbed / not reflected / eq</p>	4 exp

Question Number	Answer	Additional guidance	Mark
4(b)(iii)	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • temperature (1) • carbon dioxide (1) • light <u>intensity</u> (1) 	<p>Allow volume / amount / concentration of hydrogen carbonate</p> <p>Allow brightness of lamp/ thickness of filter / eq</p>	2 grad

Question Number	Answer	Additional guidance	Mark
4(c)(i)	<p>An explanation that makes reference to two the following points:</p> <ul style="list-style-type: none"> • bubbles are different volumes / sizes (1) • O₂ may dissolve in water (1) • bubbles may be CO₂ not oxygen / may not be due to photosynthesis /other gases may be present (1) • easy to miscount / miss bubbles (1) • bubbles get trapped / stuck (1) 	<p>Allow bubbles may be due to respiration</p> <p>Ignore 'make error' unqualified</p>	2 exp

Question Number	Answer	Additional guidance	Mark
4(c)(ii)	<p>An answer that makes reference to two the following points:</p> <ul style="list-style-type: none"> • use measuring cylinder / (gas) syringe / burette / graduated test tube (1) • (to measure) volume (1) <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • use hydrogen carbonate <u>indicator</u> (1) • change colour (of hydrogen carbonate indicator) (1) 		2 exp

Total 14 marks

Question Number	Answer			Mark															
5(a)	<table border="1"> <thead> <tr> <th>Hormone</th> <th>Name of structure that secretes hormone</th> <th>Functions of hormone</th> </tr> </thead> <tbody> <tr> <td>FSH</td> <td>pituitary (1)</td> <td> 1. stimulate follicle growth / mature eggs / develop eggs / eq (1) 2. stimulates oestrogen secretion </td> </tr> <tr> <td>LH / Lutenising hormone (1)</td> <td>pituitary</td> <td> 1. cause ovulation / egg / ovum release / eq / stimulate progesterone release (1) 2. stimulates development of corpus luteum </td> </tr> <tr> <td>oestrogen / estrogen (1)</td> <td>ovaries</td> <td> 1. repairs lining of uterus 2. stimulates LH secretion </td> </tr> <tr> <td>progesterone</td> <td>ovaries / corpus luteum / placenta (1)</td> <td> 1. maintains the lining of uterus 2. inhibits LH </td> </tr> </tbody> </table>			Hormone	Name of structure that secretes hormone	Functions of hormone	FSH	pituitary (1)	1. stimulate follicle growth / mature eggs / develop eggs / eq (1) 2. stimulates oestrogen secretion	LH / Lutenising hormone (1)	pituitary	1. cause ovulation / egg / ovum release / eq / stimulate progesterone release (1) 2. stimulates development of corpus luteum	oestrogen / estrogen (1)	ovaries	1. repairs lining of uterus 2. stimulates LH secretion	progesterone	ovaries / corpus luteum / placenta (1)	1. maintains the lining of uterus 2. inhibits LH	6 exp
Hormone	Name of structure that secretes hormone	Functions of hormone																	
FSH	pituitary (1)	1. stimulate follicle growth / mature eggs / develop eggs / eq (1) 2. stimulates oestrogen secretion																	
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progesterone	ovaries / corpus luteum / placenta (1)	1. maintains the lining of uterus 2. inhibits LH																	

Question Number	Answer	Additional guidance	Mark
5(b)	<p>An answer that makes reference to one of the following points:</p> <ul style="list-style-type: none"> • blood loss once a month / monthly period / eq (1) • breakdown of uterus lining / breakdown of endometrium / eq 	Allow passing out / shedding / loss of uterus lining / endometrium	1 grad

Question Number	Answer	Additional guidance	Mark
5(c)	<ul style="list-style-type: none"> • $51 - 12 = 39$ • $39 \times 52 \times 7 = 14\ 196$ days • $39 \times 365 = 14\ 235$ • $39 \times 365.25 = 14\ 24.75$ • $14\ 196 \div 28 = 507$ • = 510 to 2 sig figs (3) <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • $51 - 12 = 39$ • $365 / 28 = 13(.04)$ • $13.04 \times 39 = 508$ • = 510 to 2 sig figs (3) 	<p>Award full marks for correct numerical answer without working</p> <p>Allow one mark for $\times 39$ OR for $\div 28$</p> <p>Allow answer between 507 and 510 for 2 marks e.g. 507 / 508 / 509</p>	3 exp

Question Number	Answer	Additional guidance	Mark
5(d)	<p>An answer that makes reference to one of the following points:</p> <ul style="list-style-type: none"> • not all eggs fertilised / eq (1) • no sexual intercourse / eq (1) • contraception / eq (1) • no implantation / eq (1) • miscarriages / eq (1) • some eggs not fertile / eq (1) 	Allow eggs fertilised by abnormal sperm	1 exp

Total 11 marks

Question Number	Answer	Additional guidance	Mark
6(a)(i)	<p>A description that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • elongated / pointed / projections / extensions /eq (1) • increase surface area (1) • thin wall for short diffusion path / eq (1) • concentrated cell sap for osmosis / eq (1) 	<p>Allow low water potential to increase gradient for osmosis / increase water potential gradient /eq</p>	2 grad

Question Number	Answer	Additional guidance	Mark
6(a)(ii)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • water enters (root) by osmosis (1) • from dilute solution to more concentrated solution / eq (1) • (water) enters / moves up xylem (1) • water pulled up to leaf due to transpiration / pulled along transpiration stream / eq (1) • (water vapour) exits through stomata (1) 	<p>Allow from higher water potential to lower water potential</p> <p>Allow from high concentration of water to low concentration of water</p> <p>Allow water pulled due to evaporation from leaf / eq</p>	4 exp

Question Number	Answer	Additional guidance	Mark
6(b)	<p>A description that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • use (bubble) / (weight) <u>potometer</u> (1) • cut shoot underwater / dry leaves / place mineral oil on surface of water / eq (1) • measure distance moved by bubble (in cm) / mass lost / change in volume of water (1) • (in set) time (1) • repeat / calculate mean rate (1) 	<p>Allow polythene bag around soil (if shoot placed in soil)</p> <p>Allow stated time</p> <p>Allow time mark ref and mass mark for two marks if given as units e.g. cm per min g per min</p>	4 exp

Total 10 marks