Pearson Edexcel

Mark Scheme (Results)

November 2021

Pearson Edexcel International GCSE
In Biology (Single Award) (4SSO) Paper 1B

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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	Mark
1(a)	C uterus / womb / uterine wall / uterine lining / uterus lining /endometrium (1) D vagina (1)	**2**

Question Number	Answer	Mark
1(b)	A description that makes reference two the following points: • site of fertilisation / fusion (1) • egg travels / egg from ovary / transports egg /eq (1) • sperm travels (from vagina/ uterus /cervix/ to egg) / transports sperm / eq (1)	**2**

Question Number	Answer	additional guidance	Mark
1(c)	An explanation that makes reference to two of the following points: • produces oestrogen / eq (1) • at puberty (1) • example of named secondary sexual characteristic /eq(1) • second example of named secondary sexual characteristic /eq (1)	examples pubic hair/ breasts develop/ body hair / hips widen / menstruation starts	**2**

Total = 6 marks

Question Number	Answer	additional guidance	Mark
2(a)	• oak → caterpillar → mouse → tick (1)	no credit for other chains without correct arrows pyramids	**1 grad**

Question Number	Answer	Mark
2(b)	An explanation that makes reference to two the following points: • less food (for mice) / eq (1) • mice can (now only) feed on tree (1) • mice population declines / fewer mice / it declines / eq (1)	**2**

Question Number	Answer	Mark
2(c)	An explanation that makes reference to three of the following points: • energy loss / used up (at each trophic level) / not all energy transferred /less energy reaches top / eq (1) • respiration / heat loss / movement (1) • cannot digest / egested / not absorbed /eq (1) • uneaten / die / decomposition (1) • excretion / eq (1)	**3**

Total = 6 marks

Question Number	Answer	additional guidance	Mark
3(a)	• (the allele coding for) grey	allow grey mouse allow grey male mouse	**1**

Question Number	Answer	additional guidance	Mark
3(b)(i)	An answer that makes reference to the following points: • parent genotypes aa x Aa (1) • correct gametes for parents a and a or A (1) • offspring genotypes aa and Aa (1) • phenotypes white (aa) and grey (Aa) (1)	allow G and W allow full marks from Punnet square gametes must be clearly shown separated or in circles or in Punnet square allow ecf for wrong parent genotypes gametes and offspring mark for 2 max	**4**

Question Number	Answer	additional guidance	Mark
3(b)(ii)	an answer that makes reference to one of the following: • fertilisation is random / combination of gametes is random / eq (1) • due / by chance / to chance / eq (1)	it is a probability doesn't happen every time	**1**

Question Number	Answer	additional guidance	Mark
3(b)(iii)	• probability of male 0.5 / eq • probability of white 0.5/eq so combined = 0.5 x 0.5 0.25 / 25% / ¼ (2)	allow 1 mark for 0.5 /eq full marks for correct answer no working	**2**

Question Number	Answer	additional guidance	Mark
3(c)	A description that makes reference to three of the following points: • white blood cells (1) • phagocytes (1) • (phagocytes) ingesting / engulfing / pathogens / eq (1) • lymphocytes (1) • (lymphocytes) releasing antibodies (1)	phagocytes release antibodies scores mp 2 but not mp5 white blood cells produce antibodies scores mp1 and mp 5	**3**

Total 11 marks

Question Number	Answer	Mark
4(a)	The only correct answer is C producers A is not correct as it is not decomposers B is not correct as it is not primary consumers D is not correct as it is not secondary consumers	**1**

Question Number	Answer	Mark
4(b)	The only correct answer is C $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$ A is not correct as it is not photosynthesis B is not correct as it is not photosynthesis D is not correct as it is not photosynthesis	**1**

Question Number	Answer	additional guidance	Mark
4(c)(i)	An explanation that makes reference to two of the following points: • so that starch is used up / no starch present / remove starch / destarch / no starch made / eq (1) • in respiration (1) • prevent photosynthesis (1)	to show that any starch present is the product of photosynthesis in the light scores mp 1 and mp3	**2**

Question Number	Answer	Mark
4(c)(ii)	A description that makes reference to two of the following points: • use water bath / eq (1) • extinguish Bunsen flame / no contact with flame / eq (1) • as ethanol flammable / eq (1)	**2**

Question Number	Answer	Mark
4(c)(iii)	leaf from light turns blue black / blue / black / purple **and** leaf from dark stays brown / yellow orange / no change /eq (1)	**1**

Total 7 marks

Question Number	Answer	Mark
5(a)(i)	The only correct answer is C structure S A is not correct as P is not part of digestive system B is not correct as Q is not part of digestive system D is not correct as U is not part of digestive system	**1**

Question Number	Answer	Mark
5(a)(ii)	The only correct answer is D structure U A is not correct as P is not part of circulation system B is not correct as R is not part of circulation system D is not correct as S is not part of circulation system	**1**

Question Number	Answer	Mark
5(b)	The only correct answer is B diaphragm contracts and the volume within the rib cage increases A is not correct as volume within the rib cage does not decrease C is not correct as diaphragm does not relax D is not correct as diaphragm does not relax	**1**

Question Number	Answer	Additional guidance	Mark
5(c)(i)	• oxygen 20% (1) • carbon dioxide 9900% (1)	(40/200) x 100 = 20% (39.6/0.4) x 100 = 9900 one mark for each correct %	**2**

Question Number	Answer	Mark
5(c)(ii)	An explanation that makes reference to four of the following points: • more carbon dioxide in exhaled air / eq (1) • as produced by / released from respiration (in cells) (1) • transported in (red cells and plasma) to lungs / eq (1) • less oxygen in exhaled air / eq (1) • as absorbed by red blood cells / absorbed by lungs / eq (1) • as used / required in respiration (in cells) (1) • little change/ no change in Nitrogen (as not absorbed / not required) (1)	**4**

Question Number	Answer	Mark
5(c)(iii)	An explanation that makes reference to four of the following points • (many) alveoli provide large surface area /eq (1) • blood flow / blood supply / capillaries / maintain(s) diffusion / concentration gradient / eq (1) • capillaries provide blood supply / surround / close to alveoli/ eq (1) • thin (walls) one cell thick / short distance for diffusion eq (1) • moist lining to allow gases to dissolve / pass through / for gas exchange /eq (1)	**4**

Total 13 marks

Question Number	Answer	additional guidance	Mark
6(a)	movement of a substance / molecules / particles / ions from a region of high concentration to a region of lower concentration / down a concentration gradient / eq	ignore ref to partially permeable	**1**

Question Number	Answer	additional guidance	Mark
6(b)	An answer that refers to two of • temperature (1) • concentration of dye (1) • density / thickness / concentration / solidity of / type of agar / jelly eq (1) • volume of dye (1)	ignore time ignore amount of dye	**2**

Question Number	Answer	additional guidance	Mark
6(c)(i)	SA = 6 × SA of one side 6 × 2 × 2 6 × 4 • 24 cm ^{2} (2)	allow 1 mark for × 4 or × 2 × 2 allow full marks for correct answer with no working	**2**

Question Number	Answer	additional guidance	Mark
6(c)(ii)	• 3:1 / eq	allow 3 allow ECF from 6ci	**1**

Question Number	Answer	additional guidance	Mark
6(c)(iii)	2 (mm)	allow **1-2**(mm)	**1**

Question Number	Answer	additional guidance	Mark
6(c)(iv)	An answer that makes reference to four of the following points: • dye moves (into each cube) same distance / eq (1) • but smaller cube (C) has greater proportion penetrated / eq (1) • as small cube (C) has higher surface area to volume ratio / eq (1) • as size decreases SA / vol ratio increases (1) • so smaller organisms are more efficient / can rely on diffusion (alone) / diffusion more effective / eq (1) • larger organisms need circulation system / transport system / ventilation / lungs / digestive system / eq (1)	allow converse mp 2 3 4 5 6	**4**

Total 11 marks

Question Number	Answer	additional guidance	Mark
7	An answer that makes reference to six of the following points • C change carbon dioxide concentration / eq (1) • O use same plant species / same seeds / same variety /eq (1) • R repeat for each carbon dioxide concentration / eq (1) • M1 measure height / mass / yield of crop / number of fruit / eq (1) • M2 after stated time / same time (1) • S1 use same temperature / stated temperature / eq (1) • S2 water / minerals / nitrates / compost /soil / light intensity / period / eq (1)	ignore amount unqualified 4 weeks plus	**6**

Total 6 marks

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