Pearson Edexcel

Mark Scheme (Results)

Summer 2022

Pearson Edexcel International GCSE
In Science Single Award (4SS0)
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)(i)	The only correct answer is D nucleoid A is not correct as it is the flagellum B is not correct as it is the cell membrane C is not correct as it is the cell wall	**1**

Question Number	Answer	Mark
1(a)(ii)	The only correct answer is B cell membrane A is not correct as it is a flagellum D is not correct as it is the nucleoid E is not correct as it is a plasmid	**1**

Question Number	Answer	additional guidance	Mark
1(b)	An answer that makes reference to three of the following points: • bacterium has no chloroplasts (1) • bacterium has no nucleus (1) • bacterium has no (large) vacuole (1) • bacterium has plasmids (1) • bacterium has flagella (1) • bacterium has no mitochondria (1)	allow converse for plant cell ignore chlorophyll no credit for reference to structure A etc	**3**

Total = 5 marks

Question Number	Answer	Mark
2(a)(i)	The only correct answer is C R is the bronchus A is not correct as P is the lung B is not correct as Q is the trachea D is not correct as S is the bronchiole	**1**

Question Number	Answer	Mark
2(a)(ii)	An answer that makes reference to **three** of the following points: • thin (walled) / one cell thick / eq (1) • moist /eq (1) • large surface area / many alveoli / eq (1) • close to capillary / good blood supply /eq (1)	**3**

Question Number	Answer	additional guidance	Mark
2(b)(i)	An answer that makes reference to the following points: • increase up to 13 -20 / eq (1) • then (slow) decrease (from 13-20) / eq (1) • males higher (at each age) / females lower / eq (1)	Must make one correct reference to age to get mp 1 and 2 (and no incorrect ref) increase then decrease with no ages reference = 1 mark	**3**

Question Number	Answer	Mark
2(b)(ii)	An answer that makes reference to: • males larger / bigger / taller / more mass / more alveoli / larger lungs/ larger thorax/ stronger (internal) intercostal muscles / stronger diaphragm / eq (1)	**1**

Total = 8 marks

Question Number	Answer	additional guidance	Mark
3(a)(i)	(4-16) ÷16 ×100 = 75 (2)	allow full marks for correct answer with no working allow 1 mark for ÷ 16 ignore sign	**2**

Question Number	Answer	Mark
3(a)(ii)	• colour of light / wavelength of light / eq	**1**

Question Number	Answer	additional guidance	Mark
3(a)(iii)	• carbon dioxide / temperature / light intensity / brightness / minerals ions/ named mineral ions in water / eq (1)	not just light allow distance of light from beaker	**1**

Question Number	Answer	additional guidance	Mark
3(b)	An answer that makes reference to **four** of the following points: • number of bubbles in one minute gives the rate of photosynthesis / eq (1) • high(est) in white light /eq (1) • as provides all colours / wavelengths /eq (1) • low(est) in green /eq (1) • as green light reflected / not absorbed / eq (1) • by chlorophyll / chloroplasts /eq (1) • red / blue higher than green / red/blue less than white /eq (1) • as red / blue absorbed (1)	Allow highest photosynthesis or highest bubbles/ eq for mp 2 4 7	**4**

Question Number	Answer	Additional guidance	Mark
3(c)	An explanation that makes reference to four of the following points: • leaf flat / wide / large SA for diffusion / gas exchange / light absorption / eq (1) • leaf thin so no cells far from surface to absorb light / short diffusion distance / eq (1) • upper epidermis transparent to allow light through / eq (1) • palisade (mesophyll) (cells) contain many chloroplasts / much chlorophyll (near surface) to absorb light /eq (1) • spongy (mesophyll) (cells) have air spaces / not tightly packed / for gas exchange / diffusion /eq (1) • stomata / pores to absorb carbon dioxide/ eq (1) • xylem / vascular bundle / veins bring water (for photosynthesis) / eq (1)	Each mp must have explanation as to how it benefits photosynthesis	**4**

Total =12 marks

Question Number	Answer	Mark
4(a)	• respiration (1)	**1**

Question Number	Answer	additional guidance	Mark
4(b)(i)	A description that makes reference to **three** of the following points: • measure out one m^2 / use quadrat / eq (1) • place randomly / eq (1) • cut / harvest grass / remove plants / eq (1) • repeat / use quadrat**s** /eq (1) • measure mass/ weight after one year / eq (1)	allow crops not repeat several times a year allow find difference between start and end of year idea	**3**

Question Number	Answer	Additional guidance	Mark
4(b)(ii)	An answer that makes reference to 5 of the following points: • S y axis scale linear and half the grid (1) • axis labelled (mean) net primary productivity (1) • Units in g per m^2/ eq (1) • P bars plotted correctly within one (1) • K key / each bar labelled with ecosystem type (1)	line graph scores 4 max **if scale non-linear no S or P**	**5**

Question Number	Answer	additional guidance	Mark
4(b)(iii)	An answer that makes reference to **five** of the following points: • **tropical rainforest** high(est) productivity / growth / eq (1) • high temperature / sunlight / rainfall / water/ eq (1) • **desert** low(est) growth / eq (1) • too little water / rain / dry eq (1) • too hot / extremes of temperature / enzymes denature / eq (1) • for photosynthesis (1) • **deciduous temperate forest** high / second highest / eq (1) • not as warm / less intense sunlight / less leaves in autumn / more diverse / range of plants eq(1) • **cultivated farmland higher than /** similar to **(temperate) grassland** / eq (1) • contain similar plants / grasses / cereals / no trees / eq (1) • cultivated is given water / minerals/ fertiliser / grown in polythene tunnels / eq (1)		**5**

Total 14 marks

Question Number	Answer	Mark
5(a)	An answer that makes reference to **two** of the following points: • large petals / coloured petals /flowers / eq (1) • scented / eq (1) • nectaries / nectar (1) • enclosed stamens / enclosed stigma / sticky stigma / eq (1)	**2** Allow smell

Question Number	Answer	Additional guidance	Mark
5(b)(i)	An explanation that makes reference to **two** of the following points: • has no stamens / anthers / no male part /eq (1) • no pollen produced / male gamete / eq (1) • no fertilisation / pollination / eq (1)	Allow converse	**2**

Question Number	Answer	additional guidance	Mark
5(b)(ii) **CLIP WITH 5(b) (iii)**	An answer that includes : • parent genotypes Dd (1) • correct gametes shown D or d (1) • correct offspring genotypes shown DD Dd Dd dd (1) • correct offspring phenotypes shown / ratio shown or key shown/eq (1)	allow other symbols allow all 4 marks from suitable Punnett square allow ECF for 2 max gametes and offspring genotypes from any parents	**4**

Question Number	Answer	additional guidance	Mark
5(b)(iii) **CLIP WITH 5(b) (ii)**	0.25 / ¼ / 25% of 600 = 150 (2)	allow full marks for correct answer with no working allow 1 mark for 0.25 / ¼ / 25% allow ecf from (b) (ii) so if offspring shown in 5bii are 50% double allow 300 as answer here.	**2**

Total 10 marks

Question Number	Answer	Mark
6(a)	bacteria that contain added genes / additional DNA / added genetic information / genes from another species / DNA from another species / foreign genes / foreign DNA / genetic information from another species / eq (1)	**1**

Question Number	Answer	Mark
6(b)	A description that makes reference to **four** of the following points: • restriction enzyme used (1) • to cut human DNA / gene (that codes) for insulin / to cut plasmid (1) • produces sticky ends /eq (1) • ligase used to (1) • insert gene / join DNA into bacterial plasmid / eq (1) • plasmid inserted into bacterium / eq (1)	**4**

Total 5 marks

Question Number	Answer	additional guidance	Mark
7	An answer that makes reference to six of the following points • C use weights and running (1) • O use same sex / same age / same fitness / same resting heart rate / or matched individuals / same number of males and females /eq (1) • R repeat / use groups (for each training regime) / eq (1) • M1 measure (resting) heart rate / count beats per minute / eq (1) • M2 after stated duration of programme / 1 week plus / eq (1) • S1 equivalent same duration / time of exercise / frequency of exercise / eq (1) • S2 same environmental conditions during exercise / temperature / clothing / humidity / altitude / eq (1)	Not same person	**6**

Total 6 marks

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