



Pearson
Edexcel

Mark Scheme (Results)

Summer 2024

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)	<p>The only correct answer is A structure Q</p> <p><i>B is not correct as R is the bronchus</i></p> <p><i>C is not correct as S is the alveolus</i></p> <p><i>D is not correct as T is the pleural membrane</i></p>	1

Question Number	Answer	Mark
1(a)(ii)	<p>The only correct answer is C structure S</p> <p><i>A is not correct as Q is the trachea</i></p> <p><i>B is not correct as R is the bronchus</i></p> <p><i>D is not correct as T is the pleural membrane</i></p>	1

Question Number	Answer	Mark
1(a)(iii)	<p>The only correct answer is B Q and R</p> <p><i>A is not correct as P and Q do not both contain cartilage rings</i></p> <p><i>C is not correct as Q and S do not both contain cartilage rings</i></p> <p><i>D is not correct as S and T do not both contain cartilage rings</i></p>	1

Question Number	Answer	Additional guidance	Mark
1(b)(i)	<ul style="list-style-type: none"> (healthy) lung is larger / bigger / not collapsed/ not shrunk / no air in thorax /lung not detached from chest wall / no hole in chest wall / eq (1) 	(Pneumothorax) lung is smaller / lung is collapsed / shrunk / air in thorax / lung detached from chest wall/ hole in chest wall	1

Question Number	Answer	Additional guidance	Mark
1(b)(ii)	<p>An answer that makes reference to four of the following points:</p> <ol style="list-style-type: none"> 1. chest cavity / thorax not sealed / airtight / air enters / escapes thorax through hole / eq (1) 2. as chest / thorax volume / increases / changes / eq(1) 3. pressure cannot change / no pressure / eq (1) 4. lung cannot inflate / lung cannot expand / no air drawn in / less air enters / eq (1) 5. only one lung works / harder to breathe / short of breath / cannot inhale / eq (1) 6. no / less gas exchange / diffusion of oxygen / eq (1) 	not air enters lung	4

Total = 8 marks

Question Number	Answer	Mark
2(a)(i)	<p>The only correct answer is C rabbit</p> <p><i>A is not correct as the cactus is not a primary consumer</i></p> <p><i>B is not correct as the lizard is not a primary consumer</i></p> <p><i>D is not correct as the tarantula is not a primary consumer</i></p>	1

Question Number	Answer	Mark
2(a)(ii)	<p>The only correct answer is C rattlesnake</p> <p><i>A is not correct as the lizard is not a tertiary consumer</i></p> <p><i>B is not correct as the rabbit is not a secondary or tertiary consumer</i></p> <p><i>D is not correct as the tarantula is not a tertiary consumer</i></p>	1

Question Number	Answer	Mark
2(b)(i)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • hawk population falls / eq (1) • less food available / as they eat rabbits / eq (1) <p style="text-align: center;">or</p> <ul style="list-style-type: none"> • no change / little change / eq (1) • as the hawks eat more lizards / kangaroo rats /eq (1) 	2

Question Number	Answer	Additional guidance	Mark
2(b)(ii)	<p>A description that makes reference to four of the following points:</p> <ol style="list-style-type: none"> 1. white blood cells (1) 2. lymphocytes (1) 3. (lymphocytes) produce antibodies / antitoxins / eq (1) 4. phagocytes (1) 5. (phagocytes) engulf/ surround / eat bacteria / phagocytosis / eq (1) 	<p>allow white blood cells produce antibodies no mp 3 for phagocytes produce antibodies</p> <p>allow white blood cells engulf no mp 5 for lymphocytes engulf</p>	4

Total = 8 marks

Question Number	Answer	Mark
3(a)(i)	<ul style="list-style-type: none"> absorb carbon dioxide / eq (1) 	1

Question Number	Answer	Mark
3(a)(ii)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> prevent release of carbon dioxide / eq (1) (from respiration) by soil organisms / eq (1) 	2

Question Number	Answer	Additional guidance	Mark
3(b)	<ul style="list-style-type: none"> prevents carbon dioxide entering from outside bell jar / keeps carbon dioxide out /eq (1) 	ignore stops CO ₂ escaping / leaving	1

Question Number	Answer	Additional guidance	Mark
3(c)	<p>A description that makes reference to four of the following points:</p> <ol style="list-style-type: none"> place leaf in boiling water / boil leaf in water / eq(1) place leaf in boiling ethanol / ethanol at 70°C / boil leaf in ethanol /eq (1) using water bath / extinguish Bunsen flame / ethanol is flammable / eq (1) remove chlorophyll / green colour from leaf / colourless leaf / eq (1) add iodine (solution) / eq (1) blue / black colour starch present / eq (1) 	allow purple	4

Question Number	Answer	Mark
3(d)	<p>A description that makes reference to two of the following points:</p> <ol style="list-style-type: none"> 1. same plant / similar plant / same sized / same mass of plant / same species of plant / same age of plant / eq(1) 2. same light / in sun / same conditions / same water/ same temperature / same time / eq (1) 3. no (potassium) hydroxide in bell jar / not in bell jar / outside / with carbon dioxide / eq (1) 	2

Total = 10 marks

Question Number	Answer	Mark
4(a)	<ul style="list-style-type: none"> • W vena cava / superior vena cava / main vein (1) • X aorta (1) • Y pulmonary artery (1) • Z pulmonary vein (1) 	4

Question Number	Answer	Mark
4(b)	<p>An answer that makes reference to:</p> <ul style="list-style-type: none"> • separates / a barrier between / prevents mixing of oxygenated and deoxygenated blood / eq (1) 	1

Question Number	Answer	additional guidance	Mark
4(c)(i)	<p>An answer that includes:</p> <p>Calculation method not marking points</p> <p>$(2.27 - 1.74) = 0.53$</p> <p>$0.53 \div 1.74 \times 100$</p> <p>$= 30.5\%$ (2)</p>	<p>allow 1 mark for 0.53 or 2.27-1.74</p> <p>allow 30.46 or 30.460 30.4598 30.45978 30.459770 30.4597701 30.45977011 for 2 marks</p>	2

Question Number	Answer	additional guidance	Mark
4(c) (ii)	<p>An answer that makes reference to five of the following:</p> <ol style="list-style-type: none"> 1. better to give up completely / eq (1) 2. large study / reliable / repeatable / significant / results / eq (1) 3. no information on age / mass / blood pressure / health / no information on exercise / fitness / eq (1) 4. no information on how long each person smoked for / whether they have smoked in the past / eq (1) 5. increased risk higher in women (for heart disease and stroke) (1) 6. little difference in risk between 1 cigarette and 20 / still a big increased risk with 1 / for heart and stroke / eq (1) 7. greater difference in women than men between 1 and 20 cigarettes (for heart disease and stroke) / eq (1) 8. increased risk higher for heart disease than for stroke (in men and women) / eq (1) 9. smoking one cigarette per day may lead to increased smoking later / eq (1) 10. smoking is addictive / may find it easier to cut down / contains nicotine / better to reduce that do nothing / eq (1) 11. smoking reduces oxygen levels in blood /eq (1) 	<p>It is true.</p> <p>credit manipulated data ie 4 x in women but (only) 2 times in men.</p> <p>greater difference between 0 and 1 (converse)</p> <p>allow converse</p> <p>allow converse</p> <p>allow ref to nicotine patches</p>	5

Total = 12 marks

Question Number	Answer	additional guidance	Mark
5(a)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> parent genotypes Pp x Pp (1) correct gametes for parents P or p and P or p (1) offspring genotypes PP Pp pp (1) phenotypes Purple PP Pp and yellow pp (allow from 3:1 ratio) (1) 	<p>allow other symbols not x and y</p> <p>allow full marks from Punnet square</p> <p>gametes must be clearly shown separated or in circles or in Punnet square</p> <p>allow ecf for wrong parent genotypes gametes and offspring mark for 2 max</p>	4

Question Number	Answer	additional guidance	Mark
5(b)	<p>An answer that includes:</p> <p>Calculation method not marking points</p> <p>total offspring = 1453 + 462 = 1915</p> <p>1915 - 1453 = 462</p> <p>ratio 1453 ÷ 462</p> <p>= 3.145:1 or 3.15:1 or 3.1:1</p>	<p>allow 1 mark for</p> <p>1453 and 462</p>	2

Question Number	Answer	additional guidance	Mark
5(c)	An answer that includes : Calculation method not marking points $1915 \div 4$ $= 478.75$ 3×478.75 $= 1436$ or 1436.25 or 1436.3 or 1436.4 or 1437 (2)	allow 1 mark for 478.75 or 478.8 or 479 Or x 3	2

Question Number	Answer	additional guidance	Mark
5(d)	An explanation that includes the following: <ul style="list-style-type: none"> • fertilisation / which gametes fuse / eq (1) • random /due to / by chance / to chance / not exact ratio / probability / every time /eq (1) 	random fertilisation = 2 marks	2

Total = 10 marks

Question Number	Answer	Mark
6(a)	<p>A description that makes reference to four of the following points:</p> <ol style="list-style-type: none"> 1. restriction enzyme used to cut selected gene / DNA / eq (1) 2. (same) restriction enzyme used to cut plasmid / eq (1) 3. producing sticky ends / complementary bases /eq (1) 4. ligase enzyme used to join DNA / genes / put DNA / genes into plasmid /eq (1) 5. plasmid inserted into bacterium / taken up by plant cell / eq (1) 6. ref to plasmid from <i>Agrobacterium</i> / gene gun / eq (1) 	4

Question Number	Answer	additional guidance	Mark
6(b)(i)	<p>An answer that makes reference to the following :</p> <ul style="list-style-type: none"> • containing gene / DNA from other species / from two species / from a different species / foreign genes / foreign DNA / eq (1) 	Not just another organism	1

Question Number	Answer	additional guidance	Mark
6(b)(ii)	<p>Increased yield / size / mass / frost resistant / drought resistant / pesticide resistant / herbicide resistant / insect resistant / pest resistant / taste/ nutrition / disease resistant / improved shelf life / eq (1)</p>	allow other suitable examples eg golden rice	1

Total = 6 marks

Question Number	Answer	additional guidance	Mark
7	<p>An answer that makes reference to six of the following points</p> <ul style="list-style-type: none"> • C change exercise / different levels of exercise or activity to change heart rate / breathing rate / eq (1) • O use same person / same age / same sex/ fitness / eq (1) • R repeat with different people / repeat with same person / eq (1) • M1 measure heart rate / count beats per minute / use heart monitor / eq (1) • M2 measure breathing rate / count breaths per minute / use breathing rate monitor / eq (1) • S1 for / in same / stated duration / amount / laps / period of exercise / eq (1) • S2 control temperature / oxygen availability / type of exercise / eq (1) 	<p>not just change breathing rate need to explain how</p>	6

Total 6 = marks

