Mark Scheme (Results)

Summer 2017

Pearson Edexcel GCSE

In Biology (5BI2F) Paper 01

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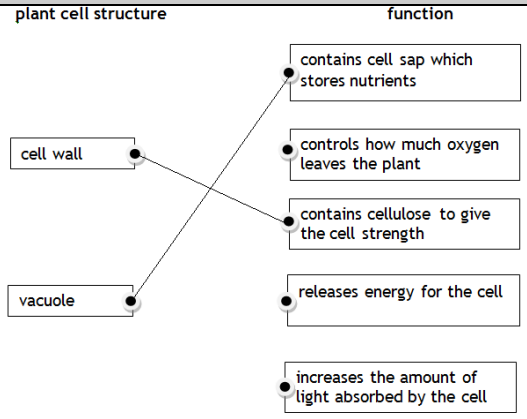
General Marking Guidance

- 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	Acceptable answers	Marks
1 (a) (i)	A description linking two of the following: • photosynthesis (1) • carbon dioxide (absorbed) (1) • (using) water (1) • (sun)<u>light</u> (absorbed) (1) • by chlorophyll/chloroplasts (1)	Ignore energy/Sun Accept equation for 2 marks	(2)

Question number	Answer	Marks
1 (a) (ii)	**B** from an area of high concentration to an area of low concentration **The only correct answer is B** ***A*** *is not correct because glucose does not diffuse from a low to a high concentration. This is active transport.* ***C*** *is not correct because glucose does not diffuse using energy. Only active transport uses energy.* ***D*** *is not correct because energy is not needed and transpiration is the evaporation of water.*	(1)

Question number	Answer	Marks
1 (a) (iii)	**A** water from the roots to the leaves **The only correct answer is A** ***B** is not correct because this is the wrong direction. Water is transported from roots to leaves.* ***C** is not correct because do not transport sugars.* ***D** is not correct because do not transport sugars. This is the role of phloem.*	(1)

Question number	Answer		Marks
1 (b)		**Reject more than one line from each plant cell structure**	(2)

Question number	Answer	Marks
1 (c)	Two from: • (bubbles) increase (to 25ºC) (1) • peaks at 25ºC/until 26 bubbles (1) • then decrease (after 25 ºC) (1)	(2)

Total for question 1 = 8 marks

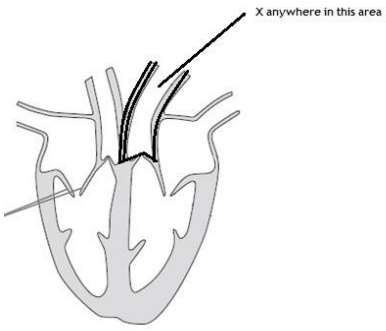
Question number	Answer	Acceptable answers	Marks
2 (a) (i)	• 70 **and** 60 (1) • 10 (kg)	Correct final answer for 2 marks	(2)

Question number	Answer	Marks
2 (a) (ii)	• add masses (of each male) together (1) • divide by the number of (19-year-old) males (1)	(2)

Question number	Answer	Acceptable answers	Marks
2 (b)	• glucose (1) • carbon dioxide (1)	**In this order only**	(2)

Question number	Answer	Acceptable answers	Marks
2 (c)	An explanation including two of the following: • asexual reproduction(1); • to produce (genetically) identical cells (1); • by mitosis (1);	Allow same genes/DNA / chromosomes	(2)

Total for question 2 = 8 marks

Question number	Answer	Acceptable answers	Marks
3 (a) (i)	A line to anywhere on the aorta.  	Allow line labelled 'aorta'	(1)

Question number	Answer	Marks
3 (a) (ii)	**C** blood to all parts of the body **The only correct answer is C** ***A** is not correct because the blood in the left ventricle contains less carbon dioxide.* ***B** is not correct because the speed at which the heart pumps blood bears no relation to thickness.* ***D** is not correct because the left side of the heart pumps blood a further distance i.e. to the body.*	(1)

Question number	Answer	Acceptable answers	Marks
3 (a) (iii)	An explanation including two of the following: • valve (1) • opens/closes (1) • stops backflow of blood /so blood flows in one direction only(1);	accept so blood can only go into the (pulmonary) artery/to lungs	(2)

Question number	Answer	Acceptable answers	Marks
3 (b) (i)	10:1/10 to 1	accept 20:2/20 to 2 Allow 1 white to 10 red / 10 red to 1 white Reject 1:10 or 2:20	(1)

Question number	Answer	Marks
3 (b) (ii)	**D** are involved in blood clotting **The only correct answer is D** ***A** is not correct because the plasma transports glucose, not platelets.* ***B** is not correct because platelets do not transport carbon dioxide. This is the role of the plasma.* ***C** is not correct because do not have a nucleus – they are fragments of cells.*	(1)

Question number	Answer	Acceptable answers	Marks
3 (b) (iii)	• the patient has an infection • white blood cells defend the body against disease/pathogens (1)	Allow the patient is ill/sick Allow named infectious disease Allow immune response	(2)

Question number	Answer	Acceptable answers	Marks
3 (b) (iv)	An explanation linking two points from the following • contain haemoglobin(1) • which combines with oxygen(1) OR • no nucleus (1) • so (more) haemoglobin can be carried(1) OR • biconcave (shape)(1) • large surface area(1)	Accept forms oxyhaemoglobin for 2 marks Allow more room to carry oxygen	(2)

Total for question 3 = 10 marks

Question number	Answer	Acceptable answers	Marks
4 (a) (i)	23 and 23 (in egg and sperm cell) (1); 46 and 46 (in cells of embryo)(1);	In this order only	(2)

Question number	Answer	Acceptable answers	Marks
4 (a) (ii)	• meiosis (1); • haploid (1);	In this order only	(2)

Question number	Answer	Acceptable answers	Marks
4 (b) (i)	• nucleus (1); • allows substances to enter and exit the cell (1);	Reject nucleolus	(2)

Question number	Answer	Acceptable answers	Marks
4 (b) (ii)	35 ÷ 5000 (1) 0.007/7 x 10^{-3} (mm)	Allow 7/1000 full marks for correct final answer	(2)

Question number	Answer	Acceptable answers	Marks
4 (b) (iii)	A description including any two from • adenine pairs with thymine/A pairs with T(1) • guanine pairs with cytosine / C pairs with G (1) • hydrogen bonds between base pairs (1)	Allow A-T Allow C-G	(2)

Question number	Answer	Marks
4 (c)	**B** undifferentiated cells **The only correct answer is B** ***A** is not correct because stem cells from embryos are not differentiated.* ***C** is not correct because stem cells are not specialised cells.* ***D** is not correct because stem cells are non-specialised and therefore not sex cells.*	(1)

Total for question 4 = 11 marks

Question number	Answer	Marks
5 (a)	**B** statement 2 only **The only correct answer is B** ***A** is not correct because the amount of wheat harvest does not increase every year. There are clearly years where the harvest decreases.* ***C** is not correct because statement 1 is incorrect for reasons given above.* ***D** is not correct because statement 2 is correct (100 tonnes of wheat was harvested) and statement 1 is incorrect for reasons given above.*	(1)

Question number	Answer	Acceptable answers	Marks
5 (b)	A description linking two of the following: • (water absorbed by) root hair cells (1) • by osmosis (1) • from low solute concentration to high solute concentration (1)	accept roots Accept from high (water) concentration to low (water) concentration.	(2)

Question number	Answer	Acceptable answers	Marks
5 (c)	Any two from: • produce toxins/pesticide (1) • herbicide resistance (1) • increase vitamin A/beta carotene content (1)	Allow other valid reasons for genetically modifying plants e.g. drought resistance	(2)

Question Number		Indicative Content	Mark
QWC	***5d**	A description to include some of the following points **method** • count number of plants • in a small area/1m^2 • reference to quadrat • (place quadrat) randomly • (place quadrat) several times **calculation** • add total number of plants in all quadrats • reference to a mean/calculate an average • multiply mean by 100/area of field	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited description which includes at least one piece of indicative content • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• A simple description which includes at least one piece of indicative content from the method and the calculation OR a detailed description of a method OR calculation • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• A detailed description that includes both the method including details of repeats and the calculation including reference to a mean/average. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for question 5 = 11 marks

Question number	Answer	Marks
6 (a) (i)	**A** **The only correct answer is A** ***B** is not correct because no digestion takes place in the oesophagus.* ***C** is not correct because amylase would denature in the low pH found in the stomach.* ***D** is not correct because this is the last place where carbohydrates are digested, not the first place as the question suggests.*	(1)

Question number	Answer	Marks
6 (a) (ii)	maltose/glucose/sugar	(1)

Question number	Answer	Acceptable answers	Marks
6 (b)	A description including two of the following: • food/named food molecule broken down/ digested (1); • by enzymes/named enzyme (1); • (nutrients) absorbed/diffuse (1); • through villi/into blood (1);	Allow nutrients for food Accept moves / pushes food along / peristalsis	(2)

Question Number		Indicative Content	Mark
QWC	***6c(i)**	An explanation linking some of the following points • food stains can be fats or proteins • (enzymes are) biological catalysts • enzymes break down fats and proteins • references to complementary shapes • reference to lock and key hypothesis /active site of enzyme • clothes washed at lower temperatures/energy saving **Lipase** • lipase breaks down fats • into fatty acids/glycerol **Protease** • protease breaks down proteins • into amino acids	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited explanation that includes at least one piece of indicative content • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• A simple explanation of the action of lipase **or** protease enzymes OR a detailed explanation of enzyme action. • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• A detailed explanation of the action of enzymes AND includes the products of lipase OR protease digestion. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Question number	Answer	Acceptable answers	Marks
6 (c) (ii)	A suggestion including two of the following: • enzymes have an optimum temperature(1) • denature at high temperatures (1) • less stains broken down / removed/clothes not cleaned (1);	Accept stated temperatures between 35-40 ºC / body temperature Accept change in shape of enzyme/active site	(2)

Total for question 6 = 12 marks

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