

# Markscheme

November 2017

Biology

Standard level

Paper 2

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**Section A**

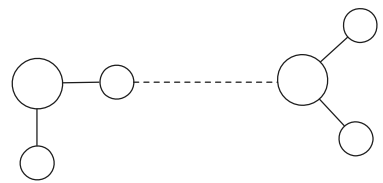
Question		Answers	Notes	Total
1.	a	severe ✓		1
1.	b	a. low FEV indicates inability to force out air/adequate volume of air ✓ b. airflow limitation is the reason for inability to force out air/shortness of breath ✓ c. inability to force out air/shortness of breath indicates emphysema ✓ d. emphysema causes/involves breakdown of alveoli walls «so less elastin» ✓	OWTTE  <i>The idea that there are fewer alveoli to “push”</i>	2 max
1.	c	no disease ✓		1
1.	d	a. plasma desmosines ✓ b. neither is very good due to large overlaps of ranges <b>OR</b> the range of data for each category is less for plasma desmosines <b>OR</b> data are more reliable ✓ c. the level of plasma desmosines increases with disease severity ✓ d. easier/less invasive to take urine sample rather than a plasma sample ✓	OWTTE	2 max
1.	e	a. degradation of elastin from other tissues may have contributed to the results b. there is no guarantee that the concentrations of desmosines measured came from the lungs ✓ <b>OR</b> difficult to assess how much lung elastin constitutes the total ✓ c. overlapping ranges makes interpretation difficult ✓		2 max

(continued...)

(Question 1 continued)

Question		Answers	Notes	Total
1.	f	<p>inversely correlated  <b>OR</b>                      negative correlation  <b>OR</b>                      the higher the «urine» desmosine concentration, the lower the diffusion «rate» ✓</p>		1
1.	g	<p>a. «small» sample size  <b>OR</b>                      only studied in one country ✓</p> <p>b. methods used ✓</p> <p>c. environment/pollution/workplace exposure ✓</p> <p>d. race/genetic factors ✓</p> <p>e. health status/fitness/BMI of volunteers ✓</p>		2 max
1.	h	<p>a. positive correlation with COPD severity «as seen in the table»  <b>OR</b>                      negative correlation with «CO» diffusion capacity «as seen in the graph» ✓</p> <p>b. not directly proportional/other factors affect it ✓</p> <p>c. «but» if other factors stay the same in a patient it could be an effective indicator of change ✓</p> <p>d. because the ranges are high, only change in an individual is useful ✓</p> <p>e. the measurements may be more useful for one gender than the other as differences seen in the graph ✓</p>		3 max

Question		Answers	Notes	Total
2.	a	electron microscope has greater resolution/magnification <b>OR</b> 70 nm is too small/viruses are too small to be viewed by a light microscope ✓		1
2.	b	a. viruses are not living ✓ b. viruses lack metabolism/lack enzymes «for metabolism»/lack cell walls ✓ c. antibiotics target metabolic «pathways»/cell wall production ✓		2 max
2.	c	transfer/vector of genetic material/genes/DNA fragments <b>OR</b> to produce insulin/useful protein ✓		1

Question		Answers	Notes	Total
3.	a	<p>a. similar water molecule drawn with oxygen on one molecule facing hydrogen on the other water molecule ✓</p> <p>b. one hydrogen bond drawn as a dotted/dashed line between the two water molecules and labelled ✓</p>	<p><i>O and H do not have to be labelled but must be positioned correctly</i></p> <p>eg:</p>  <p><i>Can get this mark even if atoms incorrect</i></p>	2
3.	b	<p>a. water molecule is polar <b>OR</b> water has «weak» positive and negative charges ✓</p> <p>b. substances that dissolve in water are hydrophilic ✓</p> <p>c. water forms hydrogen bonds with <u>polar</u> substances ✓</p> <p>d. positive/hydrogen side/pole of water attracted to negative <u>ions</u> <b>OR</b> negative/oxygen side/pole attracted to positive <u>ions</u> ✓</p> <p>e. glucose/other example dissolves because it is polar <b>OR</b> sodium chloride/other example dissolves because ions are attracted to water ✓</p>		3 max

Question			Answers	Notes	Total
4.	a	i	Filicinophyta/Filicinophytes/Pteridophytes ✓	<i>Reject "ferns"</i>	1
		ii	a. have roots, stem and leaves ✓ b. pinnate leaves/leaves divided «repeatedly» into leaflets ✓ c. have vascular tissue/xylem and phloem ✓ d. produce spores/sporangia <b>OR</b> no flowers/fruits/seeds ✓	<i>All three, roots, stem and leaves required</i>	2 max
4.	b		energy losses between trophic levels <b>OR</b> only part of the energy in one trophic level will become part of the next trophic level ✓		1

Question		Answers	Notes	Total
5.	a	<p>a. disaccharide name ✓</p> <p>b. both monomers that make up mpa ✓</p>	<p>eg: lactose glucose and galactose</p> <p>eg: maltose glucose and glucose</p> <p>eg: sucrose glucose and fructose</p>	2
5.	b	<p>a. amylase breaks down/catalyzes/hydrolyses starch to maltose ✓</p> <p>b. lipase breaks down/catalyzes/hydrolyses fats to fatty acids and glycerol ✓</p> <p>c. proteases/peptidases break down/catalyze/hydrolyze proteins into smaller polypeptides/dipeptides/amino acids ✓</p>	<p>Award [2] if all three enzymes and substrates named correctly and one further mark for all three products named correctly</p> <p>Allow specific enzymes</p>	3
5.	c	<p>a. both are <u>unsaturated</u> fatty acids <b>OR</b> both have two carbon atoms joined by a double bond ✓</p> <p>b. in cis-fatty acids the two H atoms are on the same side while in trans-fatty acids they are on opposite sides <b>OR</b> cis-fatty acids are healthier than trans-fatty acids <b>OR</b> cis-fatty acids have a lower boiling/melting point than trans <b>OR</b> cis-fatty acids have a kink «in the chain» but trans do not ✓</p>	<p>Accept answer in an annotated diagram</p>	2



**Section B**

**Clarity of communication: [1]**

The candidate's answers are clear enough to be understood without re-reading. The candidate has answered the question succinctly with little or no repetition or irrelevant material.

Question		Answers	Notes	Total
6.	a	<p>a. mitochondria and chloroplasts are similar to prokaryotes ✓</p> <p>b. «host» cell took in another cell by endocytosis/by engulfing «in a vesicle» ✓</p> <p>c. but did not digest the cell/kept the «ingested» cell alive <b>OR</b> symbiotic/mutualistic relationship «between engulfed and host cell» ✓</p> <p>d. chloroplasts and mitochondria were once independent/free-living «organisms» ✓</p> <p>e. DNA «loop» in chloroplast/mitochondrion ✓</p> <p>f. division/binary fission of chloroplast/mitochondrion ✓</p> <p>g. double membrane around chloroplast/mitochondrion ✓</p> <p>h. 70s ribosomes «in chloroplast/mitochondrion» ✓</p>	<p><i>Allow “taking in” in place of “engulfing”</i></p> <p><i>Award up to [2] for evidence from mpe to mph</i></p>	4 max

(continued...)

(Question 6 continued)

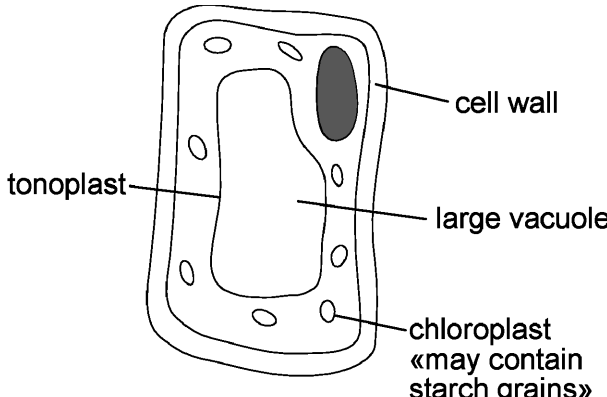
Question		Answers	Notes	Total
6.	b	a. FSH stimulates the development of follicles ✓ b. follicles produce estrogen ✓ c. estrogen stimulates the repair of the uterus lining ✓ d. estrogen stimulates LH secretion ✓ e. LH causes/stimulates ovulation ✓ f. LH causes/stimulates the development of the corpus luteum ✓ g. corpus luteum secretes progesterone ✓ h. progesterone causes/stimulates thickening of the uterus lining <b>OR</b> prepares uterine lining for implantation <b>OR</b> maintains the endometrium ✓ i. progesterone/estrogen inhibits the secretion of LH/FSH ✓ j. falling progesterone levels at the end of the cycle allow FSH production/menstruation ✓ k. negative/positive feedback «control» described correctly ✓ l. LH/FSH are pituitary hormones ✓		8 max

(continued...)

(Question 6 continued)

Question		Answers	Notes	Total
6.	c	a. clones are genetically identical organisms <b>OR</b> group of cells derived from a single parent cell ✓ b. asexual reproduction in plants such as tubers/runners/bulbs ✓ c. common in non-vertebrates such as budding in hydra ✓ d. budding in yeast/fungi ✓ e. identical twins «in humans» are clones because they originate from the same cell ✓	Allow other verifiable examples of plants Allow other verifiable examples of invertebrates Allow other verifiable examples of fungi	3 max

(Plus up to [1] for quality)

Question		Answers	Notes	Total
7.	a	<p>a. cell wall ✓</p> <p>b. large vacuole ✓</p> <p>c. chloroplast/plastid ✓</p> <p>d. starch grain ✓</p> <p>e. tonoplast ✓</p>	<p><i>Allow [2 max] if any features common to both plant cells and animal cells are labelled</i></p>  <p><i>Must be shown as a double line</i></p> <p><i>Labelled either inside or on the membrane</i></p>	3 max

(continued...)

(Question 7 continued)

Question		Answers	Notes	Total
7.	b	<ul style="list-style-type: none"> <li>a. <u>autotrophs</u> perform photosynthesis ✓</li> <li>b. carbon dioxide and water are the reactants/raw materials required for «photosynthesis» ✓</li> <li>c. light splits water molecules/causes photolysis ✓</li> <li>d. «photolysis» releases oxygen as a «waste» product ✓</li> <li>e. light energy is converted into chemical energy ✓</li> <li>f. «photosynthesis» produces organic compounds/glucose/carbohydrates ✓</li> <li>g. photosynthesis occurs in chloroplasts ✓</li> <li>h. chlorophyll «photosynthetic pigment» absorbs light ✓</li> <li>i. different pigments absorb different wavelengths «of light» ✓</li> <li>j. chlorophyll absorbs red and blue light/ends of the spectrum ✓</li> <li>k. carbon dioxide concentration/temperature/light intensity are limiting factors ✓</li> </ul>	<p><i>Award only [1] for correct display of equation unless further annotated or explained</i></p> <p><i>Allow up to [2] for correct use of understandings specified as AHL topic 8</i></p>	<b>8 max</b>
7.	c	<ul style="list-style-type: none"> <li>a. formed from dead plant material/leaves/mosses/<i>Sphagnum</i> ✓</li> <li>b. formed in waterlogged sites/bogs/mires/swamps ✓</li> <li>c. where bacteria/fungi/saprotrophs are not active/are inhibited ✓</li> <li>d. organic matter not fully decomposed ✓</li> <li>e. «occurs» in acidic conditions ✓</li> <li>f. «occurs» in anaerobic conditions ✓</li> <li>g. «very» slow process/takes a long time ✓</li> </ul>	<p><i>Reject anaerobic respiration</i></p>	<b>4 max</b>

(Plus up to [1] for quality)