

**Biology Unit 1 (Modular)
Mark Scheme**

Question Number	Answer	Mark
1	<ul style="list-style-type: none"> • hyphae (1) • chitin (1) • enzymes (1) • saprotrophic / saprophytic (1) 	4

Question Number	Answer	Mark
2(a)(i)	<p>An answer that makes reference to two of the following:</p> <ul style="list-style-type: none"> • (require) nutrition / food / eq (1) • respire /eq (1) • excrete (waste) /eq (1) • respond to surroundings / sensitivity / eq (1) • move /eq (1) • control their internal conditions / homeostasis /eq (1) • reproduce /eq (1) • grow / develop /eq (1) 	2

Question Number	Answer	Mark
2(a)(ii)	<p>The only correct answer is D <i>Pneumococcus</i></p> <p><i>A is not the answer as Amoeba does not cause bacterial disease in humans</i></p> <p><i>B is not the answer as Lactobacillus bulgaricus does not cause bacterial disease in humans</i></p> <p><i>C is not the answer as Mucor does not cause bacterial disease in humans</i></p>	1

Question Number	Answer	Additional guidance	Mark
2(b)	<p>An answer that makes reference to three of the following:</p> <p>Virus</p> <ul style="list-style-type: none"> • smaller / eq (1) • protein coat (1) • no cell wall (1) • no cell membrane / eq (1) • no cytoplasm / organelles / ribosomes / no vacuole / eq (1) • no plasmids (1) • no flagella (1) 	<p>Mark first 3 answers allow converse</p> <p>ignore nucleus mitochondria Golgi</p> <p>ignore chloroplasts loop or circles of DNA</p>	3

Question Number	Answer	Mark														
3(a)	<table border="1"> <thead> <tr> <th>Component</th> <th>Function of Component</th> </tr> </thead> <tbody> <tr> <td>vitamin A</td> <td>Vision/sight/sight in dim light/immune system/disease resistance/skin</td> </tr> <tr> <td>vitamin C</td> <td>Skin/tissue/connective tissue/prevent scurvy/wound healing/ immune system / disease resistance</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>vitamin D</td> <td>(bone growth)</td> </tr> <tr> <td>iron</td> <td>Haemoglobin/red blood cells</td> </tr> <tr> <td>dietary Fibre</td> <td>Peristalsis/food movement/reduce risk of bowel cancer/ reduce constipation</td> </tr> </tbody> </table>	Component	Function of Component	vitamin A	Vision/sight/sight in dim light/immune system/disease resistance/skin	vitamin C	Skin/tissue/connective tissue/prevent scurvy/wound healing/ immune system / disease resistance			vitamin D	(bone growth)	iron	Haemoglobin/red blood cells	dietary Fibre	Peristalsis/food movement/reduce risk of bowel cancer/ reduce constipation	4
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Question Number	Answer	Mark
3(b)	Nitrogen/N	1

Question Number	Answer	Additional guidance	Mark
4(a)(i)	0.57 (3)	<p>0.57 gains all three marks</p> <p>Accept 0.90 for two marks</p> <p>OR</p> <p>Accept 0.56 or 0.56(66666....7) or 0.56 recurring for two marks</p> <p>Accept 0.9 or 0.8975 or 1.7 or $\div 3$ for one mark</p> <p><i>Example calculation (not mark points):</i> $(0.55 + 0.54 + 0.61) = 1.7$ $\div 3$</p> <p><i>to two dp</i></p> <p>Correct answer with no working gains all three marks.</p>	3

Question Number	Answer	Additional guidance	Mark
4(a)(ii)	<ul style="list-style-type: none"> amino acids / peptides (1) 	Accept polypeptide	1

Question Number	Answer	Additional guidance	Mark
4(b)(i)	<p>An answer that makes reference to two of the following.</p> <ul style="list-style-type: none"> temperature (1) height / volume / mass / concentration of gelatine / protein/ eq (1) volume / concentration, of, enzyme / bromelain / pineapple juice / eq (1) volume of buffer (1) time (in incubator) (1) surface area of gelatine / SA:vol ratio / width of tube (1) 	<p>Ignore amount</p> <p>Accept gel for gelatine</p> <p>Ignore type / source of protein Ignore type / source of juice</p>	2

Question Number	Answer	Additional guidance	Mark
4(b)(ii)	<p>An explanation that makes reference to three of the following.</p> <ul style="list-style-type: none"> • volume digested increases up to (pH) 5 then decreases (above 5) / volume digested decreases above and below 5 / eq (1) • <u>optimal pH</u> / <u>optimum pH</u> (1) • (away from optimal pH / 5) enzyme denatures / (active site) shape changes / eq (1) • substrate no longer binds / fits / shape not complementary to substrate (1) 	<p>Accept rate increases up to 5 then decreases</p> <p>Accept denatures at high pH / low pH</p> <p>Accept E/S complexes do not form</p>	3

Question Number	Answer	Mark
5(a)(i)	<p>The only correct answer is B</p> <p><i>A is not correct as it does not produce hydrochloric acid</i></p> <p><i>C is not correct as it does not produce hydrochloric acid</i></p> <p><i>D is not correct as it does not produce hydrochloric acid</i></p>	1

Question Number	Answer	Mark
5(a)(ii)	<p>The only correct answer is D</p> <p><i>A is not correct as it does not store faeces</i></p> <p><i>B is not correct as it does not store faeces</i></p> <p><i>C is not correct as it does not store faeces</i></p>	1

Question Number	Answer	Mark
5(a)(iii)	<p>The only correct answer is C</p> <p><i>A is not correct as it is not the small intestine</i></p> <p><i>B is not correct as it is not the small intestine</i></p> <p><i>D is not correct as it is not the small intestine</i></p>	1

Question Number	Answer	Mark
5(b)	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • neutralises acid / eq (1) • optimal pH for enzymes / lipase eq (1) • emulsifies lipid / eq (1) • breaks down (large droplets) into small droplets / eq (1) • increases surface area for enzyme action / eq (1) 	3

Question Number	Answer	Mark
6(a)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • waxy cuticle to prevent evaporation of water / eq (1) • air spaces / spongy cells / gaps/eq (1) • to allow diffusion of CO₂ / eq (1) • stomata (1) • allow entry of CO₂ / exit of O₂ / eq (1) • moist to allow gases to dissolve/ eq (1) 	4

Question Number	Answer	Additional Guidance	Mark
6(b)	<p>An answer that makes reference to six of the following:</p> <ul style="list-style-type: none"> • C – (plant ivy in) shaded and unshaded area / different exposure to light / eq (1) • O – same species / type / age / starting size of leaf / same plant / eq (1) • R – repeat with multiple leaves / repeat / eq (1) • M1 – measure length / width / height / surface area / eq (of leaves) (1) • M2 – grow ivy for same stated time (1) • S1 - temperature / pests / humidity / plant density / carbon dioxide / weather / time of year / wind / eq (1) • S2 – same water / minerals / soil / nutrients / fertiliser / pH / eq (1) 	<p>Allow different light intensities / distances of lamp</p> <p>Allow groups</p> <p>Ignore size of leaves Allow measure size with a ruler / in mm / eq Allow volume</p> <p>Minimum time of one day</p>	6

Question Number	Answer	Additional guidance	Mark
7(a)(i)	5.5 – 4.2 $((5.5 - 4.2) / 5.5) \times 100 = 24\%$	Full marks for correct answer Accept 23.6%	2

Question Number	Answer	Additional guidance	Mark
7(a)(ii)	An explanation that makes reference to two of the following points: <ul style="list-style-type: none"> • median used as each age has wide / high range (1) • not (influenced by) affected by extreme values / less affected by anomalies / eq (1) • data is skewed /eq (1) 	Allow converse for mean	2

Question Number	Answer	Mark
7(a)(iii)	An explanation that makes reference to two of the following: <ul style="list-style-type: none"> • (increases) (up to 20 years) as body / size / mass / chest cavity / lungs / muscle increases / grows / develops / eq (1) • no / little change (from 20) no further growth / stop growing / eq (1) • (decreases) (from 25 years) as <u>diaphragm</u> / <u>intercostal</u> muscle weaker / lungs less elastic / less recoil / eq (1) 	2

Question Number	Answer	Additional guidance	Mark
7(a)(iv)	An answer that makes reference to two of the following: <ul style="list-style-type: none"> • smoking (1) • lung disease / infection / condition / asthma/ bronchitis / emphysema / eq (1) • fitness / how active you are / eq (1) • body size/ height / mass / genetics /eq (1) • sex /eq (1) • altitude at which you live / eq (1) • pregnancy (1) • pollution / eq(1) 	ignore illness / health	2

Question Number	Answer	Additional guidance	Mark
7(b)	<p>A description that makes reference to three of the following:</p> <ul style="list-style-type: none"> count number of breaths per minute / number of breaths in stated time (at rest) / eq (1) breathing rate count per minute / number of breaths in stated time <u>after / during exercise</u> /eq (1) repeat / using more participants /use group/ eq (1) control age / sex / fitness of subjects / amount / period of exercise / eq (1) 	<p>allow use spirometer at rest for mp 1 – use spirometer after exercise for mp 2</p> <p>allow running increasing distances or durations of exercise for mp 1 and mp 2</p> <p>if measure heart rate can score mp 3 and 4 only</p>	3

Question Number	Answer	Mark
8(a)(i)	<p>The only correct answer is B M is the cell wall.</p> <p><i>A is not the answer as M is not the cell membrane</i></p> <p><i>C is not the answer as M is not the nucleus</i></p> <p><i>D is not the answer as M is not the vacuole</i></p>	1

Question Number	Answer	Mark
8(a)(ii)	<p>The only correct answer is C N is the cytoplasm.</p> <p><i>A is not the answer as N is not the cell membrane</i></p> <p><i>B is not the answer as N is not the cell wall</i></p> <p><i>D is not the answer as N is not the vacuole</i></p>	1

Question Number	Answer	Mark
8(b)(i)	<ul style="list-style-type: none"> sodium chloride (solution) / salt solution / bathing solution / eq (1) 	1

Question Number	Answer	Additional guidance	Mark
8(b)(ii)	<p>An explanation that makes reference to four of the following</p> <p>in distilled water</p> <ul style="list-style-type: none"> water enters cell / eq(1) by osmosis (1) from dilute solution to more concentrated solution / from high(er) water potential to low(er) water potential / water / outside has a higher water potential / eq (1) cytoplasm pushed against cell membrane/ cell wall / eq (1) cell is turgid / (1) 	<p>allow converse for cell in salt solution</p> <p>water exits</p> <p>allow as salt soln / outside has lower water potential</p> <p>allow <u>high conc of water to low conc of water</u></p> <p>cytoplasm /cell membrane shrinks away</p> <p>cell plasmolysed / flaccid</p>	4

Question Number	Answer	Additional guidance	Mark
8(c)	<p>A description that makes reference to four of the following:</p> <ul style="list-style-type: none"> • (immerse) onion epidermis /rhubarb epidermis /named suitable plant tissues / leaf epidermis / eq (1) • same volume of solutions / stated volume of solutions /eq (1) • <u>at least two</u> different concentrations of salt solution / eq (1) • leave cells for stated time / same time / eq (1) • (observe / draw / photograph under) <u>microscope</u> / eq (1) 	<p>allow 'layer of onion' 'onion skin cells' 'rhubarb stem' <i>Cladophora</i> / / toadflax /eq</p> <p>not just leaf</p> <p>not just water and salt solution</p> <p>if describe potato discs expt can score mp 2 3 4 so 3 max</p>	4

Question Number	Answer	Additional guidance	Mark
9(a)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • S scales linear and at least half axis (1) • A1 Axes 'correct way round' (1) • L lines straight and joining each point (1) • A2 labelled 'year' and 'percentage of students' (1) • P points accurately plotted (1) • K key or lines labelled for cigarettes and vaping (1) 	<p>bar chart lose L only</p> <p>Do not allow L if extrapolated</p> <p>Points plotted within one small square</p>	6

Question Number	Answer	Mark
9(b)	<p>A description that makes reference to two from the following points:</p> <ul style="list-style-type: none"> e-cigarette use increased (from 2011) up to 2015 then decreased / decreased in 2016 (1) smoking normal cigarettes decreases (from 2011 to 2016) (1) at start e-cigarettes lower than smoking / significantly low / at end e-cigarette use higher than smoking / significantly high (1) 	2

Question Number	Answer	Additional guidance	Mark
9(c)	<ul style="list-style-type: none"> $15.8 - 8 = 7.8$ $7.8 \div 100 \times 60\,000 = 4680$ (2) <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> $15.8 / 100 \times 60\,000 = 9480$ $8.0 / 100 \times 60\,000 = 4800$ $9480 - 4800 =$ 4680 (2) 	<p>Allow 1 mark for 7.8 or 0.078</p> <p>Award full marks for correct numerical answer without working</p>	2

Question Number	Answer	Additional guidance	Mark
9(d)(i)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> less tar (1) fewer carcinogens / less risk of cancer (1) less risk of emphysema / lung disease / damage to alveoli / chronic bronchitis / damage to cilia / eq (1) less carbon monoxide (1) less risk of heart disease / strokes (1) less risk of addiction / can control nicotine levels (1) 	<p>Allow converse for normal cigarettes for all MPs</p>	4

Question Number	Answer	Mark
9(d)(ii)	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • non-smokers may start using e-cigarettes (1) • e-cigarettes may lead to taking up smoking (1) • e-cigarettes are addictive as they contain nicotine (1) • nicotine can increase risk of blood clots / increase blood pressure (1) • e-cigarettes may also be harmful / damage lungs / risks not yet known (1) 	2

Question Number	Answer	Mark
10 (a)(i)	<p>The only correct answer is D (protocists)</p> <p><i>A is incorrect as the animals do not have chloroplasts</i></p> <p><i>B is incorrect as bacteria do not have nuclei</i></p> <p><i>C is incorrect as plants are multicellular</i></p>	1

Question Number	Answer	Mark
10 (a)(ii)	<p>The only correct answer is B (cell membrane and mitochondrion)</p> <p><i>A is incorrect as animal cells do not have chloroplasts</i></p> <p><i>C is incorrect as animal cells do not have chloroplasts</i></p> <p><i>D is incorrect as animal cells do not have cell walls</i></p>	1

Question Number	Answer	Additional guidance	Mark
10 (b)(i)	<p>An explanation that makes reference to two of the following.</p> <ul style="list-style-type: none"> • low / less / no light (1) • photosynthesis is slower than respiration / photosynthesis is less than respiration / respiration is faster than photosynthesis / eq (1) • more oxygen taken in than released / more oxygen used than produced / there is a <u>net</u> movement of oxygen in / eq (1) 	<p>Accept dark</p> <p>Accept no photosynthesis but respiration occurs</p> <p>Ignore respiration gets faster</p> <p>Accept less oxygen released than taken in</p>	2

Question Number	Answer	Additional guidance	Mark
10 (b)(ii)	<p>An explanation that makes reference to three of the following.</p> <ul style="list-style-type: none"> • at 10 (au) respiration (rate) and photosynthesis (rate) are equal / at the compensation point respiration and photosynthesis are equal (1) • rate of photosynthesis increases (as light intensity increases) (1) • photosynthesis rate is greater than respiration rate (1) • levels off / eq, because another factor / temperature / carbon dioxide is limiting (1) 	<p>Accept converse</p> <p>Accept levels off as light is no longer limiting Accept at (value between 45 (a.u.) and 55(a.u.) / 40 mm³) another factor / temperature / carbon dioxide is limiting)</p>	3

Question Number	Answer	Additional guidance	Mark
10(b)(iii)	two marks for 48 (2)	one mark for correct reading of 38 (1) OR one mark for +10 (1)	2

Question Number	Answer	Additional guidance	Mark
10(c)	<p>A description that makes reference to three of the following:</p> <ul style="list-style-type: none"> • move lamp different distances / eq (1) • place same mass / number / volume / concentration <i>Chlorella</i> / algae, in (hydrogen-carbonate indicator) (1) • same volume / concentration of indicator / same temperature / leave for same or stated time / same starting colour of indicator / use a control tube (with no <i>Chlorella</i>) (1) • (indicator turns) yellow with low light / covered tube / and red / purple with high light / uncovered tube (1) 	<p>Accept other correct methods e.g. cover with cloths / foil / change bulb power / use of variable resistor Ignore place in dark and light unqualified</p> <p>Ignore amount</p> <p>Accept place bung in / seal tubes</p> <p>Accept yellow with increase in carbon dioxide / and red / purple with decrease of carbon dioxide Accept correct references to photosynthesis and respiration</p>	3

