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# INTERNATIONAL AS **BIOLOGY** **BL02 (9610)**

Unit 2 Biological Systems and Disease

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Mark scheme

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2 2 1 X B L 0 2 / M S

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Question	Marking guidance	Mark	Comments
01.1	(Salivary) Amylase;	1	Reject pancreatic amylase

Question	Marking guidance	Mark	Comments
01.2	1. (Bile salts) emulsify fats/lipids; 2. (Bile salts) increase surface area for lipase <b>OR</b> neutralise stomach acid (to optimum pH for lipase);	2	1. Allow description of emulsification

Question	Marking guidance	Mark	Comments
01.3	1. Releases pancreatic juice/enzymes/lipase into small intestine/duodenum/ileum; 2. Lipase <u>hydrolyses</u> lipids <b>OR</b> 2. Lipase breaks <u>ester</u> bond; 3. (to) fatty acids and glycerol/monoglycerides; 4. (Pancreatic juice) neutralises stomach contents/chyme (so enzymes work);	3 max	

Question	Marking guidance	Mark	Comments
01.4	1. (Cancerous) tumour of pancreas blocks bile duct; 2. Substance builds up in liver <b>OR</b> Substance cannot enter duodenum/small intestine; 3. Substance moves in blood to body/whites of eyes;	3	

Question	Marking guidance	Mark	Comments
01.5	1. Prevents enzymes (in tablets) being <u>denatured</u> by acid pH in stomach <b>OR</b> Prevents enzymes (in tablets) being digested by proteases in stomach; 2. Only releases enzymes in small intestine;	2	Allow suitable stated pH value

Question	Marking guidance	Mark	Comments
02.1	Sodium;	1	

Question	Marking guidance	Mark	Comments
02.2	<p><i>(Advantages)</i></p> <ol style="list-style-type: none"> <li>1. Double-blind trial so no bias;</li> <li>2. Large number of patients;</li> <li>3. All patients still receive ORS treatment (and so not disadvantaged by the trial);</li> <li>4. Patients are matched for sex/gender, age;</li> </ol> <p><i>(Disadvantages)</i></p> <ol style="list-style-type: none"> <li>5. Only males;</li> <li>6. Only babies/very young children;</li> <li>7. Only severe diarrhoea;</li> <li>8. Only 1 trial;</li> <li>9. Could be sulfate not zinc;</li> <li>10. Only 1 dose tested/inappropriate dose of zinc/babies vary in mass/size (and effective dosage may depend on mass);</li> </ol>	2 max	<p>Must have 1 advantage and 1 disadvantage for full marks</p> <ol style="list-style-type: none"> <li>1. Allow description of double-blind trial so no bias</li> <li>4. Do not allow all male unqualified</li> </ol>

Question	Marking guidance	Mark	Comments
02.3	1. (Zinc ions) reduce mean duration and mean total mass of diarrhoea; 2. Duration reduced by 9 hours/14% <b>OR</b> mass reduced by 40g/27%;	2	2. Allow reduced from 65 to 56 (h) and from 150 to 110 (g)

Question	Marking guidance	Mark	Comments
02.4	77%;;	2	1 mark if correct values from graph (15 and 3.5) but incorrect % 1 mark if incorrect values used but show (difference divided by initial value)*100 Allow 76.7 / 76.67 / other correct rounding

Question	Marking guidance	Mark	Comments
02.5	1. (Zn ions reduce number of ion channel open) so <u>chloride</u> ions do not flood/move into lumen; 2. Water potential of lumen is not lowered / is higher <b>OR</b> water potential gradient is not as steep; 3. (so) Water does not enter/diffuse in by osmosis; 4. (Watery) diarrhoea does not form (so patient does not become dehydrated);	4	

Question	Marking guidance	Mark	Comments
03.1	<u>Left</u> ventricle;	1	

Question	Marking guidance	Mark	Comments
03.2	1. Atria do not fill completely (with blood); 2. Less blood enters/leaves ventricles; 3. (So) less oxygenated blood reaches brain;	3	1. Allow atria have less volume 2. Allow lower blood pressure 3. Allow less oxygen reaches brain

Question	Marking guidance	Mark	Comments
03.3	1. Press fingers on artery; 2. Count number of beats in set time (and multiply)/per minute;	2	Allow wrist/neck/other named place where pulse can be detected

Question	Marking guidance	Mark	Comments
03.4	1. (Heart rate increases as) more muscle contraction / more energy needed; 2. Needs <u>more</u> oxygen (for respiration); 3. Needs to get rid of <u>more</u> carbon dioxide;	3	2 and 3 – only need to write more once

Question	Marking guidance	Mark	Comments
03.5	17.325;;;	3	Accept 17.3 / 17.33 / 17 Allow 1 mark for idea of $CO = HR \times SV$ Allow 1 mark for 0.0875 (dm <sup>3</sup> ) or 165 (bpm) Allow 2 marks for 14.4 (correct initial SV x max HR but not increasing by 20%)

Question	Marking guidance	Mark	Comments
03.6	Any <b>two</b> from: Only female/young/1 subject; Only 1 trial/recording for short time/12 hours; (Fitness tracker) only recording every 10 min/not continuously (so might miss short-lived atrial fibrillation);	2 max	



Question	Marking guidance	Mark	Comments
04.1	Evaporation of water (vapour) from (the aerial parts of) a plant;	1	Allow diffusion of water vapour from plant

Question	Marking guidance	Mark	Comments
04.2	Plant uses some of the water <b>OR</b> Water is produced by respiration (in plant);	1	Allow examples of use

Question	Marking guidance	Mark	Comments
04.3	1. (Covers joints) to prevent leaks; 2. (Cuts under water) to prevent air/bubbles in xylem;	2	

Question	Marking guidance	Mark	Comments
04.4	1. Record distance moved by bubble in set time; 2. Use $\pi r^2 h$ to calculate volume (of water) taken up; 3. (idea of) Convert all measurements to same units/mm to cm or $\text{mm}^3$ to $\text{cm}^3$ ; 4. (Calculate rate by) Divide volume by time taken/ record volume in 1 min; 5. Would need to move air bubble back onto scale;	4 max	1. Allow record time taken for bubble to move set distance

Question	Marking guidance	Mark	Comments
04.5	1. Decreased water potential gradient (between inside of leaf and air); 2. Slower rate of diffusion (of water molecules out of the plant); 3. Rate of water uptake <u>decreases</u> ;	3	

Question	Marking guidance	Mark	Comments
04.6	Any <b>two</b> from: Light intensity; Air movement/wind; Temperature;	2 max	

Question	Marking guidance	Mark	Comments
05.1	1. Antigens; 2. (Antigens on) foreign cells stimulate an immune response/lymphocytes/antibody production; 3. (Antigens on) own cells have no lymphocytes to match/no immune response;	3	1. Allow description e.g. glycoprotein on (cell) surface

Question	Marking guidance	Mark	Comments
05.2	1. Patients with low CEA more likely to still be alive; 2. 50% of low CEA alive compared with 16% high CEA <b>OR</b> Survival with low CEA is 3.125 times that with high CEA;	2	Allow 3.13 / 3.1 / 3

Question	Marking guidance	Mark	Comments
05.3	(Idea of) other factors; (Idea of) CEA levels show likelihood, not guarantee;	1 max	Allow examples of other factors

Question	Marking guidance	Mark	Comments
06.1	Plant is immobile;	1	

Question	Marking guidance	Mark	Comments
06.2	1. Phloem; 2. Forced (into gut) under (high) pressure;	2	

Question	Marking guidance	Mark	Comments
06.3	1. Categories on x-axis and only bars for probing; 2. Suitable axis title on y-axis; 3. Correct plotting of values using appropriate scale;	3	1. Line graph lose mp1 2. e.g. number of times probing recorded over 1 hour 3. Data should cover > half of y-axis

Question	Marking guidance	Mark	Comments
06.4	1. (Support) male carriers show increased probing (so more likely to spread TSWV); 2. (Do not support) behaviour of females unchanged/decreased;	2	

Question	Marking guidance	Mark	Comments
06.5	1. Brown patches means less photosynthesis; 2. Less sugars/proteins/biomass produced to grow tomatoes;	2	

Question	Marking guidance	Mark	Comments
<p><b>07.1</b></p>	<p><i>(During interphase/G1, S, G2)</i></p> <ol style="list-style-type: none"> <li>1. Protein synthesis to make the spindle/proteins for new cell;</li> <li>2. DNA replication so each new cell has correct amount/identical DNA /is genetically identical;</li> <li>3. Cell growth so enough cytoplasm for both cells/so can form (2) new cells;</li> <li>4. Replication of organelles so enough for new cell;</li> </ol> <p><i>(During mitosis)</i></p> <ol style="list-style-type: none"> <li>5. Nuclear envelope breaks down to make space for spindle or for chromosomes to move around;</li> <li>6. Spindle fibres (form) so chromosomes can attach/be moved;</li> <li>7. Spindle fibres contract/pull/move so (sister) chromatids /chromosomes are separated;</li> <li>8. Chromatids/chromosomes moved to opposite poles to give genetically identical daughter cells;</li> </ol> <p><i>(After mitosis)</i></p> <ol style="list-style-type: none"> <li>9. Nuclear membrane reforms to form new nuclei / keep chromosomes together;</li> <li>10. Cytoplasm divides/cytokinesis to make new cells;</li> </ol>	<p>6 max</p>	<p>Need at least 1 mp from each section for full marks</p> <p>Allow named stage of mitosis</p> <p>If no other marks allow 1 mark for 'mitosis produces genetically identical cells'</p>

Question	Marking guidance	Mark	Comments
07.2	1. (UV light results in) change in DNA base sequence; 2. Proto-oncogenes become oncogenes that stimulate cell division; 3. Tumour suppressor genes inactivated so don't inhibit cell division; 4. Uncontrolled cell division results in cancer/tumour;	4	