

Answers to examination-style questions

| Answers  | Marks                               | Examiner's tips   |
|--|-------------------------------------|---|
| <p>1 (a) (i) build up of fatty deposits/atheroma/arteriosclerosis/plaque deposits/blood clots;<br/>in walls of arteries;</p> <p>(ii) narrowing/blockage (of coronary arteries) restricts/reduces blood flow to the heart;<br/>heart gets reduced oxygen supply/is starved of oxygen;<br/>muscle dies/muscle does not contract;</p> | <p><b>2</b></p> <p><b>3 max</b></p> | <p>You only need to describe one way in which high concentrations of cholesterol lead to disease of the arteries.</p> <p>It is important that you refer to the reduced supply of oxygen to the cardiac muscle. This leads to death of the cardiac muscle cells.</p> |
| <p>(b) fewer people with very high cholesterol levels;<br/>therefore contribution to total/relative number of deaths lower;</p>  | <b>2</b>                            | <p>This is really a feature of the way the data has been provided, i.e. number of deaths in a population.</p>   |
| <p>2 (a) <b>left</b> ventricle;</p>  | <b>1</b>                            |   |
| <p>(b) (i) (left) ventricle/heart relaxes/diastole/filling/not contracting;</p> <p>(ii) elastic tissue/wall;<br/>recoils/springs back (to main pressure);</p>  | <p><b>1</b></p> <p><b>2</b></p>     | <p>A common error is to suggest that the pressure is maintained by muscle in the arterial wall. Any reference to this would disqualify the second mark point.</p>   |
| <p>3 (a) effective water/sewage treatment/prevent water contamination/improve hygiene/vaccination/quarantining of affected area;</p>   | <b>1</b>                            | <p>Any two of these ideas for one mark.</p>   |
| <p>(b) oral rehydration therapy/ORT or oral rehydration solution/ORS;<br/>replaces lost water and salts;<br/><i>OR</i><br/>drinking large amounts of water;<br/>with salts/minerals;</p>   | <b>2</b>                            | <p>Many students mention the sugar used in ORT/ORS. This provides a source of respiratory substrate. The water helps rehydrate the body and the salts replace those that have been lost.</p>  |
| <p>(c) receptor/proteins on membrane;<br/>complementary shape of exotoxin;</p>   | <b>2</b>                            | <p>Remember the shapes of the receptor and exotoxin are complementary <b>not</b> the same.</p>  |
| <p>(d) (i) active transport;<br/>using ATP/carrier proteins;</p> <p>(ii) higher solute concentration/water potential lowered in small intestine;<br/>osmotic loss of water;</p>  | <p><b>2</b></p> <p><b>2</b></p>     | <p>It must be active transport as it is against the concentration gradient.</p> <p>The high solute concentration is in the lumen of the small intestine.</p>  |

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| 4 (a) X – protein synthesis/translation;<br>Y – movement;  | 2     |  |
| (b) (i) cytoplasm;<br>ribosomes;<br>phospholipid membranes/cell<br>membrane/semipermeable membrane;  | 2 max | This question is simply asking for the similarities between prokaryotic and eukaryotic cells.  |
| (ii) cell wall;<br>capsule;<br>flagellum;<br>mesosome;<br>no nucleus/nuclear membrane/DNA<br>free;<br>no mitochondria;<br>no microvilli;<br>no Golgi bodies;<br>no ER;<br>70S/smaller ribosomes; | 2 max | This question is simply asking for the differences between prokaryotic and eukaryotic cells.<br>You would also gain credit for 'no membrane-bound organelles' if neither the nucleus nor mitochondria marks had been credited. |
| 5 (a) protein/glycoprotein;<br>on microorganism/pathogen/'foreign' cells;  | 2 max | Carbohydrates can also act as antigens. You could refer to bacteria, viruses or other pathogens for the second mark point.   |
| (b) divide by mitosis/form a clone;<br>develop into plasma cells;<br>produce/secrete antibody;<br>reference to specificity of the response;<br>formation of memory cells;                        | 4 max | B lymphocytes will have the specific antibody on their cell surface membrane. Stimulation by the specific antigen will initiate the changes described.   |
| (c) antibodies are all of the same specific type;<br>will only form antigen–antibody complex<br>with one species of bacterium;   | 2 max | The benefit of using monoclonal antibodies is their specificity and the fact that they can be produced in high quantities.   |
| 6 (a) use of water;<br>OH drawn correctly in place of glycosidic<br>bond on each monosaccharide;   | 2     | It is essential that you know the structure of glucose for the exam. By remembering this you can work out the structure of galactose in this question.   |
| (b) water potential made lower/more negative;<br>less water absorption/water enters gut by<br>osmosis;   | 2     | Diffusion of water is acceptable as an alternative to osmosis.   |
| 7 (a) (i) 150;   | 1     |  |
| (ii) 27;   | 1     |  |

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| (b) 100;<br>number of peptide bonds hydrolysed = total number present/all peptide bonds have been hydrolysed;   | <b>2</b>     | Accept calculation showing the same number top and bottom.  |
| (c) curve rising to peak at pH 2 and falling to zero by pH 6;   | <b>1</b>     |   |
| (d) (change in pH) leads to breaking of bonds holding tertiary structure/changes charge on amino acids;<br>enzyme/protein/active site loses shape/denatured;<br>substrate will not bind with/fit active site;<br>fewer/no enzyme–substrate complexes formed;  | <b>3 max</b> | This answer requires a description of how enzymes are denatured. It is advisable to refer specifically to the effect of the change of pH on hydrogen and ionic bonds, which would be broken, leading to change in the tertiary structure.       |
| (e) more resistant to changes in pH and washing conditions variable/works in alkaline pH and washing powders;   | <b>1</b>     | To obtain the mark you must indicate the aspect of the effect of pH and the advantage of this in terms of washing powder or conditions in the wash.   |
| (f) each enzyme/protein has a specific primary structure/amino acid sequence;<br>folds in a particular way/has a particular structure;<br>active site with unique structure;<br>shape of active site complementary to/will only fit that of substrate;<br>inhibitor fits at site on the enzyme other than active site;<br>determined by shape;<br>distorts active site;<br>so substrate will no longer fit/form enzyme–substrate complex; | <b>6 max</b> | You would obtain a maximum of 3 marks for the first four points and a maximum of 3 marks for the last four points. This is to ensure that you provide a full answer to both parts of the question: specificity and the effect of the inhibitor. |
| 8 (a) removes debris/intact cells/sand;<br>which would contaminate sediment A/<br>interfere with the results;   | <b>2</b>     |   |
| (b) (i) nuclei;   | <b>1</b>     |   |
| (ii) ribosomes/endoplasmic reticulum/<br>Golgi body;  | <b>1</b>     | You should learn the order in which the organelles are separated out during centrifugation.   |
| (c) density/mass;   | <b>1</b>     |   |
| (d) an electron microscope has a higher resolution;<br>electrons have shorter wavelength;   | <b>2</b>     | This has nothing to do with magnification. You can obtain a high magnification with an optical microscope but the image is poor due to lower resolution.  |

Nelson Thornes is responsible for the solution(s) given and they may not constitute the only possible solution(s).