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BIOLOGY

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Paper 2 AS Level Structured Questions

March 2017

MARK SCHEME

Maximum Mark: 60

Published

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Question	Answer	Marks
1(a)	label line and letter G to one of the ends of the chromosome ;	1
1(b)	anaphase/telophase ;	1
1(c)	cytokinesis ;	1
1(d)	receptor(s) ; I description of receptor	1

Question	Answer	Marks
2(a)(i)	<i>Vibrio cholerae</i> ;	1
2(a)(ii)	<p>A</p> <p>1 <i>cell structure</i>: ribosome ; R RER</p> <p>2 <i>difference</i>: 70S / smaller / 18 nm v 80S / larger / 25–30 nm ;</p> <p>B</p> <p>3 <i>cell structure</i>: DNA / chromosome ; I RNA</p> <p>4 <i>difference</i>: circular / (closed) loop v linear OR no histone proteins / naked v histone proteins OR not surrounded by nuclear envelope v surrounded by nuclear envelope ; A in a nucleus v not in a nucleus</p> <p>C</p> <p>5 <i>cell structure</i>: cell wall ;</p> <p>6 <i>difference</i>: murein / peptidoglycan v cellulose ; I lignin</p>	6

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Question	Answer	Marks
2(b)	<i>two from</i> 1 caused by, a pathogen/a bacterium/ <i>V. cholerae</i> ; 2 transmissible/AW OR reference to faecal-oral route ; 3 reference to reduced effectiveness of functions/AW ;	2
2(c)	primary, secondary, tertiary ; A 1°, 2°, 3° quaternary ; A 4°	2
2(d)	<i>three from:</i> 1 cholerae, fits into/complementary to, receptor/GM1 ; A complementary shape 2 membrane pinches in/invaginates/AW ; A engulfs/envelops 3 membrane fusion ; 4 (endocytotic) vesicle/vacuole, formed ; 5 ATP/energy, required ; A points from an annotated diagram	3
2(e)(i)	<i>one from:</i> 1 portion that binds to cell ; 2 (antibodies produced) prevent binding to cell/prevent entry to cell ; 3 safer as not the toxic portion ; 4 A subunit, causes damage to cell/less safe/AW ; 5 AVP e.g. larger so more likely to provoke immune response/AW ;	1

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Question	Answer	Marks
2(e)(ii)	<p><i>five from:</i></p> <ol style="list-style-type: none"> 1 vaccine contains (subunit B/bacterial) antigen(s) ; 2 primary immune response occurs ; 3 correct ref to B-lymphocytes/formation of plasma cells ; A B cells 4 secretion of, antibody/immunoglobulin (against cholera antigens)/ antitoxins ; 5 T-helper lymphocytes secrete cytokine ; 6 (cytokine) increases humoral response/stimulates T-killer cells/stimulates macrophages ; 7 memory cell production ; 8 secondary (immune) response/response on further infection, is faster ; 9 higher levels of antibodies produced (during further infection) ; 10 active artificial immunity (against cholera) ; 11 AVP e.g. <i>idea</i> of specific antibody against each of the different vaccine antigens ; 	5

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Question	Answer	Marks
3(d)	<i>two from:</i> 1 <i>idea that</i> , hydrogen peroxide, damage / breaks, DNA <u>and</u> repair errors (may) occur ; 2 (so leads to) incorrect, nucleotide / base, inserted (during replication) / change in, nucleotide / base, sequence (of DNA / RNA) ; 3 new allele (may be) formed ; 4 may result in an altered polypeptide / AW ;	2

Question	Answer	Marks
4(a)	(closed) double circulation ; capillary ; pulmonary vein ; right atrium ; A auricle septum ;	5
4(b)(i)	<i>two from:</i> 1 <i>idea</i> that (to be transported) many substances need to, dissolve / be in solution ; 2 ionic compounds/named, can, dissociate/dissolve ; 3 polar compounds/named, e.g. glucose/amino acids, can dissolve ; 4 globular proteins/named, e.g. antibodies, can dissolve ;	2
4(b)(ii)	<i>three from:</i> 1 water molecules attracted to each other ; A sticky/stickiness <i>cohesion:</i> 2 (hydrogen bonding provides) <u>cohesion</u> between water molecules ; A water is cohesive 3 reference to water leaving xylem (at top), pulling water (molecules below) ; A there is a transpiration pull <i>adhesion:</i> 4 <u>adhesion</u> to <u>cellulose</u> lining (of xylem) ; A <u>cellulose</u> wall 5 maintains/prevents falling of, column of water ; 6 AVP e.g. reference to cellulose hydrophilic / adhesion to hydrophilic parts of lignin ;	3

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Question	Answer	Marks
5(a)	bronchus } ; trachea } bronchiole ; alveolus ; I same structure written on more than one line	3
5(b)	<i>two from:</i> 1 (tobacco) smoke contains, tar / carcinogens / named carcinogen ; 2 causes mutations / mutagenic / described mutation e.g. protooncogene to oncogene / oncogene forms / tumour suppressor gene switched off ; 3 uncontrolled mitosis / AW ;	2
5(c)	<i>three from:</i> 1 many layers v few(er) layers ; A one layer / thicker 2 cells all the same v more than one type of cell / goblet cells and (epithelial) cells ; A no goblet cells 3 cells, flatter / smaller / cubical / AW v columnar cells ; 4 reference absence of cilia ; 5 large / prominent, nuclei / ORA ;	3

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Question	Answer	Marks									
6(a)(i)	surface area : volume = 1.67 : 1 ; ; A 1.7 : 1, 5 : 3 <i>if incorrect, allow one mark for working</i> surface area = 90 mm ² <u>and</u> volume = 54 mm ³ <i>calculations:</i> <table style="margin-left: 40px; border: none;"> <tr> <td style="padding-right: 40px;">surface area</td> <td style="padding-right: 40px;">volume</td> <td>ratio</td> </tr> <tr> <td>6 × 3 × 4 (sides) = 72 mm²</td> <td>6 × 3 × 3</td> <td>90 : 54</td> </tr> <tr> <td>3 × 3 × 2 (sides) = 18 mm²</td> <td></td> <td></td> </tr> </table>	surface area	volume	ratio	6 × 3 × 4 (sides) = 72 mm ²	6 × 3 × 3	90 : 54	3 × 3 × 2 (sides) = 18 mm ²			2
surface area	volume	ratio									
6 × 3 × 4 (sides) = 72 mm ²	6 × 3 × 3	90 : 54									
3 × 3 × 2 (sides) = 18 mm ²											
6(a)(ii)	(block X) has higher, surface area to volume ratio/SA:V ; OR (block X) has more surface area proportionately per unit volume/AW ; reference to shorter distance for diffusion to centre ;	2									
6(a)(iii)	<i>two from:</i> 1 diffusion (rate) too slow ; A idea of cannot rely on diffusion 2 reference to distances too far to reach all, cells/tissues ; 3 time taken is too long/AW ;	2									
6(b)	Benedict's (reagent/solution) ;	1									