GCE

## Biology

## Advanced Subsidiary GCE

## Mark Scheme for June 2012

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## Annotations

Annotations available in SCORIS．

| Annotation | Meaning |
| :---: | :---: |
| ［1］${ }^{\text {a }}$ | Benefit of Doubt |
| ［ Cl | Contradiction |
| 3 | Cross |
| ［1］ | Error Carried Forward |
| ［－15 | Odd or incorrect Grammar |
| $\cdots$ | Extendable horizontal wavy line |
| T | Ignore |
| O | Large dot（Key point attempted） |
| 二⿺𠃊⿻丷木斤丶 | Benefit of the doubt not given |
| ［ix | additional QWC credit given |
| $\checkmark$ | Tick |
| EI | Tick 1 |
| EE | Tick 2 |
| － | Omission Mark |


| Question |  |  | Answer | Marks | Guidance |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | (a) | (i) | $\underline{\text { mitosis ; }}$ | 1 | Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then $\mathbf{= 0}$ marks |
|  |  | (ii) | idea that: cells, genetically identical / have same DNA ; <br> so both (daughter) cells receive a full, copy / complement ; | 2 | ACCEPT in context of identical to each other or identical to parent <br> ACCEPT ‘same genetic information/material' <br> ACCEPT same / correct amount of DNA <br> ACCEPT same / correct number of chromosomes <br> IGNORE ref to clones unqualified <br> IGNORE 'new cells need genetic material' without ref to full amount <br> daughter cells have all the identical genetic material $=2$ marks (mp 1 and 2$)$ |
|  | (b) |  | 1 one maternal and one paternal / AW ; 2 carry same genes ; <br> 3 carry, same / different, alleles; 4 (usually) same / similar, length ; <br> 5 centromere in same position ; <br> 6 same banding pattern; <br> 7 pair up in meiosis / form bivalent ; | 3 max | CREDIT 'same loci' IGNORE 'genetic material', 'genetically identical' 'genetic information' <br> ACCEPT 'same shape' 'same size' <br> IGNORE 'same pattern' |
|  | (c) | (i) | ```a, group / collection, of cells ; (cells) specialised / AW ; to perform a function(s) / working together ;``` | 2 max | IGNORE 'same’ or 'different' cells ACCEPT same job |



| Question |  |  | Answer | Marks | Guidance |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2 | (a) | (i) | C (secretory / Golgi) vesicle; <br> D plasma membrane or cell surface membrane ; <br> E ribosome; | 3 | Mark the first answer on each prompt line. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks <br> DO NOT CREDIT lysosome <br> ACCEPT cell plasma membrane <br> IGNORE rough endoplasmic reticulum |
|  |  | (ii) | enzyme / (peptide) hormone / glycoprotein ; | 1 | Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = $\mathbf{0}$ marks <br> ACCEPT named example e.g. insulin, mucus, cytokine, antibodies, collagen <br> IGNORE haemoglobin, histamine, steroid hormones e.g. testosterone |
|  |  | (iii) | transport vesicles to, plasma / cell surface, membrane ; <br> fusing vesicle to membrane / exocytosis; | 1 max | Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = $\mathbf{0}$ marks <br> CREDIT greater detail of cytoskeleton activity e.g. role of protein motors / changing length of microtubules - 'transport' alone not enough <br> IGNORE ref to membrane unqualified <br> ACCEPT binding / merging <br> IGNORE bonding |
|  |  | (iv) | 1 receives proteins from the, (R)ER / ribosomes; <br> 2 modify / process, proteins or make glycoproteins / add named molecule(s) / described ; <br> 3 (re)package / AW, into vesicles; <br> 4 make lysosomes; <br> 5 replenishes, plasma / cell surface, membrane ; <br> 6 lipid synthesis; | 2 max | IGNORE SER <br> eg add carbohydrate groups / sugars or fold protein <br> modifies and packages proteins into vesicles $=2$ marks <br> ACCEPT make glycolipids |


| Question |  | Answer | Marks | Guidance |
| :---: | :---: | :---: | :---: | :---: |
| (b) | (i) | nucleus or nuclear, envelope / pore / membrane ; <br> mitochondrion / mitochondria ; <br> (rough / smooth) endoplasmic reticulum / ER <br> OR ribosomes attached to membrane ; <br> Golgi (body / apparatus) ; <br> (secretory) vesicle(s) ; | 2 max | Mark the first two answers only. <br> IGNORE membrane bound organelles, lysosomes, free ribosomes, ref to ribosome size |
|  | (ii) | (free / circular / naked) DNA / genetic material / nucleoid ; <br> plasmid ; <br> 18nm / 70S / smaller, ribosomes; |  | Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then $\mathbf{= 0}$ marks <br> IGNORE 'chromosomes', 'chromatin' <br> IGNORE mesosome (as this is an infolding of plasma membrane and not in the cytoplasm) |
|  |  | Total | 10 |  |


| Question |  |  | Answer |  |  | $\begin{array}{\|c} \hline \text { Marks } \\ \hline 1 \end{array}$ | Guidance |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 3 | (a) |  | single circulatory <br> system <br> double <br> circulatory <br> system | open circulatory system | closed circulatory system <br> $\checkmark$; |  | ACCEPT cross / other mark DO NOT CREDIT if a tick is placed in more than one box |
|  | (b) | (i) | systole / contractio <br> diastole / relaxatio <br> (contraction of) ven <br> left (ventricle) ; | increases pressu <br> blood flowing onw <br> icle, muscle / wal | , decreases pressure ; | 2 max | IGNORE 'the heart' or 'the heart beating' or 'the heart pumping' without further qualification IGNORE ref to right (side) for mp 1-3 <br> ACCEPT ref to peak on graph for increasing pressure <br> ACCEPT ref to trough on graph for decrease in pressure <br> ACCEPT ventricular systole <br> 'contraction of left ventricle' = 1 mark 'contraction of muscle in left ventricle' $=2$ marks 'ventricular systole increases pressure' = 2 marks |
|  |  | (ii) | pulse / heart, rate ; |  |  | 1 | IGNORE heart beat / beats per minute |


| Question |  | Answer | Marks | Guidance |
| :---: | :---: | :---: | :---: | :---: |
| (c) |  | marks for pressure change: pressure drops, as distance from heart increases ; greatest / rapid / significant, pressure drop while blood is in the arteries ; pressure, constant / does not drop, in veins ; <br> marks for amplitude of fluctuations: fluctuation / AW, decreases from aorta to arteries ; <br> no fluctuation in, capillaries / veins; <br> use of comparative figures with unit ; | 3 max | ACCEPT from aorta to arteries / correctly named blood vessels - look for decrease in pressure trend <br> ACCEPT plateaus / level <br> IGNORE ref to frequency of fluctuations ACCEPT 'smaller fluctuations in artery' <br> correct figures must be quoted from the graph to back up one point - correct unit used at least once. <br> eg 'peak to peak', between aorta and arteries, falls 18.5 to 14 kPa <br> pressure in aorta between 18.5 and 12.5 kPa pressure in arteries drops from 12.5 to 5 kPa pressure in capillary drops from 5 to 0.5 kPa overall drop from 18.5 to 0.5 kPa <br> Any other figures must be checked against graph <br> ACCEPT correct calculated figure <br> eg pressure drops 6kPa in aorta |


| Question |  | Answer | Marks | Guidance |
| :---: | :---: | :---: | :---: | :---: |
| (d) | (i) | blood flows into larger number of vessels ; <br> (total) cross-sectional area of the arteries is greater than the aorta; (total) cross-sectional area of the capillaries is greater than the, aorta / arteries ; |  | IGNORE ref to pressure fluctuations and structure of vessel walls as not relevant to overall pressure change ACCEPT idea of vessels branching to many/more (smaller) vessels <br> IGNORE ref to lumen size |
|  |  | capillary (wall) is, thin / only one cell thick ; (high pressure would) burst / damage, capillary (wall) ; reduce chance of, tissue fluid build up / oedema; | 2 max | IGNORE ref to rate of flow IGNORE ref to capillary walls small / made of squamous cells ACCEPT cannot withstand (high) pressure |
|  |  | Total | 11 |  |



| Question |  | Answer | Marks | Guidance |
| :---: | :---: | :---: | :---: | :---: |
|  | (ii) | use a, salt / sugar, solution OR add solute to water ; <br> use a solution with the, same / similar / lower, water potential as blood cells ; | 1 max | ACCEPT saline solution <br> ACCEPT isotonic / hypertonic <br> ACCEPT same solute concentration / potential <br> IGNORE same water concentration <br> IGNORE use less water / solution with low water potential |
| (b) |  | diffusion ; | 1 | DO NOT CREDIT facilitated diffusion |
| (c) |  | 1 active, transport / uptake ; <br> plus any two from: <br> 2 cells have, extensions / hairs ; <br> 3 thin cell wall ; <br> 4 large / increased, surface area; <br> 5 many / more, mitochondria; <br> 6 (many) carrier proteins in cell (surface) membrane ; | 3 max | 1 ACCEPT facilitated diffusion IGNORE transport using ATP DO NOT CREDIT osmosis <br> Allow max two marks for specialised features <br> 2 ACCEPT cells have root hairs IGNORE roots have root hair cells <br> 4 ACCEPT high, surface area to volume ratio / SA:vol credit in context on root hair cell or root having large surface area <br> 6 ACCEPT transport proteins / protein pumps ACCEPT channel protein in context of facilitated diffusion |
|  |  | Total | 10 |  |


| Question |  |  | Answer | Marks | Guidance |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 5 | (a) | (i) | tidal volume ; | 1 |  |
|  |  | (ii) | being stretched / stretching ; | 1 | ACCEPT lengthening DO NOT CREDIT relaxing <br> IGNORE expanding 'stretching and contracting' $=\mathbf{C O N}$ |
|  | (b) |  | between B \& C expiration: <br> 1 (external) intercostal muscles / diaphragm, relax ; <br> 2 rib cage / ribs, move down OR diaphragm, moves / pushed, up ; <br> 3 volume of, thorax / chest cavity / lungs, drops / decreases; <br> 4 pressure inside, thorax / chest cavity / lungs, increases; <br> 5 above, external / atmospheric, pressure ; <br> 6 air leaves down pressure gradient ; <br> 7 (elastic) recoil of alveoli ; <br> 3 max <br> QWC - two technical terms used in context and spelt correctly ; 1 | 4 max | 1 ACCEPT ref to internal intercostal muscles contracting <br> 1 DO NOT CREDIT ref to diaphragm relaxing and intercostal muscles (unqualified) contracting <br> 2 IGNORE ‘diaphragm becomes domed / curved' <br> 3 ACCEPT ‘space inside’ or ‘air in' for volume <br> 5 ACCEPT (pressure) higher than outside <br> Answers given in context of 'at B' or 'at C' - QWC not awarded. <br> Any two from intercostal, diaphragm, recoil, volume thorax, pressure, gradient |
|  | (c) |  | $12 ;$ | 2 | Allow two marks for correct answer. If answer wrong allow one mark for working $\frac{60}{5}$ |


| Quest | Answer | Marks | Guidance |
| :---: | :---: | :---: | :---: |
| (d) | idea that: <br> thorax / rib cage / lungs, cannot be completely , compressed / flattened ; <br> trachea / bronchi, held open by cartilage ; <br> bronchioles / alveoli, held open by elastic fibres ; <br> AVP; | 2 max | IGNORE bronchioles or alveoli <br> IGNORE bronchi or trachea <br> eg absence of pressure gradient / atmospheric and thoracic pressures equal presence of surfactant in alveoli upward movement of diaphragm limited by collagen fibres |
|  | Total | 10 |  |


| Question |  |  | Answer | Marks | Guidance |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 6 | (a) | (i) | sucrose and phloem ; | 1 | Both needed for one mark <br> Mark the first answer on each line. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = $\mathbf{0}$ marks <br> DO NOT CREDIT sucrase <br> DO NOT CREDIT phloem sieve tubes / companion cells |
|  |  | (ii) | 1 hydrogen ions / $\mathrm{H}^{+} /$protons, pumped out of companion cells ; <br> 2 increases, hydrogen ion / $\mathrm{H}^{+} /$proton, concentration (gradient) (outside companion cell) ; <br> 3 hydrogen ions, re-enter / flow back into, companion cells ; <br> 4 sucrose / sugar, moves with hydrogen ions / AW ; <br> 5 down concentration gradient ; <br> 6 ref. cotransporter proteins / cotransport(ation) ; <br> 7 by facilitated diffusion ; <br> 8 sucrose / sugar, diffuses into sieve tube (element); <br> 9 through plasmodesmata; | 3 max | 1 ACCEPT hydrogen ions leave companion cells using ATP <br> 2 ACCEPT creates gradient <br> 2 DO NOT CREDIT increase, hydrogen ion / $\mathrm{H}^{+}$/ proton concentration, in sieve tube element <br> 3 ACCEPT diffuse / move <br> 4 DO NOT CREDIT glucose (penalise once) <br> 4 DO NOT CREDIT sucrose follows $\mathrm{H}^{+}$ <br> 8 IGNORE sucrose diffuses into phloem |



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