**MARK SCHEME**

| **Question** | **Mks** | **Answer** | **Question Source and Guidance Notes** | **Topics** | **Demand** |
| --- | --- | --- | --- | --- | --- |
| **1** | **1** | **C** | *Q4-GCE-Biology A-Specimen-H020/01* | Foundations in Biology;  Enzymes | M |
| **2** | **1** | **D** | *Q6-GCE-Biology A-Specimen-H020/01* | Foundations in Biology;  Cell Structure | M |
| **3** | **1** | **B** | *Q9-GCE-Biology A-Specimen-H020/01* | Foundations in Biology;  Nucleotides and nucleic acids | M |
| **4** | **1** | **B** | *Q11-GCE-Biology A-Specimen-H020/01* | Foundations in Biology;  Cell division, cell diversity and cellular organisation | M |
| **5** | **1** | **D** | *Q18-GCE-Biology A-Specimen-H020/01* | Foundations in Biology; Biological molecules | H |
| **6 (a)(i)** | **2** | particles have (their own) kinetic energy ✓ (movement) down concentration gradient ✓ | *Q21(a)(i)-GCE-Biology -Specimen-H020/01*  **ALLOW** glucose for particles.  **ALLOW** from high(er) concentration to low(er) concentration | Foundations in Biology;  Biological molecules | L,M,H |
| **6 (a)(ii)** | **1** | ATP ./ | *Q21(a)(ii)-GCE-Biology A-Specimen-H020/01*  **ALLOW** adenosine triphosphate |
| **6 (a)(iii)** | **2** | phospholipids act as a barrier ✓  (glucose) molecules too large ✓ | *Q21(a)(iii)-GCE-Biology -Specimen-H020/01*  **ALLOW** (glucose) not soluble in phospholipid bilayer because of polar –OH groups for 2 marks |
| **6(b)(i)** | **1** | one from  volume of ethanol not given ✓  same onion / size of onion epidermis / position of epidermis in onion not stated ✓ | *Q21(b)(i)-GCE-Biology A-Specimen-H020/01* | Practical Skills; Planning; Analysis; Evaluation | L,M |
| **6(b)(ii)** | **2** | 20–30% ✓  lowest concentration must be between 20 and 30% ✓ | *Q21(b)(ii)-GCE-Biology A-Specimen-H020/01*  idea that 100% blue nuclei is not reached at 20% but is reached at 30% | Practical Skills; Planning; Analysis; Evaluation | L,M |
| **6(b)(iii)** | **1** | idea of more accurate determination of permeability ✓ | *Q21(b)(iii)-GCE-Biology A-Specimen-H020/01* | Practical Skills; Planning; Analysis; Evaluation | L,M |
| **7(a)(i)** | **1** | 1.7 mm ✓ | *Q22(a)(i)-GCE-Biology A-Specimen-H020/01* | Practical Skills; Implementing | L,M |
| **7(a)(ii)** | **2** | × 50 ✓ | *Q22(a)(ii)-GCE-Biology A-Specimen-H020/01*  **ALLOW** 1 mark for correct working e.g. 80/1.6  **ALLOW** answer in the range of 48–51 |
| **7(a)(iii)** | **1** | air spaces give buoyancy ✓  supported by (surrounding) water ✓ | *Q22(a)(iii)-GCE-Biology A-Specimen-H020/01* |
| **7(b)(i)** | **2** | B  comment about detail of organelles ✓  comment about shapes of cells ✓ | *Q22(b)(i)-GCE-Biology A- Specimen-H020/01*  **No Mark** for identification of B  e.g. light microscope would not allow nuclear pores / ribosomes / endoplasmic reticulum / plasmodesmata to be seen.  e.g. sieve tube elements are angular / hexagonal. | Practical Skills; Implementing | L,M |
| **7(b)(ii)** | **1** | the ability to, see more detail / separate two objects ✓ | *Q22(b)(ii)-GCE-Biology A-Specimen-H020/01* |
| **7(b)(iii)** | **2** | Nile blue ✓  to increase contrast / to make nuclei visible / to show no nuclei in sieve tubes ✓ | *Q22(b)(iii)-GCE-Biology A-Specimen-H020/01* |
| **8** | **1** | cofactor ./ | *Q2(d)-GCE-Biology A-Specimen-H020/02*  **IGNORE** coenzyme. | Foundations in Biology; Biological molecules | L |
| **9(i)** | **3** | (involves) DNA polymerase ./  sugar-phosphate backbone (re)forms/condensation reaction between phosphate and sugar ./  DNA winds into double helix ./ | *Q6(b)(i)-GCE-Biology A-Specimen-H020/02*  **ALLOW** higher level answers  e.g. role of DNA ligase in joining sugar-phosphate backbone lagging strand filled in with Okazaki fragments. | Foundations in Biology;  Nucleotides and nucleic acids | M,H |
| **9(ii)** | **1** | (new molecule consists of) one old strand and one new strand ./ | *Q6(b)(ii)-GCE-Biology A-Specimen-H020/02* |
| **10(a)(i)** | **1** | mitosis ; | *Q5(a)(i)-GCE-Biology -June 2014-F211/01*  **CREDIT** correct spelling only  **ACCEPT** binary fission | Foundations in Biology;  Cell division, cell diversity and cellular organisation | L,M |
| **10(a)(ii)** | **1** | in the grex / 3 ; | *Q5(a)(ii)-GCE-Biology -June 2014-F211/01* |
| **10(b)(i)** | **1** | cell signalling ; | *Q5(b)(i)-GCE-Biology -June 2014-F211/01* | Foundations in Biology;  Biological molecules | L,H |
| **10(b)(ii)** | **2** | 1 attraction of cell(s) to folic acid from bacteria ;  2 attraction of cells to each other by cAMP ;  3 coordinated movement in grex ;  4 differentiation / described, of (grex / slime mould) cells in response to DIF ; | *Q5(b)(ii)-GCE-Biology -June 2014-F211/01*  **NOTE** must name the chemical involved for description  (except mp 3coordinated movement)  **ACCEPT** attraction of cells to bacteria by folic acid  **IGNORE** makes cells stick together |
| **10(b)(iii)** | **2** | contains , receptors / glycoproteins / glycolipids /  glycocalyx ;  for , folic acid / cAMP / DIF; | *Q5(b)(iii)-GCE-Biology -June 2014-F211/01*  **DO NOT CREDIT** consists of receptors |
| **11** | **3** | **1** reduces , water potential / Ψ , outside , microbial / bacterial / fungal , cells ;  **2** (microbes) lose water and cannot , reproduce / survive / carry out metabolic reactions / AW ;  **3** water moves by osmosis ; | *Q7(c)-GCE-Biology -June 2014-F212/01*  **1 Cannot be** implied from references to water potential  gradient  **1 ACCEPT** reduces beef water potential  **1 IGNORE** solute potential  **1 IGNORE** viruses  **2 ACCEPT** bacteria lose water and die  **2 AWARD** only in context of microbes dehydrating  **2 IGNORE** viruses  **2 IGNORE** beef losing water so microbes cant reproduce  **3 ACCEPT** in any correct water potential contex | Foundations in Biology;  Biological molecules | L,M,H |
| **12(a)(i)** | **2** | A nucleus ;  B chloroplast ; | *Q1(a)(i)-GCE-Biology - June 2013-F211/01*  **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**  **DO NOT CREDIT** nuclear envelope / nucleolus  **IGNORE** chlorophyll | Foundations in Biology;  Cell Structure | L,M |
| **12(a)(ii)** | **2** | **C** mitochondrion  (aerobic) respiration / producing ATP / release energy ;  **D** SER / smooth endoplasmic reticulum  transport / production / processing, of, fats / lipids /  steroids / carbohydrates | *Q1(a)(ii)-GCE-Biology - June 2013-F211/01*  **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**  **DO NOT CREDIT** Function of organelle if organelle  identified / named incorrectly (as this would be an incorrect  biological statement.  **DO NOT CREDIT** makes / produces, energy  **ACCEPT** produces ATP for respiration  **IGNORE** ref to transport / modification of proteins  **DO NOT CREDIT** ref production of proteins | Foundations in Biology;  Cell Structure | L,M |
| **12(b)** | **2** | C/ mitochondrion / cristae, too small ;  resolution (of light microscope), not high (enough)  OR idea of only, 0.2μm / 200nm ;  wavelength of light too long ; | *Q1(b)-GCE-Biology - June 2013-F211/01*  idea of too small / not big enough important  **IGNORE** very small  **ACCEPT** resolution low  **IGNORE** ref to magnification  for resolution accept any value in range 0.05 - 0.2 μm  **IGNORE** ref to electron microscope | Foundations in Biology;  Cell Structure | M,H |
| **13(a)** | **1** | enzymes ; | *Q2(a)-GCE-Biology -June 2013-F212/01*  **IGNORE** protein / catalysts  **ACCEPT** enzymic | Foundations in Biology;  Enzymes | L |
| **13(b)(i)** | **3** | **1** similar, shape / structure **;**  **2** example of similarity **;**  **3** both, will fit into / complementary (shape) to /  bind to / bond to , active site (of alcohol dehydrogenase ) **;** | *Q2(b)(i)-GCE-Biology -June 2013-F212/01*  **1 IGNORE** same shape  **1 ACCEPT** ‘ethanol same shape as part of DEG’  **2 IGNORE** they contain C, H and O  **2 IGNORE** the end is the same  **2 ACCEPT** e.g. they both have OH  **2 ACCEPT** similar parts identified on diagram if they are clearly indicating an example of similarity  **3 ACCEPT** implication of both  **3 IGNORE** attach / enter  **3 IGNORE** both will form ESC (with alcohol dehydrogenase) | Foundations in Biology;  Enzymes | L,M,H |
| **13(b)(ii)** | **3** | **1** (ethanol) competes with DEG **; ora**  **2** (when at high(er) concentration) ethanol more  likely to , collide with / bind to / bond to , active site **; ora**  **3** less , DEG breakdown / toxic product **; ora** | *Q2(b)(ii)-GCE-Biology -June 2013-F212/01*  **1 ACCEPT** ethanol / DEG , is , a competitive inhibitor  **2 ACCEPT** ‘ethanol more likely to form ESC’  **2 ACCEPT** implication of ‘more likely’ from context  **2 IGNORE** attach / enter  **3 ACCEPT** DEG product is diluted  **3 ACCEPT** no DEG breakdown  **IGNORE** ‘you will drink less of it’ |
| **14(i)** | **1** | code for (one or more) polypeptide(s) ; | *Q5(d)(i)-GCE-Biology - June 2014-F212/01*  **ACCEPT** protein  **IGNORE** amino acid sequence | Foundations in Biology;  Nucleotides and nucleic acids | L,M,H |
| **14(ii)** | **5** | **1** double stranded **;**  **2** each / both (strands) act as template **;**  **3** hydrogen bonds , easily , break / form , between  bases ;  **4** complementary (specified) base , pairing / AW **;**  **5** purine (only able to) bind to pyrimidine **;**  **6** (due to) different sizes of purines and pyrimidines **;**  **7** hydrogen bonding different between A & T **and** C & G  **or**  3 H bonds between C & G **and**  2 H bonds between A & T **;** | *Q5(d)(ii)-GCE-Biology -June 2014-F212/01*  **AWARD** marks from clearly annotated diagram  **1 ACCEPT** double helix **or** two , polynucleotides / strands /  chains **or** antiparallel strands  **1 IGNORE** one old and one new strand  **2 IGNORE** either  **NOTE** ‘there are 2 strands which act as templates’ = 2 marks (mp 1 and 2)  **3 ACCEPT** weak H bonds between bases break  **3 IGNORE** refs to H bonds , breaking / forming , without  qualification that the bonds are weak or , form / break , easily  **4 IGNORE** complementary nucleotides unless qualified with examples of base-pairing  **7 ACCEPT** names of bases with phonetic spellings  **7 DO NOT CREDIT** thyamine  **7ACCEPT** A=T **and** C≡G without reference to hydrogen  bonds |
| **15(a)(i)** | **1** | primary structure **;** | *Q1(a)(i)-GCE-Biology -June 2013-F212/01*  **ACCEPT** 1o structure  **IGNORE** polypeptide | Foundations in Biology;  Biological molecules | L,M |
| **15(a)(ii)** | **3** | NH2 at one end **;**  COOH at opposite end **;**  C in centre (of a single amino acid) bonded  (separately) to one R and one H **;** | *Q1(a)(ii)-GCE-Biology -June 2013-F212/01*  If R group not shown as ‘**R**’ then award **max 2** (as general  structure asked for in Q)  **IGNORE** labels  **ACCEPT** displayed structure of NH2 / HNH  **ACCEPT** displayed structure of COOH if correct double bond shown  **AWARD** only if the candidate has drawn a single ‘amino acid’ Molecule  H  H2N C COOH  R |
| **15(b)** | **1** | strength / toughness / insolubility **;** | *Q1(b)(i)-GCE-Biology -June 2013-F212/01*  **Mark the first answer.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks**  **ACCEPT** strong / tough  **IGNORE** flexible / inelastic  **IGNORE** withstand pressure | Foundations in Biology;  Biological molecules | L,M,H |
| **15(c)** | **1** | transport / AW , of, oxygen / O2 **;** | *Q1(c)(i)-GCE-Biology -June 2013-F212/01*  **Mark the first answer.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks**  **ACCEPT** buffering blood / carrying CO2 / storing oxygen  **IGNORE** binding oxygen  **IGNORE** Iron | Foundations in Biology;  Biological molecules | L,M,H |
| **Total** | **64** |  |  |  |  |

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