**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 fromvolume 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** | Bcomment about detail of organelles ✓comment about shapes of cells ✓ | *Q22(b)(i)-GCE-Biology A- Specimen-H020/01***No Mark** for identification of Be.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 answerse.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 potentialgradient**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 answeris 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 reticulumtransport / 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 answeris 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 organelleidentified / named incorrectly (as this would be an incorrectbiological 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 magnificationfor 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 morelikely 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 , betweenbases ;**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 , withoutqualification 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 hydrogenbonds |
| **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 generalstructure 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 HH2N 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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