BIOLOGY MIND

Edexcel

A-Level

BIOLOGY

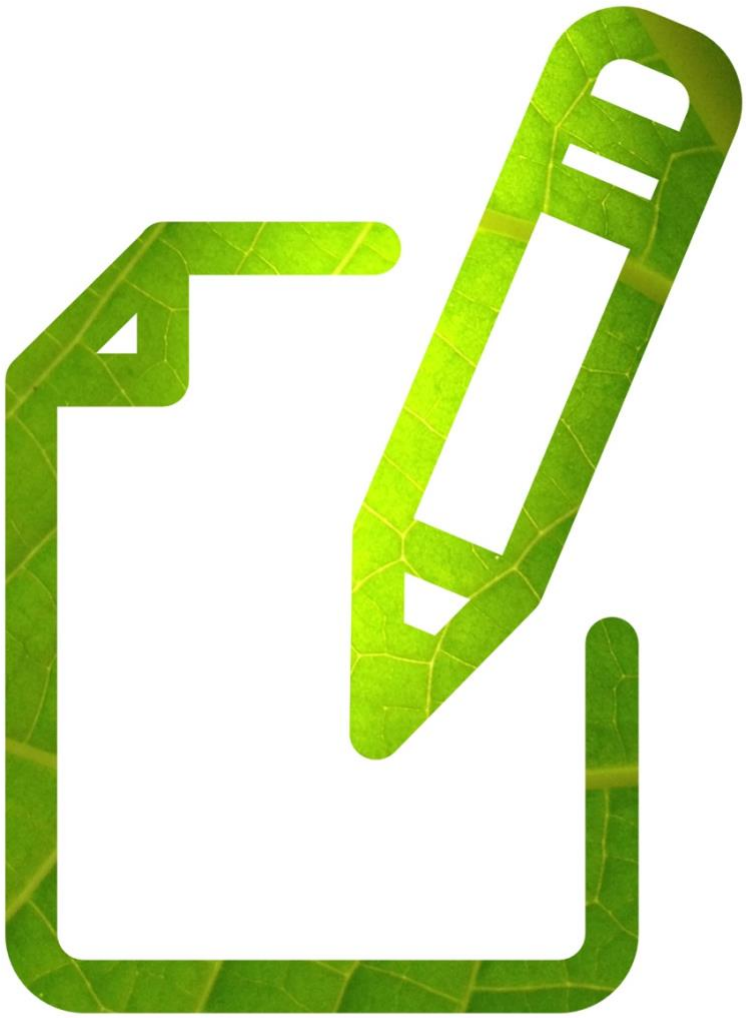
Biological Molecules

Carbohydrates 2

Time allowed

55 minutes

MARK SCHEME



Score	Percentage
/46	%

Question Number	Answer	Mark
1 (a)	1. idea that less {food /eq} required to deliver energy requirement ; 2. (so) more likely to have extra food not respired / {extra/surplus} energy ; 3. which could be laid down in body as fat / eq ;	**(2)**

Question Number	Answer	Mark
1 (b)	Any two from: 1. ADP 2. Pi / inorganic phosphate 3. pyruvate / pyruvic acid / lactate 4. fatty acids 5. NAD / eq 6. acetyl CoA / eq 7. water ; ;	**(2)**

Question Number	Answer	Mark
1 (c)	1. many {alpha / eq} glucose monomers ; 2. joined by glycosidic bonds ; 3. detail of glycosidic bonds e.g. 1-4 ; 4. reference to side branches present / 1-6 glycosidic bonds ;	**(3)**

Question Number	Answer	Mark
1 (d)	1. more gonadotropins ; 2. {use / muscle uptake} of (excess) fatty acids ; 3. respired to release (much) energy / increased fat metabolism ; 4. idea of reduced requirement to replenish glycogen stores ;	**(3)**

Question Number	Answer	Mark
1 (e)	1. (slow twitch muscles) carry out aerobic respiration / full oxidation / eq ; 2. which produces more ATP (than anaerobic) / eq ; 3. 'energy' not locked up in lactate / eq ; 4. idea that it takes longer for lactate levels to build up ;	**(2)**

Question Number	Answer	Mark
1 *(f)	QWC – Spelling of technical terms (*shown in italics*) must be correct and the answer must be organised in a logical sequence) 1. Ca^{2+} leaks out of {cell / *cytoplasm* / *sarcoplasmic reticulum*} ; 2. idea of change in Ca^{2+} binding to *troponin* ; 3. causes displacement of *tropomyosin* / eq ; 4. idea of change in number of *myosin* binding sites exposed ; 5. comment on *myosin* binding to *actin* ; 6. (loss of Ca^{2+} from cell / cytoplasm) therefore force exerted by muscle is lower than expected OR (more Ca^{2+} in cytoplasm) results in less ATP so less muscle contraction ;	**(4)**

Question Number	Answer	Mark
1 (g)		**(2)**

Process	**Two nucleic acids involved in the process**
Transcription of the ACE gene	DNA & mRNA ;
Production of ACE at a ribosome	Any **two** from: mRNA, tRNA, rRNA ;

Question Number	Answer	Mark
1 (h)	1. obtain a sample of cells / extract DNA (from cells) ; 2. reference to named enzyme ; 3. idea of how to increase amount of DNA ; 4. reference to electrophoresis ; 5. details of electrophoresis ; 6. use a {DNA / gene} probe ; 7. with a base sequence complementary to that on the {variant / eq} ; 8. idea of matching with known variant profile ;	**(4)**

Question Number	Answer	Mark
1 (i)	B ;	**(1)**

Question Number	Answer	Mark
1 (j)	1. (higher metabolic rate) means more chemical reactions / eq ; 2. more {energy released / ATP used} / eq ; 3. (which) releases heat / eq ; 4. keeps divers warmer / warm for longer / able to swim without a wetsuit / eq ;	**(3)**

Question Number	Answer	Mark
1 (k)	1. carbon dioxide due to {deforestation / land cleaning / burning fossil fuels / correct ref to respiration / eq} ; 2. methane from {rice fields / anaerobic bacterial action / ruminant fermentation / named ruminant} ;	**(2)**

Question Number	Answer	Mark
1 (l)	1. 1.4 ÷ 37 = ; 2. 3.8 (%) ; Correct answer gains both 2 marks	**(2)**

Question Number	Answer	Mark
2(a)(i)	1. idea that a monosaccharide consists of one {sugar / named sugar / eq} (unit) whereas a disaccharide consists of two (sugar units) ; 2. idea that disaccharide has a glycosidic bond (whereas monosaccharide does not) ; 3. general formula for a monosaccharide is $C_nH_{2n}O_n$ whereas formula for disaccharide is $C_nH_{2n-2}O_{n-1}$ / eq ;	**(2)**

Question Number	Answer	Mark
2(a)(ii)	1. amylose is {straight chained / unbranched / eq} whereas amylopectin is branched ; 2. amylose {coiled / eq} (whereas amylopectin is not) / eq ; 3. amylose has 1-4 (glycosidic) bonds whereas amylopectin has 1-4 and 1-6 (glycosidic) bonds ;	**(2)**

Question Number	Answer	Mark
2(b)	1. idea of carbohydrates providing a source of energy ; 2. if the {energy / carbohydrate / eq} input is greater than the {energy output / carbohydrate use / eq} (weight will be gained) / eq ; 3. idea of excess carbohydrate converted to fat ;	**(2)**

Question Number	Answer	Mark
3 (a)	Any 3 of the following: 1. consists of (α) glucose ; 2. (joined by 1,4 / 1,6) glycosidic bonds ; 3. branched structure / eq ; 4. idea of compact structure ; Any 3 of the following: 5. idea that it is {easily / rapidly / eq} hydrolysed ; 6. (leading to) more {glucose / eq} in a smaller space (in a cell)/ eq ; 7. idea of low solubility ; 8. it does not diffuse out of cells /eq ; 9. it has no osmotic effect / eq ;	**(4)**

Question Number	Answer	Mark
3 (b)(i)	1. increasing intensity {increases carbohydrate use / decreases fat use / eq} / eq ; 2. {low intensity exercise / intensity below {39 / 40} au ses more energy derived from fats / eq ; OR {high intensity exercise / intensity above {39 / 40} au} uses more energy derived from carbohydrates / eq ; 3. at {39 / 40} au both sources of energy used equally / eq ; 4. credit correct manipulation of figures to compare energy usage ;	**(3)**

Question Number	Answer	Mark
3(b)(ii)	1. idea that this diet is suitable for {a high intensity / eq} event ; 2. credit suitable example of athletic event e.g. any endurance or power event ; 3. reference to more carbohydrate being used (than fat) above {39 / 40} a.u. / eq ; 4. reference to carbohydrate being stored as glycogen ; 5. idea of {maximum / more / lots of} glycogen (stored) ; 6. idea that breakdown of glycogen provides energy (for the event) ;	**(3)**