

Question Number	Answer	Additional guidance	Mark
1(a)	<ol style="list-style-type: none"> 1. presence of { membrane bound / named membrane bound } organelle in eukaryotic cells / eq ; 2. presence of { plasmids / slime capsule / pili / eq} in prokaryotic cells ; 3. size of ribosomes i.e. larger in eukaryotic cells / 70S in prokaryotes and 80S in eukaryotes / eq ; 4. DNA in a nucleus in eukaryotic cells /eq ; 5. { DNA / chromosome } linear in eukaryotic cells and circular in prokaryotic cells / eq ; 6. relevant comment regarding cell walls e.g. cell walls always present in prokaryotic cells, only in some eukaryotic cells; 	<p>ACCEPT converse where appropriate</p> <ol style="list-style-type: none"> 1. ACCEPT reference to a named organelle such as mitochondria or nucleus present in eukaryotic cells and NOT in prokaryotic cells 2. ACCEPT reference to mesosomes 6. cell walls in prokaryotic cells contain{ peptidoglycan / murein} and in eukaryotic cells they contain {cellulose /chitin } 	(3)

Question Number	Answer	Additional guidance	Mark
1(b)	1. idea of molecular { differences / similarities } ; 2. in { DNA / RNA } ; 3. in proteins / proteomics ; 4. idea of (evolutionary) relationships between organisms ;	2. ACCEPT base sequences 3. ACCEPT amino acid sequences 4. ACCEPT idea of closely related species	(3)

Question Number	Answer	Additional guidance	Mark
1(c)(i)	1. idea of cell membrane being different ; 2. idea of different number of protein molecules ;	1. ACCEPT description of difference e.g. ether bonds, branched hydrocarbons 2. AC PT NOT same number, they have 10 protein molecules	(2)

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1(c)(ii)	1. number of protein molecules is closer to Eukaryota than to Bacteria / eq ; 2. no peptidoglycan in cell wall ;		(2)

Question Number	Answer	Mark
2 (a)	<ol style="list-style-type: none"> 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
2 (b)	<p>Any two from:</p> <ol style="list-style-type: none"> 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
2 (c)	<ol style="list-style-type: none"> 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
2 (d)	<ol style="list-style-type: none"> 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
2 (e)	<ol style="list-style-type: none"> 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)

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2 * (f)	<p>QWC – Spelling of technical terms (<i>shown in italics</i>) must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> 1. Ca^{2+} leaks out of {cell / <i>cytoplasm</i> / <i>sarcoplasmic reticulum</i>} ; 2. idea of change in Ca^{2+} binding to <i>troponin</i> ; 3. causes displacement of <i>tropomyosin</i> / eq ; 4. idea of change in number of <i>myosin</i> binding sites exposed ; 5. comment on <i>myosin</i> binding to <i>actin</i> ; 6. (loss of Ca^{2+} from cell / cytoplasm) therefore force exerted by muscle is lower than expected <p>OR (more Ca^{2+} in cytoplasm) results in less ATP so less muscle contraction ;</p>	(4)

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2 (g)	<table border="1"> <thead> <tr> <th>Process</th> <th>Two nucleic acids involved in the process</th> </tr> </thead> <tbody> <tr> <td>Transcription of the ACE gene</td> <td>DNA & mRNA ;</td> </tr> <tr> <td>Production of ACE at a ribosome</td> <td>Any two from: mRNA, tRNA, rRNA ;</td> </tr> </tbody> </table>	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 ;	(2)
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2 (h)	<ol style="list-style-type: none"> 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
2 (i)	B ;	(1)

Question Number	Answer	Mark
2 (j)	<ol style="list-style-type: none"> 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
2 (k)	<ol style="list-style-type: none"> 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
2 (1)	1. $1.4 \div 37 =$; 2. 3.8 (%) ; Correct answer gains both 2 marks	(2)