## edexcel

Mark Scheme（Results）
January 2015

Pearson Edexcel International
Advanced Subsidiary Level in Biology（WBI01）Paper 01

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J anuary 2015
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## General Marking Guidance

－All candidates must receive the same treatment．Examiners must mark the first candidate in exactly the same way as they mark the last．
－Mark schemes should be applied positively．Candidates must be rewarded for what they have shown they can do rather than penalised for omissions．
－Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie．
－There is no ceiling on achievement．All marks on the mark scheme should be used appropriately．
－All the marks on the mark scheme are designed to be awarded． Examiners should always award full marks if deserved，i．e．if the answer matches the mark scheme．Examiners should also be prepared to award zero marks if the candidate＇s response is not worthy of credit according to the mark scheme．
－Where some judgement is required，mark schemes will provide the principles by which marks will be awarded and exemplification may be limited．
－When examiners are in doubt regarding the application of the mark scheme to a candidate＇s response，the team leader must be consulted．
－Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response．

| Question Number | Answer |  | Mark |
| :---: | :---: | :---: | :---: |
| 1（a）（i） | C ； | ribose | （1） |
| Question | Answer |  | Mark |
| 1（a）（ii） | C ； | hydrogen bonds between bases | （1） |


| Question <br> Number | Answer | Mark |
| :--- | :--- | :--- |
| $\mathbf{1 ( a ) ( \text { iii } )}$ | D ； | uracil |


| Question <br> Number | Answer | Mark |  |
| :--- | :--- | :--- | :--- |
| $\mathbf{1 ( a ) ( i v ) ~}$ | D ； | phosphodiester bonds | （1） |


| Question <br> Number | Answer | Mark |  |
| :--- | :--- | :--- | :--- |
| $\mathbf{1 ( a ) ( v )}$ | $\mathrm{B} ;$ | cytosine | $\mathbf{( 1 )}$ |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| $\mathbf{1 ( b ) ( i )}$ | 1．idea that（new）DNA is synthesised； <br> 2．idea of a new DNA contains original strand and new <br> strand ； | IGNORE DNA is replicated |



| Question <br> Number | Answer | Additional Guidance | Mark |
| :--- | :---: | :---: | :---: | :---: |
| 2（a）（i） | A；$\quad$ an ester bond formed by a condensation reaction |  |  |


| Question <br> Number | Answer | Additional Guidance | Mark |
| :--- | :--- | :--- | :--- |
| 2（a）（ii） | 1．carbon－carbon double bond present in unsaturated lipid <br> OR <br> saturated lipid has only single bonds between carbons； <br> 2．idea that hydrogen to carbon ratio is larger in saturated <br> lipid ； | 2．IGNORE more hydrogen <br> ACCEPT more hydrogen on <br> each carbon |  |
| 3．idea that unsaturated FA chain is bent／saturated FA chain <br> is straight； | 3．ACCEPT unsaturated fatty acid <br> chain has kinks <br> IGNORE lipids are bent／have <br> kinks |  |  |


| Question <br> Number | Answer | Additional Guidance | Mark |
| :--- | :--- | :--- | :---: |
| 2（b） | 1．consists of（a）glucose／eq ； <br>  <br>  <br>  <br>  <br> 2．（joined）by glycosidic bonds／eq ； <br> 3． 1,4 and 1,6 （glycosidic bonds）； <br> 4．branched structure／eq ； | 1,4 and 1,6 glycosidic bonds <br> would also gain mp2 |  |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| 2（c | 1．increasing intensity decreased lipid use／eq ； |  |
|  | 2．increasing intensity increased carbohydrate use／eq ； |  |
|  | 3．correct use of figures to support both mp1 and mp2； |  |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| 3（a） | 1．plaques／atheroma； |  |
|  | 2．arteries／artery ； |  |
|  | 3．narrow／thicken／block／eq ； <br> 4．blood／oxygen $/ \mathrm{O}_{2} /$ nutrients／glucose／eq ； <br> 5．brain／carotid artery ； | 3．IGNORE constrict／loss of <br> elasticity |
| 4．ACCEPT metabolite |  |  |
| 5．ACCEPT artery to brain OR in |  |  |
| brain |  |  |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| $\mathbf{3 ( b ) ( i )}$ | positive correlation between risk of death and blood cholesterol <br> concentration／as blood cholesterol concentration increases the <br> risk of death from CHD increases／eq ； |  |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| （b）（ii） | 1．for each cholesterol level the risk is higher for people living <br> in Asia（up to 5.8 blood cholesterol）； | 1．ACCEPT idea that higher <br> concentrations of cholesterol are <br> required to bring about same <br> increase in risk in Australians and <br> New Zealanders；； |
| 2．idea that in Asia there is a continual increase in risk and in <br> Australia and New Zealand it is not linear； |  |  |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| 3（b）（iii） | Any one risk from： | Mark |
|  | 1．more smoking in Asia <br> 2．idea of differences in diet <br> 3．idea of differences in health care <br> 4．genetic differences（between Asians and Australians／ <br> New Zealanders ） <br> 5．idea of different level of activity ； |  |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| 3（b）（iv） | 1．idea of identifying higher（CVD）risk in Asia and suggest or <br> implement a change to reduce the risk； | Need to link risk and what to do <br> about it to gain mark |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| $\mathbf{4 ( a )}$ | 1．correctly drawn amino and carboxylic acid groups； | ACCEPT－NH ${ }_{3}+$ and $-\mathrm{COO}^{-}$ |
|  | 2．central carbon with R group and hydrogen； |  |


| Question Number | Answer | Additional Guidance | Mark |
| :---: | :---: | :---: | :---: |
| 4（b）＊ | ＊QWC Emphasis on spelling <br> 1．transcription of mRNA（takes place in the nucleus）； <br> 2．mRNA contains the code for new \｛protein／polypeptide／ eq\} / eq ; <br> 3．mRNA \｛moves to the cytoplasm／leaves the nucleus\} ; <br> 4．idea that mRNA associates with a ribosome； <br> 5．idea that tRNA molecules attached to \｛specific／eq \} amino acids ； <br> 6．idea that tRNA molecules transport amino acids to the \｛ribosome／mRNA\}; | QWC－Emphasis on spelling． penalise once only for the entire response <br> 1 ．ACCEPT a description of mRNA synthesis | （5） |


| Question Number | Answer | Additional Guidance | Mark |
| :---: | :---: | :---: | :---: |
| 4（c） | 1．idea of（change in DNA sequence leads to）change in primary structure ； <br> 2．idea of polypeptide chain will fold differently ； <br> 3．idea that active site will have a different \｛shape／charge／ ionisation\} ; <br> 4．idea that \｛substrate／phenylalanine\} will no longer bind to active site ； | 1．ACCEPT change in the amino acids <br> 2．ACCEPT change in 3D／protein shape <br> Alternative answer ： <br> Mp2 reference to stop codons <br> Mp3 could result in no enzyme being synthesised <br> Mp4 substrate has nothing to bind with |  |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| 4（d） | 1．idea that（recessive condition so individual） 8 must have <br> inherited one copy of the recessive allele from each parent ； | 1．ACCEPT individual person 8 is <br> homozygous recessive／aa |
|  | 2．idea that neither 5 or 6 is affected so \｛they can＇t be <br> homozygous／must be heterozygous\} for the condition ; | 2．ACCEPT（therefore） 5 and 6 <br> are both Aa |


| Question Number | Answer | Additional Guidance | Mark |
| :---: | :---: | :---: | :---: |
| 5（a） | 1．many（small）alveoli ； <br> 2．covered by extensive network of capillaries／eq ； <br> 3．ensuring large surface area（for gas exchange）／eq ； <br> 4．idea of thin \｛capillary walls／alveolar walls\} ; <br> 5．increases diffusion ； | IGNORE reference to moisture <br> 1．ACCEPT＂air sacs＂； <br> 4．DO NOT ACCEPT thin lining <br> 5．ACCEPT any correct reference to diffusion | （4） |


| Question <br> Number | Answer | Additional Guidance | Mark |
| :--- | :--- | :--- | :--- |
| 5（b） | 1．idea that only a short distance from surface of C．elegans to <br> cells inside body ； <br> 2．idea that diffusion（alone）is sufficient ； <br> 3．idea that $C$. elegans has low activity ； | 1．ACCEPT large surface area to <br> volume ratio ； |  |


| Question Number | Answer | Additional Guidance | Mark |
| :---: | :---: | :---: | :---: |
| 6（a） | 1．fatty acid chains（on phospholipid）are hydrophobic／eq ； <br> 2．and \｛aggregate／group／eq\} together ; <br> 3．phosphate groups（on the phospholipid）are hydrophilic／eq ； <br> 4．and associate with water ； <br> 5．two monolayers form a bilayer ； | 1．ACCEPT tails／hydrocarbon chains in place of fatty acid chains ； <br> 2．ACCEPT orientate away from water ； <br> 3．ACCEPT heads in place of phosphate group ； | （3） |


| Question Number | Answer | Additional Guidance | Mark |
| :---: | :---: | :---: | :---: |
| 6（b） | 1．phospholipids can move（in the plasma membrane）； <br> 2．proteins randomly inserted（in plasma membrane）／eq ； | 1．ACCEPT \｛proteins／molecules／eq\} can move around within the phospholipid（mono）layer ； <br> 2．ACCEPT variety of different \｛proteins／ glycoproteins\} ; ACCEPT proteins scattered in the membrane； | （2） |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| $\mathbf{6 ( c ) ( i )}$ | 1．idea that colour intensity increases as the <br> permeability of the membrane increases； <br> 2．as the concentration（of alcohol above 10\％） <br> increases，the permeability of the cell <br> membranes increases／eq ； | MP2 and MP3 ACCEPT answers in terms of <br> intensity of colour only if correct <br> correlation between colour intensity and <br> permeability has been made for MP1 |
| 3．concentrations（of alcohol）up to 10\％have no <br> effect the permeability of the membrane； | （2） |  |


| Question Number | Answer | Additional Guidance | Mark |
| :---: | :---: | :---: | :---: |
| 6（c）（ii） | Temperature <br> 1．if（temperature）increased the rate of diffusion increases／permeability increases／eq； <br> 2．and the solution may be darker／eq ； <br> Size of single cube <br> 3．smaller surface area／less tissue ； <br> 4．solution will be less dark ； | 2．and 4．ACCEPT correct reference to colorimeter reading <br> ALTERNATIVE candidates might use several smaller cubes but it must be clear this is the case <br> 3．ACCEPT increased surface area（to volume） <br> 4．ACCEPT solution will be darker |  |


| Question <br> Number | Answer | Additional Guidance | Mark |
| :--- | :--- | :--- | :--- |
| $\mathbf{7 ( a )}$ | A；aorta |  |  |


| Question Number | Answer | Additional Guidance | Mark |
| :---: | :---: | :---: | :---: |
| 7（b） | 1．thin walls e．g．one layer of cells <br> 2．so increased diffusion／short diffusion distance ； <br> OR <br> 3．gaps between cells <br> 4．so allows exchange（of materials）； | paired marks for MP1 and MP2 or MP3 and MP4 <br> 1．NOT thin membranes／thin lining／ capillary is one cell thick <br> 3．ACCEPT＂has pores＂ <br> ACCEPT＂is permeable＂ | （2） |



| Question <br> Number | Answer | Additional Guidance | Mark |
| :--- | :--- | :--- | :--- |
| 7（d） | 1．idea of oxygen rich and oxygen depleted blood mix／eq ； <br> 2．idea that less blood pumped around body／blood pumped <br> around body has a lower oxygen concentration／less <br> oxygen delivered to body ； <br> OR <br> blood pumped to lungs has a higher oxygen concentration <br> ／less efficient gas exchange ； |  |  |
|  | 3．idea that（systemic）blood pressure will be low ； |  |  |


| Question <br> Number | Answer | Additional Guidance | Mark |
| :--- | :--- | :--- | :---: |
| $\mathbf{8 ( a ) ( i )}$ | idea of repeating the experiment ； |  | （1） |


| Question <br> Number | Answer | Additional Guidance | Mark |
| :--- | :--- | :--- | :---: |
| 8（a）（ii） | 1．use additional concentration（s）of salt ； | stated concentration（s）between <br> 4.0 and 4.5 g dm <br>  <br> marks | gains both |$\quad$.


| Question Number | Answer | Additional Guidance | Mark |
| :---: | :---: | :---: | :---: |
| 8（a）（iii） | 1．（they are swelling）as water is entering the cell ； <br> 2．by osmosis ； <br> 3．from an area of \｛high water／low solute／eq\} concentration ； OR to one of \｛low water／high solute／eq\} concentration ; | 3．ACCEPT salt concentration is higher inside the cells（than outside cells）； ACCEPT description of water potential gradient e．g．water moves into the cell down a water potential gradient gains mpl and mp3； | （3） |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| 8（b）（i） | 1．cell membrane is（selectively）permeable to potassium ions／ <br> eq ； | 1．ACCEPT potassium leaves the <br> cell |
|  | 2．potassium ions diffuse ； <br> 3．cell membrane is impermeable to haemoglobin／eq ； |  |


| Question <br> Number | Answer | Additional Guidance |
| :--- | :--- | :--- | :--- |
| $\mathbf{8 ( b ) ( i i )}$ | 1．in the presence of glucose，potassium enters the cell／eq ； |  |
| 2．potassium taken up against a concentration gradient／eq ； |  |  |
| 3．need for glucose suggests energy is required／eq ； | 3．ACCEPT glucose as a <br> respiratory substrate <br> 4．ACCEPT pumping of potassium <br> ions |  |
|  | 4．（suggesting）active transport of potassium ions； |  |

