

Mark Scheme (Final)

Summer 2008

GCE

GCE Biology (6105/01)

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.

PRE-STANDARDISATION MARK SCHEME - UNIT 5 (6105/01) A2 BIOLOGY / BIOLOGY (HUMAN) June 2008

STRICTLY CONFIDENTIAL

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- (1) You must have provisionally marked 15 of every item **ONLINE** before the Standardisation Meeting on **24/06/2008** in order to familiarise yourself with the Pre-standardisation mark scheme.
- (2) At the meeting the mark scheme will be discussed and amplified. It will be amended in the light of the discussion and of marking experience. Assistant Examiners will then be asked to take part in an Agreement Trial. The marks will be compared and discussed. Scripts used in Agreement Trials may be taken away from the meeting for reference purposes; these must be **destroyed** at the conclusion of marking.
- (3) Within **48 hours** of the Standardisation meeting, Assistant Examiners must mark fully, **ONLINE**, a sample of **10** of every item in the light of the amended **FINAL** mark scheme which you will be able to access **ONLINE**. Please note that you will not be able to mark any more responses until after you have received clearance from your Team Leader, and any differences are resolved.
- (4) Once clearance has been received from the Team Leader, you **MUST** start marking and all your marking **MUST** be done by the **contract completion date on your contracts**.
- (5) Further checks on your marking will be made by your Team Leader at any point throughout the marking period to ensure that your marking is accurate.

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Please contact the ePEN helpdesk for technical queries:

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Question Number	Answer	Mark
1(a)	<p>1. 63 ;</p> <p>[max 2 from the following 3 marking points]</p> <p>2. cannot form gametes /eq ;</p> <p>3. (because) chromosome pairing not possible / eq ;</p> <p>4. during {meiosis / eq} ;</p> <p>COMMENT mp 3: ACCEPT idea of not being able to pair but NOT just "there is an odd number" mp 4: if stage in meiosis given then must be correct : prophase 1 or metaphase 1.</p>	max (3)

Question Number	Answer	Mark
1(b)	<p>1. (isolating mechanisms) prevent interbreeding (between species / populations) / barrier to reproduction / eq ;</p> <p>2. (postzygotic mechanisms) allow {mating / fertilisation / eq} / eq;</p> <p>3. but prevent production of {viable / fertile} offspring / prevent offspring developing / eq ;</p> <p>COMMENT mp 3: allow converse "produced sterile offspring".</p>	(3)

Question Number	Answer	Mark
1(c)	<p>1. idea that species is group of organisms that can interbreed to produce fertile offspring / eq ;</p> <p>2. but mule {is sterile / cannot produce offspring} ;</p>	max (2)

Question Number	Answer	Mark
2(a)	<ol style="list-style-type: none"> 1. lapwing ; 2. greatest increase when predators are removed ; 3. use of data (either for lapwing or comparing lapwing to other birds) ; <p>OR</p> <ol style="list-style-type: none"> 1. red grouse ; 2. greatest increase of population with time when predators removed ; 3. use of data ; <p>COMMENT mp 3: credit an attempt to back up their reason with reference to data</p> <p>NB - incorrect species = 0 for all marks - if both correct species given, credit best answer</p>	(3)

Question Number	Answer	Mark
2(b)	<ol style="list-style-type: none"> 1. collect a sample of animals mark them release them; 2. qualified ref. to nature of mark ; 3. leave for suitable time, collect a second sample ; 4. count the number of marked animals in the sample ; 5. equation for Lincoln Index given / explanation of how Index is used ; 	max (3)

Question Number	Answer	Mark
3(a)	<ol style="list-style-type: none"> 1. absorption spectrum shows wavelengths where light is absorbed by pigments / eq ; 2. action spectrum shows activity at different wavelengths / eq ; 3. ref to the link between peak absorption for a pigment and the photosynthetic rate ; 4. indicates that pigments are involved in {photosynthesis / eq} ; 5. correct comparison between graphs (using whole range of wavelengths) ; 	max (3)

Question Number	Answer	Mark
3(b)	thylakoid (membrane) / granum / grana ;	(1)

Question Number	Answer	Mark
3(c)	<ol style="list-style-type: none"> 1. use of {chromatography paper / (silica) gel plates / eq}; 2. using {solvent / named example} to {move / separate} pigments ; 3. left to run until solvent {reaches / near to} {top / other end} of {paper / plate} ; 4. origin and solvent front marked ; 5. reference to use of R_f values to identify pigments ; 	max (4)

Question Number	Answer	Mark
3(d)	<ol style="list-style-type: none"> 1. (magnesium) {component / used in formation / eq} of chlorophyll ; 2. less chlorophyll formed if magnesium deficient / eq; 3. {other pigments / carotenoids} still present / eq ; <p>COMMENT mp 1: must be chlorophyll not chloroplast</p>	max (2)

Question Number	Answer	Mark
4(a)	<p>1 mark per structure correctly drawn ; ; ; ;</p> <p>COMMENT cell wall must be double-line</p> <p>flagellum has to go through wall and be closed off</p> <p>membrane and adhere to inner line of cell wall</p> <p>if mesosome shown, it must be separated from cell wall</p>	(4)

Question Number	Answer	Mark
4(b)	<ol style="list-style-type: none"> 1. (more nutrients) increases the numbers of {cyanobacteria / algae}, more food for {zooplankton / fish} so their numbers increase ; 2. cyanobacteria produce / {toxins / eq} that kill {animals / organisms} (in the water) ; 3. create algal bloom that shades other (aquatic) plants ; 4. increase in {bacteria / decomposers } {uses up oxygen / increase BOD} ; 5. therefore {zooplankton / fish} {die / decrease in numbers} ; 	max (3)

Question Number	Answer	Mark
4(c)	<ol style="list-style-type: none"> 1. could inhibit {cell/ nuclear} / division / mitosis ; 2. could act as enzyme inhibitors (any form of inhibition) ; 3. could interfere with metabolic pathways / specific example ; 4. any other appropriate reason ; <p>COMMENT mp 4: e.g. interfere with formation of cell wall</p>	max (2)

Question Number	Answer	Mark
4(d)	<p>{the chemical pesticides could kill other organisms, not just the cyanobacteria} / {the water could be used as a source of drinking water for {people / animals} and the chemicals could disrupt food chains / any other suitable reason ;</p> <p>ACCEPT converse arguments</p> <p>COMMENT use of "it" assume biological control</p> <p>IGNORE references to costs / economic comments</p>	(1)

Question Number	Answer	Mark
5(a)(i)	artery ;	(1)

Question Number	Answer	Mark
5(a)(ii)	<p><i>Needs one feature and a function for the two marks, max. of two features</i></p> <ol style="list-style-type: none"> 1. thick {wall / layer} of (smooth) muscle / thick elastic {layer / wall} ; 2. allows artery to expand / withstand pressure from the pulse of blood / eq ; 3. collagen (fibres) ; 4. provides strength / eq ; 5. smooth lining ; 6. prevent resistance to blood flow / eq ; 7. small lumen / eq ; 8. to maintain high pressure / eq ; <p>COMMENT function must follow on from correct feature mp 8: accept idea of creating high pressure</p>	<p>max (4)</p>

Question Number	Answer	Mark
5(b)	<ol style="list-style-type: none">1. inhibits the enzyme (that catalyses the conversion) ;2. by active site-directed inhibition / eq ;3. inhibitor {is a similar shape to the substrate } / blocks active site ;4. by non active site-directed inhibition ;5. inhibitor attaches to enzyme at point other than active site / eq ;6. (and) causes active site to change shape ;	max (4)

Question Number	Answer	Mark
6(a)	<ol style="list-style-type: none"> 1. peptide {bond / link} ; 2. (formed by) condensation ; 3. between {carboxyl / COOH} and {amine / amino / NH₂} ; <p>NB marks can be awarded from annotated diagram</p> <p>COMMENT NOT dipeptide / polypeptide {bond / link}</p>	max (2)

Question Number	Answer	Mark
6(b)	<ol style="list-style-type: none"> 1. ionic ; 2. hydrogen ; 3. disulphide stronger than hydrogen and ionic / eq ; <p>COMMENT comparative comment of relative strengths</p>	(3)

Question Number	Answer	Mark
6(c)	<p>glucose able to be absorbed in stomach / no need for digestion of glucose / any other suitable suggestions / ;</p> <p>COMMENT IGNORE references to glucose being soluble</p> <p>IGNORE references to student not eating for sometime unless qualified</p>	(1)

Question Number	Answer	Mark
6(d)	<ol style="list-style-type: none"> 1. disulphide links {cannot form} ; 2. reference to disulphide links form between cysteine molecules ; 3. {chains / chain A and chain B} cannot be linked correctly ; 4. {molecule /insulin / polypeptide} has a different {shape / tertiary structure / 3D-structure eq} ; 5. (therefore) insulin {has different properties / not formed / eq} ; 6. insulin receptor sites on {cell surface membrane / eq} ; 7. receptor sites do not accept this insulin / eq ; 8. blood glucose level would {continue to rise / not fall / take longer to decrease} ; 9. reference to decrease in uptake of glucose from blood into cells ; 10. reference to less {glucose to glycogen / glycogenesis} in {liver / muscles} / ref/ to excess glucose in urine ; 	max (6)

Question Number	Answer	Mark
7(a)	<ol style="list-style-type: none"> 1. loss of rod cells (in retinitis pigmentosa) reduces ability to{receive light / eq} ; 2. reference to rhodopsin as photosensitive pigment ; 3. light causes {change of shape (in retinal) / reference to cis- to trans- retinal} ; 4. causes rhodopsin to split into opsin and retinal [NOT retinol] ; 5. opsin decreases permeability of rod cell to sodium ions ; 6. ref to generator potential / hyper polarisation ; 	max (4)

Question Number	Answer	Mark
7(b)	<ol style="list-style-type: none"> 1. parental genotype and possible gametes shown using acceptable symbols ; 2. correct cross shown on diagram to give child genotypes ; 3. statement that both parents are carriers of recessive allele / child receives recessive allele from each parent ; 4. child with disorder will be homozygous recessive ; [as a statement or identified clearly in diagram] 5. {1 in 4 / 25% / 0.25} chance of each child having disorder ; 6. {1 in 2 / 50% / 0.5} chance of each child being a carrier ; 	max (5)

Question Number	Answer	Mark
8	<ol style="list-style-type: none"> 1. buoyancy ; 2. less dense than water ; 3. hormones ; 4. reference to steroids / named example ; 5. water-proofing / reducing evaporation ; 6. reference to {waxes / oils} / example / hydrophobic nature ; 7. thermal insulation ; 8. reference to suitable example such as blubber / subcutaneous fat ; 9. electrical insulation ; 10. reference to myelin sheath / Schwann cell / increased impulse propagation ; 11. energy store ; 12. reference to respiration release energy / compact molecule / energy for germination / reference to brown fat ; 13. cell membrane ; 14. phospholipids / polar nature / forms bi layer ; 15. metabolic water ; 16. reference to survival in desert animals ; 17. physical protection / shock absorber ; 18. around {organs / named example} ; 19. {source / store} of vitamins ; 20. named example such as A, D or E ; 	<p style="text-align: right;">max (6)</p>