edexcel

Mark Scheme (Results)

June 2011

GCE Biology (6BI01) Paper 01
Lifestyle, Transport, Genes and Health

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at www.edexcel.com.

If you have any subject specific questions about the content of this Mark Scheme that require the help of a subject specialist, you may find our **Ask The Expert** email service helpful.

Ask The Expert can be accessed online at the following link:
http://www.edexcel.com/Aboutus/contact-us/

Alternatively, you can contact our GCE Science Advisor directly by sending an email to ScienceSubjectAdvisor@EdexcelExperts.co.uk.
You can also telephone 0844 576 0037 to speak to a member of our subject advisor team.

June 2011
Publications Code US027472

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.

Quality of Written Communication

- Questions which involve the writing of continuous prose will expect candidates to:
- write legibly, with accurate use of spelling, grammar and punctuation in order to make the meaning clear
- select and use a form and style of writing appropriate to purpose and to complex subject matter
- organise information clearly and coherently, using specialist vocabulary when appropriate.

Full marks will be awarded if the candidate has demonstrated the above abilities.
Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

GENERAL INFORMATION

The following symbols are used in the mark schemes for all questions:

Symbol	Meaning of symbol
; semi colon	Indicates the end of a marking point
Eq	Indicates that credit should be given for other correct alternatives to a word or statement, as discussed in the Standardisation meeting
/ oblique	Words or phrases separated by an oblique are alternatives to each other
{} curly brackets	Indicate the beginning and end of a list of alternatives (separated by obliques) where necessary to avoid confusion
() round brackets	Words inside round brackets are to aid understanding of the marking point but are not required to award the point
[] square brackets	Words inside square brackets are instructions or guidance for examiners
[CE] or [TE]	Consecutive error / transferred error

Crossed out work

If a candidate has crossed out an answer and written new text, the crossed out work can be ignored. If the candidate has crossed out work but written no new text, the crossed out work for that question or part question should be marked, as far as it is possible to do so.

Spelling and clarity

In general, an error made in an early part of a question is penalised when it occurs but not subsequently. The candidate is penalised once only and can gain credit in later parts of the question by correct reasoning from the earlier incorrect answer.

No marks are awarded specifically for quality of language in the written papers, except for the essays in the synoptic paper. Use of English is however taken into account as follows:

- the spelling of technical terms must be sufficiently correct for the answer to be unambiguous
  e.g. for amylase, 'ammalase' is acceptable whereas 'amylose' is not
  e.g. for glycogen, 'glicojen' is acceptable whereas 'glucagen' is not
  e.g. for ileum, 'illeum' is acceptable whereas 'ilium' is not
  e.g. for mitosis, 'mytosis' is acceptable whereas 'meitosis' is not

- candidates must make their meaning clear to the examiner to gain the mark.

- a correct statement that is contradicted by an incorrect statement in the same part of an answer gains no mark – irrelevant material should be ignored

Question Number	Answer	Mark
1(a)	1. protein / glycoprotein ; 2. facilitated diffusion ; 3. active transport / eq ; 4. ATP / adenosine triphosphate ;	**(4)**

Question Number	Answer	Mark
1(b)(i)	1. 77-70 / 7; 2. correct division by 77 (multiplied by 100) to give correct answer, e.g. 9.1 / 9.09 / 9.0 / 9 [CE applies] Correct answer = 2 marks	**(2)**

Question Number	Answer	Mark
1(b)(ii)	1. idea that not all of the {juice / sugar} washed off / idea that the strawberries were not dried after rinsing properly / idea that some water reabsorbed (during washing) ; 2. loss of mass of strawberries not as high as it should have been / eq ; 3. (%) value too small / eq ; OR 1. idea that strawberry {tissue / juice} lost because {washing too vigorous / tissue stuck to towel when drying / squeezing strawberries / juice absorbed from strawberries} / water lost through evaporation / eq ; 2. loss of mass of strawberries higher than it should have been / eq ; 3. (%) value too high / eq ;	**(3)**

Question Number	Answer	Mark
1(b)(iii)	1. correct reference to <u>water</u> gradient (between sugar and strawberries) ; 2. reference to osmosis (of water from inside of strawberry to outside) ; 3. idea that water is found in {cytoplasm / vacuoles} (of strawberry) ; 4. reference to water as a solvent (for the sugar) ; 5. reference to (di)polar nature of water / eq ;	**(3)**

Question Number	Answer	Mark
2(a)(i)	1. both hexose molecules in disaccharide correctly drawn ; 2. indication that water is formed ; 3. glycosidic bond correctly drawn ;	**(3)**

Question Number	Answer	Mark
2(a)(ii)	condensation / polymerisation ;	**(1)**

Question Number	Answer	Mark
2(a)(iii)	(1, 4) glycosidic (bond / link) ;	**(1)**

Question Number	Answer	Mark
2(b)(i)	A ;	**(1)**

Question Number	Answer	Mark
2(b)(ii)	B ;	**(1)**

Question Number	Answer	Mark
2(b)(iii)	B ;	**(1)**

Question Number	Answer	Mark
2(c)(i)	1. genotypes of parents correctly shown ; 2. alleles present in gametes correctly shown ; 3. possible genotypes of offspring correctly shown ; 4. probability stated as {0.5 / 50% /1 in 2 / ½ / 50:50} ;	**(4)**

Question Number	Answer	Mark
2(c)(ii)	The same (as the probability is for the first child) ;	**(1)**

Question Number	Answer	Mark
***3(a)** QWC	(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence) 1. reference to CFTR {gene / channel} not functioning properly ; 2. reference to {thicker / stickier / eq } *mucus* ; 3. (*mucus*) blocks *(pancreatic)* {duct(s) / eq } ; 4. in the *pancreas* ; 5. idea that *enzymes* cannot {be secreted into / reach} small *intestine* ; 6. idea of reduced *digestion* of {food / named food} ; 7. reference to reduced *absorption* / eq ; 8. idea of {*malnutrition* / *weight* loss} ; 9. idea of {self-*digestion* of *(pancreatic)* cells / problems controlling blood sugar levels / *cysts* / *fibroids*} ;	**(4)**

Question Number	Answer	Mark
3(b)	1. reference to {IVF / description of preimplantation} ; 2. {embryo / eq} DNA analysed / eq ; 3. presence of CFTR {gene mutation / faulty allele / eq} tested for / eq ;	**(3)**

Question Number	Answer	Mark
3(c)	Any of the following paired points 1. who has right to decide if tests should be performed / eq ; 2. {implications of medical costs / disagreements over next step / embryo has rights} ; **OR** 3. issues relating to confidentiality of {parents / child} / eq ; 4. idea that {some other abnormality may be found / paternal DNA does not match / other family members have right to know results} ; **OR** 5. idea some other abnormality may be found / false negative ; 6. comment on possible problems with e.g. future employment / insurance / what constitutes a serious condition / eq ; **OR** 7. idea that embryo could be {damaged / destroyed / discarded / eq} / false positive ; 8. embryo {is a potential life / has rights} /destroying embryo is {wrong / unethical / murder / eq} ;	**(2)**

Question Number	Answer	Mark
4(a)	(DNA) { polymerase / helicase / ligase} ;	**(1)**

Question Number	Answer	Mark
4(b)	**Stage 1** 1. only one bond drawn in lower half of tube ; **Stage 2** 2. one only bond drawn (higher than the one drawn in stage 1) ; **Stage 3** Diagram 3. {1 / 2} molecules shown with one light and one heavy strand ; 4. {1 / 2} molecules shown with two light strands; Test tube 5. 2 bands shown in roughly correct position (middle to upper half of test tube) ; 6. bands should be of (roughly) equal width ; [consequential error from stage 2 should apply for both marking points 5 and 6]	**(6)**

Question Number	Answer	Mark
5(a)(i)	Any **three** from: 1. decrease in smoking / not smoking / eq ; 2. reference to {increase / regular / eq} exercise ; 3. improvements to diet qualified, e.g. reduce salt, reduce saturated fat, increase fibre ; 4. maintaining appropriate weight / eq ; 5. {moderate / reduced} alcohol consumption / eq ; 6. reducing stress / eq ; 7. use of medication e.g. statins, antihypertensives, warfarin ;	**(3)**

Question Number	Answer	Mark
5(a)(ii)	1. (less) cholesterol (in blood) to build up on artery (wall) / eq ; 2. less likely to develop atherosclerosis / eq ; 3. credit correct reference to subsequent consequence of atherosclerosis e.g. narrowing of arteries, ischaemia, decrease in flow of blood (to heart) ;	**(2)**

Question Number	Answer	Mark
5(b)	1. age effect qualified e.g. older increases risk, {arteries {become less elastic / more easily damaged / blood pressure increases} with (increase in) age ; 2. gender effect qualified e.g. {women less likely to develop CVD than men / oestrogen offers some protection to women against CVD } (pre menopause) / eq ;	**(2)**

Question Number	Answer	Mark
5(c)(i)	1. Finland has the highest death rate / eq ; 2. Sweden has the lowest death rate /eq ; 3. credit correct manipulation of figures to compare one of these countries to one other country ;	**(3)**

Question Number	Answer	Mark
5(c)(ii)	1. Finland {highest on graph / not highest on map} Germany and UK have the highest on the map / eq ; 2. idea that a number (3 or more) of countries are the same on the map ; 3. France does not have the lowest number of deaths / eq ; 4. Credit any other correct comparison ; 5. {map shows number of deaths and graph shows relative death rate / map gives the results grouped together but graph shows individual values / map does not allow for population size} ;	**(2)**

Question Number	Answer	Mark
5(c)(iii)	Any **one** from: 1. the data on the map is shown in groups / eq; 2. the data might come from a different year / different time / no information given on the year / eq ; 3. different groups of people were surveyed / eq ; 4. idea that bar graph shows number of deaths relative to population / the map does not take into account the population of the country ;	**(1)**

Question Number	Answer	Mark
6(a)	1. presence of amine group /eq ; 2. presence of carboxyl group / eq ; 3. reference to R group ; 4. reference to central carbon atom ; [award marks on correctly drawn diagram]	**(2)**

Question Number	Answer	Mark
6(b)	1. correct reference to transcription ; 2. DNA {unwinds / strands separate / eq} ; 3. (RNA) (mono)nucleotides {line up against / attach / eq} to one (DNA) { strand / template / eq} ; 4. reference to <u>complementary</u> base pairing (between DNA and (mono)nucleotides) ; 5. reference to {(mono)nucleotides joining together / formation of phosphodiester bonds} ; 6. correct reference to condensation reaction ; 7. correct reference to named enzymes involved / eq ; 8. mRNA detaches (from DNA) / eq ;	**(4)**

Question Number	Answer	Mark
6(c)(i)	**DISCOUNTED QUESTION / DO NOT MARK**	**(0)**

Question Number	Answer	Mark
6(c)(ii)	B ;	**(1)**

Question Number	Answer	Mark
6(c)(iii)	D ;	**(1)**

Question Number	Answer	Mark
7 (a)	1. cooking decreases all the vitamins / eq ; 2. reference to only zinc does not change / eq ; 3. biggest decrease is in Vitamin A ; 4. credit manipulation of figures with units (if appropriate) to compare raw and cooked ;	**(3)**

Question Number	Answer	Mark
***7(b) QWC**	(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence) 1. idea that some carrots need to be boiled in water and some cooked in microwave ; 2. reference to control of appropriate variable; 3. reference to {juice / cooking water} being used ; 4. reference to DCPIP ; 5. {reference to titration / description of titration} (of juice) ; 6. colour change of DCPIP e.g. from blue to {colourless / pink} as juice added / until stays blue as DCPIP added ; 7. reference to {comparison of volumes of DCPIP added to each / use of calibration curve / calculation of vitamin C concentration against known vitamin C solution} ; 8. reference to repeats ;	**(5)**

Question Number	Answer	Mark
8(a) (i)	1. group on diet Q loses more mass (overall in the 6 months) / eq ; 2. both groups lost mass in the first { 2 / 6 } months ; 3. the group on diet Q {lost the most mass / lost mass the fastest} in the first 2 months ; 4. between 2 and 6 months there was {no more loss of mass / slight increase in mass} in the group on diet P AND those on diet Q lost more mass / eq ; 5. credit correct manipulation of figures to compare mass loss between two of the groups ;	**(3)**

Question Number	Answer	Mark
8 (a) (ii)	not following the diet {anymore / so strictly} / not doing so much exercise /eq ;	**(1)**

Question Number	Answer	Mark
8(a)(iii)	Any **two** from: 1. gender / eq ; 2. age / eq ; 3. extent to which individuals were over-weight / eq ; 4. occupation / eq ; 5. alcohol intake / eq ; 6. standardised exercise programme / amount of exercise taken eq ; 7. health / disability / stress / eq ; 8. timing of meals / eq ; 9. time of weighing / eq ;	**(2)**

Question Number	Answer	Mark
8(b)	1. idea that exercise uses energy ; 2. the {longer / more intense} the exercise, the more {energy used / weight loss} / eq ; 3. idea of {mass / weight} loss depends on energy input lower than energy output ; 4. idea that exercise increases metabolism / muscles use more energy than fat ;	**(3)**

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481
Email publication.orders@edexcel.com

Order Code US027472 June 2011

For more information on Edexcel qualifications, please visit
www.edexcel.com/quals

Ofqual

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Rewarding Learning