OCR
RECOGNISING ACHIEVEMENT

GCSE

# Biology B

General Certificate of Secondary Education

Unit **B631/02:** Modules B1, B2, B3 (Higher Tier)

# Mark Scheme for January 2011

Oxford Cambridge and RSA Examinations

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Abbreviations, annotations and conventions used in the detailed Mark Scheme.

| | | |
|---|---|---|
| / | = | alternative and acceptable answers for the same marking point |
| (1) | = | separates marking points |
| **not** | = | answers which are not worthy of credit |
| **reject** | = | answers which are not worthy of credit |
| **ignore** | = | statements which are irrelevant |
| **allow** | = | answers that can be accepted |
| ( ) | = | words which are not essential to gain credit |
| __ | = | underlined words must be present in answer to score a mark |
| ecf | = | error carried forward |
| AW | = | alternative wording |
| ora | = | or reverse argument |

| Question | | | Expected Answers | Marks | Additional Guidance |
|---|---|---|---|---|---|
| 1 | (a) | | insulin (1) | 1 | **allow** adrenalin |
| | (b) | | breasts develop / hips widen<br>/ pubic hair / hair under arms (1) | 1 | **ignore** periods / menstruation / menstrual cycle<br>**allow** egg release / egg production / ovulation<br>**ignore** become fertile<br>**allow** body hair **but ignore** just hair<br>**ignore** references to moods<br>**not** any solely male characteristic eg voice deepens |
| | (c) | | oestrogen = repair (1)<br>progesterone = maintain thickness (1) | 2 | **allow** oestrogen makes it thicker (1)<br>**ignore** progesterone keeps uterus in good condition |
| | | | **Total** | 4 | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|---|---|---|---|---|---|
| 2 | (a) | (i) | obese (1) | 1 | |
| | | (ii) | 34 (2)<br>**but** 110 / (1.8 x 1.8) OR 110 / 3.24 (1) | 2 | correct answer no working = (2)<br>**allow** 33.95 / 33.950617 (2)<br>**allow** 33.950 / 33.9 / 33 (1) mark only because incorrect rounding |
| | (b) | (i) | few(er) cilia / cilia do not work / cilia damaged / AW (1) | 1 | **allow** cilia clogged (1)<br>**allow** more mucus (1)<br>**ignore** just covered in mucus<br>**allow** reference to cancer / DNA damage / AW (1)<br>**ignore** just cell damage<br>**ignore** covered in tar / dirt / dust<br>**ignore** hairs |
| | | (ii) | alcohol is a poison / toxin (1) | 1 | **allow** liver breaks down the alcohol / alcohol scars liver<br>**allow** causes cirrhosis<br>**allow** kills liver cells<br>**ignore** kills liver |
| | (c) | (i) | (heat needed for) evaporation (1) | 1 | **not** heat evaporates<br>**ignore** water lost |
| | | (ii) | (lactic acid is) removed / oxidised / broken down / taken to liver (1) | 1 | **ignore** degenerates / decay<br>**allow** changed to carbon dioxide and water |
| | | | **Total** | 7 | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|---|---|---|---|---|---|
| 3 | (a) | | A, T, C , G (1) | 1 | **allow** any order<br>**allow** lower case<br>**allow** correct names |
| | (b) | (i) | 28 (1) | 1 | **not** 28 pairs<br>**not** 14 pairs |
| | | (ii) | 58 (1) | 1 | **allow** 29 pairs |
| | (c) | (i) | different sequence / order / pattern of <u>bases</u> (1) | 1 | **allow** some base(s) are missing / extra base(s) / base(s) substituted<br>**allow** different base code<br>**allow** different bases |
| | | (ii) | homozygous (no mark)<br>it would need to have two recessive alleles / if it had a dominant allele it would be dark (1) | 1 | if heterozygous – no mark for whole question |
| | | | **Total** | 5 | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|---|---|---|---|---|---|
| 4 | (a) | | idea that viruses carry <u>antigens</u> (1)<br><br>idea that white blood cells / body **releases** / **makes** <u>antibodies</u> (1)<br><br>idea of body knowing how to make the antibodies (more quickly) if infected again (1) | 3 | <br><br>**ignore** antitoxin<br><br>**allow** correct reference to memory cells<br>**allow** antibodies remain in blood / body<br>**ignore** just immunity remains (in question) |
| | (b) | | **any one from:**<br>to check for side effects / check for harmful effects / to see if they are safe / AW (1)<br>find the level of dose needed (1) | 1 | **ignore** see if they work / have an effect |
| | | | **Total** | 4 | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|---|---|---|---|---|---|
| 5 | (a) | (i) | population (1) | 1 | **allow** any indication eg underline |
| | | (ii) | **any two from:**<br>stop hunting / ban hunting (1)<br>ban egg collecting (1)<br>ban pesticides (1)<br>build them nests (1)<br>feeding stations / feed them (1)<br>educational programmes (1)<br>captive breeding **/** keep pairs together until they breed (1)<br>creating artificial ecosystems / put in a nature reserve / conservation programme / protect habitat (1) | 2 | **allow** legal protection (1) if no mention of banning hunting / egg collection / pesticides<br><br>**ignore** just keep in captivity / keep in a zoo (with no reference to breeding) |
| | (b) | | (loss of habitats) removing (natural) sources of food / nest sites (1)<br>OR<br>(artificial ecosystems use) pesticides / poisons / (introduce) things that adversely affect the red kite eg competitors (1) | 1 | **allow** less food<br>**ignore** just habitat loss |
| | | | **Total** | 4 | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|---|---|---|---|---|---|
| 6 | (a) | (i) | 16 (2)<br><br>**but**<br>4 quadrats in $1m^2$<br>OR<br>average per quadrat = 4 (1) | 2 | correct answer, no working = (2)<br>**allow** correct answer in table<br><br>**allow** working that clearly shows correct calculation, eg<br>1/ 0.25 = 4<br>OR<br>40 / 10 = 4 (1) |
| | | (ii) | 2560 (1) | 1 | **allow** ecf<br>ie answer from (i) x 160 |
| | (b) | | **only sampling 5 places:**<br>too little data / sample too small / area too small / AW (1)<br><br>**only sampling top of shore:**<br>(samples may be) unrepresentative of the population of limpets / area sampled is too small / bias / AW (1) | 2 | **allow** idea that any anomalous results may have a greater effect on final estimate eg the five samples may be unrepresentative<br><br>**ignore** just no samples from lower shore<br>**ignore** just not random<br>**allow** there may be more / fewer on the lower shore |
| | (c) | | B **and** D (1) | 1 | **allow** ringed answer on question |
| | | | **Total** | 6 | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|---|---|---|---|---|---|
| 7 | (a) | (i) | soft (1)<br>minerals (1) | 2 | |
| | | (ii) | in tar (pits) / asphalt / amber / ice / peat (1) | 1 | **allow** in bog / in swamp<br>**allow** frozen<br>**allow** in a place where microbes don't cause decay<br>**ignore** mud / clay / coal<br>**ignore** just imprint / impression<br>**ignore** unqualified reference to just acidic conditions |
| | | (iii) | **any two from**<br>**soft** body parts decay / **soft** parts don't fossilise (1)<br>fossilisation rarely occurs (1)<br>some fossils may not have been found yet (1) | 2 | **allow** fossils do not show colouration (1)<br>**allow** fossils can be damaged (by weathering etc) (1) |
| | (b) | | **idea of variation and selective advantage:**<br>eg some plants have bigger leaves / fewer indentations and so can absorb more light / photosynthesize more (1)<br><br>**idea of survival of the fittest and inheritance of successful characteristics:**<br>eg the plants with larger leaves are more likely to survive and pass on their genes / characteristics (1) | 2 | both answers must be specific to leaves and not a generic description |
| | | | **Total** | 7 | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|---|---|---|---|---|---|
| 8 | (a) | | chlorophyll (1) | 1 | |
| | (b) | | $6H_2O$ $C_6H_{12}O_6$ (1) | 1 | **both** needed for mark in correct order<br>must be upper case with subscripts |
| | (c) | | more (sun)light / higher temperature (1) | 1 | **needs to show a comparison**<br>**allow** longer days (in summer) / shorter days in winter (1)<br>**allow** warmer (in summer) / cooler in winter (1)<br>**allow** more heat<br>**allow** more sun |
| | | | **Total** | 3 | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|---|---|---|---|---|---|
| 9 | (a) | (i) | meiosis (1) | 1 | **allow** phonetic spelling<br>**allow** reduction division |
| | | (ii) | no (no mark)<br>eggs contain different combinations of chromosomes / contain one of each chromosome pair (but not the same one) (1) | 1 | if answer is yes – no marks<br>**allow** higher level answers eg random assortment / independent segregation / crossing over (1)<br>**ignore** just 'they are different sexes'<br>**ignore** just the eggs were different |
| | | (iii) | zygote (1) | 1 | **allow** any indication eg underline |
| | (b) | (i) | 13 (1) | 1 | **allow** answer in range 12.0-13.5 |
| | | (ii) | 11 (1) | 1 | **allow** answer in range 10.0-12.0 |
| | | (iii) | (height) stays the same / growth stops (1) | 1 | **allow** no change / nothing<br>**allow** increases (very) slowly / very little<br>**ignore** reference to shrinking (at old age) |
| | | | **Total** | 6 | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|---|---|---|---|---|---|
| 10 | (a) | (i) | split / divide embryo / AW (1)<br>implant embryo(s) / clone(s) (into surrogate cows) / AW (1) | 2 | **ignore** just cells divide – must be clear it's the embryo splitting<br><br>must be in correct sequence to get two marks, eg have second answer in first box (1) max |
| | | (ii) | can get **more** clones or **many** clones / could only get one or two from biological mother (if surrogates not used) / AW (1) | 1 | **ignore** just references to genetically identical<br>**allow** more chance of success<br>**ignore** just get more cows<br>**allow** can keep using the same cow for producing embryos<br>**allow** avoid risk of 'best' cow dying in labour<br>**allow** idea that to change a herd by selective breeding would take a long time |
| | | (iii) | fewer alleles / less variation (1) | 1 | **ignore** fewer genes<br>**allow** no variation |
| | (b) | (i) | DNA unzips / forms single strands (1)<br><br>new base pairs form / double strands form by semi-conservative replication / AW(1)<br><br>BUT<br><br>complementary base pairing / correct example eg AT or CG (2) | 3 | can mark from diagrams<br>**allow** DNA splits / breaks in half<br><br>**allow** higher level answer: nucleotides pair up<br>**allow** unambiguous description / diagram of semi-conservative replication |
| | | (ii) | decreases (1) | 1 | **allow** any indication eg underline |
| | | | **Total** | 8 | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|---|---|---|---|---|---|
| 11 | (a) | (i) | smaller surface area / less contact with blood (1) | 1 | **ignore** damaged alveoli / no alveoli<br>**ignore** tar in lungs |
| | | (ii) | yes (no mark)<br>net movement is into the blood / random movement of particles (1) | 1 | if answer is no – no marks<br>**ignore** just some oxygen enters alveoli (in question) |
| | | (iii) | oxyhaemoglobin (1) | 1 | |
| | (b) | (i) | forms plaque / narrows vessels / builds up on walls (1) | 1 | **allow** builds up on / in vessels<br>**ignore** references to veins<br>**ignore** just blocks / clogs / stops blood flow<br>**ignore** just blocks / clogs vessels<br>**ignore** makes vessels smaller |
| | | (ii) | blood is not pumped as efficiently / blood does not travel as quickly / AW (1) | 1 | **allow** consequences, eg less oxygen carried around body / breathlessness / fainting<br>**allow** poor circulation<br>**ignore** just tired<br>**allow** heart attack / angina / blood clots / stroke<br>**ignore** references to blood pressure<br>**ignore** not enough blood<br>**ignore** make heart work harder |
| | | (iii) | avoid rejection / AW (1) | 1 | **allow** higher level answers correctly referring to antibodies / antigens<br>**allow** donors are scarce / less risk of infection<br>**ignore** references to blood groups<br>**ignore** references to tissue types with no link to rejection<br>**allow** will accept (as alternative to avoid rejection) |
| | | | **Total** | 6 | |

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