

Mark Scheme for January 2013

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations

| Annotation | Meaning |
|---|---------------------------------------|
|  | correct response |
|  | incorrect response |
|  | benefit of the doubt |
|  | benefit of the doubt not given |
|  | error carried forward |
|  | information omitted |
|  | ignore |
|  | reject |
|  | contradiction |

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

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

| Question | | | Answer | Marks | Guidance |
|----------|-----|------|--|----------|---|
| 1 | (a) | (i) | 90 (kJ) (1) | 1 | ignore working mark answer on line first, if answer not on line then look for answer in working |
| | | (ii) | <p>any one from: less because more used for growth / growing more / still growing / growing faster (1)</p> <p>less because less active / not hunting (1)</p> <p>more because more active / playing (1)</p> <p>more because greater SA:vol ratio (1)</p> <p>more because less through waste / feeding on milk / more digestible food (1)</p> | 1 | <p>need both difference and explanation</p> <p>assume unqualified answer refers to cubs but allow converse argument if they clearly refer to adults</p> <p>ignore less heat lost because cub is smaller</p> |
| | (b) | (i) | food is more indigestible / can not digest cellulose/fibre (1) | 1 | ignore less respiration / less growth ignore zebras are herbivores / eat grass / different food from lions |
| | | (ii) | 100 x 50/1000 (1) BUT 5 (%) (2) | 2 | correct answer, no working (2) |
| | | | Total | 5 | |

| Question | | Answer | Marks | Guidance |
|--------------|-----|--|----------|---|
| 2 | (a) | <p>any two from:</p> <p>wide / broad / large surface (area) – to absorb light / energy (1)</p> <p>chlorophyll / chloroplasts – to absorb light (1)</p> <p>thin – for gas exchange / absorb CO₂ / release O₂ / diffusion of gases / movement of gases (1)</p> <p>veins – to transport sugar / food / water(1)</p> <p>stomata/pores – for gas exchange / absorb CO₂ / release O₂ / diffusion of gases (1)</p> | 2 | <p>assume it refers to leaves ignore references simply to flowers / plants ignore photosynthesis in answers since in question</p> <p>allow sunlight / sun's rays / sun's energy but ignore sun ignore flat / big / large leaves allow catch / capture / exposed to / hit by / take in light but ignore attracts light</p> <p>ignore chlorophyll for photosynthesis ignore green allow higher level answers eg more chlorophyll near top surface of leaf to absorb light / energy</p> <p>allow xylem to transport water allow phloem to transport sugar / food ignore phloem to transport water</p> <p>allow correct reference to arrangement ie avoid overlapping – to absorb light (1) allow correct reference to orientation ie leaves move towards light – to absorb light (1) allow transparent epidermis to allow light to enter leaf (1) ignore cuticle</p> |
| | (b) | <p>any two from:</p> <p>evaporation (inside leaf) (1)</p> <p>diffusion (outside) (1)</p> <p>through stomata / pores / between guard cells (1)</p> | 2 | |
| | (c) | A (1) | 1 | |
| Total | | | 5 | |

| Question | | | Answer | Marks | Guidance |
|----------|-----|------|---|----------|--|
| 3 | (a) | (i) | respiration (1) | 1 | ignore fermentation |
| | | (ii) | combustion (1) | 1 | more than one answer ringed = 0 |
| | (b) | | (fungi that) feed on dead material / AW (1) | 1 | allow correct description of extracellular digestion ignore non-saprophytes that feed on dead material e.g. flies |
| | (c) | | denitrifying (bacteria) (1) | 1 | |
| | (d) | | (to make) protein / amino acid(s) (1) | 1 | allow bases of DNA / DNA ignore contains protein / amino acid(s) allow provides protein / amino acid(s) |
| | | | Total | 5 | |

| Question | | | Answer | Marks | Guidance |
|----------|-----|------|---|----------|--|
| 4 | (a) | (i) | any two from: could harm other organisms (1) get into food chains / bioaccumulation (1) some are / could be persistent / can't be broken down / excreted (1) | 2 | ignore may get washed into rivers / damage to food chain ignore eutrophication kills organisms higher up the food chain = 2 allow may build up resistance (1) |
| | | (ii) | may not attract right birds / birds not slug eaters / bird boxes may not be used (1) | 1 | allow birds eat other food / may not be carnivores ignore don't eat all the slugs but allow don't eat many slugs ignore birds may eat the lettuce / birds may become pests |
| | (b) | | (needed to make) chlorophyll (1) | 1 | ignore chloroplasts |
| | (c) | | any one from: lack of support / need support plants (1) lack of minerals / need to add minerals (1) | 1 | allow lack of nutrients but ignore references to 'food' allow need to add fertiliser allow need computer / monitoring system (1) |
| | | | Total | 5 | |

| Question | | Answer | Marks | Guidance |
|--------------|-----|--|----------|--|
| 5 | (a) | <p>any three from: homeostasis ideas: regulate water loss / control blood concentration / removes excess water / removes excess salts (1)</p> <p>filter blood (1)</p> <p>(at high) pressure (1)</p> <p>re-absorb water / useful substances (1)</p> <p>remove urea / waste products from blood (1)</p> <p>make urine (1)</p> | 3 | <p>ignore filter fluids</p> <p>allow 'ultrafiltration' = 2</p> <p>allow named examples eg sugar / amino acids / salts</p> <p>allow higher level answer e.g. selective reabsorption = 1</p> <p>ignore clean blood / remove waste from body</p> <p>ignore removes toxins</p> <p>ignore excretes urine</p> <p>ignore just excretion</p> |
| | (b) | (i) | 2 | <p>allow clear reverse arguments for each marking point e.g. (unknown) donor will have different DNA etc</p> <p>allow more likely to be accepted</p> <p>ignore similar age</p> |
| | | (ii) | 1 | ignore simply 'not enough room' |
| Total | | | 6 | |

| Question | | Answer | Marks | Guidance | | | | |
|--------------|-----|--|----------|--------------------------------|---|--|---|---|
| 6 | (a) | max two from: (tidal vol =) 0.6 (litres) (1) (vital capacity =) 3.6 (litres) (1) BUT 6 (3) | 3 | correct answer, no working = 3 | | | | |
| | (b) | volume increases and pressure decreases (1) <table border="1" style="margin-left: 20px;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">✓</td> <td style="width: 20px; height: 20px; text-align: center;">✓</td> <td style="width: 20px; height: 20px;"></td> </tr> </table> | | ✓ | ✓ | | 1 | both ticks needed for the one mark more than two ticks = 0 |
| | ✓ | ✓ | | | | | | |
| Total | | | 4 | | | | | |

| Question | | Answer | Marks | Guidance |
|--------------|---------|--|----------|--|
| 7 | (a) | 4 th row / relaxes, contracts (1) | 1 | |
| | (b) (i) | cartilage (1) | 1 | |
| | (ii) | lack of lubrication / AW / ORA (1) | 1 | allow (too much) friction / (too) painful to move / bones rub together allow converse answer written in terms of what synovial fluid does |
| Total | | | 3 | |

| Question | | Answer | Marks | Guidance |
|----------|-----|---|-------|--|
| 8 | (a) | for (fertilised) egg / zygote / embryo to implant / AW (1) | 1 | allow attachment to lining / held by lining ignore protection / support / cushioning / settling on lining |
| | (b) | increases it / makes it thicker (1) | 1 | ignore maintains lining |

| Question | | Answer | Marks | Guidance |
|--------------|-----|---|----------|---|
| | (c) | any two from: maintains lining (1) so embryo can grow / develop / AW (1) avoid miscarriages (1) | 2 | ignore increases lining allow fertilised egg / zygote / baby / foetus but ignore 'egg' ignore simply 'protection' / 'support' allow idea of inhibiting ovulation / LH (1) |
| Total | | | 4 | |

| Question | | Answer | Marks | Guidance |
|--------------|-----|--|----------|--|
| 9 | (a) | bypass (1) | 1 | allow stent / angioplasty |
| | (b) | no antigens (in O blood) (1) (therefore) no agglutination (1) | 2 | allow (Kevin) does not produce antibodies / agglutinins allow O is universal donor / AW (1) |
| Total | | | 3 | |

| Question | | Answer | Marks | Guidance |
|----------|---------|--|-------|--|
| 10 | (a) (i) | B (1) | 1 | |
| | (ii) | line rising up but never above the existing line (1) | 1 | ignore whether line eventually reaches existing line |
| | (b) | glucose / sugar (1) carbon dioxide (1) | 2 | allow formulae if correct / any other named sugar (1) |

| Question | | Answer | Marks | Guidance |
|--------------|-----|---|----------|--|
| | (c) | <p>any two from: no / less carbon dioxide produced / less global warming / less greenhouse effect (1)</p> <p>less sulfur dioxide produced / less nitrogen oxides produced / less acid rain (1)</p> <p>no / less particulates (1)</p> <p>less fossil fuels used / less petrol used which is non-renewable / ethanol is renewable / sustainable / petrol won't run out so quickly (1)</p> | 2 | <p>ignore just less pollution</p> <p>ignore gasohol is renewable / sustainable ignore simply 'petrol is non-renewable'</p> |
| Total | | | 6 | |

| Question | | Answer | Marks | Guidance |
|--------------|-----|--|----------|--|
| 11 | (a) | <p>any three from: (because) gains water (1)</p> <p>(gains) through gills/mouths (when feeding) (1)</p> <p>(gains) by osmosis (1)</p> <p>(so) needs remove (excess) water (in urine) (1)</p> | 3 | <p>allow reabsorb salt(s) (1) by active transport (1)</p> |
| | (b) | bigger yield (in same time) (1) | 1 | ignore grow faster / more profit |
| | (c) | (PCBs) are persistent / can not be broken down / can not be excreted (1) | 1 | allow are stored in fat ignore idea of bioaccumulation / passing up food chains |
| Total | | | 5 | |

| Question | | | Answer | Marks | Guidance |
|--------------|-----|------|---|----------|---|
| 12 | (a) | (i) | 4 (1) | 1 | |
| | | (ii) | (produce) toxins / pyrogens (1) | 1 | allow body response to raise temperature ignore body fighting bacteria |
| | (b) | | (Alexander) Fleming (1) | 1 | different name e.g. Joseph Fleming = 0 |
| | (c) | | can use a wide range of energy sources / can act as producers and consumers (1) | 1 | allow can stay dormant / survive as spores allow can survive at extremes of temperatures / extremophiles |
| Total | | | | 4 | |

| Question | | | Answer | Marks | Guidance |
|--------------|-----|------|--|----------|---|
| 13 | (a) | | spiral (1) spherical (1) | 2 | allow spirillum allow coccus |
| | (b) | (i) | convert ammonium compounds (1) into nitrates / nitrites / NO_2^- / NO_3^- (1) | 2 | allow ammonia instead of ammonium allow convert nitrites into nitrates (2) |
| | | (ii) | <i>Azotobacter</i> / <i>Clostridium</i> / <i>Rhizobium</i> (1) | 1 | |
| Total | | | | 5 | |

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