

## **Biology B**

General Certificate of Secondary Education **B631/02**

Unit 1: Modules B1, B2, B3

### **Mark Scheme for June 2010**

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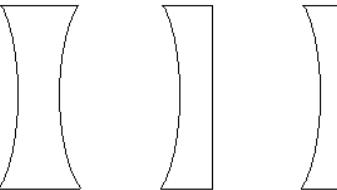
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| Question |      | Expected Answers   | Marks | Additional Guidance  |
|----------|------|--|-------|--|
| 1        | (a)  | <p>part of eye</p> <p>optic nerve</p> <p>iris</p> <p>retina</p> <p>cornea</p> <p>job</p> <p>refracts light</p> <p>contains light receptors</p> <p>controls how much light enters the pupil</p> <p>carries impulses to the brain</p>  | 2     | <p>all correct (2)<br/>one / two correct (1)</p>   |
|          |      |  | (2)   |  |
|          | (b)  | <p>(i) <u>ciliary</u> muscles contract / shorten (1)<br/>(suspensory) ligaments slacken / lose tension (1)<br/>lens becomes more convex / bulges / fatter / becomes stronger / refracts more / more rounded / more spherical (1)</p> | 3     | <p><b>ignore</b> muscles tighten<br/><b>ignore</b> ligaments relax<br/><b>allow</b> lens becomes fat<br/>only <b>allow</b> RA if it is clear it is in the content of watching TV</p>               |
|          | (ii) | (bi) concave (lens) (1)  | 1     | <p><b>allow</b> diverging (lens)<br/><b>allow</b> suitable diagram of concave lens ie narrower in middle</p>  |
|          |      | <b>Total</b>   | 6     |  |

| Question |      | Expected Answers   | Marks | Additional Guidance   |
|----------|------|--|-------|---|
| 2        | (a)  | high amount of salt in diet / 3 <sup>rd</sup> box<br>excessive alcohol consumption / 5 <sup>th</sup> box (1)         | 1     | <b>both</b> correctly ticked for 1 mark<br>more than 2 ticks = 0  |
|          | (b)  | (i) overweight (1)   | 1     | <b>ignore</b> fat / obese<br><b>allow</b> bmi>25  |
|          | (ii) | BMI = 91.0 / (1.8) <sup>2</sup> (1)<br>BUT 28.09 or 28.1 or 28 (2)   | 2     | <b>allow</b> 91.0 / 3.24 (1)<br><b>allow</b> 28.08642 or 28.0864 or 28.086 (2)<br><b>allow</b> 28.08 or 28.0 max 1 (incorrect rounding)   |
|          | (c)  | fitness involves being physically active (1)<br><br>being healthy means free from infection / disease / disorder (1) | 2     | <b>allow</b> takes part in (active) sports<br><b>allow</b> quick recovery time<br><b>allow</b> idea that fitness is to do with physical activity e.g. have stamina / strength / suppleness / speed / agility<br><br><b>allow</b> idea that health is to do with whether you have any disease / illness<br><b>allow</b> idea that health is mental / social well being<br><b>ignore</b> references simply to (healthy) diet<br><b>ignore</b> being healthy means there is nothing wrong with you |
|          |      | <b>Total</b>   | 6     |   |

| Question     |     | Expected Answers  | Marks | Additional Guidance   |
|--------------|-----|---|-------|---|
| 3            | (a) | homeostasis (1)   | 1     | <b>allow</b> ringed answer if nothing written on line   |
|              | (b) | blood vessels / capillaries / arterioles constrict / become narrower (1)<br><br>reducing blood flow (to skin surface) (1) | 2     | <b>allow</b> capillaries / arterioles in surface of skin shut off<br><b>allow</b> blood vessels contract / get smaller<br><b>not</b> move away from skin surface<br><b>ignore</b> references to veins<br><b>ignore</b> vessels get thinner<br><br><b>allow</b> less blood in skin<br><b>ignore</b> blood flows away from skin |
| <b>Total</b> |     |   | 3     |   |

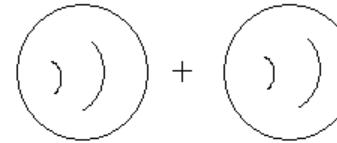
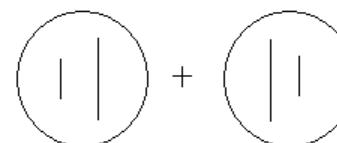
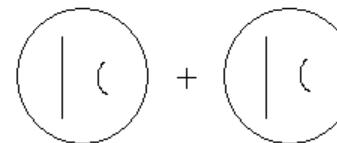
| Question     |      | Expected Answers  | Marks | Additional Guidance   |
|--------------|------|---|-------|---|
| 4            | (a)  | idea of diet e.g. what you eat, or when you eat / (by matching diet with) exercise (1)                | 1     | <b>allow</b> avoid sugary foods / eat sugary foods  |
|              | (b)  | (i) 4 (1)   | 1     | <b>allow</b> full names adenine thymine cytosine guanine / A-T-G-C  |
|              | (ii) | gene (for insulin production) is switched off / inactive / not all genes are used in any one cell (1) | 1     | <b>allow</b> 'they are switched off', unless it is clear 'they' refers to cells<br><b>ignore</b> they are dormant<br><b>not</b> do not have (correct) gene / code<br><b>ignore</b> it's not their job |
| <b>Total</b> |      |   | 3     |   |

| Question |  | Expected Answers  | Marks | Additional Guidance   |
|----------|--|---|-------|---|
| 5        |  | <p><b>advantages maximum one from:</b></p> <p>can plan care for baby (1)</p> <p>can avoid conceiving in future (1)</p> <p>may be able to reduce effects by early treatment / change of lifestyle (1)</p> <p>know that other children / parents may also have the disorder (1)</p> <p>may choose to abort the foetus (1)</p> <p><b>disadvantages maximum one from:</b></p> <p>some people think it is against God to interfere / against religion / raises ethical issues (1)</p> <p>insurance companies may increase premiums (1)</p> <p>distressing for parent(s) (1)</p> <p>may force parents to make a difficult decision (1)</p> <p>may choose to abort the foetus / parents do not want to have the baby (1)</p> | 2     | <p><b>note</b> abortion point may be given as advantage or disadvantage but only award once</p> |
|          |  | <b>Total</b>  | 2     |   |

| Question |         | Expected Answers   | Marks | Additional Guidance   |
|----------|---------|--|-------|---|
| 6        | (a)     | hair / fur (1)   | 1     | <b>allow</b> external ears<br><b>ignore</b> produce milk  |
|          | (b)     | lose less water / salts (1)  | 1     | <b>allow</b> because water is in short supply<br><b>allow</b> do not have to drink so much / so often<br><b>allow</b> so do not dehydrate / stay hydrated<br><b>allow</b> do not lose (any) water ( from sweating)<br><b>ignore</b> fluid |
|          | (c)     | mutualism / mutualistic (1)  | 1     | <b>allow</b> symbiosis<br><b>ignore</b> mutual  |
|          | (d)     | (genetic idea-) they have a common ancestor / have similar genes / DNA (1)<br><br>(environmental idea -) they live in a similar habitat (so they have similar adaptations / similar behaviour) (1) | 2     | <b>ignore</b> they are related / have similar ancestors<br><b>not</b> have same DNA / genes<br><br><b>allow</b> both live in hot climates   |
|          | (e) (i) | they are different species (1)   | 1     | <b>allow</b> different genus<br><b>allow</b> names show the genus and species<br><b>ignore</b> simply 'binomial classification'   |
|          | (ii)    | <b>any two from:</b><br>(hybrids have) a mixture of (llama and camel) characteristics (1)<br>(the hybrid is) not a (true) species (1)<br>it is sterile / infertile / cannot reproduce / breed (1)  | 2     | <b>ignore</b> a mixture of species<br><br><b>ignore</b> cannot mate   |
|          |         | <b>Total</b>   | 8     |   |

| Question |     | Expected Answers   | Marks    | Additional Guidance   |
|----------|-----|--|----------|---|
| 7        | (a) | (i) population is increasing (1)   | 1        | <b>allow</b> more growing of crops for biofuel / more demand for food   |
|          |     | (ii) <b>any one from:</b><br>legal protection / ban hunting / AW (1)<br>education programmes (1)<br>(captive) breeding (1)<br>remove predators / competitors (1) | 1        | <b>allow</b> reduce / stop use of pesticides<br><b>ignore</b> any reference to protecting where they live e.g. zoos / artificial ecosystems / reserves / protected areas<br><b>ignore</b> provide food<br><b>ignore</b> unqualified references to conservation programmes |
|          | (b) | (i) pollination (1)  | 1        | <b>allow</b> greater yield / more fruit set / fertilisation<br><b>ignore</b> honey<br><b>ignore</b> help plants breed / reproduce   |
|          |     | (ii) produce nectar (1)  | 1        | <b>allow</b> scented / smell<br><b>ignore</b> pollen<br><b>ignore</b> colour / petals   |
|          | (c) | nitrates (1)   | 1        | <b>allow</b> compounds of nitrogen / compounds of N<br><b>ignore</b> nitrogen / N / N <sub>2</sub>  |
|          |     | <b>Total</b>   | <b>5</b> |   |

| Question |         | Expected Answers   | Marks | Additional Guidance  |
|----------|---------|--|-------|--|
| 8        | (a)     | population (1)   | 1     | more than 1 answer = 0   |
|          | (b) (i) | 50 (1)   | 1     |  |
|          | (ii)    | increases / goes up (1)<br><b>less</b> were eaten (by the wolves) (1)  | 2     | <b>allow</b> less wolves to eat them / fewer predators<br><b>not</b> none were eaten / no wolves eating them<br><b>ignore</b> just 'less wolves'   |
|          | (c)     | <b>max three from:</b><br>idea of variation, e.g. some are better adapted than others / mutations (1)<br>idea of survival of the fittest / survival of better adapted individuals (1)<br>idea of inheritance / passing on (successful) genes / characteristics (1) | 3     | <b>allow</b> natural selection as an alternative to either first or second marking point<br><b>ignore</b> simply 'they become adapted'<br><br><b>allow</b> idea of accumulation of <b>many small</b> changes (may produce a new species) (1) |
|          |         | <b>Total</b>   | 7     |  |

| Question |     | Expected Answers  | Marks | Additional Guidance  |
|----------|-----|---|-------|--|
| 9        | (a) | <b>any two from:</b><br>(plant cells) have chloroplasts / chlorophyll (1)<br>(plant cells) have cell wall / cellulose (1)<br>(plant cells) have (large) vacuole (1) | 2     | assume answer refers to plants unless otherwise stated<br><b>allow</b> show turgor<br><br><b>allow</b> (plant cells) make their own food / photosynthesise (1)<br><b>allow</b> starch grains / store starch (1)<br><b>ignore</b> references to shape<br><b>ignore</b> references to leaves e.g. have stomata   |
|          | (b) | diffusion (1)   | 1     | <b>allow</b> transpiration / evaporation<br><b>not</b> osmosis   |
|          | (c) | two chromatids drawn in each new cell (1)   | 1     | <br><br><br>should be one smaller and one larger in each cell, but give BOD unless they are clearly identical |
|          |     | <b>Total</b>  | 4     |  |

| Question |     | Expected Answers   | Marks | Additional Guidance   |
|----------|-----|--|-------|---|
| 10       | (a) | thin wall to increase rate of exchange of materials / 3 <sup>rd</sup> box (1)  | 1     | more than one tick = 0  |
|          | (b) | (i) artery (1)   | 1     | <b>allow</b> aorta<br><b>ignore</b> arteriole   |
|          |     | (ii) prevent backflow / make sure blood flows in correct direction / stop blood flowing in wrong direction (1)   | 1     | <b>allow</b> they allow pressure to build up when they close<br><b>ignore</b> control blood flow  |
|          | (c) | <b>any two from:</b><br>no nucleus (1)<br>contains haemoglobin (1)<br>thin / (partial) permeable membrane (1)<br>small (size) (1)<br>biconcave / disc shaped (1)<br>flexible / can change shape (1)<br>large surface area (compared to volume) (1) | 2     | <b>allow</b> contain iron<br><b>not</b> thin / (partial) permeable walls<br><br><b>allow</b> 'donut' shaped <b>ignore</b> round /dented |
|          |     | <b>Total</b>   | 5     |   |

| Question     |     | Expected Answers  | Marks | Additional Guidance  |
|--------------|-----|---|-------|--|
| 11           | (a) | <p><b>no</b> (no mark)</p> <p>experiment is about light (not gravity) /<br/>           geotropism is response to gravity (not light) /<br/>           shoots are growing towards the light /<br/>           shoots are growing upwards /<br/>           are negatively geotropic /<br/>           shows shoots are positively phototropic /<br/>           shoots would grow down if positively geotropic /<br/>           roots are positively geotropic (1)</p> | 1     | must have answered no and given correct explanation for mark   |
|              | (b) | (i) auxin (1)   | 1     | <b>allow</b> IAA<br><b>not</b> axon  |
|              |     | (ii) collects on dark side / higher concentrations on dark side /<br>ORA (1)<br><br>causes <u>cells</u> (on dark side) to elongate (1)  | 2     | <b>allow</b> light destroys / inactivates auxin (on light side)<br><b>ignore</b> produced on dark side<br><br><b>allow</b> makes cells more elastic<br><b>allow</b> makes cells grow (bigger)<br><b>not</b> makes cells divide / more cells<br><b>ignore</b> dark side elongates |
| <b>Total</b> |     |   | 4     |  |

| Question     |     | Expected Answers  | Marks    | Additional Guidance   |
|--------------|-----|---|----------|---|
| 12           | (a) | as temperature increases time decreases from (20 °C to 40 °C) then it increases again (1) | 1        | <b>allow</b> as temperature increases <b>rate</b> increases (from 20 °C to 40 °C) then it decreases again / as temperature increases speeds up then slows down<br><br>time decreases then increases (i.e. no link to temperature) = 0 |
|              | (b) | 40 (°C) (1)   | 1        | <b>allow</b> any answer in range 31 - 49 (°C)   |
|              | (c) | it is denatured / changes shape (1)   | 1        | <b>allow</b> active site changes shape / cannot join to substrate / bonds within enzyme broken<br><b>ignore</b> enzyme destroyed / damaged<br><b>not</b> enzyme killed  |
| <b>Total</b> |     |   | <b>3</b> |   |

| Question     |     | Expected Answers  | Marks    | Additional Guidance   |
|--------------|-----|---|----------|---|
| 13           | (a) | insertion (1)   | 1        | <b>allow</b> ringed answer if no answer on line                 |
|              | (b) | so that AAT is made in the milk / AW (1)  | 1        | <b>allow</b> so both genes are switched on / expressed together |
|              | (c) | <b>any two from:</b><br>remove the nucleus from an <b>egg</b> (1)<br>put the (udder cell) nucleus into the <b>egg</b> (1)<br>electric shock given (1)<br>cell divides (1) | 2        | order not important<br><b>ignore</b> give shock to embryo       |
| <b>Total</b> |     |   | <b>4</b> |   |

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