**Cambridge Assessment International Education**
Cambridge International General Certificate of Secondary Education

**BIOLOGY** **0610/32**

Paper 3 Theory (Core) **March 2018**

MARK SCHEME

Maximum Mark: 80

**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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## Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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| GENERIC MARKING PRINCIPLE 5:<br><br>Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen). |
| GENERIC MARKING PRINCIPLE 6:<br><br>Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind. |

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**Abbreviations used in the Mark Scheme:**

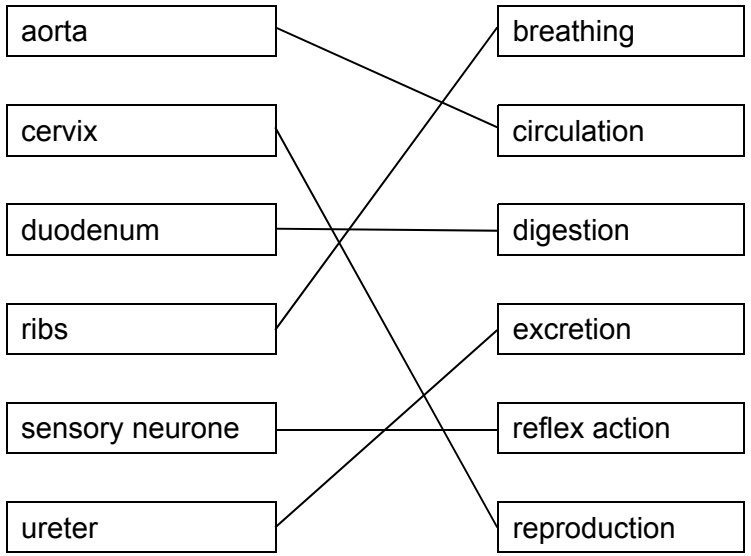
- **;** separates marking points
- / alternatives
- **I** ignore
- **R** reject
- **A** accept (for answers correctly cued by the question, or guidance for examiners)
- AW alternative wording
- AVP any valid point
- ecf credit a correct statement / calculation that follows a previous wrong response
- **ora** or reverse argument
- ( ) the word / phrase in brackets is not required, but sets the context
- underline actual words given must be used by the candidate (or grammatical variants of them)

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| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 1 | <table><tr><th>chemical</th><th>use of chemical</th></tr><tr><td>antibiotic</td><td>kill, or stop growth of, bacteria ;</td></tr><tr><td>fertiliser</td><td>increase (crop) yields / add nutrients to soil / make plants grow ;</td></tr><tr><td>herbicide</td><td>kill weeds (in crops) / reduce competition with weeds / increase crop yields ;</td></tr><tr><td>insecticide</td><td>kill insects / increase crop yields / improve quality of yields ;</td></tr><tr><td>pectinase</td><td>used in fruit juice production ;</td></tr></table> | **5** | |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(a) | capillary / capillaries ; | **1** | |
| 2(b) | no nucleus ;<br>smaller ;<br>contain, haemoglobin / Hb ;<br>(bi)concave disc shape / described ;<br>carries oxygen ;<br>does not produce antibodies / not involved in immunity ;<br>does not carry out phagocytosis ;<br>AVP ;; e.g. transports carbon dioxide / more RBC's | **3** | |
| 2(c)(i) | plasma ; | **1** | **I** water |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 2(c)(ii) | glucose ;<br>amino acids ;<br>(plasma) proteins ;<br>fats / glycerol / fatty acids ;<br>vitamins / one named vitamin ;<br>mineral (ions) / one named mineral ion ;<br>hormones ;<br>urea ;<br>carbon dioxide ;<br>water ; | **3** | |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 3 | <br>;;;;;; | **6** | |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 4(a) | urea ;<br>salt(s) / (named) ions / (named) minerals ;<br>AVP ; e.g. hormones | **2** | |
| 4(b)(i) | volume / $dm^3$<br>1.09 ;<br>0.05 ;<br>1.29 ; | **3** | **A** correct figures if given in $cm^3$<br>**A** ± 0.005 |
| 4(b)(ii) | (solution) **C** ;<br>lowest volume of urine was produced ;<br>AVP ; | **2** | **A** largest volume of urine as ecf if A given for mp1 |
| 4(c) | water (intake) ;<br>exercise / activity levels / sweat produced ;<br>temperature (body or environmental) ;<br>AVP ; ; correct ref. to diet / disease / medication | **2** | |
| 4(d) | sweat ;<br>expired air / expired water vapour / exhalation / breathing ;<br>faeces ;<br>vomit / tears / mucus ; | **2** | **A** diarrhoea |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>5(a)(i)</td><td>(F) cytoplasm ;<br>(G) chloroplast ;<br>(H) (sap / central) vacuole ;</td><td>3</td><td>I chlorophyll</td></tr>
<tr><td>5(a)(ii)</td><td>K line ending on the nucleus ;<br><br>L line ending exactly on inner line of cell wall ;</td><td>2</td><td></td></tr>
<tr><td>5(a)(iii)</td><td>palisade (mesophyll) cell ;</td><td>1</td><td></td></tr>
<tr><td>5(b)(i)</td><td>cell / it, has shrunk or is smaller / AW ;<br>cell walls are indented / AW ;<br>vacuole / AW is smaller ;<br>gap developed (between wall and membrane) ;</td><td>2</td><td>A cell / it, has become flaccid<br>I shape / size, has changed unqualified<br><br>A plasmolysis / gap between cell wall and protoplast<br>A has one more chloroplast / AW ;</td></tr>
<tr><td>5(b)(ii)</td><td><table><tr><th>diffusion</th><th>active transport</th></tr><tr><td>movement from high to low (solute) concentration / down a concentration gradient</td><td>movement for low to high (solute) concentration / AW</td></tr><tr><td>does not require a membrane</td><td>does require a membrane</td></tr><tr><td>no energy needed / passive process</td><td>requires energy / active process / requires ATP</td></tr><tr><td>occurs in (living and) non-living</td><td>only occurs in living</td></tr><tr><td>rate dependent on concentration gradient</td><td>rate dependent on requirements</td></tr><tr><td>AVP</td><td>AVP</td></tr></table>;;;</td><td>3</td><td></td></tr>
</table>

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 6 | amino acids ;<br>biological ;<br>temperature ;<br>protease ;<br>bacteria ;<br>amylase ;<br>lipase ; | **7** | |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 7(a)(i) | (human milk) 86.87 ;<br>(water buffalo milk) 80.60 ; | **2** | |
| 7(a)(ii) | carbohydrate / water ; | **1** | |
| 7(a)(iii) | fibre / iron / vitamins / named vitamin / AVP ; | **1** | |
| 7(a)(iv) | mammals ; | **1** | |
| 7(b) | ***protein:*** needed for growth / e.g. of growth / for repair / replacement ;<br>***fat:*** needed for energy / insulation / storage / protection ;<br>***carbohydrate:*** needed for energy ;<br>***calcium:*** needed for making bones / teeth / AVP ;<br>***water:*** solvent / lubricant / used in (metabolic)reactions AW / AVP ; | **5** | |
| 7(c) | obesity / AW ;<br>coronary heart disease / CHD / blockage of coronary arteries ;<br>AVP ;; | **2** | |

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>8(a)</td><td>transfer of pollen ;<br>from, anther / stamen, to stigma ;</td><td>2</td><td>A male gamete</td></tr>
<tr><td>8(b)</td><td>stigmas, large / feathery ;<br>stigmas exposed ;<br>filaments long ;<br>anthers / stamens, hang outside flower structure ;<br>anthers loosely attached to filament ;<br>no / less / small, petals ;<br>AVP ;</td><td>2</td><td></td></tr>
<tr><td>8(c)</td><td><table><tr><th>insect-pollinated</th><th>wind-pollinated</th></tr><tr><td>heavy</td><td>light</td></tr><tr><td>sticky</td><td>not sticky</td></tr><tr><td>large</td><td>small</td></tr><tr><td>spiky surface AW</td><td>smooth surface / less air resistance</td></tr><tr><td>produced in smaller numbers</td><td>produced in large numbers</td></tr></table>;;;</td><td>3</td><td></td></tr>
<tr><td>8(d)</td><td>oxygen ;<br>water ;<br>(suitable) temperature ;</td><td>3</td><td>I air<br>A humidity / moisture<br>A warmth</td></tr>
</table>

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 9(a)(i) | **N** and **S** ; | **1** | either order |
| 9(a)(ii) | **R** has different characteristics to the parent / has dark eyes / knobs on the end of antennae / knobs on abdomen ; | **1** | |
| 9(a)(iii) | phenotype ; | **1** | |
| 9(b)(i) | height ;<br>weight ;<br>skin colour ;<br>hair colour ;<br>AVP ;;; e.g. leg length / arm length | **3** | **A** hair length |
| 9(b)(ii) | tongue rolling / gender / AVP ; | **1** | **A** blood group |

| Question | Answer | Marks | Guidance |
|---|---|---|---|
| 10 | letter: **X** — name of the process: rain / precipitation / condensation / AW ;<br>letter: **Y** — name of the process: evaporation ;<br>letter: **Z** — name of the process: transpiration ; | **3** | |