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**BIOLOGY**

**0610/32**

Paper 3 Theory (Core)

**May/June 2019**

MARK SCHEME

Maximum Mark: 80

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**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.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the May/June 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

**PUBLISHED****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.

**GENERIC MARKING PRINCIPLE 5:**

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:**

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.

| Question                 | Answer  | Marks     | Guidance |        |                       |              |               |         |                        |                 |                                       |                          |                              |          |  |
|--------------------------|---|-----------|----------|--------|-----------------------|--------------|---------------|---------|------------------------|-----------------|---------------------------------------|--------------------------|------------------------------|----------|--|
| 1(a)                     | <table border="1"> <tr> <td data-bbox="322 220 734 285">structure</td> <td data-bbox="734 220 1198 285">function</td> </tr> <tr> <td data-bbox="322 285 734 351">anus ;</td> <td data-bbox="734 285 1198 351">where egestion occurs</td> </tr> <tr> <td data-bbox="322 351 734 416">gall bladder</td> <td data-bbox="734 351 1198 416">stores bile ;</td> </tr> <tr> <td data-bbox="322 416 734 481">mouth ;</td> <td data-bbox="734 416 1198 481">where ingestion occurs</td> </tr> <tr> <td data-bbox="322 481 734 579">salivary glands</td> <td data-bbox="734 481 1198 579">produce / secrete, saliva / amylase ;</td> </tr> <tr> <td data-bbox="322 579 734 644"><u>small</u> intestine ;</td> <td data-bbox="734 579 1198 644">where most absorption occurs</td> </tr> </table> | structure | function | anus ; | where egestion occurs | gall bladder | stores bile ; | mouth ; | where ingestion occurs | salivary glands | produce / secrete, saliva / amylase ; | <u>small</u> intestine ; | where most absorption occurs | <b>5</b> |  |
| structure                | function  |           |          |        |                       |              |               |         |                        |                 |                                       |                          |                              |          |  |
| anus ;                   | where egestion occurs   |           |          |        |                       |              |               |         |                        |                 |                                       |                          |                              |          |  |
| gall bladder             | stores bile ;   |           |          |        |                       |              |               |         |                        |                 |                                       |                          |                              |          |  |
| mouth ;                  | where ingestion occurs  |           |          |        |                       |              |               |         |                        |                 |                                       |                          |                              |          |  |
| salivary glands          | produce / secrete, saliva / amylase ;   |           |          |        |                       |              |               |         |                        |                 |                                       |                          |                              |          |  |
| <u>small</u> intestine ; | where most absorption occurs  |           |          |        |                       |              |               |         |                        |                 |                                       |                          |                              |          |  |
| 1(b)                     | fatty acids ;<br>glycerol ;   | <b>2</b>  |          |        |                       |              |               |         |                        |                 |                                       |                          |                              |          |  |
| 1(c)                     | C H O ;<br>N ;  | <b>2</b>  |          |        |                       |              |               |         |                        |                 |                                       |                          |                              |          |  |

| Question               | Answer  | Marks            | Guidance |              |                        |                               |                  |   |  |
|------------------------|---|------------------|----------|--------------|------------------------|-------------------------------|------------------|---|--|
| 2(a)                   | (a disease in which the) pathogen ;<br>can be passed from one host to another ;   | 2                |          |              |                        |                               |                  |   |  |
| 2(b)                   | boil ;<br>chlorinate ;<br>UV treatment ;<br>sterilising, solution / tablets ;<br>AVP ;  | 2                |          |              |                        |                               |                  |   |  |
| 2(c)(i)                | 10 (%) ;;   | 2                |          |              |                        |                               |                  |   |  |
| 2(c)(ii)               | bacterium / bacteria ;  | 1                |          |              |                        |                               |                  |   |  |
| 2(d)(i)                | (loss of) watery faeces / AW ;  | 1                |          |              |                        |                               |                  |   |  |
| 2(d)(ii)               | <u>oral rehydration</u> therapy ;<br>intake of water containing, salt / ions, and sugar ;<br>AVP ;;   | 2                |          |              |                        |                               |                  |   |  |
| 2(e)                   | genetic ;<br>rapid ;<br>complex ;   | 3                |          |              |                        |                               |                  |   |  |
| 3(a)                   | xylem labelled ;<br>phloem labelled ;<br>root hair labelled ;   | 3                |          |              |                        |                               |                  |   |  |
| 3(b)                   | <table border="1"> <thead> <tr> <th>tissue</th> <th>organ</th> <th>organ system</th> </tr> </thead> <tbody> <tr> <td>fat (under the skin) ;</td> <td>kidney ;<br/>heart ;<br/>lung ;</td> <td>(nervous system)</td> </tr> </tbody> </table> | tissue           | organ    | organ system | fat (under the skin) ; | kidney ;<br>heart ;<br>lung ; | (nervous system) | 4 |  |
| tissue                 | organ   | organ system     |          |              |                        |                               |                  |   |  |
| fat (under the skin) ; | kidney ;<br>heart ;<br>lung ;   | (nervous system) |          |              |                        |                               |                  |   |  |

| <b>Question</b> | <b>Answer</b>   | <b>Marks</b> | <b>Guidance</b> |
|-----------------|---|--------------|-----------------|
| 3(c)            | (smallest) chloroplast ;<br>palisade cell (then) phloem tissue (then) root ;<br>(largest) whole plant ; | <b>3</b>     |                 |

| Question         | Answer   | Marks                                      | Guidance           |          |              |            |                         |          |            |                      |                  |            |  |          |  |
|------------------|--|--|--------------------|----------|--------------|------------|-------------------------|----------|------------|----------------------|------------------|------------|--|----------|--|
| 4(a)             | <table border="1"> <thead> <tr> <th data-bbox="331 215 618 282">name of part</th> <th data-bbox="618 215 904 282">letter in Fig. 4.1</th> <th data-bbox="904 215 1191 282">function</th> </tr> </thead> <tbody> <tr> <td data-bbox="331 282 618 381">amniotic sac</td> <td data-bbox="618 282 904 381"><b>E ;</b></td> <td data-bbox="904 282 1191 381">contains amniotic fluid</td> </tr> <tr> <td data-bbox="331 381 618 480">cervix ;</td> <td data-bbox="618 381 904 480"><b>D ;</b></td> <td data-bbox="904 381 1191 480">dilates during birth</td> </tr> <tr> <td data-bbox="331 480 618 614">umbilical cord ;</td> <td data-bbox="618 480 904 614"><b>F ;</b></td> <td data-bbox="904 480 1191 614">carries materials between mother and fetus</td> </tr> </tbody> </table> | name of part                               | letter in Fig. 4.1 | function | amniotic sac | <b>E ;</b> | contains amniotic fluid | cervix ; | <b>D ;</b> | dilates during birth | umbilical cord ; | <b>F ;</b> | carries materials between mother and fetus | <b>5</b> |  |
| name of part     | letter in Fig. 4.1   | function                                   |                    |          |              |            |                         |          |            |                      |                  |            |  |          |  |
| amniotic sac     | <b>E ;</b>   | contains amniotic fluid                    |                    |          |              |            |                         |          |            |                      |                  |            |  |          |  |
| cervix ;         | <b>D ;</b>   | dilates during birth                       |                    |          |              |            |                         |          |            |                      |                  |            |  |          |  |
| umbilical cord ; | <b>F ;</b>   | carries materials between mother and fetus |                    |          |              |            |                         |          |            |                      |                  |            |  |          |  |
| 4(b)             | <p>zygote ;<br/>grows / divides ;<br/>reference to <u>mitosis</u> ;<br/>forms a ball of cells ;<br/>becomes an embryo ;</p>  | <b>3</b>                                   |                    |          |              |            |                         |          |            |                      |                  |            |  |          |  |
| 4(c)             | <p>early stage increases in complexity ;<br/>late stages increases in size ;</p>   | <b>2</b>                                   |                    |          |              |            |                         |          |            |                      |                  |            |  |          |  |

| <b>Question</b> | <b>Answer</b>   | <b>Marks</b> | <b>Guidance</b> |
|-----------------|---|--------------|-----------------|
| 5(a)            | movement ;<br>respiration ;<br>sensitivity ;<br>growth ;<br>nutrition ;<br>excretion ;  | <b>2</b>     |                 |
| 5(b)            | nerve (cell) ;<br>ciliated (cell) ;<br>root hair (cell) ;<br>red blood (cell) ;<br>xylem (cell) ;<br>phloem (cell) ;<br>palisade (mesophyll cell) ;<br>spongy (mesophyll cell) ;<br>white blood (cell) ;<br>AVP ; | <b>2</b>     |                 |

| Question | Answer   | Marks    | Guidance                       |
|----------|--|----------|--------------------------------|
| 5(c)     | <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;">Sexual reproduction</div> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="border: 1px solid black; padding: 5px;">always involves only one parent.</div> <div style="border: 1px solid black; padding: 5px;">involves gametes.</div> <div style="border: 1px solid black; padding: 5px;">includes the process of fertilisation.</div> <div style="border: 1px solid black; padding: 5px;">only occurs in animals.</div> <div style="border: 1px solid black; padding: 5px;">only produces genetically identical offspring.</div> <div style="border: 1px solid black; padding: 5px;">results in the formation of a zygote.</div> </div> </div> | <b>3</b> | one mark for each correct line |
| 5(d)     | <b>A ;</b><br><b>C ;</b><br>involves only one <u>parent</u> / does not involve two <u>parents</u> ;  | <b>3</b> |                                |

| Question | Answer   | Marks | Guidance |
|----------|--|-------|----------|
| 6(a)     | population is constant then increases ;<br>change occurs at 1700 ;<br>rapid / exponential, increase (from 1800) ;<br>data quote ;  | 3     |          |
| 6(b)     | increased food production ;<br>increased medical, facilities / care ;<br>better, sanitation / clean water / sewage facilities ;<br>increased hygiene ;<br>increased (health) education ; | 3     |          |
| 6(c)     | disease ;<br>war ;<br>(named) natural disaster ;<br>famine ;<br>migration ;<br>AVP ;   | 2     |          |

| <b>Question</b> | <b>Answer</b>   | <b>Marks</b> | <b>Guidance</b> |
|-----------------|---|--------------|-----------------|
| 7(a)(i)         | <b>A</b> (upper) epidermis ;<br><b>B</b> spongy mesophyll (layer) ;         | <b>2</b>     |                 |
| 7(a)(ii)        | vascular bundle circled on Fig.7.1 ;  | <b>1</b>     |                 |
| 7(a)(iii)       | arrow drawn to end on an air space in spongy mesophyll tissue on Fig. 7.1 ; | <b>1</b>     |                 |
| 7(b)            | cell membrane ;<br>cytoplasm ;<br>nucleus ;<br>AVP ;                        | <b>3</b>     |                 |

| Question | Answer  | Marks    | Guidance   |
|----------|---|----------|--|
| 8(a)     |   | <b>4</b> | 5 correct = 4 marks<br>3 or 4 correct = 3 marks<br>2 correct = 2 marks<br>1 correct = 1 mark |
| 8(b)     | loss of biodiversity ;<br>reduction in genetic variation ;<br>production of, (named) greenhouse gases / global warming ;<br>water pollution / AW ;<br>habitat destruction ; | <b>2</b> |  |

| Question  | Answer  | Marks    | Guidance |
|-----------|---|----------|----------|
| 9(a)(i)   | (potato cylinder in test-tube 1) increased in mass (by 5g) ;<br>(potato cylinder in test-tube 2) mass stayed the same ;                 | <b>2</b> |          |
| 9(a)(ii)  | 6 (g) ;   | <b>1</b> |          |
| 9(a)(iii) | water moves out of the potato (cylinder) ;<br>by osmosis ;<br>because there is more water inside the potato than in the solution / AW ; | <b>2</b> |          |
| 9(b)      | nitrate ;<br>for making amino acids / proteins ;<br>OR<br>magnesium ;<br>for making chlorophyll ;                                       | <b>2</b> |          |