Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

BIOLOGY **5090/21**

Paper 2 Theory **May/June 2019**

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.

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.

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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: 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.

Mark schemes will use these abbreviations:

;	separates marking points
/	alternatives
()	contents of brackets are not required but should be implied
R	reject
A	accept (for answers correctly cued by the question, or guidance for examiners)
Ig	ignore (for incorrect but irrelevant responses)
AW	alternative wording (where responses vary more than usual)
AVP	alternative valid point (where a greater than usual variety of responses is expected)
ORA	or reverse argument
underline	actual word underlined must be used by candidate
+	statements on both sides of the **+** are needed for that mark

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Question	Answer	Marks	Guidance
1(a)	aerobic **;** respiration **;**	**2**	
1(b)(i)	20 **+** minutes / mins **;**	**1**	
1(b)(ii)	2 **;**	**1**	
1(c)	anaerobic **;** respiration **;** lactic acid **;** produced / increases / concentration rises / not broken down **AW ;** oxygen **+** falls **AW ;**	**3**	
1(d)	falls / decreases **AW ;** breathe(s) **AW ;** oxygen **;** breaks down lactic acid **;**	**3**	

Question	Answer	Marks	Guidance
2(a)	**C /** insect with dots / spots **AW ;**	**1**	
	less easily seen / camouflaged / markings same as leaf / not eaten **;**	**1**	
2(b)	**C** and **E** decline **AW ;** **C** and **E +** easily seen / eaten / not camouflaged / markings different to leaves **AW ;** **D +** increases / breeds / reproduces **;** **D +** less easily seen / camouflaged / markings same as leaf / not eaten **;** hands on gene / allele(s) **;** natural selection / evolution **;**	**4**	

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Question	Answer	Marks	Guidance
2(c)	**D +** Tt ; Tt × Tt / heterozygous **+** cross / mate / reproduce ; reference to handing on **both** T and t alleles / gametes ; produces TT **+** dots ; tt **+** stripes ;	**4**	

Question	Answer	Marks	Guidance
3(a)	water ; oxygen ; suitable **AW +** temperature ;	**2**	
3(b)(i)	water ; protein / amino acids ; enzymes ; mineral ions **OR** named ; cellulose ; fats / oils / lipids ;	**2**	
3(b)(ii)	stage 4 ;	**1**	
	starch ; increases / being produced ;	**2**	
3(c)	sugar increases / starch decreases ; starch to sugar / maltose / glucose ; digested / broken down / hydrolysed ; by amylase ; for growth / respiration / energy ;	**3**	

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Question	Answer	Marks	Guidance
4(a)	*petals* 4 **;** *filaments* 8 **;**	**2**	
4(b)	ovary labelled between flower and leaf **;**	**1**	
4(c)(i)	insect / cross **;** petals **;** attract insects **;** landing platform for insects **AW ;** contact with stamens / anther / pollen / stigma **;**	**3**	
4(c)(ii)	wind **;** small seeds **;** large surface area / hairy **AW ;** many seeds **;**	**3**	**R** wind <u>pollination</u>

Question	Answer	Marks	Guidance
5(a)	one mark for each correctly labelled organ: **J** testis **;** **K** pancreas **;** **L** ovary **;** **M** pituitary gland **;**	**4**	
5(b)	(for testosterone **or** insulin **or** progesterone **or** FSH): production organ **+** named hormone **;** in solution / dissolved **;** in blood / plasma **;** tissue fluid **;** target organ(s) **+** named for hormone selected **;**	**4**	

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Question	Answer	Marks	Guidance
5(c)	LH from the pituitary **;** stimulates **AW +** ovary **;** egg release / ovulation **;** to produce progesterone **;** for approximately two weeks **;** (progesterone) to maintain spongy lining / wall of uterus / inhibits FSH / LH / ovulation / egg formation **AW ;**	**3**	

Question	Answer	Marks	Guidance
6(a)	movement **+** molecules **;** water **;** water potential **;** high to low **;** until concentrations equal either side / equilibrium / force applied to prevent it **;** (osmosis) partially permeable **AW** membrane **;** (diffusion) membrane not required **;** energy not required **AW ;**	**7**	
6(b)	absorption / uptake **;** by villi **;** of digested carbohydrate / glucose / amino acids / fatty acids / glycerol / minerals / ions **or** salts **or** named **;** faster than diffusion **;** against a concentration gradient **;** to prevent wastage / egestion **AW ;**	**3**	

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Question	Answer	Marks	Guidance
7(a)	carbon dioxide ; by lungs / alveoli ; lost in breath / breathing out / action any one set of muscles ; urea ; drugs or one named ; broken down hormones ; salts / water ; kidneys ; urine ; skin ; sweat ;	**7**	**A** diaphragm relaxes / moves up / domes
7(b)	carbon dioxide out ; oxygen out ; night **+** CO_2 / day **+** O_2 ; out by diffusion ; out through stomata / guard cells ; leaf fall ;	**3**	

Question	Answer	Marks	Guidance
8(a)	made of DNA ; part of a chromosome ; copied / passed on / inherited / hereditary ; one **+** character(istic) / trait ; one **+** protein / polypeptide ; (allele) a form / type / version of a gene ; may be dominant / recessive / co-dominant ;	**5**	

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Question	Answer	Marks	Guidance
8(b)	*continuous* over a range / many phenotypes / intermediates **;** the result of interaction between genes and the environment **;** valid example (skin colour, height, weight) **;** *discontinuous* very few forms / few phenotypes / no intermediates **;** the result of genes only **;** valid example (blood group, eye colour, sex) **;** inherited / passed on to next generation **;**	**5**	

Question	Answer	Marks	Guidance
9(a)	antibodies / antibiotics cure disease / fight infections **;** *antibodies* proteins **;** in the blood / plasma **;** produced by white blood cells / lymphocytes **;** against pathogens / antigens / named pathogen **;** *antibiotics* artificial / manufactured / drugs **;** taken / swallowed / injected **AW ;** often made using fungi / named example of antibiotic **;** only **+** to kill / used against bacteria / not against viruses **;** assist immune system **AW ;**	**5**	

Question	Answer	Marks	Guidance
9(b)	(viruses) smaller /reasonable size ref. (below 400 nm) (bacteria) larger / reasonable size ref. (above 400 nm) ; virus protein coat / capsid ; virus not truly living **AW** ; virus not affected by antibiotics ; bacteria have cell wall / cytoplasm / cell membrane ; bacteria may have plasmid ; bacteria involved in part of nitrogen / carbon cycle ; neither has a nucleus ; both have nucleic acid ; both are pathogenic **AW** / parasitic ;	**5**	**A** viruses cannot be seen using light microscope **ORA** **ORA** for each point