Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/33**

Paper 3 Theory (Core) **May/June 2017**

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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This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

Mark schemes will use these abbreviations

- **;** separates marking points
- / alternatives
- **I** **I**
- **R** reject
- **A** **A** (for answers correctly cued by the question, or guidance for examiners)
- AW alternative wording (where responses vary more than usual)
- 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 word given must be used by candidate (grammatical variants excepted)
- max indicates the maximum number of marks that can be given

Question	Answer	Marks	Guidance
1(a)(i)	photosynthesis ;	**1**	
1(a)(ii)	water + carbon dioxide ; ➔ oxygen + glucose ;	**2**	
1(a)(iii)	large surface area (to absorb light) ; contain chloroplasts / chlorophyll (to absorb light) ; ref. to xylem ; stomata (to allow gas exchange) ; thin (short diffusion distances) ; transparent cuticle / epidermis ; AVP ;	**1**	
1(b)(i)	*Betula pendula* = **C** *Fraxinus excelsior* = **D** *Laurus nobilis* = **E** *Quercus robur* = **A** ;;;	**3**	All 4 correct = 3 2 or 3 correct = 2 1 correct = 1

Question	Answer	Marks	Guidance
1(b)(ii)	does leaf have only 5 parts? ; does the leaf have less than 7 parts? ; do the leaf parts all join at one place? ; does the leaf have more than one vein? ; does the leaf have branched veins? ; does the leaf have more than one vein in each part? ; does the leaf have pointy ends? ;	**1**	AW but the statement must fit a correct YES or NO choice

Question	Answer	Marks	Guidance
2(a)(i)	to pump blood / AW ;	**1**	
2(a)(ii)	(cardiac) muscle ;	**1**	
2(a)(iii)	ECG ; (counting the) pulse / heart beat ; using a, heart monitor / pulse monitor / blood pressure meter ; listening (to heart valves closing) ;	**2**	
2(b)(i)	a circle drawn around the coronary artery ;	**1**	
2(b)(ii)	*any one from* diet ; stress ; smoking ; genetic factors ; age / gender ; lack of exercise ; high blood cholesterol ; obese ; diabetes ;	**1**	**A** family history
2(b)(iii)	arteries veins ;	**1**	must have both in correct order

Question	Answer	Marks	Guidance
2(c)(i)	right atrium ;	1	**A** right auricle
2(c)(ii)	ensure one way flow of blood / prevent backflow ;	1	
2(c)(iii)	septum ;	1	

Question	Answer	Marks	Guidance
3(a)(i)	hormones ;	1	
3(a)(ii)	line adrenaline joining to adrenal gland (above kidney) ; line insulin joining to pancreas ; line oestrogen joining to ovary ;	3	
3(a)(iii)	(insulin) pancreas ; (oestrogen) ovary ;	2	
3(a)(iv)	(Insulin) lowers blood, sugar / glucose *OR* (promotes conversion of) glucose to glycogen ; oestrogen causes lining of uterus to thicken / responsible for (named) secondary sexual characteristics ;	2	**I** regulates / controls **A** regulates the menstrual cycle
3(b)	*any two from* pupils are enlarge / dilated ; increased blood glucose concentration ; increased breathing (rate) ; increased, heart / pulse, rate ; increased blood pressure ; expand air passages of lungs ; increased / divert, blood to muscles ; speeds up reaction time ;	2	**A** increased depth / volume of breathing **A** increased mental awareness

Question	Answer	Marks	Guidance
4(a)	break down of molecules ; large to small molecules / insoluble to soluble molecules ;	**2**	
4(b)(i)	amylase ;	**1**	
4(b)(ii)	simple sugars / glucose ;	**1**	**A** maltose / reducing sugar
4(c)(i)	**A** ; **B** ;	**2**	either order
4(c)(ii)	small intestine / ileum / duodenum ;	**1**	**A** villi
4(d)	*any two from* secretes (named) enzymes ; storage ; mechanical digestion / described ; secretes hydrochloric acid / provides an acidic pH (for enzymes) / lowers pH / adds liquid ; kills bacteria ; digests protein ;	**2**	

Question	Answer	Marks	Guidance
5(a)(i)	37 / 38 (cm^3) ;	1	
5(a)(ii)	4 (minutes) ;	1	**ecf** from (a)(i)
5(a)(iii)	more juice extracted / bigger yield ; faster (extraction) / takes less time ; more profit ;	2	
5(b)(i)	(chemical reaction in cells that) breaks down, nutrient molecules, to release energy ; without using oxygen ;	2	
5(b)(ii)	biofuel / bread / carbon dioxide ;	1	**A** yeast extract / 'marmite' / CO_2 **I** any named alcohol
5(b)(iii)	uses oxygen ; releases more energy / makes more ATP ; produces water ; does not produce alcohol / ethanol ; AVP ;	2	e.g. produces more carbon dioxide

Question	Answer	Marks	Guidance
6(a)	shoot grows upwards / AW ;	1	
6(b)(i)	gravity ;	1	
6(b)(ii)	gravitropism ;	1	
6(c)(i)	phototropism ;	1	
6(c)(ii)	the shoot grows towards the, light / stimulus ; (shoot) receives more light ; plants need light, to make food / for photosynthesis ; food / nutrients, needed for, growth / metabolism ;	3	

Question	Answer	Marks	Guidance
7(a)(i)	<table><tr><td>meiosis</td><td>/</td><td></td><td>/</td><td></td></tr><tr><td>mitosis</td><td></td><td>/</td><td></td><td>/</td></tr></table> ;;	2	correct answer column 1 and 2 = 1 mark correct answer column 3 and 4 = 1 mark
7(b)	selection by humans / AW ; of individuals(s) with desired features / AW ; crossing / mating / breeding,(them together) ; selecting offspring with desired features and breed again ; over many generations ;	3	
7(c)	changing the, genetic material / DNA, of an organism ; by using genes ; from another organism ; (adding genes to) confer resistance to, herbicides / insect pests ; to make vitamins ; examples ;	4	**A** genetically modify an organism **A** alleles max 2 for examples **A** other examples include : salt tolerance / drought resistance / growth in harsh conditions nitrogen fixation virus resistance delayed ripening seedless watermelons flavr savr tomatoes make plants grow faster
7(d)	herbicides ; insecticide ; fertilisers ; irrigation / watering ; use of machinery ; crop rotation ; biological pest control ; more light ; AVP ;;	2	**I** weather e.g. pesticides / fungicide

Question	Answer	Marks	Guidance
8(a)(i)	**F** ; C **A / E** & **E / A** ; D **B** ;	**3**	1st box **F** 1 mark 6th box **B** 1 mark both **A E** or **E A** in the middle 1 mark
8(a)(ii)	mutation ;	**1**	
8(a)(iii)	mutagens / (named) chemicals e.g. cigarette smoke / dyes ; radiation / x rays / UV ; viruses ;	**1**	
8(b)(i)	an inherited feature ; that helps an organism to survive / reproduce ; in its environment ;	**2**	
8(b)(ii)	they all have, hair / fur ; all have (external) ears / pinnae ; middle ear bones ;	**2**	must be visible features
8(b)(iii)	mammary glands / production of milk (for offspring) / nipples ;	**1**	
9(a)	plasma – not clotting platelets – burns patients red blood cells – low immunity white blood cells – low haemoglobin	**3**	All 4 correct = 3 2 or 3 correct = 2 1 correct = 1
9(b)(i)	rounder / (bi)concave / fixed shape / disc shaped / doughnut shaped ; lacks a nucleus ; it contains haemoglobin ; smaller ;	**2**	**I** colour

Question	Answer	Marks	Guidance
9(b)(ii)	to prevent (further) blood loss / haemorrhage ; to seal wounds / as a barrier to infection idea / stop pathogens entering ;	1	