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BIOLOGY

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Paper 3 Theory (Core)

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MARK SCHEME

Maximum Mark: 80

Published

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This document consists of **11** printed pages.



Mark schemes will use these abbreviations

- ; separates marking points
- / alternatives
- **I** ignore
- **R** reject
- **A** accept (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		key	name of insect	letter	4	1 correct = 1 mark 2 correct = 2 marks 3 correct = 3 marks 4 or 5 correct = 4 marks
	1 (a)	body is long and thin	go to 2			
	(b)	body is short and rounded	go to 3			
	2 (a)	body has a spotted pattern	<i>A. oculatus</i>	D		
	(b)	body has a plain pattern	<i>P. pyralis</i>	E		
	3 (a)	no visible antennae	<i>C. lunaris</i>	C		
	(b)	visible antennae	go to 4			
	4 (a)	body has a striped pattern	<i>G. lineatum</i>	A		
	(b)	body has a dotted pattern	<i>C. septempunctata</i>	B		

Question	Answer	Marks	Guidance
2(a)	a group of organisms of one <u>species</u> ; living in the same area, at the same time ;	2	
2(b)(i)	phytoplankton / algae ;	1	
2(b)(ii)	limpets / zooplankton / mussels / fish ;	1	
2(b)(iii)	phytoplankton → zooplankton → fish → seagull ;	1	

Question	Answer	Marks	Guidance
2(b)(iv)	<p><i>starfish</i></p> <p>1. (population) increases ; 2. lack of predators / fewer sharks, to eat starfish ;</p> <p><i>limpets</i></p> <p>3. (population) decreases ; 4. increased predation / more starfish or more octopus to eat them ;</p>	4	
2(b)(v)	<p>(more) hunting ; (named) pollution / contamination ; starvation / decreased food supply / competition for (food) ; disease ; more predators ; habitat destruction ; introduced / alien species ;</p>	2	<p>A. over-harvesting / fishing (for sharks) A. death of starfish / octopus</p>
2(c)	(the) Sun ;	1	
2(d)	<p>(A) condensation ; (B) evaporation ; (C) transpiration / evaporation / evapotranspiration ; (D) precipitation ;</p>	4	

Question	Answer	Marks	Guidance												
3(a)	<table border="1" data-bbox="392 247 1429 451"> <thead> <tr> <th data-bbox="392 247 674 300">natural</th> <th data-bbox="674 247 956 300">chemical</th> <th data-bbox="956 247 1133 300">barrier</th> <th data-bbox="1133 247 1429 300">surgical</th> </tr> </thead> <tbody> <tr> <td data-bbox="392 300 674 373">abstinence</td> <td data-bbox="674 300 956 373">contraceptive pill</td> <td data-bbox="956 300 1133 373">condom</td> <td data-bbox="1133 300 1429 373">female sterilisation</td> </tr> <tr> <td data-bbox="392 373 674 451">monitoring body temperature</td> <td data-bbox="674 373 956 451">IUD</td> <td data-bbox="956 373 1133 451">diaphragm</td> <td data-bbox="1133 373 1429 451">vasectomy</td> </tr> </tbody> </table> <p data-bbox="1485 459 1529 491">;;;</p>	natural	chemical	barrier	surgical	abstinence	contraceptive pill	condom	female sterilisation	monitoring body temperature	IUD	diaphragm	vasectomy	4	<p data-bbox="1666 220 1921 384">8 correct = 4 marks 7 or 6 correct = 3 5 or 4 correct = 2 2 correct = 1 1 correct = 0</p> <p data-bbox="1666 421 1973 453">A IUD in barrier column</p>
natural	chemical	barrier	surgical												
abstinence	contraceptive pill	condom	female sterilisation												
monitoring body temperature	IUD	diaphragm	vasectomy												
3(b)	<p data-bbox="347 523 501 555">hormones ;</p> <p data-bbox="347 592 443 624">ovary ;</p> <p data-bbox="347 660 488 692">egg cells ;</p>	3													
3(c)(i)	<p data-bbox="347 726 770 758">human immunodeficiency virus ;</p>	1													
3(c)(ii)	<p data-bbox="347 790 636 853"><i>transmission</i> breast, milk / feeding ;</p> <p data-bbox="347 890 981 922">mother to unborn child / through placenta / birth ;</p> <p data-bbox="347 959 931 991">blood / blood transfusion / organ transplants ;</p> <p data-bbox="347 1027 1451 1059">injecting drugs / contaminated or sharing needles / contaminated or sharing syringes ;</p> <p data-bbox="347 1096 1128 1160"><i>idea of via</i>, vaginal / seminal / sexual, fluids OR sexual intercourse / sex, without a condom (protection) ;</p>	2													

Question	Answer	Marks	Guidance
3(c)(iii)	<i>control</i> ref. to education ; needle exchange / not sharing needles / use sterile needles / AW ; free / use, condoms / femidoms ; free testing (for individuals) ; screening of, blood / blood products / AW ; antiretroviral / ARV, drugs ; <i>idea of avoiding blood to blood contact ;</i>	2	A barrier methods / protection, during sex(ual intercourse)

Question	Answer	Marks	Guidance
4(a)	A ; C ; D ; F ;	4	
4(b)	fewer / less ; sticky ; heavier / denser ; spiky ; larger ;	2	I scent
4(c)	<u>meiosis</u> ;	1	

Question	Answer	Marks	Guidance
4(d)	<p>where ovules are produced</p> <p>ovary</p> <p>where pollen is produced</p> <p>petal</p> <p>protects the flower when in bud</p> <p>sepal</p> <p>often coloured to attract insects</p> <p>stigma</p> <p>where pollen is deposited</p> <p style="text-align: right;">;;;</p>	4	

Question	Answer	Marks	Guidance
5(a)(i)	palisade (mesophyll) ; guard (cell) ;	2	
5(a)(ii)	chloroplast ;	1	
5(b)	cell membrane circled ; cytoplasm circled ; nucleus circled ;	3	minus 1 mark for each additional circled structure
5(c)	carbon dioxide and water ;	1	

Question	Answer	Marks	Guidance
5(d)	leaf A bigger / larger, surface (area) OR bigger / thicker / more, mesophyll (layer / cells) ; absorbs more light / more chlorophyll / more chloroplasts / more gas exchange / more stomata ;	2	

Question	Answer	Marks	Guidance
6(a)		3	1 mark for each correctly linked drug
6(b)(i)	66–70 ;	1	
6(b)(ii)	10(%) ;	1	

Question	Answer	Marks	Guidance
6(b)(iii)	increases and decreases / after 20 years old it decreases ; peaks in the 16–20 year old age group / AW ; any correct reference to description of fluctuation at 51–65 year olds ; data quote with units ;	3	
6(c)	bacterial ;	1	

Question	Answer	Marks	Guidance
7(a)(i)	warm, dry air ;	1	
7(a)(ii)	0.4 (mm per min) ;;	2	If no correct answer 4÷10 for 1 mark
7(a)(iii)	(air bubble) moves, further / faster ;	1	
7(b)	root (hair cell) ; by osmosis ;	2	

Question	Answer	Marks	Guidance
7(c)	(water) evaporates ; from (surface of mesophyll) cells ; water vapour diffuses ; through stomata ;	3	
7(d)	<u>xylem</u> ;	1	

Question	Answer	Marks	Guidance
8(a)	carbohydrates ; fats / lipids ; protein ; vitamins / named vitamin ; minerals / name mineral ; fibre ;	3	
8(b)	small intestine ;	1	
8(c)	(A) <u>ureter</u> ; (B) bladder ; (C) <u>urethra</u> ;	3	

Question	Answer				Marks	Guidance	
8(d)	changes in the body	urine volume		urine concentration		2	1 mark for each correct row
		increases	decreases	increases	decrease		
	increase in body temperature		✓	✓			
	increase in exercise		✓	✓			
	increase in water uptake	✓			✓		

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