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Mark Scheme (Results)

January 2017

Pearson Edexcel International GCSE in
Biology (4BI0) Paper 2B

Pearson Edexcel Certificate in
Biology (KBI0) Paper 2B

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question number	Answer	Notes	Marks
1 (a) (i)	runners / corms / bulbs / rhizomes / eq;	Ignore cuttings / cloning buds	1
	(ii) <u>genetic</u> variation / enables adaptation / survival / avoid extinction / eq;		1
(b)	1. unisexual / only have male or female flowers / have male or female sex organs / have stamens or carpels / only have one type of sex organ / flowers with one type of gamete / eq; 2. cross-pollination / transfer of pollen to different plant / transfer of pollen to different flower / two parent flowers needed / gametes from one plant fertilise gametes of another plant / eq;	Allow converse for Mps 1 and 2	2
(c)	1. Benedict's / clinistix / glucose test strip / eq; 2. most red / deeper red / darker red / green is least / yellow least / time to turn brick red;	2. Ignore colour change alone / compare colour / compare colour change Mp must be comparative	2
(d)	1. low mass / light; 2. small; 3. smooth; 4. more produced;	Ignore wings / sails / feathery	2 max
(e)	1. quadrat; 2. random / eq; 3. count; 4. repeat / calculate mean; 5. scale up / multiply sample size for full area;	1. quadrats = 2	4 max

(f)	<ol style="list-style-type: none">1. (position within flower) anther and stigma different heights / stamens and styles different lengths / sex organs not close to each other / eq;2. (transfer) pollen not transferred to stigma (of same flower) / prevent pollen transfer (in same flower) / eq;	<ol style="list-style-type: none">2. Ignore prevent self-pollination – need description	2
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Question number	Answer	Notes	Marks
2 (a)	1. (mucus) traps bacteria / pathogens / microbes / microorganisms / prevents bacteria getting into lungs / eq; 2. (cilia/ciliated cells) (re)move bacteria / <u>move</u> bacteria out / eq;	1. Ignore dust 2. Ignore prevent mucus build up / prevent blockage of mucus	2
(b)	remove <u>mucus</u> / prevent <u>mucus</u> build up / clear <u>mucus</u> blockage / cilia cannot remove <u>mucus</u> / eq;		1
(c)(i)	1. reduce movement / lower than control; 2. brand B more than brand A / eq;	Brand B reduces movement more than brand A = 2	2
(ii)	water / no tobacco;		1

(iii)	<ol style="list-style-type: none"> 1. (brand) only 2 brands investigated / other brands not investigated / different brands have different effect / different types of tobacco; 2. (smoke versus liquid) humans inhale smoke / extract did not contain smoke / smoke in lungs / only water soluble tobacco compounds investigated / effect could be non-water soluble compound / different solubility of tobacco; 3. (repeat) only one <i>Paramecium</i> tested / no repeats / small sample size / data not reliable; 4. (organism) <i>Paramecium</i> not human / human not used / lung not used; 5. (smoking) frequency of smoking / duration of smoking; 6. (variables) no control of temperature; concentration of extract / volume of water in test tubes / amount of tobacco used; pH; light; size of <i>Paramecium</i> / eq; 	<p>4. human lungs have bacteria = 1 for ref to lungs</p> <p>6. Allow up to 2 max</p>	4 max
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Question number	Answer	Notes	Marks
3 (a)	1. plasmids; 2. nucleiod / <u>circular</u> chromosome; 3. cytoplasm; 4. cell wall; 5. <u>cell</u> membrane; 6. ribosome; 7. flagellum; 8. slime capsule;	2. Ignore nucleus	2 max
(b)	1. ingest / engulf / surround / wrap around / phagocyte / phagocytosis / eq; 2. digest / break down; 3. enzyme / lysozyme / named digestive enzyme;	1. Ignore trap / cover 2. Ignore kill / destroy	3
(c)	1. <u>carbon cycle</u> ; 2. decomposition / decomposers; 3. breakdown / digest; 4. release carbon <u>dioxide</u> ; 5. <u>nitrogen cycle</u> ; 6. nitrogen fixing / nitrogen to ammonia / nitrogen to nitrate; 7. denitrifying / nitrate to nitrite / produce nitrogen; 8. nitrifying / ammonia/ammonium to nitrite/nitrate / nitrite to nitrate;	2. Ignore decay Ignore Mp 6, 7 and 8 if process named but incorrectly described	6

(d)	1. lack of food / nutrients / energy / water / resources / oxygen / minerals / eq; 2. (killed by) toxins / waste products / poisons;		2
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Question number	Answer	Notes	Marks
4 (a)	pancreas / <u>small</u> intestine / duodenum / ileum;	Ignore pancrease	1
(b)	1. fat not digested / fat not broken down / less fatty acid produced / less glycerol produced; 2. less absorption / less assimilation / fat egested / eq;	2. Allow less absorption of fat	2
(c)	1. <u>37 °C</u> ; 2. (human) body temperature / <u>optimum</u> temperature;		2
(d)(i)	between 73 to 75;;	Allow one mark for 79 to 80 or 5 to 6 in working	2
(ii)	1. pH meter; 2. fatty acid; 3. change in pH / compare starting pH with pH at end / compare pH with control / no change in pH / neutral pH / pH stays at 6 to 7 means inhibition / means lipase inhibited / less alkali needed (to neutralise);		3
(iii)	1. higher concentration gives little increase in inhibition / inhibits high percentage / plateaus / levels off / eq; 2. toxic / harmful / side effects / eq;		1 max

Question number	Answer	Notes	Marks
5 (a)	<u>osmoregulation</u> / <u>homeostasis</u> ;		1
(b)	8;;	Allow one mark for 200 in working	2
(c)	1. <u>more</u> sweat / <u>more</u> sweating / <u>more</u> water lost as sweat; 2. less water in <u>blood</u> / <u>blood</u> more concentrated / eq; 3. pituitary / hypothalamus; 4. ADH released / eq; 5. collecting duct (more) permeable; 6. water (re)absorbed / less water in urine / less urine / urine concentrated;	Ignore start to sweat 2. Ignore body	4 max

Question number	Answer	Notes	Marks
6 (a) (i)	1. oxygen; 2. <u>aerobic</u> respiration / prevent <u>anaerobic</u> respiration;		2
(ii)	prevent entry of bacteria / pathogens / microbes / microorganisms / fungi / eq;	Ignore dust / organisms / clean the air / prevent disease / prevent infection / prevent contamination	1
(b)	1. temperature rise / gets hot / overheat / eq; 2. enzymes <u>denatured</u> / change to active site / substrate no longer fits / eq;	Ignore ideas linked to fall in temperature	2 max

