Cambridge O Level

Cambridge International Examinations
Cambridge Ordinary Level

ENVIRONMENTAL MANAGEMENT **5014/21**

Paper 2 **May/June 2017**

MARK SCHEME

Maximum Mark: 60

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 will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2017 series for most Cambridge IGCSE®, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

Question	Answer	Marks
1(a)(i)	*any two of:* damage / interfere, with farmland / eq; so less food available / eq; *reference to* risk of pollution of Nile; risk of flooding homes; difficult to travel into the city; easier / more space, to the east; AVP, e.g. unsuitable ground for building;	**2**
1(a)(ii)	estimate between 100–200 (km^2);; (*if answer incorrect, allow one mark for* use of scale *[1]*);	**2**
1(a)(iii)	*any two of:* only desert; not used for farming; unused land; more space available for building; connects to existing housing / old city; connects to services / named services; low transport costs; no risk of flooding; AVP;	**2**
1(a)(iv)	*any three of:* roads / transport; electricity; telecoms; water supply; sewage removal; hospitals / healthcare / clinics; schools / education; *reference to* street lights / waste collections / other example; law enforcement / other named emergency service;	**3**

Question	Answer	Marks
1(a)(v)	*any two of:* cooling effect; *reference to* transpiration; shade; windbreak; absorbs some air pollutants; scenic value / pleasant environment / eq;	**2**
1(b)	*any three of:* for irrigation; so crops can grow all year; cheap / easy access to, water supply; easy to keep, animals / livestock; close to, population / farm workers; transport, crops / goods, to people; rich / fertile soil;	**3**
1(c)(i)	*any two of:* bacteria fix nitrogen gas from atmosphere / eq; pea plants do not need fertiliser; *reference to* amino acids / proteins / DNA / enzyme;	**2**
1(c)(ii)	5 / 4.6 / 4.58 / 4.583; g;	**2**
1(c)(iii)	5 OR 3–8;	**1**
1(c)(iv)	2400;; (*if answer incorrect, allow one mark for correct method, e.g.* 60 × 40 *[1]*)	**2**
1(d)(i)	*next two pairs circled* 4+6 AND 9+5; correctly drawn on grid;;	**3**

Question	Answer	Marks
1(d)(ii)	more plants / samples (3 not 2); more areas of field (10 areas rather than 1); random sampling; many samples remove bias / eq; anomalies / outliers, can be identified; and removed from average or have less effect; *reference to* validity;	**3**
1(e)(i)	*4 correct [2]* *2 to 3 correct [1]* 5, 2, 3, 1;;	**2**
1(e)(ii)	**R** and *any two of:* **highest** values for, BOD; bacteria; chromium; iron; allow a reason, e.g. not enough oxygen means organisms will die / chromium is toxic / etc.;	**2**
1(e)(iii)	**T** and low / no, BOD / bacteria count / no metal content;	**1**
1(e)(iv)	**R** and highest concentration of, chromium / iron;	**1**
1(e)(v)	*any two of:* organic matter / sewage / fertiliser, present; more bacteria / bacteria feed on this / multiply / eq; bacterial respiration increases / respire more oxygen; so oxygen used up / eq;	**2**
1(f)(i)	129 / 128.6 / 128.57 / 128.571(%);; (*if answer incorrect, allow one mark for* 4.5 e.g. 8.0–3.5 = 4.5, 4.5 / 3.5 × 100 *[1]*)	**2**
1(f)(ii)	to check there were no changes in temperature / make sure it was not an important factor in this canal;	**1**

Question	Answer	Marks
1(f)(iii)	*any two of:* dissolved oxygen decreased at site 3; dropped by a half / by 4.4 (between site 2–3); organic matter / sewage / fertiliser / other valid effluent, e.g. tannery waste; so bacteria increase in numbers and use up oxygen / BOD increase;	**2**
1(g)	*allow any three valid suggestions, such as:* more monitoring of water sources; strict laws about water quality; enforcing the laws; take polluters to court; polluter pays for clean up; AVP;	**3**
2(a)(i)	add all the responses for each question; express as a % of total number of questionnaire or out of 100;	**2**
2(a)(ii)	so decision makers can compare results (of different living areas); to find out if only people near the canal were in favour / ORA;	**2**
2(a)(iii)	*any two of:* reason why (government) need the money / eq; government can find out if people, approved of the project / value the project; give people / nation, a sense of ownership of project / eq; AVP;	**2**
2(a)(iv)	*any two of:* close to, canal / new roads, for easy transport; low cost of transport; encourages, import / export / trade; creates new jobs / canal already has skilled workers, so readily available / eq; provides source of water for industries;	**2**
2(a)(v)	tax breaks / investment grants / interest free loans / subsidies / eq or AVP;	**1**

Question	Answer	Marks
2(a)(vi)	*any three of:* *for*: saves, money / time; so more ships will use canal; more canal fees earned; AVP; *against:* canals already save days / weeks anyway (not going around Africa); new route only saves 8 hours; may not be demand for these improvements; AVP;	**3**
2(b)(i)	*any two of:* swim; flow / drift, in current; in ships bilges; cargo; stuck on hull; smuggled / tourists; AVP;	**2**
2(b)(ii)	*any three of:* disrupt food chain / web; *reference to* competition; e.g. effect of invasive producer or consumer; lack of natural predators; so population explosion; or population crash; habitat destruction; decrease in biodiversity; credit valid aquatic example; can carry, disease / pathogen / toxin;	**3**