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**ENVIRONMENTAL MANAGEMENT**

**0680/41**

Paper 4

**May/June 2017**

MARK SCHEME

Maximum Mark: 60

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**Published**

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This document consists of **6** printed pages.

Question	Answer	Marks
1(a)(i)	<p><i>any two of:</i>            damage / interfere, with farmland / eq;            so less food available / eq;  <i>reference to</i> 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;</p>	<b>2</b>
1(a)(ii)	<p>estimate between 100–200 (km<sup>2</sup>);;  <i>(if answer incorrect, allow one mark for use of scale [1]);</i></p>	<b>2</b>
1(a)(iii)	<p><i>any two of:</i>            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;</p>	<b>2</b>
1(a)(iv)	<p><i>any three of:</i>            roads / transport;            electricity;            telecoms;            water supply;            sewage removal;            hospitals / healthcare / clinics;            schools / education;  <i>reference to</i> street lights / waste collections / other example;            law enforcement / other named emergency service;</p>	<b>3</b>

Question	Answer	Marks
1(a)(v)	<i>any two of:</i> cooling effect; <i>reference to</i> transpiration; shade; windbreak; absorbs some air pollutants; scenic value / pleasant environment / eq;	<b>2</b>
1(b)	<i>any three of:</i> 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;	<b>3</b>
1(c)(i)	<i>any two of:</i> bacteria fix nitrogen gas from atmosphere / eq; pea plants do not need fertiliser; <i>reference to</i> amino acids / proteins / DNA / enzyme;	<b>2</b>
1(c)(ii)	5 / 4.6 / 4.58 / 4.583; g;	<b>2</b>
1(c)(iii)	5 OR 3–8;	<b>1</b>
1(c)(iv)	2400;;  <i>(if answer incorrect, allow one mark for correct method, e.g. 60 × 40 [1])</i>	<b>2</b>
1(d)(i)	<i>next two pairs circled</i> 4+6 AND 9+5; correctly drawn on grid;;	<b>3</b>

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; <i>reference to validity;</i>	3
1(e)(i)	4 correct [2] 2 to 3 correct [1]  5, 2, 3, 1;;	2
1(e)(ii)	<b>R</b> <u>and</u> any two of: <b>highest</b> 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)	<b>T</b> <u>and</u> low / no, BOD / bacteria count / no metal content;	1
1(e)(iv)	<b>R</b> <u>and</u> 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 <u>more</u> oxygen; so oxygen used up / eq;	2
1(f)(i)	129 / 128.6 / 128.57 / 128.571(%);;  <i>(if answer incorrect, allow one mark for 4.5 e.g. <math>8.0 - 3.5 = 4.5</math>, <math>4.5 / 3.5 \times 100</math> [1])</i>	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)	<p><i>any two of:</i>            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;</p>	<b>2</b>
1(g)	<p><i>allow any three valid suggestions, such as:</i>            more monitoring of water sources;            strict laws about water quality;            enforcing the laws;            take polluters to court;            polluter pays for clean up;            AVP;</p>	<b>3</b>
2(a)(i)	<p>add all the responses for each question;            express as a % of total number of questionnaire or out of 100;</p>	<b>2</b>
2(a)(ii)	<p>so decision makers can compare results (of different living areas);            to find out if only people near the canal were in favour / ORA;</p>	<b>2</b>
2(a)(iii)	<p><i>any two of:</i>            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;</p>	<b>2</b>
2(a)(iv)	<p><i>any two of:</i>            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;</p>	<b>2</b>
2(a)(v)	<p>tax breaks / investment grants / interest free loans / subsidies / eq or AVP;</p>	<b>1</b>

Question	Answer	Marks
2(a)(vi)	<p><i>any three of:</i></p> <p><i>for:</i> saves, money / time; so more ships will use canal; more canal fees earned; AVP;</p> <p><i>against:</i> canals already save days / weeks anyway (not going around Africa); new route only saves 8 hours; may not be demand for these improvements; AVP;</p>	3
2(b)(i)	<p><i>any two of:</i> swim; flow / drift, in current; in ships bilges; cargo; stuck on hull; smuggled / tourists; AVP;</p>	2
2(b)(ii)	<p><i>any three of:</i> disrupt food chain / web; <i>reference to</i> 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 <u>aquatic</u> example; can carry, disease / pathogen / toxin;</p>	3