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ENVIRONMENTAL MANAGEMENT

Paper 0680/12
Paper 1 Theory

Key messages

- There was a misconception that ozone depletion either caused global warming or was a result of global warming.
- A common misconception was that an advantage of using nuclear power is that the resource (uranium) is renewable.
- Some responses were too general and not specific enough to gain credit at this level.
- Candidates should be encouraged to show their working out in all calculations even if this is not specifically asked for in the question.
- Candidates were not confident at recording data in a table with suitable column headings that included units.
- More practice on plotting all types of graphs is recommended.
- More practice in describing trends shown from data or patterns on maps is recommended.

General comments

The mark allocation (shown in square brackets) and the answer space should be taken into account before starting to write a response to a question.

Examples where responses were too general included general references to 'causes pollution'. Candidates should clarify their meaning such as 'causes air pollution due to increased carbon dioxide concentrations' or 'causes water pollution due to increased nutrients in the water.' Also 'harmful to health', 'causes cancer' or 'causes death' should be clarified. For example, 'causes respiratory problems' or 'causes skin cancer' or 'causes death due to malnutrition'. Some explanations of eutrophication did not make it clear that oxygen is reduced due to algae/plant decomposition.

When plotting bar charts the bars should be the same width. The same shading used in the key should be used to complete the bars. Candidates would benefit from using a sharp pencil and ruler for all types of graph work.

Comments on specific questions

Section A

Question 1

(a) Most candidates knew that the process was surface run-off. Occasionally, candidates disadvantaged themselves by giving other contradictory processes.

(b) Descriptions of the water cycle processes leading to precipitation were well known. Water evaporating from water bodies, such as the ocean and evaporation of water from plant leaves were usually described. Some responses included a reference to the Sun being the driving force of the water cycle. Fewer responses included descriptions of water droplets in clouds getting bigger or an idea of clouds reaching their water holding capacity.

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Question 2

(a) In general, the order of the layers was well known. The thermosphere and mesosphere were sometimes reversed. The stratosphere and troposphere were also occasionally reversed.

(b) Most responses included a reference to harmful ultra-violet radiation. A common misconception was that a depleted ozone layer caused global warming or global warming caused the ozone layer depletion. Most responses stated skin cancer or cataracts as impacts. A reference to cancer without the type of cancer caused was not considered specific enough to gain credit.

Question 3

(a) This was well known and many sensible suggestions on how to control population growth were seen. Many responses focused on the improved education of woman as a key factor in reducing population growth. Some responses suggested national policies and many referred to the old One Child policy of China. Some responses stated both antinatalist and pronatalist policies. These responses could gain full credit if they developed their strategies, such as the old antinatalist One Child policy of China and the pronatalist strategies in Japan.

(b) (i) Some responses repeated the information in the question, 'increases yield', which did not gain credit. More successful responses named the elements nitrogen, phosphorus and potassium.

(ii) The impact of the overuse of fertilisers was well known by many candidates. Weaker responses did not make it clear that the reduction in oxygen is due to algae/plant decomposition.

Question 4

(a) A common misconception was that nuclear power is a renewable resource. In most cases, the fuel used for nuclear fission is uranium and uranium deposits within the Earth are finite. Better responses referred to no carbon dioxide emissions at the point of use and that a small amount of fuel can produce a large amount of energy.

(b) This was well answered; the most common explanations were using energy efficient devices and switching off devices when not in use. Weaker responses gave a list of different electrical appliances to be used less often.

Section B

Question 5

(a) Most responses correctly selected category 4 and stated that this was because the wind speed was between 209 and 251 km/h.

(b) (i) Most responses gave well supported viewpoints. Better responses developed each view point such as, 'There was limited food after the hurricane; this indicated that the strategy was not well planned because there were no emergency supplies.'

(ii) This was well answered. Most responses referred to cholera and malaria. Better responses related a lack of adequate sanitation and limited access to medical facilities after the damage caused by the hurricane, to the concern about water-related diseases. Weaker responses referred to contaminated water and did not specify that this related to contaminated *drinking* water. Other weaker answers stated people were concerned about dying. This was not considered sufficiently specific to gain credit. These responses could have been clarified by stating that drinking water contaminated with faecal matter can lead to cholera, which can lead to death.

(c) Suggested consequences of the crop destruction were usually linked to food shortages. Some responses went on to comment about a reduction in income for farmers and the potential for increased migration.

(d) Good suggestions included ideas about family connections, poverty or job choice. It was not considered sufficient to state that people did not want to leave, without qualifying this answer with a suitable reason.

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Question 6

(a) (i) Most responses stated a form of surface mining. Occasionally, sub-surface was incorrectly given.

(ii) Most responses explained that the tungsten was close to the surface. Incorrect ideas included discussions about safety which did not answer the question asked.

(b) Many responses correctly described negative impacts of the mine. Some responses also correctly described positive impacts, such as improved employment opportunities and improved infrastructure. A general reference to 'causes pollution' was not considered specific enough to gain credit. This needed to be clarified, for example 'causes air pollution due to increased dust particles in the air' or 'causes water pollution due to leaching from the overburden.'

(c) Many candidates found this question challenging. Better responses described increased efficiency of extraction, such as using new technologies to further extract resources. Some responses were able to name new technologies such as phytomining or bioleaching. Specific knowledge of these processes is not required but an idea that new technology can help with increased efficiency of extraction should be covered.

(d) (i) Most responses gave a correct description of e-waste. Weaker responses did not explain what the 'e' part of e-waste referred to.

(ii) Some responses were too vague to gain credit. The question required candidates to explain their suggestions and some responses did not provide a suitable explanation. For example, 'They are harmful' is not considered sufficiently detailed at this level.

(iii) Candidates found this question challenging and often did not gain full credit.

(e) (i) Many correct percentage increases were seen. There were many good examples of candidates showing their working out. This is good exam practice and should be encouraged as it may be possible to award partial credit for correct working out when a final answer is incorrect.

(ii) Many candidates found recording data in a suitable table challenging. It was common for tables to have missing or incorrect column headings. The unit 'Mt' was often missing from the column heading.

(f) (i) Many correctly plotted bars were seen. A common error was to present the bar wider than the other bars already plotted. The bars should be the same width. Also, the bar shading should match the shading in the key.

(ii) Candidates performed poorly on this question. A common misconception was to select the UK. Those candidates who correctly identified the USA did not always explain how they determined their answer. Statements such as 'because it produced the most e-waste' were not detailed enough and did not take into account both sets of data. The multiplication required was 'production of e-waste x population'.

Question 7

(a) (i) Candidates found describing the major ocean currents challenging. Some candidates misread the key. Other responses were not specific enough in their descriptions, for example, 'there are mostly cold currents' – needed to be clarified with '…in the South Atlantic' to gain credit.

(ii) The idea of the ocean currents taking the oil spilt at **Y** to the coastlines of many countries was often explained. Fewer responses went on to explain that this could have an international impact on marine ecosystems.

(iii) Nutrient upwelling was well known. Some candidates contradicted their answer by referring to warm water rising. Fewer responses explained the idea of the nutrients supporting a large food web.

(b) Candidates found interpreting the data in the graph challenging. Many confused the two y-axes and did not use the information provided in their answer.

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Question 8

(a) (i) A correct food chain was often seen. Weaker responses did not include arrows, or these arrows were the wrong way round.

(ii) Many candidates did not appear to be familiar with the term trophic levels. Others gave the number of trophic levels in their food chain from **8(a)(i)**. The question asked for the greatest number of trophic levels in the food web.

(b) (i) The equation for photosynthesis was not particularly well known. Some correct word equations were seen. The question asked for a word equation and candidates should not provide a symbol equation in this case.

(ii) Candidates found it challenging to describe the features of a sandy soil and gain full credit. This was an area of the syllabus that did not appear to be well known.

(c) Many correct benefits and negative effects were seen. Some weaker responses stated 'causes pollution' which is not sufficiently detailed at this level. Better answers stated how the air pollution is caused, such as 'release of carbon dioxide during burning, which causes climate change.'

(d) This extended response question was marked using a level of response mark scheme. Better responses included a balanced argument that reached a conclusion. These responses included either specific examples or fully developed ideas. These responses specifically considered why the sustainable management of forests should or should not be a global environmental priority.

Some weaker responses did not reach a conclusion or answered from one side of the argument only. Many of these responses did not refer to the global nature of the question. They often did not include any examples and were sometimes only a list of points.

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ENVIRONMENTAL MANAGEMENT

Paper 0680/22
Paper 2 Management in Context

Key messages

- Read the source material and the question carefully.
- Use data from either graphs or tables to help describe trends or patterns.
- Avoid statements such as 'crop growth will be affected' without any further detail. Candidates should always suggest how the growth might be affected and use their own knowledge to support their suggestion.
- Both axes of any graph should be labelled with units.

General comments

The mark allocation (shown in square brackets) and the answer space should be taken into account before starting to write a response to a question. For example, write concisely where one or two lines are provided for an answer.

Candidates should read the whole of each question carefully. For instance, to answer **Question 2(c)(ii)** candidates needed to look at the table at the beginning of **Question 2(c)** and in **Question 2(f)(ii)** candidates needed to refer back to the sentence at the beginning of **Question 2(f)**.

When measuring a distance on a map, candidates should use the scale line on the map to convert the answer to the correct units and not write a measurement taken from a ruler.

When plotting graphs; make good use of the grid space, use a sensible scale and label the axes accurately, including units.

Comments on specific questions

Question 1

(a) (i) Most candidates correctly calculated the percentage of people with a low standard of living in Ecuador.

(ii) Many candidates found the calculation of the number of people living on less than 1.9 USD a day demanding. Those who showed their working were sometimes able to gain partial credit when the final answer was incorrect.

(b) (i) Many candidates plotted the data correctly as a bar graph and labelled both axes correctly. Some candidates did not include the unit 'thousand tonnes' on the y-axis. Some candidates did not label the x-axis 'year'.

(ii) Most candidates correctly identified 2013 and 2014 as the two years with the greatest increase in shrimp production.

(iii) Many candidates correctly calculated the mass of shrimp exported in 2017. As with **1(a)(ii)**, those who showed their working were sometimes able to gain partial credit when the final answer was incorrect.

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(c) (i) Most candidates gained some credit for suggesting why villagers making charcoal is a sustainable activity.

(ii) Candidates found this question challenging. Many candidates made at least one sensible suggestion as to how shrimp farming could have caused changes in the quality of the village water supply. Few candidates gained full credit.

(d) (i) Most candidates stated correctly that small invertebrates were the primary consumer shown in the diagram.

(ii) Many candidates defined the term population correctly. Some candidates had clearly prepared and learned the definition. The most common error was to refer to more than one species.

(iii) Most responses correctly named at least one abiotic component that could affect the shrimp population.

(iv) Many candidates gained credit for suggesting reasons for shrimp growing quickly when fed fishmeal, related to food supply or energy.

(e) (i) Nearly all candidates completed the calculation of the average mass of a shrimp head correctly.

(ii) The calculation of the average percentage of a whole shrimp that is edible flesh proved more challenging.

(iii) Most candidates were able to suggest one way of using the shrimp heads.

(f) (i) Most candidates were able to use the formula for calculating the actual length of the dorado fish correctly. Measuring the length of the dorado fish in the drawing appeared to be more challenging**.**

(ii) Many responses correctly stated that the fisherman could sell the dorado fish because it was longer than 80 cm. A small number of responses appeared to confuse the meaning of legal with illegal.

(iii) There were some vague suggestions about how controlling the length of dorado fish that can be caught and sold will help to conserve this fish stock. The best responses explained that if the young fish were left to grow and mature they could breed and this would mean there were more fish. Some weaker responses were about the fish less than 80 cm in length breeding.

(iv) This question required a discussion of the possible problems in maintaining a sustainable source of fish if many fishermen use FADs. The responses were variable. Many candidates wrote about problems such as overfishing leading to the capture of young fish and bycatch that would reduce the number of fish. There were also descriptions of how food chains could be damaged. Few candidates gained full credit. Some candidates strayed from the question asked, including possible environmental problems caused to the sea bed by the FAD, or writing about possible effects on the fishing industry.

(v) This question required careful reading as the first part gave the following information: **The dorado fishing season has been changed from December to May to between November and February to control fishing activity.** There were many competent answers describing other ways of controlling fishing activity; quotas, net size, types of mesh, protected areas, licensing boats and reserves. Some candidates wrote about closed seasons although the question referred to 'other ways'. There were some incorrect references to MARPOL; this is an acronym for the International Convention for the Prevention of Pollution from Ships.

(g) There were some good answers describing the ENSO phenomenon. Many candidates wrote about the easterly trade winds weakening, warm water moving from the western Pacific Ocean to the east and the cold current off South America being replaced by a warm current. The stronger responses included reference to upwelling, dry weather in Indonesia and Australia and heavy rainfall and floods in Peru and Ecuador.

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Question 2

(a) Many candidates found estimating the shortest distance between the oil fields and the oil refinery challenging. Some candidates possibly used a ruler to measure the distance on the map, and then did not use the scale on the map to give their answer in kilometres. In other cases candidates may have measured the distance between the capital and the oil fields rather than between the oil fields and the oil refinery.

(b) (i) Most candidates were able to describe at least one environmental impact of building pipelines in tropical rainforest, as shown in the photograph. The most common impacts were removal of trees and loss of habitat. Many candidates did not read the question carefully and wrote extensively about oil leaking and causing pollution.

(ii) Most candidates were able to suggest at least one reason why the vegetation around the pipeline is **not** allowed to grow tall. There were some detailed answers about the ways in which vegetation could damage the pipeline. Some candidates wrote about how oil could damage the vegetation in the rainforest.

(iii) Most candidates found describing a method you could use to record changes in plant biodiversity between the pipeline and the tropical rainforest challenging. There were frequent references to transects and quadrats but many answers were vague as to how they could be used. Some candidates referred to plants and species but made no mention of counting them. Other candidates did not confine their answers to plants and wrote about pooters and pitfall traps.

(c) (i) Many candidates had difficulty suggesting why the estimated number of species of insects is much greater than the other animal types.

(ii) This question, asking candidates to suggest why the numbers of species are only estimates, was not well answered. Many candidates seemed to think the question was about the numbers of insects and that because there were so many, counting them all was difficult.

(d) (i) Candidates found discussing the benefits of the proposal described to Ecuador and other countries challenging. Few achieved good credit.

(ii) Responses suggesting reasons why the government of Ecuador continues to invest in oil extraction were more successful. The most common reasons were about oil and petroleum products being major exports or sources of income and job opportunities in the oil industry.

(e) (i) Most candidates demonstrated a poor understanding of the results of the questionnaire. Most responses restated the numbers in the questionnaire without discussing the results.

(ii) Many candidates suggested a good question that could be asked to find out people's opinions about the oil extraction.

(iii) Many candidates had difficulty describing a random or systematic method of sampling to select the people to be interviewed for the questionnaire.

(f) (i) Few candidates were able to explain why there is a risk of oil pollution reaching the coast of Ecuador. Full credit was gained by answers that began with oil leaks occurring offshore during extraction from oil fields or from tankers and went on to explain how wind, ocean currents or waves carried the oil to the coast. Some candidates wrote about oil that was being extracted on land, in the national park or in pipelines in the rainforest, leaking and reaching the coast.

(ii) Almost all candidates were able to describe at least one impact of an oil pollution event on the coastal ecosystems of Ecuador. Many answers described how oil can cause the death of fish and cover the feathers of birds. There were descriptions of oil preventing photosynthesis and covering beaches. Few candidates referred to the toxic effect of oil.

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(g) This question required candidates to explain why wind power and solar energy may **not** be able to provide all the energy needed to generate electricity for Ecuador. There were many references to the costs of renewable energy and Ecuador being a less economically developed country (LEDC). Many responses could have gained credit by providing detail about how wind and solar power were weather dependant instead of just stating that they were. Few candidates explained that solar energy is not always available as no power is generated at night, or that wind energy is not a constant energy source as sometimes there is no wind to turn the turbines. A number of candidates wrote about why they thought it was more efficient for Ecuador to generate electricity from its oil supplies.

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