

**MARK SCHEME for the October/November 2006 question paper**

**0680 ENVIRONMENTAL MANAGEMENT**

**0680/02** Paper 2, maximum raw mark 80

This mark scheme is published as an aid to teachers and students, 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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

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- 1 (a) (i) Three from fertilisers and manure, oil refineries, oil and gas fields, and chemical industries [2]
- (ii) Basic reasons are  
 \* pattern of sea currents  
 \* almost enclosed at its southern end  
 Reference to both of these = 2 marks  
 Reference to one of them with supporting explanation = 2 marks [2]
- (iii) In lines parallel to/close to the coasts,  
 off the shores of the Netherlands, Germany, Denmark and Norway.  
 One of these or similar (e.g. in the east of the North Sea) [1]
- (iv) Close to the sources of land pollution which cause them to grow (or similar)/  
 in areas of shallow water [1]
- (b) (i) All five accurately plotted = 3 marks  
 3 or 4 plotted accurately = 2 marks  
 at least one accurately plotted as a bar = 1 mark [3]
- (ii) Two from synthetic fertilisers, sewage and animal waste [2]
- (c) (i) Many people/settlements/industries are on sides of rivers/in river valleys,  
 elaboration of reasons for the attractions of river side locations for people,  
 references to the sources of pollution,  
 reward relevant examples.  
 Minimum of 2 marks Maximum of 3 for this part
- (ii) Some river drainage basins are more densely populated/have more industries along them,  
 some are longer (e.g. the Rhine) so have more chance of passing through populated areas,  
 presence of heavy industries (e.g. oil refining and chemicals) are particularly significant as  
 regards chances of pollution,  
 some are important for navigation/used by shipping/mouths used by ocean ships,  
 others (e.g. the Amazon) flow through sparsely populated regions,  
 reference to different levels of pollution control,  
 use of examples.  
 Minimum of 2 marks Maximum of 4 for this part [6]
- (d) (i) Basic food upon which the rest of the food chains depend – however expressed [1]
- (ii) Supplies of plankton upon which many species depend directly and indirectly are being  
 affected by pollution,  
 likely that numbers of other species are being directly reduced by pollution,  
 from two levels in the food chain humans are extracting marine resources,  
 all of these reduce the amount of food left for the top predators,  
 pollution is affecting the organisms and species at all levels intensifying the competition for  
 food.  
 Three points made along these lines 3 @ 1 mark [3]
- (iii) Process of eutrophication takes place,  
 bloom growth in surface waters reduces the amount of light available,  
 not enough light to support as many shallow water plants,  
 when the dense blooms decompose they reduce oxygen levels in the water,  
 destroy organisms eaten by the larger fish which are used in commercial fisheries,  
 upsets the food chain at more than one level.  
 Three points made along these lines 3 @ 1 mark [3]

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- (e) Progressive decline in cod stocks, from 275 thousand tonnes in 1970 to 60 in 2000/drop of over 200 thousand tonnes, occasional increases against the trend e.g. in 1979, levelled out at a much lower level between 1990 and 2000/within range of 50-100 thousand tonnes
- 1 mark for general statement of decline  
2<sup>nd</sup> mark for values to show size of the decline  
3<sup>rd</sup> mark for description within the period from 1975-2000 [3]
- (f) (i) A certain number of any species is needed to support breeding stocks for the future, the suggestion is that cod and haddock numbers have fallen so low that they may never be able to recover to the levels needed for commercial fishing.
- Understood (however stated) = 2 marks  
Some understanding = 1 mark [2]
- (ii) Previously luck/skill were needed in order to find large fish shoals, from the 1950s sonar/radar did the finding with pin-point accuracy, ships/nets both became larger so that more fish could be caught, caught for other purposes such as industrial products and not just food.
- Three points made along these lines 3 @ 1 mark [3]
- (g) (i) Most likely options that will be chosen;  
\* Quotas on catch sizes  
\* Minimum net sizes  
\* Areas closed or restricted for fishing  
\* Limits on number of days fishing allowed/types of fish caught
- 1 mark for suitable choice of management technique  
2<sup>nd</sup> mark for additional information about it (in the manner used in the three examples already given)
- Likely 2 + 2 marks, but allow 3 + 1 if thoroughly deserved [4]
- (ii) Easy to argue against the sustainability of 'Do nothing' as the size of North Sea cod stocks in a previous question show.  
Methods that are inherently sustainable are only sustainable if monitored and enforced.  
There may be a valid attempt to show how one or more of the options are sustainable to emphasise understanding of the word/concept.
- (iii) Arguments for one measure only  
Valid if it will manage the fish stocks better than anything else; easy focus for what needs to be done; it may be easier to monitor and control just one measure
- Arguments for using two or more measures  
May be able to allow better for different types of fish / different problems in various places which will make management of stocks more effective; one alone may not be strong enough to ensure the outcome needed; some options complement each other such as imposing quotas and paying fishermen to decommission their boats so that some go out of the business leaving more fish to be caught for others who remain; pollution control is something different and to the benefit of both marine life and people.
- Marks parts (ii) and (iii) together
- 1-2 marks – Sustainable understood in (ii), but little or no worthwhile comment in (iii)  
– Understanding of sustainable not established in (ii), but some worthwhile explanation of the case for using two or more options in (iii)
- 3-4 marks – Understanding understood in (ii) and meaningful comment in (iii), perhaps of a general nature without clear enough references to actual options
- 5 marks – Well answered in both parts with options used to illustrate and support the valid points made [5]

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- 2 (a) (i) A funnel  
B metal container/outer container  
C glass bottle/inner container
- (ii) Partly buried  
\* reduce/stop evaporation of rainwater collected  
\* for stability  
Top 30 cm above ground  
\* stop rainwater splashing back into it off the surface  
\* prevent the flow of surface water from entering container  
On grass (as opposed to a paved surface)  
\* less water bouncing back off the surface in heavy rainfall  
\* for ease of burying because of presence of soil layer below the grass
- 3 @ 1 mark [3]
- (iii) \* Frost/snow pose particular problems, snow builds up around funnel top and blocks entry into glass bottle, mention of possible solutions to the problem,  
\* Heavy rain/rain falling in strong wind may miss funnel entry, too much water for the size of the container in torrential storms, tampering by people if not in a fenced-off zone.  
  
\* Unable to bury part of the rain gauge in the ground, reasons for this such as rocky ground.  
  
\* Only hard surfaces such as rock/stone available, gauge needs to be taller to reduce splash back.  
  
Two separate ideas such as these or one well explained. [2]
- (b) (i) July 440 + June 320 + August 305 = 1065 mm  
Method = 1 mark [2]
- (ii) Towards the end of the wet season instead of at the beginning, river water levels will be higher and then increased by more rain, spaces in soil and rocks will fill up so that there is less groundwater and more runoff as the wet season proceeds, total rain fall in both July and August was higher than in May and June.  
  
[NB do not credit a loose statement such as 'they months were wetter months, because the month of June was wetter than August']  
  
Ideas/points made along these lines 2 @ 1 mark [2]
- (c) (i) Flood waters in 2004 more than 4 m above normal flood levels, high amount of damage and destruction caused, more than half the country already flooded by July/August, allow also Dhaka had its worst rains for 50 years on 13<sup>th</sup> September.  
  
2 @ 1 mark [2]
- (ii) Houses are built on raised ground/some built on stilts [1]

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- (d) (i) New layer of silt left covering the fields  
 \* important because it fertilises the rice fields and increases output/provided more food;  
 most Bangladeshis are farmers living in the countryside  
 Fills up dams and other water stores  
 \* supplies water in dry times of year/drought  
 Fishing in the many lakes and rivers  
 \* important because it is an additional food source and provides protein for a more balanced diet
- Advantages stated = 2 @ 1 mark  
 importance explained = 2 @ 1 mark [4]
- (ii) Short-term problem – one from the following
- Huge numbers of people affected, homelessness, loss of food/rice supplies are covered in the report, along with the threat of diseases from the presence of dirty water
- Long-term problem – one from the following
- Destruction of infrastructure and the cost of repairs to roads, houses, agriculture and industry are of more significance.
- 2 @ 1 mark [2]
- (iii) Emergency aid is needed to cope with a natural hazard like a flood to stop more people from dying, immediate needs are for food, clean water and shelter, in normal times it would be expected that these are readily available.
- Development aid is money/trained and skilled workers for infrastructure improvements, so that people can return to normal life/have a better life than before
- Points made along these lines 3 @ 1 mark, but with one mark reserved for references to each of short-term and long-term. [3]
- (e) (i) All three plotted with reasonable accuracy = 2 marks  
 At least one accurately shown = 1 mark  
 Attempt to shade a similar style as in the key for first graph = 1 mark [3]
- (ii) Runoff [1]
- (iii) Reduced evapo-transpiration  
 \* fewer leaves/less vegetation to use and lose water into the atmosphere
- Less groundwater  
 \* fewer leaves and branches to intercept and delay rainwater  
 \* less rainwater being used/obstructed by the trees
- Result  
 \* increased runoff, speeded up by the steep slopes of mountains and hills
- Three points made along these lines 3 @ 1 mark [3]

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(f) All the marks are for explanation. General points that apply to more than one of the sources of weather data shown;

\* provide weather data from the upper atmosphere; what happens there has direct effects upon weather on the ground (upper air balloons, aircraft, satellites)

\* provide weather data from on and over the oceans in places without surface weather stations (ships, aircraft)

\* provide pictures or images of the weather from above (satellites) and from the ground (radar)

\* provide detailed regular or continuous data (land stations, radar)

Overall having more weather data, from all parts of the world, to feed into computers enables more accurate forecasts to be generated.

1-2 marks Some idea, but stated only in general terms; mention of data sources in the diagram rather than explanation

3-4 marks Good understanding – references made to data sources in the diagram are used to explain along the lines suggested above

[4]

(g) (i) and (ii)

(i) Yes – fewer people might have been killed if people had been evacuated with government planning and organisation

No – they could not have stopped that amount of damage no matter how much warning was given; the rains and resulting floods were too big for damage to have been avoided; people used to floods may have been unwilling to leave their homes and farms even after warnings

Views/ideas supported by some justification as here

(ii) Some governments in developing countries do plan e.g. by building cyclone shelters/emergency places of refuge; they also pay for flood control works especially large-scale ones such as big dams

Others show less interest in planning for climatic hazards, especially in rural areas. Some are too poor to make a real difference; other consider that they have more pressing political or economic problems.

Some climatic hazards e.g. the flooding in Bangladesh in 2004 are on such a large scale that it there would still have been deaths and damage if it had occurred in a developed countries (even if it might not have been as bad)

Mark both parts together

1-2 marks – starter answer; occasional comment that addresses the questions set

3-4 marks – meaningful comment for both parts even if there is some imbalance between the two

5 marks – well answered; references to governments in countries other than Bangladesh would enhance the value of answers to the second part

[5]

[Question total: 40 marks]