MARK SCHEME for the May/June 2008 question paper

0680 ENVIRONMENTAL MANAGEMENT

0680/02   Paper 2, maximum raw mark 80

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.

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.

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UNIVERSITY *of* CAMBRIDGE
International Examinations

1 (a) (i) most are north of Equator/northern hemisphere,
only one south of the Equator,
in temperate latitudes,
both on western and eastern sides of the continents,
large areas enclose islands (e.g. Japan, British Isles, Iceland)   [max 3]

    (ii) Similarity
both fringe the coastlines/in between and around islands

    Difference
more of the other important areas south of the Equator/more common in the Indian Ocean/different hemispheres
1 mark for each   [2]

  (b) (i) two   [1]

    (ii) wide continental shelf:
shallow seas (under 200m deep) next to the land masses,
more light, minerals, plankton and other food supplies for fish,
further explanation of how these favour fish life,
easy access from populated land areas,
significance of wide shelf providing a large area for fish/fishing

presence of ocean currents:
bring fresh supplies of nutrients,
plankton rich (especially cold ocean currents),
where currents upwell to surface (e.g. Peru)/where currents meet (e.g. Newfoundland),
named examples of currents

nearby densely populated coastal areas:
fish are important food/protein source,
close to harbours out of which fishing boats operate
quick/easy to reach fishing grounds/take catch back to shore,
fish reach the market fresh (refrigerated ships not needed)

likely 2 + 2, but allow 3 marks and 1 mark   [4]

  (c) (i) 1970 – 50; 1987 – 80; 2000 – 72 million tonnes
(allow +/– 1 for all values)

all three correct = 2 marks
two correct = 1 mark   [2]

    (ii) steady rise in world catches until the peak in 1987,
noticeable dip downwards in early 1990s/around 1993,
catches at lower levels (closer to 70 million tonnes) ever since,
comment about how overfishing is suggested

1 mark for each point that shows understanding   [max 2]

(d) (i) Larger size fishing boats – fish further from shore/in more difficult locations or weather conditions, hold more before they need to return to shore, economies of scale favouring use of more sophisticated equipment

High technology for locating shoals of fish – mention of an example of the technology such as radar and sonar, or technology in terms of operational capabilities of boats

Bigger nets in use – trap larger shoals/numbers of fish, non-selective which means that immature fish are caught as well

Refrigerated factory ships – allow fishing much further from the shores/out in the oceans, some processing at sea means that enormous numbers of fish need to be caught before it returns to port

1 mark for each   [4]

(ii) no mark for choice – any choice is valid
the two marks are for explanation, emphasising areas such as enormous numbers caught, finding and taking shoals of fish in the oceans well beyond the traditional fishing grounds, non-selective taking young and immature so that future stocks are affected, contrast could be made with fishing practices using traditional methods/small boats   [2]

(e) (i) ocean currents – cold Peru current no longer up-wells to flow on the surface/cold Peru current in an El Nino year flows below warm surface water

mention of the Peru current is essential for the mark here

(ii) warm and cold water – all cold sea-water, both at the surface and in the ocean deeps, is replaced by a layer of warm water on the sea surface

sufficient reference to this might have been covered in the first part for the award of the mark   [2]

(iii) plankton is a food supply for fish,
Peru current brings it to the surface where most fish live in normal years,
warm water in El Nino years is low in oxygen and nutrients

understood = 2 marks
some understanding/selection of suitable content from diagrams without full or effective use = 1 mark   [2]

(f) **(i)** 1982, 1983 and 1998 [1]

(ii) evidence to support 'Yes'
lowest catches of all in 1983 and 1994 which were both El Nino years,
in 1983 size of catch was half that of the years around it,
more noticeable drop in catches in 1994/only about 15% of years around it,
big drop in 1998 coinciding with quite a strong El Nino

some weak evidence for 'No'
1982/1990 El Nino event did not seem to have any effect on catches

entirely 'Yes' answers are the most likely and easiest to justify

points along the lines of the ones listed; reward comments towards the focus of the question, an answer is unlikely to be worth two or more marks without at least one specific reference to values and dates [4]

(iii) the trend in fish catches is upwards throughout the 20 years,
in 2000 was the highest ever catch/between 3–4 times more than in 1980,
variations in catch sizes is greater in the 1990s than 1980s,
El Nino year of 1994 resulted in the lowest catch/greatest fall in catch size

however, fish catches go up and down anyway/everywhere because of year to year changes in natural conditions,
the record 1994 level was soon recovered in subsequent years,
fact that more fish are being caught could be an indication of the great size of fish stocks here,
that the natural resource had been under-exploited in previous years,
would need significantly lower values in later (especially normal years) for conclusive evidence for overfishing

credit points made along these lines

both marks can be gained from 'For' or 'No evidence' answers, provided that they are supported by specific information from the graph of fish catches [2]

(g) (i) strategies for sustainable harvesting of ocean fisheries include:
quotas; closed seasons; conservation laws; conservation controls/monitoring;
net types; net sizes; territoriality

three labels = 3 marks
'Sustainable harvesting of fisheries' (or similar) written in centre of drawn spider diagram
= 1 mark   [4]

(ii) problems for implementation of strategies include:
economic costs to boat owners, fishermen and economy of countries,
increasing demand for fish for animal feed (not just human food),
difficulty of monitoring/patrolling fishing grounds,
problems in international waters with boats from many countries,
difficulties of reaching international agreements and abiding by them,
some fishing stocks may have already fallen below safe biological limits, e.g. cod in
many parts of the North Sea

easy – general point that sustainable strategies are rarely easy to implement because
they involve costs for humans; only easy where fish stocks remain a plentiful natural
resource.

points made that are relevant to the question – up to 4 marks
fifth mark reserved for an explanatory or concluding comment which answers the
question posed   [5]

[Total: 40 marks]

2 (a) (i) open place/in the countryside,
 well away from the trees,
 no sign of any buildings,
 nothing to block sun, wind, rain,
 soft surface [max 2]

 (ii) protect the instruments from animals/people,
 ensure that they are not disturbed to increase chance of taking accurate readings [1]

 (iii) thermometer or name of an individual type of thermometer [1]

 (iv) title anemometer,
 long pole,
 three cups at the top,
 cups facing in different directions,
 meter below counting number of rotations

 three labels on the diagram for 1 mark each
 maximum 1 mark for the name without a diagram or with a totally or largely incorrect diagram [3]

(b) (i) Highest temperature 34 and Lowest temperature 16 = 1 mark
 Annual range 18 = 1 mark
 Precipitation none, dry all year or desert = 1 mark [3]

 (ii) May/June to September or in summer [1]

 (iii) Station A   desert
 Station B   savanna
 both needed for the mark [1]

 (iv) Station A   no rain

 Station B   not Equatorial, i.e. there is one wet season and one dry season
 explanation **must** be given for mark to be awarded
 an alternative (less likely) answer is that temperature is highest before the wet season begins and not in mid-summer

 1 mark for each [2]

(c) (i) *Option 1*   *Extensive livestock farming*

Advantage   – long established/traditional method of farming,
depends on animals adapted to conditions such as camels

Disadvantage – dangers from overgrazing especially from goats and sheep,
low productivity/can only support a few people

Option 2   *New varieties of crops*

Advantage   – drought resistant so that they survive the natural conditions,
seeds genetically developed to allow cultivation where not otherwise possible

Disadvantage – may require greater inputs/higher level of technology for success,
expensive purchases for poor people/go into debt

Option 3   *Large dams etc.*

Advantage   – enable more land to be cultivated/more than one crop a year,
most likely option to lead to high and reliable crop output

Disadvantage – water costly to buy/expensive to supply isolated places,
many more environmental problems from dam construction/use of large amounts of irrigation water e.g. salinisation

Option 4   *Underground supplies for trickle drip irrigation*

Advantage   – does not waste water/uses less than from dams etc.,
much less risk of environmental problems like salinisation

Disadvantage – underground supplies of water not available everywhere/may be salty,
only small areas likely to be cultivated

essentially 2 marks per option, one mark for advantage and one mark for disadvantage, if maximum is not reached, allow one mark to be used as a floating mark to reward any part that was particularly well answered   **[max 6]**

(ii) no marks for choice; a good choice makes for easier/more detailed explanation, award marks for positive comments for chosen option and negative comment about the others

examples of potentially good answers:
- Trickle drip irrigation - sustainability advantages over large scale irrigation reduces salinisation risk, water use conserved by careful direction of water to plant roots, smaller scale, many of problems of large schemes avoided such as removal of communities for land to be flooded, not dependent on water supplies coming from other areas or countries
- Extensive livestock farming - sustainability advantages compared with cultivation with new varieties not making as heavy a demand on the environment, much of it is nomadic in dry areas so that grazing areas are changed, low level of technology leaving less of an imprint on the land, using methods and a way of life which has already been sustained for centuries

if full marks are not claimed by the likes of the positive and negative comments stated above, one mark can be awarded for comment that is included which is well directed towards the question theme of sustainable ways of farming

some understanding; with no clearly stated choice = 1 mark
more understanding for a good choice = 2 marks
as above and well related to question theme = 3 marks   **[3]**

(d) (i) can be a large area like the Sahel; may be smaller such as the Indus Valley, however, it cannot be just the name of a desert such as the Sahara or a region with little farming such as just the Middle East [1]

(ii) Physical cause is drier than usual conditions/drought as opposed to just a dry/desert climate,
allows other natural factors such as wind and heavy rain to erode the soil/land with a vegetation cover less than normal
Human causes are related to over-use of the land such as overcultivation and overgrazing or clearance of vegetation for fuelwood
often the consequence of continued population increase/no surpluses accumulated any more for use in dry years

minimum 1 mark, maximum 2 marks for each of physical and human causes [max 3]

(iii) no separate mark for view expressed, the generally accepted view is that a natural process is being increased by human activities and actions, reward all views from very physical to very human

view effectively justified = 2 marks
some merit in support put forward = 1 mark [2]

(e) (i) lack of rain to dissolve and wash away pollution particles in the atmosphere,
desert areas have many calm days/low wind speeds,
strong sunlight creates ideal conditions for formation of low level ozone,
inversion of temperature in lower layers which traps particles preventing them rising to higher levels,
high pressure/sinking air keeps pollution near surface

any two for 1 mark each [2]

(ii) axes labelled for number of days and dates = 1 mark
suitable method chosen such as bars or a line graph = 1 mark
all plotted correctly = 2 marks
(at least two correct plots = 1 mark) [4]

(iii) decrease in number of days with pollution worse than recommended health standards [1]

(iv) evidence of a reduction here in Los Angeles so that it shows methods used are working in this developed world city,

developing world cities are growing faster/traffic and industry are increasing more than in the developed world,

pollution/traffic controls are less strong/less likely to be strictly enforced,

control measures are costly,

examples of measures used to reduce traffic and industrial emissions – up to two marks if used within the context of the answer

if the answer is based on strategies for reducing traffic emissions being more effective in developing cities, some progress can be made with the line of argument that there is massive private car ownership and use in developed world cities, so much more traffic that, even with lower emissions, pollution levels are greater, public transport is more likely to run on newer cleaner fuels like natural gas

mark according to the strength of the explanation

references to strategies with little comment, or some relevant comment without much real support = 1 or 2 marks

clear answer to the question supported by relevant explanation, including references to strategies or other city/country examples = 3 or 4 marks   [max 4]

[Total: 40 marks]