

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

## **MARK SCHEME for the October/November 2015 series**

### **0680 ENVIRONMENTAL MANAGEMENT**

**0680/21**

Paper 2, maximum raw mark 80

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- 1 (a) (i) oil; [1]
- (ii) 80%; [1]
- (iii) alternative sources of energy do not contribute much in 2013/only a small percentage of our energy comes from alternative sources;  
only 13.6% (accept 12–15%) of our energy comes from alternative sources;  
more than nuclear/less than fossil fuels/named fossil fuels; [2]
- (b) (i) the distribution (of coal deposits) is not even/is uneven around the world;  
one identified area;  
coal deposits are found mainly in the northern hemisphere/north of the Tropic of Cancer/not many deposits in southern hemisphere; except Oceania;  
few deposits between the tropics; [3]
- (ii) coal was formed over millions of years;  
huge forests/swamps covered much of the Earth;  
vegetation/plants died/decayed;  
layering/covered with sediments;  
heat/pressure; [3]
- (iii) correct scale on y-axis;  
axes labelled correctly (including bars identified);  
all three bars plotted correctly;  
one or two bars plotted correctly; [4]
- (c) (i) coal is burned (in furnace);  
the water is turned into steam;  
steam turns a turbine;  
under pressure;  
the turbine is linked to a generator to produce electricity; [3]
- (ii) visual impact of power station/cooling towers/pylons;  
loss of habitat to build power station/clearance of natural vegetation;  
atmospheric pollution (from burning coal);  
sulfur dioxide causes acid rain;  
carbon dioxide enhances greenhouse effect/global warming;  
increased water vapour/local precipitation;  
increased temperature locally (heat island);  
warm water released into rivers affects aquatic life;  
heavy lorries on local roads increases air pollution/noise pollution (which scares animals);  
unsightly ash heaps, etc.; [4]
- (d) (i) North America; Europe; Africa; Asia; South America; [2]
- (ii) Oceania or Antarctica (*Allow Africa.*);  
reasons: low population density/no permanent population; less demand for energy; less vehicles/cars used; land used for agriculture and not industry; long distance from main producers of acid rain; [2]

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- (iii) sulfur dioxide/ nitrogen oxides;  
 named source;  
 rise into atmosphere;  
 mix/ dissolve/ react with water in the atmosphere;  
 pH lowered;

*Allow formulae.*

[4]

- (iv) it is a global problem/it affects more than one country/it is a problem in many countries;  
 it is caused in one country and felt in another/ pollution crosses national boundaries;  
 because is blown/ carried by the wind;  
 named example to support;  
 solutions will not be effective unless all countries agree to them;  
 difficult for one country to solve on its own;  
 some countries might need financial help;  
 technology required;  
 it is costly to install alternative energy sources;

[5]

**(e) Content guide:**

renewable energy sources are costly to set up  
 some countries cannot afford the set-up costs  
 some countries may not have sufficient technology  
 there are not many available sites  
 renewable energy is not reliable  
 supply will not meet demand  
 times of high supply are not always time of high demand and electricity cannot be stored  
 some renewable energy schemes will face opposition/ planning constraints etc.  
 fossil fuels cheap, already established and available  
 political agendas

*Do not expect every aspect to be covered, even for answers in the top level.*

Level 3      5–6 marks

Comprehensive understanding of the issue shown. Three or more reasons why alternative energy sources are not more widely used well explained.

Level 2      3–4 marks

Some understanding of the issue shown. Some explanation of at least two reasons why alternative energy sources are not more widely used.

Level 1      1–2 marks

Basic understanding of the issue shown. Descriptive points. Little or no explanation.

*No response or no creditable response scores zero marks.*

[6]

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- 2 (a) (i) correctly placed line at 70%;  
correctly placed line at 82% or 88%;  
appropriate shading and completed key; [3]
- (ii) clay soils retain water; so they give lush/good pasture;  
clay soils can be waterlogged/poorly aerated/eq.; so would be too wet for crops;  
clay soils are heavy; so are difficult to plough;  
clay soils are too cold for crop growth; [2]
- (b) (i) natural protective vegetation is removed;  
fewer roots to bind the soil;  
less organic matter to bind the soil/degradation to soil structure;  
windbreaks removed;  
soil more easily eroded by the wind/rain;  
soil left bare for part of the year;  
less interception of rainfall etc.;  
ploughing weakens soil structure;  
ploughing creates furrows for rainwater to follow etc.; [4]
- (ii) *One mark for correctly identifying a way in which arable farming can impact on the environment and a further mark for describing the impact.*
- for example: use of fertilisers; can lead to eutrophication of local rivers;
- removal of hedgerows/trees; causing habitat loss;  
draining of wetlands; causing habitat loss;  
pesticides; causing impact on wildlife/food chain;  
irrigation; causing waterlogging of soils/salinisation, etc.;  
monoculture; causing reduction in biodiversity;
- Accept other valid ways.* [4]
- (c) (i) slows down/reduces surface run-off;  
allowing more infiltration;  
small bank of earth traps soil at edge of terrace; [2]

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- (ii) *Credit reasonable ideas. One mark for description and one for explanation for each method.*

land reform:

land ownership is changed, land taken out of hands of landlords and given to local people;

increased community involvement; more incentive to conserve the soil;

dry farming:

straw / mulch / layer of weeds covers the soil;

stops soil drying so less likely to be eroded; reduces evaporation;

contour ploughing:

ploughing of the land around slopes;

creates a water break reducing the effects of rills and gullies; allows more time for water to soak into the soil reducing surface run-off;

rural development programmes:

training (from government or NGO);

an example of a relevant programme given; [4]

- (d) (i) Punjab shaded on map as shown in key; [1]

- (ii) 15% (and over); [1]

- (iii) the trend is that food production increases steadily over the period;  
it increases from 20 million tonnes in 1950/51 to 85 million tonnes in 1998/99;  
the exception is 1965/66 (or 1961–1966) where production decreased slightly; [3]

- (iv) 1900; 53; [2]

- (v) 21; [1]

- (vi) *Allow max. two marks for description or explanation alone.*

the scatter graph shows a positive correlation / as irrigation increases then rice production also increases; (D)

pair of statistics from the graph to back up idea; (D)

idea that as irrigation (technology) is increased, land becomes more productive; (E)

allows the use of high-yielding varieties; (E)

irrigation allows for double cropping so increasing yield / mitigates drought; (E) [3]

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- (e) increased food production / wider range of crops can be grown;  
developed the use of high-yielding varieties;  
more mechanisation means less labour needed;  
reduced food shortages;  
less reliant on imports / can export food;  
falling food prices;  
crops less prone to disease / drought;  
crops more able to withstand wind and rain;  
some farmers became more wealthy;

[4]

(f) *Content guide:*

organic farming  
mixed cropping  
crop rotations  
plant breeding  
trickle drip irrigation  
integrated pest control / biological control

*Do not expect every aspect to be covered, even for answers in the top level.*

Level 3      5–6 marks

Comprehensive understanding of the issue shown. Detailed explanation of three or more strategies.

Level 2      3–4 marks

Some understanding of the issues shown. Two or more strategies explained although may be in simple terms.

Level 1      1–2 marks

Basic understanding shown. Descriptive points. Little or no explanation.

*No response or no creditable response scores zero marks.*

[6]

**[Total: 80]**