CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

MARK SCHEME for the October/November 2015 series

5014 ENVIRONMENTAL MANAGEMENT

5014/11 Paper 1, maximum raw mark 120

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CAMBRIDGE
International Examinations

Section A

1 (a) (i) plot at 800 thousand; [1]

(ii) China; [1]

(iii) India uses 1.2 million tonnes (of refined copper) but produces less than 800 thousand tonnes (of copper ore);
India is a main user but not a main producer;

Allow combinations of these statements to make the point. [1]

(b) (i) income for the country / foreign exchange;
employment / income for the people / decrease in poverty;
raised standards of living;
government can finance social needs / hospitals / schools / other example;
development of ports stimulates more trade;
new / better roads / railways from mine to port;
government can assist industries to start up;

Max. three marks for either benefits to government or benefits to people. [4]

(ii) *Accept any sensible suggestion, such as:*

few industries (so low demand);
low population total (so low demand);
lack finance to set up the type of industries that use copper / electronic industries;
lack education to attract electronic / high-tech industries;
little / less use of electricity in developing countries;
lack power for refining; [3]

2 (a) (i) 29 / 30; [1]

(ii) 1908; [1]

(iii) (rapid) decrease; [1]

(iv) drugs / vaccination idea;
improved sanitation;
piped water supplies;
better personal hygiene / wash hands (before cooking / eating);
education about personal hygiene; [3]

(v) cholera / diarrhoea / gastroenteritis / dysentery / etc.; [1]

(b) poor economy / government does not have sufficient finance;
lack of medical facilities / hospitals / clinics / doctors / nurses / drugs;
many people too poor to buy health care / medicines;
long distance from medical facilities / poor transport / no transport;
lack of political will;
fear / lack of education; [3]

3 **(a)** northern hemisphere / below the Arctic Circle;
between 23.5 °N and 66.5 °N / between Tropic of Cancer and Arctic Circle;
northern parts of the continent / North America / Eurasia; [2]

(b) **(i)** 42; [1]

(ii) open-pit (opencast mining) – frozen rock (in winter);
ice / snow make transport difficult;
long winter darkness;

farming – growing season too short / summer too short for growth to maturity;
ground frozen (in winter) to cannot be cultivated;
animals need to be kept inside / fed for many months;

people – very cold winters;
long winters;
long winter darkness;
extremes of temperature through the year;
difficult to adjust to rapid / large temperature changes;
need for / cost of heating;
frozen water;
ice / snow make transport difficult; etc.

Max. one mark for each. Different reasons needed for each. [3]

(iii) will lead to (global) warming; [1]

(iv) *Names of two gases for one mark.*
oxygen, ozone, nitrogen, water vapour, argon, helium, neon, krypton, xenon

One mark per relevant explanation.
oxygen important for respiration / breathing;
water vapour provides rainfall;
ozone protects against harmful UV rays;
nitrogen (fixed) in the soil for fertility / needed to make protein / DNA;

Accept relevant use for other gases. [3]

4 **(a)** dividing line within the semi-arid segment;
shading as per key; [2]

(b) **(i)** south; [1]

(ii) savanna; [1]

(c) (i) overgrazing leaves soil bare;
trampling kills plants;
development, e.g. rain / wind removes the soil;
over-cultivation destroys soil structure / removes nutrients / reduces fertility;
burning (before planting) removes vegetation;
when whole crop / vegetation removed soil lacks humus so becomes infertile;
vegetation clearance for agriculture leaves soil unprotected from erosion; [3]

(ii) plants removed for firewood;
herds increase in size to feed the increased population;
need to cultivate continuously to feed population so soil does not have time to recover; [1]

(d) (i) they may settle permanently / stop migrating / impact on migration patterns; [1]

(ii) herds (coming to drink) trample and kill plants;
attracts too many animals for the carrying capacity / eq.;
accumulation of waste in the area; [1]

Section B

5 (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]

(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]

6 (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]

(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]

(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: 120]