CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

MARK SCHEME for the October/November 2015 series

5014 ENVIRONMENTAL MANAGEMENT

5014/12 Paper 1, maximum raw mark 120

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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CAMBRIDGE
International Examinations

Section A

1 (a) (i) bar at 480 m.t.o.e. correctly shaded; [1]

(ii) value between 1520 and 1540; [1]

(iii) Asia Pacific increased and Europe and Eurasia decreased / large change in Asia Pacific but small change in Europe and Eurasia; [1]

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

growth of (coal-fired) industry;
growth of demand for electricity;
growth of transport using coal;
loss of / no access to other energy sources;
increase in population;
coal became the cheapest fuel;
government energy policy; [1]

(c) carbon dioxide emissions lead to global warming;
smoke / smog;
soot dirties area;
coal mining leads to unsightly waste heaps / pit area;
keep supplies for future generations;
pollution can cause respiratory problems;
sulfur dioxide emissions cause acid rain; [3]

(d) (i) no power when wind too weak / too strong;
needs back-up power station using a different source of power to be readily available all the time;
expense of installing / maintaining wind farms;
ruins the countryside / ugly;
kills birds / bats etc.;
noise pollution; [1]

(ii) radioactive waste;
leaks;
danger of explosions;
expensive to set up; *(Allow only once in **(i)** and **(ii)**.)*
expensive to decommission; [1]

(iii) takes valuable agricultural land / reduces food supply;
leads to the removal of large areas of forest;
(short-term) production of carbon dioxide; [1]

2 (a) (i) 0–249 *(Allow intermediate values.)* [1]

(ii) north / near Gulf of Carpentaria;
east coast;
south west coast;
western Tasmania; [2]

(b) high temperatures / high evaporation; [1]

(c) (i) irrigation;
water storage in reservoirs / dams;
water transfer from areas of surplus;
tapping groundwater supplies / artesian water / boreholes / wells;
dry farming;
mulching;
zero tilling;
use of drought-tolerant crops;
maintaining plant cover; [3]

(ii) drinking water for animals;
domestic / drinking water for humans;
hospitals;
for sanitation / washing; [1]

(d) atmospheric pressure: (long period of) high pressure;

air movement: idea of descending air; [2]

3 (a) (i) hand labour;
small fields;

Accept seedlings grown in nursery. [2]

(ii) river valleys / river basins / near rivers; so water available;
flood plains / flat valley floors; so easily flooded;
alluvium; so fertile / less / little need for fertiliser; [2]

(b) (i) 202.6 – 100 = 102.6
102.6 / 100 × 100 (= 102.6%); [1]

(ii) very important to be able to feed the rapidly rising population / important that food production increased faster than the population; [1]

(c) use of fertiliser;
use of pesticides;
high-yielding varieties;
new hybrid seeds;
with shorter growing seasons;
(allowed) double cropping / more than one harvest a year;
(allowed) rice monoculture;
disease-resistant seeds;
pest-resistant varieties;
more intensified farming;
mechanised harvesting;
(improved) irrigation schemes; [4]

4 (a) (i) 20%; [1]

(ii) in the south east of tropical rainforest area /
near the southern / eastern edge; [1]

(iii) nearest area of tropical rainforest to the most densely populated area /
most accessible area; [1]

(b) (i) obtain fruit / nuts / berries from forest vegetation;
obtain fuel;
hunt the animals that live in the forest;
obtain medicines;
material for weapons;
building materials; [2]

(ii) abandon the plot when the soil is exhausted;
allows the vegetation grow back;
gives time to restore fertility; [2]

(c) loss of habitats / shelter;
numbers concentrate on a smaller area / more likely to be predated;
numbers compete for less food;
species die out / population numbers reduce; [3]

Section B

5 **(a)** A crust;
B mantle; [2]

(b) **(i)** moving apart:
e.g. Eurasian and North American / African and South American / Nazca and Pacific;

at a destructive plate boundary:
e.g. Nazca and South American / Pacific and Eurasian; [2]

(ii) they are found along plate boundaries / they are found in long or narrow belts;
specific examples stated using map, e.g. large number of volcanoes on the western coast of the Americas / eastern Africa / OWTTE;
there is a large concentration of volcanic activity around the edge of the Pacific Ocean / Pacific Ring of Fire;
there are some isolated volcanoes in the centre of plates;
many volcanoes occur on coasts; [3]

(iii) two plates are moving towards each other / plates colliding;
plates are moved (slowly) by convection currents (in the mantle);
heavier / denser / oceanic plate descends into the mantle;
at subduction zone / plate is subducted;
the heat / friction of the mantle melts the plate;
magma rises under pressure and erupts to form a volcano; [4]

(c) **(i)** description:
farming / employment / high crop yields / food;

explanation:
fertile soils;
generates income / jobs; [2]

(ii) *One mark for each of two problems:*
e.g. loss of life; destruction of property; destruction of farmland; breathing problems; roads destroyed; etc.

One mark for each explanation:
e.g. impact of named volcanic hazard; speed of events; melting; toxic gases produced; etc. [4]

(iii) land use zoning;
structure of buildings;
disaster relief / aid;
monitoring;
early warning system;
evacuation;
education about how to react;
mechanism to redirect lava; [2]

(d) (i) hot rocks heat the water;
the water turns to steam and is returned to the surface;
steam is used to turn a turbine;
under pressure;
the turbine is linked to a generator to produce electricity; [3]

(ii) agree:
it is renewable / will not run out;
it is a cheap source of electricity once set up;
it does not contribute to the enhanced greenhouse effect / global warming;
the supply is constant;
water re-used;

disagree:
it is limited to volcanic areas;
it is expensive to set up;
some countries may not be able to afford set up and running costs;
it can be at threat from eruptions and earthquakes;
heat pollution into external water courses;
overuse can deplete local source; [4]

(e) (i) heavy rain;
saturated ground;
Cyclone Eline;
grassland for farming;
draining wetlands;
urbanisation;
large amount of surface run-off; [3]

(ii) 985; [1]

(iii) urbanisation:
more impermeable surfaces;
less rain infiltrates into the ground;
increased surface run-off;
water enters the river more quickly through drains;

deforestation:
less interception (by leaves);
less natural channels for water to follow to encourage infiltration;
no roots to bind the soil so more surface run-off;
water reaches river more quickly;
erosion of soil raises river bed increasing flooding risk / silt increase;

Maximum of three marks for urbanisation or deforestation alone. [4]

(f) *Content guide:*

agree:
may be higher population density
less money and technology to predict volcanoes
less money and technology so fewer earthquake-proof buildings
roads and infrastructure not so well developed for evacuation and to distribute relief
less investment in emergency services
less money for recovery after the disaster
may be less educated about how to react

disagree:
the scale of the hazard is important – i.e. magnitude of earthquake
type of eruption is important – some are more violent than others
some developing countries have areas of low population density
some developing countries have regular hazards so are well prepared

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

Level 3 5–6 marks
View expressed. Well-detailed explanation of three or more ideas.

Level 2 3–4 marks
View expressed. Some attempt at explanation of at least two ideas.

Level 1 1–2 marks
View expressed. Simple descriptive points with little or no explanation.

No response or no creditable response scores zero marks. [6]

6 (a) (i) near the tropics;
western parts of North and South America;
one specific desert, e.g. (large desert in) Centre of Africa / middle east / western Oceania;
more north of the Equator; [2]

(ii) *All months correct for two marks.*
One error for one mark. [2]

(iii) total annual rainfall is low;
only 100 mm falls per year;
most rain falls from October to February;
no rain falls in June, July and August;
the most rain falls in January;
rainfall increases from September to December etc.;

Max. two marks if no reference to statistics from the graph. [3]

(iv) 5; [1]

(v) 21 °C; [1]

(vi) rainfall is higher when temperature is lower / ORA; [1]

(b) (i) producer: plant / cactus / yucca
consumer: insect / rodent / snake / lizard / scorpion / tarantula / fox / hawk [1]

Both required for one mark.

(ii) fewer insects as more lizards to eat them;
more food for hawks;
number of hawks might increase;
less food for tarantulas and scorpions;
numbers of tarantulas and scorpions might decrease;
hawks might eat fewer snakes;
number of plants might increase;
other valid statement based on food web; [3]

(c) (i) vegetation has long / deep roots; to access less accessible water;
vegetation has broad roots; to access large amount of water when it rains;
vegetation is spaced far apart; to reduce competition for water;
vegetation is able to store water in stems; to survive periods without rainfall;
waxy cuticles; to reduce water loss;
thorns and spikes; to prevent predation;
no leaves / spines instead of leaves; to reduce water loss;

Maximum of two marks for description. [4]

(ii) desert tortoises relocated;
vegetation cleared;
loss of habitat for animals;
loss of food supply for animals;
birds and insects can burn in light reflected from solar panels;
area more prone to erosion once vegetation removed; [3]

(iii) it is renewable / will not run out;
making use of the country's natural resources;
once set up, it is cheaper than fossil fuels;
reduces the reliance on imported fuel;
does not cause global warming / acid rain; [3]

(iv) not reliable as sun does not always shine;
takes up large areas of land;
may displace local people;
looks unsightly;
expensive to set up;
costs too high for some countries;
some countries may lack technology; [3]

(d) (i) desertification means the degradation of the land / soil; turning previously fertile soil into desert; [1]

(ii) B, C, A, D and F, E

All correct for three marks. Four correct for two marks. Two or three for one mark. [3]

(iii) *Credit reasonable suggestions with explanation.*

e.g., less food so people go hungry; less able to work / too weak to work; so people get diseases / illnesses; migration;
drought; reduction in water supply; less fresh water for people to use; water-related disease; migration;
less bushes / trees; so less wood for fuel / cooking / lighting; etc. [3]

(e) *Content guide:*

crop rotation
mixed farming
contour ploughing
terracing
dry farming
tree planting
windbreaks
adding organic matter
irrigation management
agro-forestry

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. Detailed explanation of three or more strategies.

Level 2 3–4 marks
Some understanding of the issue. Explanation of at least two strategies, although can be simple.

Level 1 1–2 marks
Basic understanding of the issue shown. Simple descriptive points.

No response or creditable response scores zero marks. [6]

[Total: 120]