MARK SCHEME for the May/June 2014 series

0680 ENVIRONMENTAL MANAGEMENT

0680/13 Paper 1, maximum raw mark 60

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, which would have considered the acceptability of alternative answers.

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

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

1 (a) (i)

Sun	→	grasses	→	gazelle	→	lion
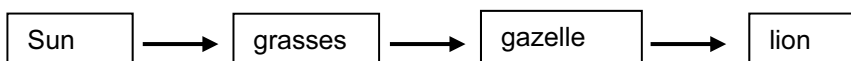
Three arrows in correct direction as above for one mark. [1]

(ii)

animal	niche
gazelle	consumer in the savanna
grasses	producer in the savanna
lion	consumer in the savanna

All three correct for two marks, one or two correct for one mark. [2]

(iii) energy is lost as heat used in respiration / growth / reproduction / excretion / egestion; [1]

Credit one clear point.

(b) (i) Cameroon; [1]

(ii) *One mark for any two savanna animals.*
from box – elephants / hippos / giraffes / lions / monkeys;
from own knowledge e.g. – antelopes / cheetahs / gazelles / impala / leopards /
mongooses / ostriches / warthogs / wildebeest / zebra

Second mark for two plants.
(tall) grass(es); trees (e.g. baobab / acacia); [2]

(iii) *Credit three separate points.*
conservation of ecosystem / resources (previously lost through hunting / deforestation);
income from tourism / jobs / guides / accommodation;
income / benefits from scientific research;
involvement in decision making;
improved infrastructure; e.g. roads;

[3]

2 (a) (i) bars for Brazil and USA completed correctly; [2]

(ii) China; [1]

(iii) 433 / 2592 = 16.7%;

Accept 16.7% or 17% [1]

(iv) iron ore reserves in Australia will be expected to run out (at current rates of use) in 2081;

Accept 'the number of years the iron ore reserves will be expected to last'. [1]

(b) (i) *Credit four separate points.*
visual pollution / loss of scenic beauty / eyesore;
loss of vegetation / wildlife / habitat destruction / loss of biodiversity;
dust / fumes / atmospheric pollution;
noise / danger;
river / water pollution;
increase in traffic / road congestion; [4]

(ii) jobs;
wealth / money for local area / economy;
develops infrastructure / roads; [1]

3 (a) (i) *Credit three features for one mark each.*
painted white: to reflect Sun's rays / incoming solar radiation;
door opens to north in northern hemisphere and to south in southern hemisphere: to prevent Sun from affecting the readings;
slatted / louvred sides: to allow air to circulate freely around instruments;
1.2 metres: above ground so air (not ground) temperature is measured;
sloping roof: to protect instruments from rain affecting temperature / malfunction;
sited on grass: to avoid refection from dark surfaces;
in open space: sited away from influence on readings by buildings/trees; [3]

(ii) *Credit two weather elements, reject 'temperature'.*
highest / maximum temperature;
lowest / minimum temperature;
relative humidity / how moist the air is / the amount of moisture in the air compared to what the air can hold at that temperature; [2]

(iii) (air / atmospheric) pressure / the force exerted by the atmosphere / air; [1]

(b) *Credit two strategies (see italics below for examples). One mark for the strategy with second mark for development.*

reduce sulfur dioxide (SO_2) and nitrogen oxides (NO_x) emissions from power stations
burn low sulfur coal in coal fired power stations;
remove sulfur from / wash coal;
burn limestone with coal to absorb sulfur dioxide;
build power stations that have acid gas 'scrubbers' / 'end of pipe technologies to remove sulfur dioxide;

reduce nitrogen oxides emissions from vehicles
fit catalytic converters;
use / develop cleaner fuels natural gas, batteries, and fuel cells;
improve car engines;

use alternative energy resources such as
HEP/wind/solar/tidal/geothermal/nuclear;

laws and taxes
example developed;

international agreements
e.g. Kyoto protocol;

conserve energy
turn off lights, computers, and other appliances when not in use;
use energy efficient appliances: lighting / air conditioners / heaters / refrigerators / washing machines;
only use electric appliances when you need them;
turn down central heating;
insulate houses;
whenever possible carpool / use public transportation / walk / bicycle;
buy vehicles with low NO_x emissions / properly maintain vehicles;   [4]

4 (a) (i) *A* natural increase / the birth rate minus the death rate / the difference between the number of live births and the number of deaths;

B natural decrease / the death rate minus the birth rate / the difference between the number of deaths and the number of live births; [2]

(ii) *stage 1* F
stage 2 D
stage 3 E
stage 4 C
stage 5 G

All five correct for three marks. Three or four correct for two marks. One or two correct for one mark. [3]

(iii) *Credit descriptions of two valid limitations.*
Credit any valid points. Examples may include:
the original model had four stages, a fifth has been added because some developed countries e.g. Germany, Sweden now have a declining population

stage 1 does not exist (now).

the model has been developed by studying the development of countries in Europe and North America; conditions might be different for developing countries / countries different parts of the world

the model is linked to industrialisation; some developing countries may never become industrialised

the model assumes the death rate in stage 2 was the consequence of industrialisation; the death rate often only began to fall after advances were made in medicine; the delayed fall in the death rate in many developing countries has been due mainly to their inability to afford medical facilities

there is no timescale for passing through the stages; the model may take more time; in some countries the fall in the birth rate in stage 3 has been slow owing to religious and / or political opposition to birth control e.g. Brazil; in other countries the fall has been faster e.g. China as a result of the 'one child' policy; Hong Kong and Malaysia are moving through the model rapidly as they develop at a much faster rate than the early industrialised countries in Europe;
some countries did not pass through the early stages of the model as they grew as a result of emigration e.g. USA, Canada, Australia [2]

(b) *Credit three strategies.*
family planning education;
education especially of women;
improved health education;
government policies; [3]

5 **(a)** **(i)** *V*   evaporation
             W   interception
             X   rainfall / precipitation
             Y   transpiration / evapotranspiration *(accept evaporation)*
             Z   runoff

             All five correct for three marks. Three or four correct two marks. One or two correct for one mark. [3]

       (ii) *W* (interception) less / none;
             no leaves / foliage to hold back / intercept rainfall / precipitation;

             Z (runoff) more / increase;
             no trees to stop / delay rainfall / precipitation from reaching the ground;

             Credit one mark for change and one mark for explanation. [4]

    (b) *Credit three ways.*
        deforestation: sediment silting; poor water quality;
        farming: leaching of animal waste; fertilisers; pesticides;
        settlements: human waste; sewage; garbage; mines / factories: dumping of industrial wastes; heavy metals; harmful chemicals; bi-products; organic toxins; oils; effluents; water used for cooling raises water temperature / causes thermal pollution; [3]

6 **(a)** **(i)** August, September, October *(all three correct).* [1]

       (ii) *Credit two reasons.*
             farming depended on the (annual) flood;
             the flood(s) contained (fresh) silt;
             which maintained the fertility of the soil / fertilised the crops;
             river below dam / irrigation channels are silt free;
             because silt is trapped / builds up behind the dam;
             artificial fertilisers needed as farmland is less fertile without the silt; without addition of fertiliser yields of crops will fall / people may starve; [2]

    (b) **(i)** HEP / Hydroelectric power / Hydro power [1]

           Do not accept water power.

       (ii) *Credit two reasons.*
             renewable energy
             never runs out / replaced naturally;
             sustainable energy
             can be used for a long time / use does not destroy it; [2]

(iii) *Credit two marks for description of <u>environmental</u> problems and two marks for development/explanation.*
Credit any valid points. Examples may include:
visual pollution at dam site;
destruction of natural environment/forests/ecosystems/wetlands/extinction of species (e.g. fish, birds);
pollution from construction;
emission of greenhouse gases/carbon dioxide/methane as flooded trees and plants decompose causing climate change;
dams block migratory fish species from their spawning/feeding sites;
disturb natural fluctuations in water flow/damaging seasonal floodplains, affecting ecosystems/deposits of nutrients/lifecycles of species/change daily flows by releasing water as a reaction to human demands for energy/irrigation;
degradation of water quality/increase in salinity/toxins from decomposition of organic matter/leaching of mercury from the soil;
water-related diseases;
transport of sediment disrupted – downstream river bed/coastal delta degradation
increase flood risk downstream/farmland flooded;
decrease volume of water downstream;
disruption to navigation/transport routes (river, road);
increased risk of landslides/earthquakes; [4]

[Total: 60]