CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the March 2016 series

0680 ENVIRONMENTAL MANAGEMENT

0680/12 Paper 12, 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 March 2016 series for most Cambridge IGCSE® and Cambridge International A and AS Level components.

® IGCSE is the registered trademark of Cambridge International Examinations.

CAMBRIDGE
International Examinations

Abbreviations used in this mark scheme

/ separates alternative answers e.g. copper / gold / silver / lead / zinc

; alternatives for the award of a mark e.g. hot; wet;

underline word must be used by candidates e.g. air pollution.

ORA or reverse argument

AW alternative wording / OWTTE 'or words to that effect'

( ) the word / phrase in brackets is not required to gain marks e.g. fertile soils (for farming);

ECF error carried forward. If an incorrect answer is given to part of a question, and this answer is subsequently used by a candidate in later parts of the question, ECF indicates that the candidate's incorrect answer will be used as a starting point for marking the later parts of the question.

© Cambridge International Examinations 2016

Question	Answer	Marks	Guidance
1(a)	*condensation* D; *evaporation* B; *ground water flow* E; *precipitation* A; *transpiration* C;	**3**	Five correct for 3 marks. Three or four correct for 2 marks. One or two correct for 1 mark
1(b)(i)	*any 3 of:* valley (in mountains, upland area); narrow; deep / steep sided; steep gradient; natural lake; wet climate; high / heavy annual rainfall / precipitation; low evaporation rate; (large) river; many tributaries; few people / settlements;	**3**	
1(b)(ii)	*any 4 of or 1 / 2 / 3 ideas developed correctly:* loss of (farm)land; valley floor; fertile; loss of homes / villages; loss of jobs / employment; income; loss / disruption of ecosystems / wildlife / deforestation; people forced to move; communities destroyed; archaeological / historic / cultural heritage destroyed; dam may break; endanger life; dam may cause / increase earthquakes; visual pollution; noise during construction;	**4**	

© Cambridge International Examinations 2016

Question	Answer	Marks	Guidance
2(a)(i)	flowering plants / grasses AND fox;	**1**	
2(a)(ii)	fish / fox;	**1**	
2(a)(iii)	5;	**1**	
2(a)(iv)	*any 2 of:* energy decreases / returns to the environment / is transferred / 'is lost'*;* energy is used for respiration; generating heat; growing; moving; defecation; excretion; '10% rule' that between each stage in the food chain / trophic level only 10% of energy is passed on;	**2**	

© Cambridge International Examinations 2016

Question	Answer	Marks	Guidance
2(b)	small / low-growing / close to the ground / stunted; few nutrients in the soil; close to warmth of soil; keeps plants from freezing; roots (shallow) cannot penetrate the permafrost; wind; short roots; shallow soils; frozen ground; permafrost; some are dark in colour; to absorb solar heat; some plants are covered with hair / fuzz; to protect from wind; trap heat; to keep plant warm; the warmer the plant the faster they grow; some plants grow in clumps; to protect one another from the wind; cold; some plants have dish-like (owtte) flowers; follow/track the sun helping the plant stay warm; plants grow quickly; are perennials; do not die in the winter; short summers / growing season; plants are able to grow under a layer of snow; protects / insulates them during the winter; have small leaves; to retain moisture / heat reduce transpiration; seeds have thick coat; to protect from cold temperatures / permafrost;	**4**	*two marks for state (short, clear description) and two for correct explanation:*

© Cambridge International Examinations 2016

Question	Answer	Marks	Guidance
2(c)	*any 1 of:* more vegetation will grow; increase in the number / type of shrubs; change in vegetation (from tundra to taiga vegetation / shrubs replaced by (coniferous) trees); permafrost will thaw / snow / ice melt forming wetlands; some species will not survive;	**1**	

Question	Answer	Marks	Guidance
3(a)(i)	coal 30; oil 32; natural gas 23;	**3**	*one mark for each correct row*
3(a)(ii)	*any 4 of:* incentives for energy conservation; insulation; introduce / increase the use of alternative energy sources; named example of an alternative energy source; taxation to reduce use of fossil fuels / carbon tax; encourage use of public transport; encourage car sharing / pooling; encourage walking / cycling; walk/cycle ways; encourage / subsidise hybrid / solar powered cars; afforestation / biomass to provide an alternative energy source; promote recycling to reduce energy use; research new energy related technologies; education / campaigns for conservation; quotas on fossil fuels;	**4**	

© Cambridge International Examinations 2016

Question	Answer	Marks	Guidance
3(b)	*any 3 of:* lack of expertise (in some countries); expensive to commission; (some) countries have other (plentiful) source(s) of power; e.g. geothermal power (Iceland) / coal (Russia); risk of nuclear accidents / explosions / leaks can contaminate large areas; risk of terrorism; expensive to decommission; waste is highly toxic / radioactive / dangerous; waste is difficult to dispose of; waste is costly to store; waste remains dangerously radioactive for many / thousands years; equipment used in nuclear power stations becomes radioactive; radioactivity can cause death / cancers / leukaemia; mutations; nuclear plant explosions have led to loss of public confidence / support; people unwilling to live near nuclear power stations; visual pollution / intrusion / eyesore; Fukushima disaster 2011 caused catastrophic damage to the nuclear power plant; Chernobyl explosion 1986 highly radioactive zone will be unsafe for 100s of years;	**3**	

© Cambridge International Examinations 2016

Question	Answer	Marks	Guidance
4(a)(i)	two rainfall bars; three temperature plots; line joining **all** the temperatures;	**3**	October accept on 20 mm line or just below it c.f. plot for July, November on 10 mm line) no bar for December (as J F M). **Ignore** shading
4(a)(ii)	savanna;	**1**	
4(b)	*name of instrument* — *what it measures* (Campbell–Stokes) sunshine recorder / Stokes sphere — sunshine / sunlight; anemometer — wind speed; weather / wind vane — wind direction;	**3**	one mark for each correct row
4(c)	sustainable; water conserved / not wasted / less required; water directed at roots; most absorbed by plant; fewer weeds (germinate); less water lost by evaporation; surface runoff; no wet leaves so fewer leaf diseases; work can continue during watering; no risk of water-related diseases; soil structure is not damaged from water falling on bare soil; insecticide / fungicide use is reduced as they are not washed away; leaching reduced; risk of salinisation reduced;	**3**	three ideas or one / two ideas developed correctly

© Cambridge International Examinations 2016

Question	Answer	Marks	Guidance
5(a)(i)	west / westwards;	1	**Accept** south west / north west **Not** left
5(a)(ii)	65–130;	1	
5(a)(iii)	35;	1	**Accept** 34.6% / 34.62%
5(b)	some of the airports on Java were closed; runways covered with ash (several centimetres deep); planes could not take off; reduced visibility; planes cannot fly through ash clouds; danger of engine failure; ash causes abrasion of engine parts; clogging of the fuel / cooling systems; ash concentrates in engines; turns into a kind of molten glass; affects fuel flow; can cause engines to shut off; thousands of people were evacuated danger of roofs collapsing; causing death; health issues; volcanic ash (fine pulverised rock and gases) in eyes / nose / throat / lungs; death from burns / asphyxiation from ash inhaled in (hot, dense) pyroclastic flow / surge; danger from flowing lava / volcanic bombs; disruption to water / electricity supplies / transport;	3	*any three reasons or one / two reasons developed* **Not** falling ash causing deaths / disease / injury without some development e.g. above.

© Cambridge International Examinations 2016

Question	Answer	Marks	Guidance
5(c)	lava / ash produces fertile soils (for farming); some of richest agricultural lands in the world; family/friends live there / have always lived there / traditional / emotional attachment; shortage of land; job / investments / cannot afford to move; risk not great enough to move; good forecasting / protection schemes; (volcanic) tourism / scenery; health spas (hot springs); minerals (can be mined); e.g. copper / gold / silver / lead / zinc / mercury / molybendum valuable gems can be mined; e.g. diamonds / opals; (volcanoes provide) building materials; e.g. tuff / hardened volcanic ash; geothermal energy can be generated (in volcanic areas);	**4**	**Not** if for fertiliser / plant nutrients;

Question	Answer	Marks	Guidance
6(a)(i)	*any 3 of:* mostly between 40 °N (***not*** *tropic of Canc*er) and the tropic of Capricorn; around the equator / within / between the tropics; southern / middle part of Africa; largest area is in Africa; northern part of South America; southern / south east Asia; max for one named country e.g. India / Malaysia; none in Oceania / Europe;	**3**	

© Cambridge International Examinations 2016

Question	Answer	Marks	Guidance
6(a)(ii)	*any 2 of:* *Eradication of parasite* drugs to prevent malaria from being caught; e.g. chloroquinine; larium; which kill parasites / plasmodium in blood; vaccines being developed following trial results; *Eradication of vector* kill female mosquito; sterilise male mosquito; drainage of mosquito breeding grounds; pour oil / salt / polystyrene beads on breeding waters to suffocate larvae; biological control using carnivorous fish; insecticides (pyrethrum) used to spray indoor surfaces / pesticides; cover water storage areas / wells; sloping roofs on buildings; empty water collected in tyres / empty bottles; *Protection from vector* repel mosquito with; mosquito / bed nets; insect repellents; accept references to vaccination using new vaccine (RTS,S, or Mosquirix);	**2**	
6(a)(iii)	*any 2 water related diseases:* bilharzia / cholera / typhoid / dengue / diarrhoea / dysentery;;	**2**	

© Cambridge International Examinations 2016

Question	Answer	Marks	Guidance
6(b)	*any 3 of:* more wealth / developed; more money from taxes / rates; water pipes are easier / cheaper to build; public taps / standpipes / bottled water for sale; piped household water (in dwelling, plot or yard); water is more likely to be treated; chlorination / filtration / ro (reverse osmosis); sewage treatment; sanitation / separation of clean drinking water and sewage disposal; easier to put pressure on politicians / officials to improve infrastructure;	**3**	

© Cambridge International Examinations 2016