CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the March 2016 series

0680 ENVIRONMENTAL MANAGEMENT

0680/22 Paper 22, maximum raw mark 80

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.

CAMBRIDGE
International Examinations

Question	Answer	Marks	Guidance
1(a)	only in northern hemisphere; (narrow) band stretching east – west; any 2 from: In N. America / Europe / Asia; in the north of these continents / (mainly) just south of / near / around Arctic Circle;	**3**	**Not** near north pole or tundra
1(b)(i)	34;	**1**	
1(b)(ii)	*any 4 from:* (very) cold winters / below freezing in winter; 6 months / October to March with temps below freezing; warm summer; rainfall / precipitation lowest in winter / highest in summer / highest May to September or October; low annual ppt; long winter / short summer; data from graph to a max of 2 marks related to month;; 252 mm total ppt / rainfall; large temperature range;	**4**	**Not** range of temp here max 3 on either temp or ppt
1(b)(iii)	5;	**1**	
1(b)(iv)	*any 2 from:* short growing season / few warm months / temperatures too low to grow crops / fodder / food; low rainfall for crop / fodder growth; isolation / poor transport;	**2**	

Question	Answer	Marks	Guidance
1(c)(i)	*any 3 from:* cone shaped trees / coniferous trees; straight trunks; spaced apart / not close together; sloping branches; ground cover in foreground / grass / bushes / shrubs / sedges / rushes; some flowering plants; few species;	**3**	
1(c)(ii)	*any 5 from:* shallow roots – thin soils / soils frozen except for surface layer; conical shape – to shed snow; flexible branches – so don't break under weight of snow; flexible branches – so don't break in strong winds; evergreen leaves – as little energy to grow new leaves each year / ready to grow in spring; needle-like leaves – to reduce transpiration; dark colour leaves – to absorb more sunlight; cells / sap tolerant to severe cold – to survive winter temperatures; thick bark – for frost protection;	**5**	
1(d)(i)	*the interaction of living organisms (biotic) in conjunction with the physical environment (abiotic) components:* biotic / abiotic (however stated); interaction (however stated);	**2**	

Question	Answer	Marks	Guidance
1(d)(ii)	*producer*: plant / example; the first trophic level in a food chain / autotrophs; produce own food; – can get second mark for details; an organism capable of making organic compounds through photosynthesis; *consumer:* wolves / lynx / birds / weasels / foxes / elk / insects / small rodents / worms / insects; any of the organisms in all trophic levels in a food chain, except for producers; an organism that (generally) obtains food by feeding on other organisms or organic matter / heterotrophs;	**4**	max 3 on either part max 1 for example
1(d)(iii)	*any 3 from:* *general point relating to all three* decomposition of plant material; nutrient recyclers; bacteria are important in the nitrogen cycle; returning nitrogen to the soil; bacteria are decomposers producing humus / nutrients; bacteria fix nitrogen from the atmosphere; earthworms aerate the soil; earthworms mix the soil; spread organic material (through soil); fungi aid plants in the take-up of nutrients through their roots; fungi are decomposers producing humus; / nutrients;	**3**	any three points – they do not have to be one per subject, but max 2 on general points.

Question	Answer	Marks	Guidance
1(d)(iv)	*any 2 from:* building; paper; chipboard; fuel; furniture; AVP;	**2**	
1(d)(v)	*any 4 from:* reduction in primary consumers; therefore less food for carnivores / secondary / tertiary consumers; so they decrease / die; consumers migrate if possible to other areas of forest; increased growth of other plants; animals that live off these plants would increase in numbers; soil erosion / leaching so nutrients washed away; loss of animal habitats in leaf litter; bacteria and fungi dependent on tree roots would decline;	**4**	**Allow** logical carry-through of impacts

Question	Answer	Marks	Guidance
1(e)	*indicative content:* Expect some debate, especially in higher scoring answers. No correct decision. Mark on quality of argument. Most likely to disagree on the grounds that once ecosystem destroyed it cannot return (plagio-climax vegetation). Will discuss impacts on food webs and consumers. May agree in that selective, sustainable logging will allow regeneration. Level 3 5–6 marks Answers the question and provides at least two reasons explained well or three in less detail. Should look at both sides of the argument. Level 2 3–4 marks Some detail of at least two reasons for or against. May answer the question (i.e. looks at both sides) but provide only sketchy reasons. Level 1 1–2 marks Basic descriptive points with little or no reasoning. May just be a list of for and / or against. No response or no creditable response; 0	**6**	

Question	Answer	Marks	Guidance
2(a)(i)	urban population 80%; annual rate of urbanisation 0.7%;	**2**	
2(a)(ii)	accurate location given;	**1**	
2(a)(iii)	in general, rate of urbanisation decreases with increase in urban population / negative correlation	**1**	

Question	Answer	Marks	Guidance
2(a)(iv)	as urban population % is large, fewer people in rural areas to migrate to city (or similar);	1	
2(b)(i)	1970 1–2 million; 2020 20 ± 1 million;	2	
2(b)(ii)	*any 4 from:* both increase (even if in two separate statements); *all other marks require comparison* Dhaka grown more than Kolkata; Dhaka grew more slowly than Kolkata until1970; Dhaka grown faster than Kolkata; Dhaka overtook Kolkata in approx. 2010 / same populations in 2010; Dhaka growth exponential whereas Kolkata linear; max 2 for comparative figures;;	4	
2(b)(iii)	rural to urban migration; pull factors / push factors;;; max 3 high birth rate compared to death rate;	4	**Not** services or infrastructure unless specified. **Allow** Physical growth of cities can gain credit. **Not** double credit opposites for pull/push factors

Question	Answer	Marks	Guidance
2(b)(iv)	*air:* increase in power stations; increased traffic; industry develops; many people use wood; charcoal; dung for fuel; these put smoke particles / diesel particulates into the air; industry often little regulated so high volumes of pollutants; nitrogen / sulfur oxides / carbon monoxide given off by burning fuel; lead from petrol engines; AVP; *water*: much rubbish not collected; gets into water courses; sewage system unable to cope with increased population; many slum dwellers do not have toilets; sewage not treated; humans / animals defecate in water courses; industries discharge waste into rivers; detergents / washing clothes; thermal pollution (from power stations); example such as mercury; AVP;	**8**	max 5 on either part and must be local not global

Question	Answer	Marks	Guidance
2(b)(v)	*water:* water borne diseases such as cholera / typhoid / dysentery; from human effluent; used for drinking / washing food / cooking utensils in water; liquid stools likely to further infect water; cholera causes dehydration; industrial waste may contain poisons / heavy metals; eating poisoned fish; *air:* particulates in air help create smog / damage lungs; industry / vehicle emissions contribute to photochemical smog; may cause breathing difficulties / asthma / bronchitis / heart problems; CO causes headaches / fatigue; brain damage from lead;	**4**	max 3 for either water or air
2(c)(i)	*Average daily water consumption per person / litres* *India* 140; *USA* 575;	**2**	
2(c)(ii)	*any 3 from:* greater domestic use; example of domestic use; greater industrial use; example of industrial use; greater availability of water; example of greater water availability; higher standard of living / higher incomes; greater wastage / leakage;	**3**	

Question	Answer	Marks	Guidance
2(c)(iii)	need for more food and therefore irrigation; developing countries increasing standard of living; developing countries increasing industrialisation; AVP;	**2**	
2(d)	*indicative content:* Expect some debate, especially in higher scoring answers. No correct decision. Mark on quality of argument. Reasons for likely to be based on need for fresh water for irrigation, growing population, increased domestic / industrial demand with development. Reasons against will be based on environmental impact of using fossil fuels for energy, possible enhanced greenhouse effect, increasing cost as fossil fuels decrease / other demands. Plus not all countries have coasts and cost of pumping water inland / uphill. Level 3 5–6 marks Answers the question and provides at least two reasons explained well or three in less detail. Should look at both sides of the argument. Level 2 3–4 marks Some detail of at least two reasons for or against. May answer the question (i.e. looks at both sides) but provide only sketchy reasons Level 1 1–2 marks Basic descriptive points with little or no reasoning. May just be a list of for and/or against No response or no creditable response; 0	**6**	