



General Certificate of Secondary Education

Environmental Science 3441

3441/F

Mark Scheme

2007 examination – June series

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Foundation Tier – 3441F
Question 1 3441 F

	answers	extra information	mark
a(i)	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">containment</div> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">control rod</div> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">fuel rod</div> <div style="border: 1px solid black; padding: 2px; width: fit-content;">coolant</div>		4
(ii)	so that they can obtain large amounts of cooling water		1
b(i)	19.3		1
(ii)	any one from wind, wave, solar, biofuel, geothermal, tidal, hydro, oil, landfill gas		1
c(i)	fossil fuels carbon dioxide long wavelength greenhouse effect		4
(ii)	any two from risk of accident link to nuclear weapons/terrorist threat risk from (low level) exposure to radiation problem of nuclear waste high cost of decommissioning/initial build cost		2
Total			13

Question 2 3441 F

	answers	extra information	mark
a			3
b(i)	either nitrogen or potassium		1
(ii)	iron		1
(iii)	at pH 6.5 most nutrients are at their most readily available	1 mark for stated reason	1
	iron is the exception	1 mark for valid qualification	1
	including the three most important ones		
c(i)	4m ²		1
(ii)	lime/calcium carbonate	accept limestone/quicklime	1
(iii)	any one from		1
	there will be a (significant) difference in yield between crops grown in the two soils.	accept null versions of hypotheses	
	yields will be higher for crops grown in the natural soil/treated soil		
(iv)	C		1

continued

Question 2 (continued) 3441 F

	answers	extra information	mark
(v)	for first mark any one from same distance from natural/treated boundary same distance from hedge same side of hedge for second mark – hence more valid basis for comparison OWTTE	if B chosen in c(iv) allow same distance from hedge/same side of hedge for 1 mark if D chosen allow same side of hedge for 1 mark	1 1
(vi)	any two from same crop variety seeds planted at same time same depth in soil same planting density/number/mass of seeds same treatment of seeds (watering etc) replicates		2
Total			15

Question 3 3441 F

	answers	extra information	mark				
a	<table border="1"> <tr><td>A or D</td></tr> <tr><td>B or E</td></tr> <tr><td>F or A</td></tr> <tr><td>C or D</td></tr> </table>	A or D	B or E	F or A	C or D		4
A or D							
B or E							
F or A							
C or D							
b(i)	<p>erosion of paths caused by large numbers of skiers causes eyesore damages plant life</p> <p>buildings/ski lifts/litter cause eyesore</p> <p>deforestation increases risk of avalanches</p> <p>construction work damages habitat</p> <p>ski lifts cause noise pollution</p>	<p>one mark for simple statement</p> <p>second for linked explanatory statement</p> <p>(accept eyesore only once)</p>	<p>2</p> <p>2</p>				
(ii)	<p>any two from</p> <p>employment</p> <p>income</p> <p>recreational value</p> <p>improved local infrastructure</p>		2				
c(i)	<p>any one from</p> <p>Brecon Beacons, Broads, Cairngorms, Dartmoor, Exmoor, Lake District, Loch Lomond, New Forest, North York Moors, Northumberland, Peak District, Pembrokeshire Coast, Snowdonia, South Downs, Yorkshire Dales</p>		1				
(ii)	landscape conservation	accept rural recreation	1				
Total			12				

Question 4 3441 F

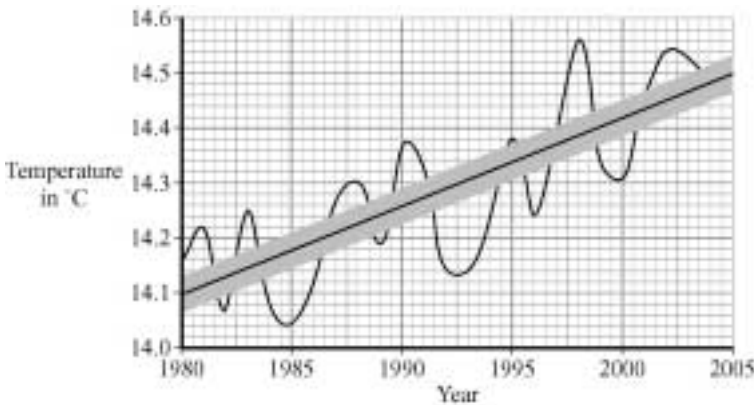
	answers	extra information	mark
a(i)	any two from overall rise some fluctuations OWTTE accurate reference to values		2
(ii)	1998		1
(iii)	100 000 tonnes is not a sensible estimate reason – accept any one from no two successive years of decline in production from 1984 – 2004 continuing trend from '03 and '04 does not predict value as low as 100 000 OWTTE		1 1
b(i)	441600		1
(ii)	any one from spread of pests/diseases from farmed fish escaped fish outcompete wild fish escaped fish contribute to 'genetic contamination' of wild populations		1
(iii)	nutrients released into water by decomposition of fish farm waste/ excreted by fish	one mark for simple statement second for linked explanatory statement	1 1
c(i)	catching too many fish so that too few survive to breed OWTTE which is unsustainable	one mark for simple statement second for linked explanatory statement	1 1

continued

Question 4 (continued) 3441 F

	answers	extra information	mark
(ii)	any one from	one mark for simple statement	1
	larger mesh size nets which allow smaller fish to escape (to breed)	second for linked explanatory statement	1
	close seasons to avoid catching breeding fish OWTTE		
	closed areas so some populations of fish can recover		
	fleet cuts so fewer fish are caught		
	quotas which limit the amount of fish which can be caught		
	ban fishing for a particular species allows populations to recover		
	ban certain fishing methods eg trawling/drift netting allows populations/habitats to recover		
	fish farming reduces pressure on wild stocks OWTTE		
Total			13

Question 5 3441 F

	answers	extra information	mark
a(i)	carbon dioxide		1
(ii)	any one from correct percentage in atmosphere CO ₂ (is only gas that) shows this pattern of increase OWTTE	accept converse statements (N + O have not changed)	1
(iii)	increased burning of fossil fuels	accept deforestation increased vehicles/power stations	1
b(i)	1987	accept 1986 – 1988	1
(ii)			1
(iii)	graph shows Earth's temperature is increasing but gives no information about the cause		1
(iv)	temperature is increasing but this may be result of natural change (rather than because of air pollution) OWTTE		1 1

continued

Question 5 (continued) 3441 F

	answers	extra information	mark
c	Quality of Written Communication		
	correct linking of ideas as specified by any one of the following paired statements		1
	rise in sea level causes increased flooding/as a result of melting ice	OWTTE	1
	increased atmospheric turbulence causes increased storm damage	OWTTE	1
	rising sea level causes salinisation of soils causes reduced crop yields		1
Total			13

Question 6 3441 F

Question 1 3441 H

	answers	extra information	mark
a	A = filtration		1
	B = chlorination/disinfection	accept sterilisation	1
b(i)	aquifer		1
b(ii)	any one from	one mark for process	1
	screening because large objects cannot enter aquifer sedimentation/filtration because water already filtered through rock	second mark for valid reason	1
(iii)	Quality of Written Communication correct use of scientific terms (recharge area, precipitation, aquifer, leach, infiltration, percolation, contamination, blue baby syndrome) this is recharge area for the aquifer – precipitation in this area infiltrates the permeable rock and could therefore carry nitrates into the aquifer, causing contamination of drinking water supplies (possibly leading to blue baby syndrome)	award mark for appropriate use of any of these words	1 1 1
(iv)	most against Site X		1
	because it is in recharge area/contamination here will enter aquifer OWTTE		1
Total			10

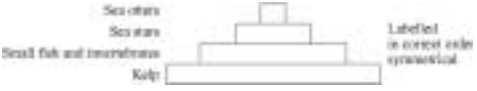
Question 7 3441 F

Question 2 3441 H

	answers	extra information	mark
a(i)	one mark per bar correctly plotted	$\pm \frac{1}{2}$ small square	2
(ii)	2.5 million tonnes		1
(iii)	any one from specified amenity use bulk fill filter beds foundry sand glass making	accept tarmac	1
b	any two from mainly off east coast mainly within approx 25 km of coast small areas off south coast small areas off west coast	accept sandbanks accept close to coast/in shallow water do not accept reference to offshore islands	2
c(i)	less sand and gravel to help beaches build up naturally hence more risk of storm damage damage to marine habitats leads to either problems for fishing industry or less food for seals, etc		1 1 1 1
(ii)	any two from loss of amenity noise visual dust traffic impact loss of farm land habitat loss affects local house prices		2
Total			12

Question 8 3441 F

Question 3 3441 H

	answers	extra information	mark
a(i)	food web		1
(ii)	any one from Sea Urchins small fish invertebrates		1
(iii)	Sun		1
b(i)		labelled in correct order tapers upward symmetrical stepped pyramid	1 1 1
(ii)	pyramid of energy		1
c(i)	killed/eaten by Orcas/killer whales	do not accept simply 'because of increase in Orcas'	1
(ii)	(decrease in Sea Otters causes) increase in Sea Urchins which feed on kelp		1 1
Total			10

Question 9 3441 F

Question 4 3441H

	answers	extra information	mark
(a)(i)	many people think veteran trees are beautiful		1
a(ii)	any one from owls etc nest bats give birth beetles and other insects oak native to UK		1
(iii)	tourist attraction		1
b(i)	slow increase rapid increase then levels off from 200 – 400 years	accept 'increase' for 1 mark accept 'no wood in first 50 years' for 1 mark	1 1 1
(ii)	trees have reached point where growth levels off/slows down therefore more profitable to fell and plant a new crop OWTTE	one mark for simple statement second for linked explanatory statement	1 1
c(i)	any two from (mainly) alien species planted therefore support less wildlife dark/no seasonal colour change/ regular outlines therefore do not blend with landscape coniferous trees intercept acid deposition and/or produce acidic litter and so contribute to acidification of soils/watercourses close planting (hence limited space) hence limited recreational value loss of habitat specified habitat example for second mark creates monoculture leading to spread of disease/pests forestry conflicts with other land uses eg agriculture/nature conservation	one mark for simple statement second for linked explanatory statement	1 1 1 1

continued

Question 9 (continued) 3441 F**Question 4 3441H**

	answers	extra information	mark
(ii)	any one from provides habitat for some species good for recreational use reduced reliance on imports create employment acts as a carbon sink reduce runoff/soil erosion/ sedimentation generates income higher yield reduces pressure on natural forests provides useful resource OWTTE		1
Total			13

Question 10 3441 F

Question 5 3441 H

	answers	extra information	mark
a(i)	inversely correlated/as one increases the other decreases		1
(ii)	thermal pollution		1
(iii)	respiration		1
(iv)	oxygen concentration fell (below 6ppm) therefore trout likely to have been killed/migrated		1 1
b(i)	permit /licence allowing specified discharges to water OWTTE		1
(ii)	Environment Agency		1
c	any two from samples taken from same depth samples taken at same places samples taken at same time of day replicates calibration of meter/use same meter/ equipment cleaning between samples		1 1
Total			9