

**MARK SCHEME for the May/June 2012 question paper**  
**for the guidance of teachers**

**0608 TWENTY FIRST CENTURY SCIENCE**

**0608/03**

Paper 3 (Core Written), 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 must be read in conjunction with the question papers and the report on the examination.

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Question	Expected Answers	Mks	Additional Guidance
1 (a)	sperm / <u>male</u> sex cells (1)	[1]	
(b)	may not work / low success rate / embryo may not develop (1)	[1]	
(c) (i)	<b>any two from:</b> need both alleles to get cystic fibrosis / each parent can pass on recessive allele (1) high risk (1 in 4) of offspring having cystic fibrosis (1) process will allow removal of embryos with two recessive alleles (1)	[2]	first marking point is for explaining 'carrier'
(ii)	unethical / kills embryos / embryo is a living human being / not natural (1)	[1]	
	<b>Total</b>	<b>[5]</b>	
2 (a) (i)	<b>A:</b> artery <b>and B:</b> vein (1)	[1]	
(ii)	<i>artery:</i> thick wall (1) to withstand high pressure (1) <b>or</b> small lumen / narrow (lumen) (1) blood at high pressure / fast flowing (1)	[2]	
(b) (i)	fat / lipid / cholesterol (1)	[1]	
(ii)	less oxygen reaching the heart (1) heart tissue dies (1)	[2]	
(c) (i)	factor: smoking <b>and</b> outcome: heart disease (1)	[1]	
(ii)	poor diet / stress / excessive alcohol intake / lack of exercise / high blood pressure / obesity (1)	[1]	<b>allow</b> description of poor diet, e.g. high salt intake / too much junk food
(iii)	as the amount of smoking increases, the risk of heart disease also increases / alternative wording	[1]	<b>allow</b> 'there is a <u>positive</u> correlation between amount of smoking and risk of heart disease'  amount of smoking could refer to number of cigarettes / length of time
	<b>Total</b>	<b>[9]</b>	

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<b>3</b>	<b>(a)</b>	seagull sand eels / small sea fish plankton / plants	[2]	all 3 correct = 2 marks 2 correct = 1 mark
	<b>(b)</b>	increase: B D decrease: A C E	[2]	all 5 correct = 2 marks 4 correct = 1 mark
	<b>(c) (i)</b>	extinct	[1]	<b>allow</b> endangered
	<b>(ii)</b>	dodo / dinosaur	[1]	<b>allow</b> any extinct species if endangered is answer to <b>(c)(i)</b> , <b>allow</b> any endangered species here
		<b>Total</b>	<b>[6]</b>	
<b>4</b>	<b>(a) (i)</b>	increases (1)...increases (1)	[2]	<b>allow</b> decreases...decreases (2)
	<b>(ii)</b>	(positive) correlation	[1]	
	<b>(b) (i)</b>	very small pieces of solid / carbon	[1]	<b>allow</b> dust
	<b>(ii)</b>	fuel burns (1) in a limited supply of oxygen / by incomplete combustion (1)	[2]	
	<b>(c)</b>	<b>any two from:</b> increase provision of/encourage people to use public transport (1) design more efficient car engines (1) have legal limits to emissions (1)	[2]	<b>allow</b> other valid answers
		<b>Total</b>	<b>[8]</b>	
<b>5</b>	<b>(a) (i)</b>	1704 / 6 (1); = 284 (1)	[2]	
	<b>(ii)</b>	279 to 289	[1]	
	<b>(b)</b>	<i>HDPE because:</i> tensile strength is higher (1) so rope will not break easily (1)	[2]	if LDPE chosen = 0 marks
	<b>(c)</b>	polymerisation	[1]	
		<b>Total</b>	<b>[6]</b>	
<b>6</b>	<b>(a)</b>	<b>any two from:</b> to give the food a brighter colour (1) to replace colour lost in processing (1) make them look more attractive / to attract people to the product / to make people buy them (1)	[2]	<b>do not allow</b> 'to colour the food' unqualified

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	<b>(b)</b>	identifying beta-carotene, lycopene & tartrazine as natural / others as synthesised (1) colourings from a natural/plant source do not cause hyperactivity / colourings that may cause hyperactivity are synthesised (1)	[2]	
	<b>(c)</b>	<i>government</i> : carry out risk assessment / set limits to concentrations in foods / ban some colourings (1) <i>individuals</i> : look at labels / choose food that does not have potentially harmful colourings (1)	[2]	
		<b>Total</b>	<b>[6]</b>	
<b>7</b>	<b>(a)</b>	any part of the crust except heavy line (1) end of line within light grey region (1)	[2]	
	<b>(b) (i)</b>	<b>any one from:</b> similar fossils (1) fit of continents (1) similar rock (layers) (1)	[1]	
	<b>(ii)</b>	<b>any one from:</b> too different from own ideas (1); Wegener was an outsider (1); there were simpler explanations (1); no mechanism thought possible (1)	[1]	
	<b>(c) (i)</b>	3.0 to 3.9	[1]	<b>allow</b> any value in range
	<b>(ii)</b>	data get 10× smaller in each row/for each magnitude (1) expect 7.0–7.9 to be about 13 (1)	[2]	one mark for spotting the pattern of decrease and one for coming up with a number
		<b>Total</b>	<b>[7]</b>	

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<b>8 (a)</b>	electromagnetic (1) photons (1)	[2]	
<b>(b) (i)</b>	<b>any two from:</b> food absorbs microwaves (1) molecules (of water) in food vibrate (1) vibration heats food (1)	[2]	
<b>(ii)</b>	metal walls / door screen (to reflect back microwaves)	[1]	
<b>(c)</b>	<i>benefit:</i> social acceptance / ability to ring home in emergency / able to contact people quickly (1) <i>risk management:</i> only use text / keep for brief calls and emergencies / use hands-free set (1)	[2]	
	<b>Total</b>	<b>[7]</b>	
<b>9 (a)</b>	count (for same time) with each absorber (1) passes through paper and aluminium but not lead (1)	[2]	ignore any reference to background radiation.
<b>(b) (i)</b>	<b>B</b>	[1]	
<b>(ii)</b>	<b>C</b>	[1]	
<b>(c)</b>	risk of damage to cells is small (1) benefit is being cured of the cancer (1)	[2]	'benefit outweighs risk' = 2 marks
	<b>Total</b>	<b>[6]</b>	