UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

0608 TWENTY FIRST CENTURY SCIENCE

0608/05 Paper 5 (Analysis and Interpretation), 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.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

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Question	Expected Answers	Mks	Additional Guid
1 (a) (i)	oil, gas, coal	[1]	Any one
(ii)	carbon dioxide	[1]	
(b)	reactor turbine generator	[2]	All 3 correct: 2 marks 1 or 2 correct: 1 mark
(c)	any mention of environmental damage during building (1); discussion of CO_2 emitted during building (1)	[2]	Second mark could be from transport or concrete
(d)	electrical energy produced = 4000 MJ – 2800 MJ = 1200 MJ (1); efficiency = (1200/4000) × 100% (1) = 30% (1)	[3]	e.c.f. for last two marks if $E \neq$ 1200 J One mark for method, one for evaluation Allow fraction for efficiency, e.g. 0.3
(e)	For: reliable; not running out; cheap to run; no CO_2 (1) Against: accident risk; waste problem; not renewable (1)	[2]	Any 1 Any 1
(f) (i)	Any reasonable choice, e.g. wind, wave, biomass, geothermal, hydroelectric (1)	[1]	
(ii)	not reasonable available all the time (1)	[1]	
(g)	neutron heads for nucleus (1); nucleus splits (1); two nuclei (about half size of parent) produced (1); more neutrons produced (1); neutrons produced go on to hit more nuclei in a chain reaction (1)	[3]	Any 3 marks
	Total	**[16]**	

2 (a) (i)	(Seal up and) put in landfill (1);	[1]	
(ii)	If high level waste leaked out, it could contaminate water supplies/environment (1)	[1]	must refer to or describe contamination
(b)	stays radioactive/dangerous for thousands of years (1); could be released by water /earthquake/other disturbance (1); risk may be small, but consequence is very serious indeed (1)	[3]	Allow 'will affect property values/tourism' (1) as one of the first two marks. Final mark must address risk/consequence (may mention precautionary principle)
(c) (i)	Eating/breathing in radioactive chemical	[1]	
(ii)	protective clothing/remote handling/shielding (1); protects by absorption/blocking (1) ***or*** not getting close to radioactive materials (1); gets weaker with distance (1) ***or*** not working with radioactives for long periods (1); reduced dose (1)	[2]	suggestion (1) and mechanism (1)
(iii)	More penetrating/not easily stopped (1); damage cells/DNA or cause cancer (1)	[2]	
(d) (i)	supervise use of protective clothing/shielding/ remote handling (1) to minimise irradiation (1) ***or*** use of radiation badges/regular health/dosage checks (1); to ensure not affected ***or*** hygiene rules/checks between work and eating (1); to ensure not contaminated (1)	[2]	
(ii)	'As Low As Reasonably Achievable' (1); Reduce exposure to minimum which does not critically affect working of establishment owtte (1)	[2]	
	Total	**[14]**	

3 (a)	place one disc in each Petri dish (1); leave for a fixed amount of time (1); in incubator/warm place (1); measure the area of clear agar (1)	[3]	Any three points
(b)	size of circles of paper (1); length of time soaked for (1); temperature (1); length of time left for (1);	[2]	accept any two reasonable answers
(c) (i)	control (1)	[1]	
(ii)	**B** (1)	[1]	
(iii)	no bacteria are killed (1)	[1]	
(d)	most effective to least effective = **DAC** (1); **A** & **C** not very different, but not so good as **D** (1).	[2]	'**D** is best' owtte is enough for 1 mark. Use of data needed for second mark.
	Total	**[10]**	

4 (a) (i)	500g mass 15 cm ruler stand and clamp	[2]	all correct for 2 marks two correct for 1 mark one mark subtracted for each additional choice
(ii)	attach polymer strip to clamp (1); attach mass to polymer strip (1); measure increase in length (1)	[3]	
(b)	polymer **A** 3.0 cm (1); polymer **B** 6.5 cm (1);	[2]	allow ± 0.1 allow one mark for both answers 8.0 and 11.5
(c) (i)	use a ruler with smaller divisions/1 mm divisions (1)	[1]	Accept e.g. use of magnifying glass
(ii)	repeat the experiment with more polymer strips (1); work out a mean/average (1)	[2]	
	Total	**[10]**	

5 (a)	(stop)clock or (stop)watch (1)	[1]	
(b)	(8.8 + 9.3 + 9.1 + 8.7 + 9.1)/5 (1) = 9.0 (1)	[2]	One mark for method, one for evaluation Answer of 9.0 with no working gets both marks
(c)	radius of orbit/length of cord (1); angle of orbit (1); mass of 'planet' (1)	[1]	Any one
(d) (i)	Plotting: 1 mark for each correct point (2); Curve: (1)	[3]	See plotted graph below
(ii)	1.43 to 1.45 (seconds) (1)	[1]	
(iii)	Bigger force, less time (or reverse) (1); as force increases, change in time gets smaller (1)	[2]	First mark is for trend Second mark is for description of non-linearity
	Total	**[10]**