

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**MARK SCHEME for the October/November 2009 question paper  
for the guidance of teachers**

<p><b>0608 21<sup>ST</sup> CENTURY SCIENCE</b></p> <p><b>0608/05</b>      Paper 5 (Comprehension, Practical Procedures, Data Handling and Analysis), maximum raw mark 60</p>
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## Section A

- 1 (a) (i) cold / always below 0°C  
(ii) 2006 [1]
- (b) light (shorter  $\lambda$ /higher energy photons) transmitted through atmosphere (1);  
Earth absorbs this energy (1);  
re-emits IR/heat/longer  $\lambda$  radiation/lower energy photons (1);  
more of this is absorbed by carbon dioxide in atmosphere (1)  
*Any 3 points* [3]
- (c) (i) 2036 2070 [2]
- (ii) lack of melt water into rivers (1); e.g. 'feed'  
rivers deliver less water to Asia/dry up (1);  
huge population in those areas (1);  
possible drought (1);  
*Any 3 points*  
*allow flooding as short term problem* [3]
- (d) flooding of cities/farmland (1);  
more detail, e.g. most people live near sea level, most productive farmland lost,  
destruction of roads (1)  
*Second mark may be example of country affected.* [2]
- (e) (i) explanation of correlation (1);  
explanation of cause (1);  
correct reference to either scientist (1)  
*Any 3 points* [3]
- (ii) A clear mechanism to explain the causal link/ further data on different possible  
mechanisms to show that the CO<sub>2</sub> mechanism is the most likely correct one. [1]

[Total: 16]

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- 2 (a) (i) Too hot  
(ii) Too cold
- (b) closest planet / similar to Earth / most likely conditions for life [1]
- (c) methane (1); water (1) [2]
- (d) (i) (planets around) distant stars/stars other than Sun [1]  
(ii) Atmosphere affects observations/light and other pollution (1);  
space telescopes above (almost all of) atmosphere (1) [2]
- (e) distance / how far (1);  
light goes in one year (1) [2]
- (f) (i) any suggested project, e.g. famine relief, combating AIDS (1);  
argument for Earth based project (e.g. ethical argument) (1); [2]  
(ii) seeking knowledge (1); source of materials on other planets (1); need for room for  
population growth (1); escape environmental problems on Earth (1)  
*allow any two valid reasons for space research or one reason with justification* [2]

[Total: 14]

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## Section B

- 3 (a) wear gloves (1); wear lab coat (1); tie hair back (1); do not remove Petri dish lid completely (1); do not breathe close to the bacteria (1); use sterile equipment (1)  
*accept any two reasonable suggestions, ignore goggles* [2]
- (b) control / to allow comparison  
*Not just 'fair test'* [1]
- (c) (i) **B** [1]
- (ii) largest clear area [1]
- (d) (i) increases reliability/can discard outliers/can calculate mean [1]
- (ii) size of filter paper discs (1); length of time soaking (1); concentration of antibiotic solutions (1); time plate left for (1); conditions plate left in (1)  
*accept any two reasonable suggestions* [2]
- (e) bacteria are resistant (to antibiotic **C**) (1); antibiotic **C** is specific to another bacterium/antibiotic **C** not specific to this bacterium (1); mutation has occurred in the genes of the bacteria (1)  
*Any two* [2]
- [Total: 10]**
- 4 (a) (i) pipette [1]
- (ii) more accurate [1]
- (b) (i) 18.3 15.8 21.1  
*all correct = 2*  
*two correct = 1* [2]
- (ii) **BAC**  
one mark each for: **A** after **B**; **C** after **A**; [2]
- (c) (i) to avoid adding too much / to avoid missing the neutralisation point [1]
- (ii) to show when the solution was neutral / to show the neutralisation point / to show when all the acid had reacted [1]
- (d) the burette was used for the same solution each time (1); using the same pipette for all samples of the water containing sulfuric acid would have mixed different concentrations (1) [2]

**[Total: 10]**

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5 (a) 3

(b) (i) get values due to Pa-234 alone

(ii) Data changes rapidly near the beginning (1); Data changes slowly later on (1);  
need less frequent points to see significant changes later on (1)

*Any two points*

[2]

(iii) Taking more frequent readings (1);

repeating entire experiment and average results for each time (1); use sample with  
more Pa in it (1)

*Any two points*

[2]

(c) (i) all 3 correct (2);

at least 1 correct (1)

[2]

(ii) acceptable line

[1]

(iii) Indication of half-life calculation or interpolation and compare with value at 70 s

[1]

[Total: 10]