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

0608 21ST CENTURY SCIENCE

0608/05 Paper 5 (Comprehension, Practical Procedures, Data Handling and Analysis), 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.

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Section A

1 (a) (i) cold / always below 0°C [1]

(ii) 2006 [1]

(b) light (shorter λ/higher energy photons) transmitted through atmosphere (1);
Earth absorbs this energy (1);
re-emits IR/heat/longer λ 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_2 mechanism is the most likely correct one. [1]

[Total: 16]

2 **(a)** **(i)** Too hot [1]

(ii) Too cold [1]

(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]

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]

5 **(a)** 3 [1]

(b) **(i)** get values due to Pa-234 alone [1]

(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]