MARK SCHEME for the October/November 2010 question paper

for the guidance of teachers

0608 TWENTY-FIRST CENTURY SCIENCE

0608/05   Paper 5 (Comprehension and Practical),
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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Section A

1 **(a)** nitrogen;
oxygen;
argon;
all 3 correct = 2 marks, 2 correct = 1 mark [2]

(b) **(i)** sunlight;
nitrogen dioxide/particulates/ozone;
organic; [3]

(ii) nitrogen and oxygen from air react;
reaction takes place at high temperature (in car engine);
nitrogen monoxide is formed;
nitrogen monoxide reacts with oxygen in air to form nitrogen dioxide; [4]

(iii) $N_2 + O_2 \rightarrow 2NO$
1 mark for formulae; 1 mark for balance;
no second mark without first [2]

(iv) reacts with water;
and oxygen;
to produce acid rain; [3]

(c) wind less likely to blow it away/it gets trapped/it stays there/it builds up [1]

(d) **(i)** emphysema, bronchitis, asthma
all three required [1]

(ii) Canadian research (found that smog is responsible for 9 500 premature deaths in Ontario each year);
American Cancer Society research (found that repeated exposure to smog increases the likelihood of premature death from respiratory disease);
allow brief but clear references
accept reference to city C / Table 2 [2]

(e) 19 (days) somewhere in the calculation;
$100 \times 19/28$;
= 68%
accept 67.9/67.8/67.85/67.86
ecf wrong
number of days for max 2 marks [3]

(f) **(i)** it is an outlier/it is far different from the others; [1]

(ii) (48 + 53 + 52 + 49 + 51 + 53)/6;
= 51 [2]

(iii) range is small/values are close to each other/does not contain an outlier [1]

(iv) there is no real difference between the two sets of measurements;
because the mean for one city is within the range of the other;
allow their ranges overlap [2]

(v) as the level of particulates rises the number of deaths from asthma rises;
correlation;
allow ora [2]

(vi) a causal link/a mechanism for the way that smog causes asthma deaths [1]

[Total: 30]

Section B

2 (a) (i) ruler [1]

(ii) height from which the ball is dropped/distance ball fell;
diameter of crater
Not just 'size' [2]

(iii) use a range of at least five heights and measure diameter of crater for each;
height measurement: need to measure from same point on marble each time;
repeating drops for each height to get a better estimate
any two
could specify range from > 5 cm to < 2 m for first mark. [2]

(b) not read across diameter of crater;
ruler not accurate to 0.05 cm;
should have made several measurements across different diameters <u>in different directions</u>
and taken average<u>;</u> [3]

(c) as height increases diameter increases;
diameter increase gets smaller as height increases; [2]

[Total: 10]

3 (a) attach blood vessel sample to clamp;
add masses to blood vessel;
use ruler to measure length before and after masses added (and subtract) to get stretch; [3]

(b) (i) ruler [1]

(ii) use a ruler with mm/finer divisions/use callipers;
ignore measuring tape [1]

(c) to get a more accurate best estimate/to get an average/to discard outliers/to assess the
reliability/results may vary [1]

(d) because more elastic/stretchy/contains more elastic tissue;
arteries have to withstand high pressures
Marks cannot be scored if A chosen. [2]

(e) 8; 35 [2]

[Total: 10]

4 **(a)** **(i)** before 3.0; after 6.5 +/- 0.1 [2]

      (ii) 3.5
ecf from (a)(i) [1]

  (b) **(i)** repeat and work out mean/average [1]

      (ii) outliers can be excluded from calculation/one measurement may be in error [1]

  (c) **(i)** two marks for all five points plotted to +/- one small square;
one mark for four marks correctly plotted [2]

      (ii) straight line (drawn with ruler) within one small square of each point
need not go through 0,0 [1]

     (iii) value within +/- 0.1 of their graph value
but mark lost if extrapolation incorrect
expect 4.4 [1]

     (iv) the more plasticizer added to the polymer the more flexible the polymer
accept bending as flexible [1]

[Total: 10]