MARK SCHEME for the October/November 2010 question paper

for the guidance of teachers

5129 COMBINED SCIENCE

5129/02   Paper 2 (Theory), maximum raw mark 100

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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1 (a) 0.18 (ignore units) [1]

(b) $V = IR$ **or** $50 × 0.03$ **or** $10 × 0.15$
= 1.5 (V) [2]

(c) $Q = It$ **or** $C = It$ **or** $0.15 × 300$
= 45
C [3]
0.75 C gains 2 marks, 0.75 gains 1 mark
unit mark is independent of the numerical answer

2 (a) (i) blue / purple / indigo / violet [1]

(ii) OH^- / hydroxide ion [1]
ignore OH

(b) pipette
burette (do not accept biuret)
neutral / neutralised [3]

(c) (i) $(NH_4)_2SO_4$ [1]

(ii) fertiliser [1]

3 (a) $v = d/t$ **or** speed = distance / time **or** $2.7 × 10^8$ / 24 × 60 × 60
3125 (m/s) [2]
allow $2.7 × 10^8$ /24 = 11 250 000 for 1 mark
allow $2.7 × 10^8$ / (24 × 60) = 187 500 for 1 mark

(b) $F = ma$ **or** $a = F/m$ **or** $45/200$
= 0.225 (m/s^2) [2]

4 (a) anther / stamen (ignore pollen grains)
sepal
ovary / carpel [3]

(b) to attract <u>insects</u>
for pollination [2]
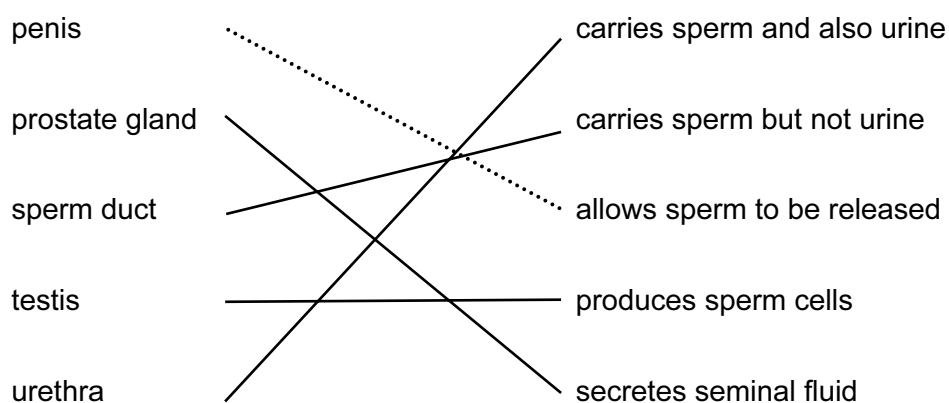
(c) anther / stamen / X [1]

5 (a) liquid – irregular shape majority of particles touching
gas – random particles not touching [2]

(b) melting
condensation [2]

6 (a) volume
density
length
resistance / resistivity } any 2
colour
e.m.f.
pressure [2]

(b) smaller range
constriction
retains reading } any two
triangular cross section
narrow bore / tube
more sensitive [2]
(ignore more accurate / narrower alone)

(c) mercury would freeze / would be solid
or alcohol stays liquid / does not freeze [1]
(ignore statement that mercury melts at –39°C)

7 (a) (i) tubing [1]

   (ii) the water (in the beaker) [1]

   (iii) the starch
   do not accept starch and amylase [1]

(b) (amylase is an) enzyme
catalyses (breakdown of starch)
starch is broken down / digested } any 3
sugar / maltose <u>diffuses</u> into the water
tube is <u>permeable</u> (to maltose / sugar) [3]
(allow correct description for diffusion)

8 (a) $E = Pt$ **or** energy = power × time **or** 1800 × 120
= 216 000
J [3]
3600 J gains 2 marks, 3600 gains 1 mark

(b) neutral
earth ANY order [2]

9 (a) oxygen [1]

(b) hydrogen [1]

(c) hydrogen [1]

(d) carbon monoxide [1]

(e) argon [1]

10 (a) (i) N   S [1]

(ii) S   N [1]

(b) current not changing / is constant / in one direction only
magnetic field not changing / is constant [2]

11 (a) two parents
(genetically) different offspring
fertilisation / fusion of gametes or nuclei [2]
allow converse argument

(b)

penis   carries sperm and also urine

prostate gland   carries sperm but not urine

sperm duct   allows sperm to be released

testis   produces sperm cells

urethra   secretes seminal fluid

[4]

12 (a) 54   112   [2]

        5.4   11.2   [1]

        (accept both above divided by 10)

                      5.6   [1]

        (accept above divided by 2)

        (correct answers always gain credit)

(b) oxidation / redox   [1]

13 (a) 46°   [1]

(b) (i) R.I. = sin i / sin r [1]

(ii) 28° (accept 27.79 to 28)   [1]

14 (a) gas A   = hydrogen

        gas B   = carbon dioxide

        liquid C = water

        gas D   = water / steam   [4]

(b) ethene contains a (carbon to carbon) double bond   [1]

(c) speed up the reaction / lowers activation energy   [1]

15 (a) (i) loss of water   [1]

(ii) through stomata

           in leaves   [2]

(b) (i) 6 hours

          24 hours (accept 23.5 to 24)   [2]

(ii) it will wilt / droop   [1]

16 (a) conduction / conduct / conductor   [1]

(b) it has expanded   [1]

17 (a) (i) 8
10 [2]

    (ii) 2 electrons on inner ring and 6 electrons on outer ring [1]

(b) same element / same number of protons
different number of neutrons / nucleon number [2]
(ignore references to electrons)

(c) oxygen tents in hospital
(oxy-acetylene) welding   } any two
oxygen tanks for divers
steel manufacture [2]
ignore breathing / saving lives / respiration / combustion
answers which relate to breathing must say 'how' or 'what' is done

18 blood
gland
target organ
liver [4]

19 (a) d = m / v **or** 5.4 / 1.8
= 3.0
g/cm^3 [3]
(correct answer with unit = 3 marks)
(unit mark independent of answer)

(b) 2.8 [1]

20 (a) <u>large</u> fish / fishermen [1]

(b) mercury into water
absorbed by micro-organisms
(small) fish eat the micro-organisms [3]

(c) because they **<u>eat</u>** fish [1]