

**MARK SCHEME for the October/November 2011 question paper
for the guidance of teachers**

5129 COMBINED SCIENCE

5129/22

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.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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- 1 (a) **A** = hydrogen ;
B = sulfuric acid ;
C = ammonia ; [3]
- (b) carbon dioxide ;
goes cloudy / milky / forms white precipitate [independent marks] ; [2]
- 2 (a) 12 ; [1]
- (b) (i) increased breathing rate / faster ;
increased depth of breathing / heavy breathing ; [2]
- (ii) exercise / stress / any valid alternative ; [1]
- 3 (a) for equilibrium / balance ;
(total) clockwise moment = (total) anticlockwise moment ; [2]
- (b) (i) force x distance (from pivot) or 8.0×0.2 ; [1]
= 1.6 ; [1]
Nm ; [1]
(unit independent of numerical answer)
- (ii) 4.0 ecf (b)(i)/0.4 ; [1]
- (c) $(2 \times 3)/1.5$;
4.0 ; [2]
- 4 (a) uv / ultra violet }
ir / infra red } any 2 ;;
gamma / γ }
x-rays } [2]
- (b) $f = c/\lambda$ or $3 \times 10^8/1.5 \times 10^3$; [1]
= 200 000 or 2×10^5 ; [1]
Hz / s^{-1} do not accept hz ; [1]
(unit independent of numerical answer)
- 5 (a) 78–80% ; [1]
- (b) corrosion of buildings / crops die / kills aquatic life / acid rain ; [1]
[incorrect statement = 0 mark, ignore air pollution]
- (c) 6 2 ; [1]

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- (d) (i) N^{3-} ; [1]
- (ii) high melting point boiling point
soluble in water
conducts electricity when molten / when in solution } any 2 ;; [2]
- 6 (a) A = oesophagus / gullet ;
B = gall bladder ;
C = pancreas ;
D = ileum / small intestine ;
E = colon / large intestine ; [5]
- (b) (i) mouth ; [1]
- (ii) anus ; [1]
- (iii) ileum / D ; [1]
- (c) pancreas / salivary gland ; [1]
- 7 (a) force \times distance or 5×1.2 ; [1]
= 6 ; [1]
(correct answer gains 2 marks)
- (b) power = energy/time or (a) / 0.5 ; [1]
= 12 ; [1]
(correct or correct ecf answer gains 2 marks)
- (c) gravity less
weighs less
less force needed to lift } any 1 ; [1]
[do not accept no / different gravity]
- 8 (a) removal of oxygen / addition of hydrogen ; [1]
- (b) 36 44 ;; [2]
11 (divide by 4) ; [1]
0.55 (divide by 20) ; [1]
- (c) basic ;
metal oxide [independent] ; [2]

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- 9 (a) (more) germination / grow in dish **P** / with wet cotton wool ;
no germination / grow in dish **Q** / dry cotton wool ;
water needed for germination / cotton wool is wet ; [3]
[mark candidate's response as a whole]
- (b) improve reliability / validity / make sure results are typical / fair test ; [1]
[ignore refs to accuracy]
- (c) temperature [do not accept heat] }
light (intensity) / sunlight } any 2 ;;
oxygen concentration }
type of cotton wool } [2]
- 10 (a) $I = P/V$ or 600/240 ; [1]
= 2.5 ; [1]
A ; [1]
(unit independent of numerical answer)
- (b) large current through earth / live ; [1]
fuse melts / blows ; [1]
live disconnected / breaks circuit ; [1]
- 11 (a) (i) fractional distillation ; [1]
(ii) aircraft fuel / jet fuel / fuel for oil stoves / lamps ;
making roads ; [2]
- (b) (i) alkanes ; [1]
(ii) 18 ; [1]
(iii) covalent ; [1]
- 12 (a) pain / burning sensation on urination / frequent urination }
abnormal discharge (from urethra) } any 2 ;;
inflammation / irritation of vagina / cervix / testes / prostate }
swollen / painful joints } [2]
- (b) syphilis ; [1]
- (c) antibiotics/ penicillin ; [1]
- (d) AIDS / (non-specific) urethritis / herpes / hepatitis ;
allow HIV [1]

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- 13 (a) measuring cylinder / burette ; [1]
- (b) measure volume of liquid in cylinder ; [1]
 place stone in liquid and measure new volume ; [1]
 find difference between two volumes ; [1]
OR
 fill displacement can
 add stone and collect water
 measure volume of water displaced
- 14 (a) element / copper one type of atom ; [1]
 mix or mixture = 0 mark
- compound / sodium chloride two types of atom / elements combined chemically ;; [2]
 mixture or mix = 0 mark
 allow two types of atom / element react = 2 marks
- alloy / brass mixture ; [2]
 two elements / types of atom ;
 marks are independent
- (b) conducts electricity ; [1]
- 15 (a) insufficient food (to support the population) ; [1]
 ignore starvation, insufficient homes / houses / water
- (b) due to flooding } any 2 ;; [2]
 insufficient / limited agricultural land
 large areas of non-agricultural land / mountains / forest
- (c) (i) (increased probability – no mark) [1]
 because more demand for food / more food needed ;
 ignore not enough food
- (ii) (increased probability – no mark)
 because plants need water / increased chance of drought
or
 (decreased probability – no mark)
 because less (chance of) flooding ; [1]
 (answers to (c)(i) and (c)(ii) must include the change in probability)
- 16 (a) (electromagnetic) induction ; [1]
- (b) number of turns / coils } any 2 ;; [2]
 strength of magnet
 speed
 cross sectional area

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(c) repels / pushes away ; [1]

17 (a) oxygen / O₂ not O ; [1]

(b) helium / He ; [1]

(c) ethene / C₂H₄ ; [1]

(d) oxygen / O₂ allow O if used in (a) and (d) ; [1]

18 (a) an externally administered / swallowed / consumed / taken in / injected substance ;
 [ignore food / medicine / pill / eat]
 which modifies / affects / changes chemical reactions / metabolism in the body ; [2]

(b) reduced self-control / poor judgement
 blurred / double vision
 depression
 addiction / withdrawal symptoms / DT's
 liver disease / cirrhosis / hepatitis / liver cancer
 cancer / inflammation of mouth / stomach / gut
 brain damage
 alcoholic poisoning
 high blood pressure
 impotence / infertility
 dizzy / can't walk / difficulty standing / slurred speech
 slow reactions
 ignore kill them / shorten lifespan / drink driving / divorce / crime / blindness / can't see

} any 3 ;;; [3]