

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

5129 COMBINED SCIENCE

5129/21

Paper 2 (Theory), maximum raw mark 100

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1 (a) red (cells) / erythrocytes ; [1]

(b) A ; [1]

(c) water has entered the cells ;
by osmosis ;
cells have burst ; } any 2 [2]

2 (a) velocity has direction / speed does not have direction ; [1]

(b) (i) 5.6–5.8 14 (both) ; [1]

(ii) distance = speed × time or $s = d/t$ or 4×7 ; [1]
= 28 ; [1]

(c) kinetic
thermal / heat / sound (in order) ;; [2]

3 (a) alkanes ; [1]

(b) 64 44 ;; [2]
6.4 4.4 (divide both by 10) ecf ; [1]
1.1 (divide by 4) ecf ; [1]

(c) glowing splint ;
relights (incorrect test = 0 marks) ; [2]

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	1 ;
1 ;	0 / neutral ;

[3]

5 (a) muscle ; [1]

(b) (i) opens ; [1]

(ii) closes ; [1]

(c) pressure rises ;
blood forced out / leaves ; [2]

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(d) blood (in chamber Z) has less oxygen / is deoxygenated ;
blood (in chamber Z) has more carbon dioxide ;
[or reverse argument if no chamber stated assume Z] [2]

6 (a) (i) normal in correct position, perpendicular ; [1]

(ii) ray looks as if coming from pin image left of mirror ; [1]

(b) left / towards mirror / nearer the mirror ; [1]

(c) sound / p-waves / push wave on a slinky ; [1]

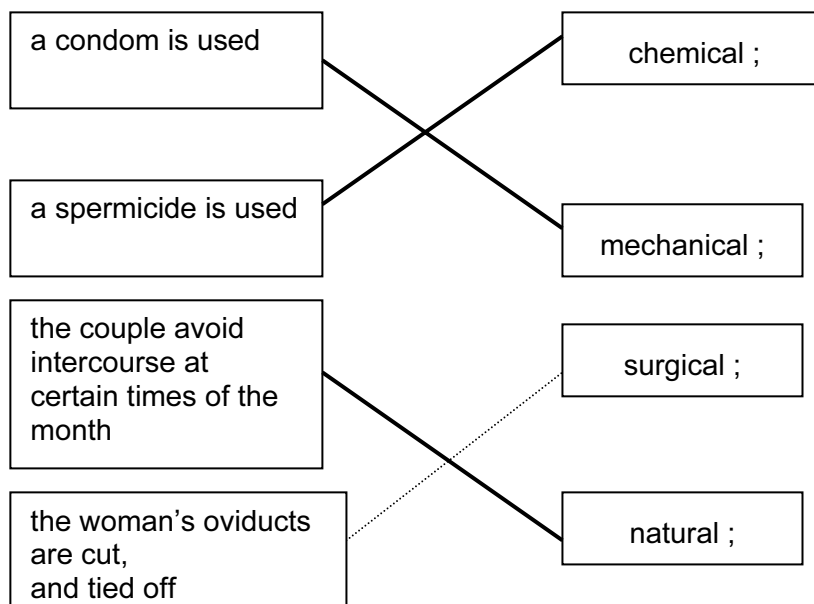
7 (a) shared pair ;
three lone pairs on each chlorine atom ; [2]

(b) increases / higher / bigger ; [1]

(c) purification of water ; [1]

(d) potassium chloride / KCl ;
iodine / I_2 (either order) ; [2]

8 (a) (i)



[3]

(ii) the (contraceptive) pill ; [1]

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(iii) condom / abstinence ;
prevents body (fluid) contact / provides barrier ; [2]

(b) the milk is sterile ;
contains correct (balance of) nutrients ;
no danger of being made up at the wrong concentration ;
contains antibodies / provides immunity ;
at right temperature ;
promotes bonding between mother and baby ;
is always / available for the baby / no preparation ; } any 2 [2]

9 (a) components connected in series ; [1]
correct symbols for all four components ;; [2]
correct symbols for two or three components (= 1 mark)

(b) (i) $V = IR$ or $R = V/I$ or $1.8/0.2$; [1]
9 ; [1]
 Ω / ohm (unit independent) ; [1]
(correct answer with unit = 3 marks)

(ii) $P = VI$ or 1.8×0.2 ; [1]
0.36 ; [1]

10 (a) (i) iron / Fe ; [1]
(ii) 3 2 ; [1]
(iii) 8–10 ; [1]

(b) nitric acid ;
neutralisation / exothermic ; [2]

11 (a) protein ;
catalyst ;
speeds up reactions ; } any 1 [2]

(b) (i) faster at higher temperature / at 40°C / best at 40°C ; [1]

(ii) fastest / optimum at pH7 ;
Increases to pH 7 then decreases ; [1]

(c) line drawn below 15°C curve throughout ; [1]

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- 12 (a)** conduction ; [1]
- (b)** heated water expands / becomes less dense ;
 heated (hot) water rises ;
 cooler (cold) water falls ;
 convection (current) ; } any 3 [3]
- (c) (i)** plastic is a poor conductor / insulator ; [1]
- (ii)** white surfaces are poor emitters ;
 (ignore poor absorber / good reflector
 but good absorber / poor reflector / conduction is incorrect) [1]
- 13 (a)** condenser ; [1]
- (b)** filter funnel ; [1]
- (c)** measuring cylinder / burette ; [1]
- (d)** pipette ;
 burette correct order ; [2]
- 14 (a)** thin wall / wall one cell thick ;
 folded / large surface area ;
 many capillaries / moist surface ; } any 2 [2]
- (b)** carbon dioxide / CO₂ / water / H₂O ; [1]
- (c)** smoke / soot particles coat gas exchange surface ;
 or reduce effective surface area ;
 prevent diffusion [2]
- 15 (a)** **A** = fermentation ;
B = water / steam ;
C = ethanoic acid ; [3]
- (b)** enzymes / zymase ; [1]
- (c)** addition / additional ;
 monomer ; [2]
- 16 (a)** magnetic materials are attracted to magnets ; [1]

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- (b) **steel** is a hard magnetic material ;
steel retains magnetism / permanent ;
steel hard to magnetise ;
iron is soft magnetic ;
iron easily loses magnetism / temporary ;
iron easy to magnetise ;
- } any 1
- [1]

- 17 (a) $a = F/m$ or 225 000/50 000 ; [1]
 $= 4.5$; [1]
 m/s^2 (unit independent) ; [1]

- (b) (spacecraft) mass / weight decreases ; [1]

- 18 (a) less (in the cheetahs) ; [1]

- (b) energy losses at each stage ; [1]

- (heat loss due to) respiration ;
not all organisms being eaten ;
(energy losses due to) egestion / excretion / movement ;
- } any 1
- 1
- [1]

- (c) decomposers / bacteria / fungi / microorganisms ; [1]

- 19 (a) **S** ; [1]

- (b) **T** ; [1]

- (c) **R** ;
T (either order) ; [2]

- (d) **W** (accept **U**) ; [1]