

MARK SCHEME for the May/June 2008 question paper

0654 CO-ORDINATED SCIENCES

0654/02

Paper 2 (Core Theory), maximum raw mark 100

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1 (a) cornea, lens;
(ignore pupil, humours) [1]

(b) (i) focuses/adjusts light/image;
onto the retina;
lens changes shape;
ref to refraction/bending light; [max 2]

(ii) contains receptor/light sensitive cells;
converts light energy to impulse in nerve (fibre);
impulse sent to brain; [max 2]

(c) (i) abnormal choroid/blindness; [1]

(ii) gametes **A** and **a**;
offspring **AA** and **Aa**;
all normal/none have disease;
(allow ecf) [3]

[Total: 9]

2 (a) density = mass/volume;
= $40 / 35 = 1.14 \text{ g / cm}^3$; [2]

(b) momentum = mass x velocity;
= 0.04×40
= 1.6 kg m/s ; [2]

(c) (i) 60 N; [1]

(ii) work = force x distance;
= 60×0.5
= 30 J; (allow ecf) [2]

[Total: 7]

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- 3 (a) A/igneous; [1]
- (b) (i) sedimentary; [1]
- (ii) (biological)
 roots;
 abrade rock surface;
 animals;
 abrade rock surface;
- (physical)
 description of freeze/thaw;
 reference to ice expansion;
 description of thermal variation;
 expansion/contraction cause surface damage;
 particles carried by wind;
 abrade rock surface;
- (chemical)
 (acidic) rain;
 reacts with rock/dissolves rock; [max 2]
- (iii) correct underlined from (ii) [1]
- (c) (i) colloid; [1]
- (ii) (incorrect)
 should be called a sol;
 emulsion is liquid in liquid / sol is name for solid in liquid; [2]
- (iii) water contains (dissolved) sulphate (ions); [1]
- [Total: 9]**
- 4 (a) (i) A = palisade (layer);
 B = (lower) epidermis; [2]
- (ii) it has a cell wall;
 it has chloroplasts/chlorophyll;
 it has a vacuole/cell sap;
 it can photosynthesise; [max 2]
- (iii) arrow drawn entering stoma; [1]
- (b) carries water (to the leaf);
 carries minerals;
 support; [max 2]
- [Total: 7]**

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- 5 (a) (i) S on a horizontal portion; [1]
(ii) goes faster/accelerates/accelerating; [1]
- (b) (i) number of waves (produced) per second; [1]
(ii) dolphin; [1]
(iii) dolphin; [1]
- (c) distance = speed x time;
= 1500 x 0.2 = 300m;
distance = 150m ; [3]
- (d) straight lines with arrows;
bending at surface;
entering eye; [3]
- [Total: 11]**
- 6 (a) (i) e.g. lithium
is less dense;
has higher melting point;
is less malleable;
is less reactive; [max 2]
(ii) electron configuration 2,8 shown; [1]
(iii) ions form by losing one electron/ions have one more proton than electron; [1]
- (b) (i) magnesium sulphate;
both soluble and ionic/electrolyte is a solution containing ions; [2]
(ii) use different metals/materials for one or both of the electrodes;
use different electrolyte; [max 1]
- [Total: 7]**
- 7 (a) (i) May; [1]
(ii) idea that it was lower (except in July) in 2003;
idea that it peaked at different times; [2]
- (b) (i) plants use nitrate to make proteins;
plants grow, larger/better/faster;
higher yield/bigger crop; [max 2]
(ii) add (nitrogen-containing) fertiliser; [1]

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(c) (i) maize → cattle → people; [1]

(ii) energy (flow); [1]

(d) decomposers/named decomposer;
rot the roots/break them down/decomposes;
respiration (by composers) releases carbon dioxide; [max 2]

[Total: 10]

8 (a) (i) normal bodywork attracted;
filled hole not attracted; [2]

(ii) plastic filler is not magnetic [1]

(iii) no – aluminium is not magnetic; [1]

(iv) aluminium doesn't corrode/corrodes less than steel/less dense; [1]

(b) In a SOLID, the particles are closer together than in a GAS.

The forces of attraction between particles are stronger in a SOLID than in a GAS.

When a SOLID is heated it will eventually turn into a liquid.

In a SOLID, the particles can only vibrate and not move.

Heat energy will travel through a SOLID by conduction.

Heat energy will **not** travel through a SOLID by convection.

Any two correct 1 mark [4]

[Total: 9]

9 (a) made from once living material/millions of years to form; [1]

(b) carbon dioxide produced;
reference to (excessive) global warming/enhanced greenhouse effect;
reference to negative consequences of climate change; [max 2]

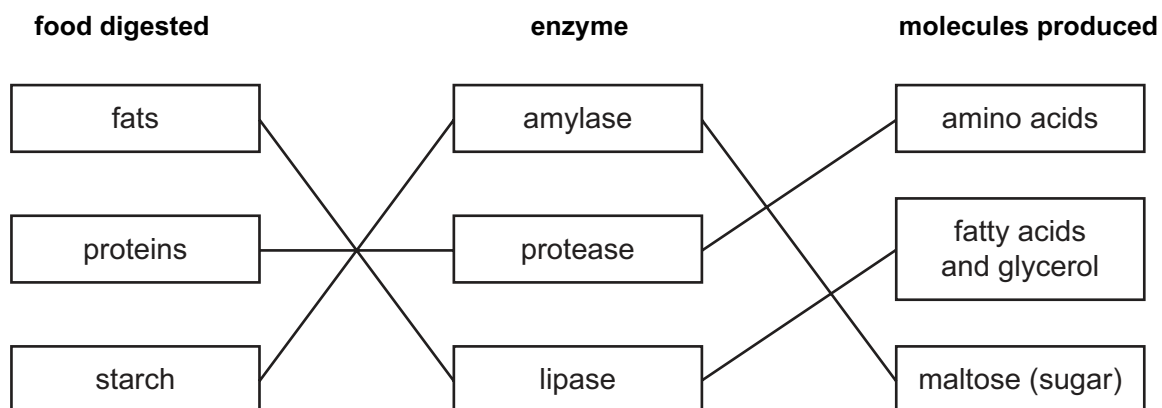
(c) (i) limewater;
goes cloudy; [2]

(ii) higher % of methane/more methane;
methane burns/other gases do not burn/contribute to heat output; [2]

[Total: 7]

10 (a) speeds up reaction;
without being used up; [2]

(b)



1 mark for each correct enzyme;

[3]

(c) (i) passes through alimentary canal/named part of alimentary canal;
egested;
as faeces;
through anus;

[max 2]

(ii) prevents constipation/helps egestion/stimulates peristalsis/lower risk of bowel cancer; [1]

(iii) fruit/named fruit/vegetables/named vegetable/breakfast cereal/grain/seeds/brown bread/
brown rice; [1]

[Total: 9]

11 (a) (i) C H O; (all three required)

[1]

(ii) covalent;

[1]

(b) (i) changing (the element) nitrogen in the air into nitrogen compounds/named nitrogen compound;
extra detail, e.g. one way it occurs/reference to inert nitrogen being converted into useful compounds/nitrifying bacteria/Haber process/lightning; [2]

(ii) ammonia;

[1]

(iii) sum of protons + neutrons = 14;
reference to the nucleus; [2]

[2]

(c) drugs/medicines;
dyes;
(accept named compounds)

[2]

[Total: 9]

12 (a) (i) ammeter;

[1]

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(ii) $M_2 = 1A$; [1]

(iii) $(R = R_1 + R_2)$
 $= 3\Omega$; [1]

(iv) power = voltage x current = $3 \times 3 = 9 W$; [1]

(b) charge = current x time;
 $= 4 \times 60 = 240 C$; [2]

[Total: 6]