

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**MARK SCHEME for the October/November 2008 question paper**

**0654 CO-ORDINATED SCIENCES**

**0654/02**

Paper 2 (Core 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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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Page 2	Mark Scheme	Syllabus	Paper
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- 1 (a) (i)  $KE = \frac{1}{2}mv^2$ ;  
 $= \frac{1}{2} \times 0.6 \times 25 = 7.5 \text{ J}$  ; [2]
- (ii) momentum =  $m \times v$ ;  
 $= 0.6 \times 5 = 3.0 \text{ kg m/s}$  ; [2]
- (b) unbalanced (no mark)  
deceleration / change of speed ; [1]
- (c) carbohydrates ;  
fats ; [2]
- [Total: 7]**
- 2 (a) no scales, feathers or fur (on skin) / smooth skin ; [1]
- (b) Bufo ; [1]
- (c) sugar cane  $\longrightarrow$  lacebugs  $\longrightarrow$  cane toads ;  
producer consumer consumer ; [2]
- (d) (i) 1550 m in 24 hours (i.e. correct reading from graph) /  
 $1550/24$  ;  
 $= 64.6$  (metres per hour) ; [2]
- (ii) the longer the legs, the faster they travelled ; [1]
- (iii) temperature ;  
type of surface ;  
time of day ;  
feeding ;  
other valid suggestion ; [max 2]
- (e) (i) protease ; [1]
- (ii) small intestine / ileum ; [1]
- [Total: 11]**

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- 3 (a) (i) magnesium chloride ; [1]
- (ii) hydrochloric (acid) ; [1]
- (iii) lit splint ;  
reference to pop ;  
because hydrogen gas is produced ; [max 2]
- (iv) thermometer reading increased ;  
shows heat produced ;  
exothermic means heat produced ; [max 2]
- (b) (i) metals melted and mixed ; [1]
- (ii) lower density / lighter ;  
planes need to be as light as possible to fly etc. /  
racing cars must not be too heavy to go faster ; [2]

**[Total: 9]**

- 4 (a) (i) nucleus (of atom) ;  
splits ; [2]
- (ii) advantage  
no global warming / no CO<sub>2</sub> emissions /  
small amount of fuel produces lots of energy /  
no reduction in fossil fuels reserves ;
- disadvantage  
radiation leaks /  
waste disposal /  
high decommissioning costs /  
high building costs /  
high maintenance costs ; [max 2]
- (iii) kinetic / heat ;  
kinetic ; [2]
- (b) (i) alpha and beta charged / gamma not charged ; [1]
- (ii) small mass (to deflect for the charge) ; [1]
- (iii) largest particle / charge / mass (therefore able to damage other atoms most) ; [1]
- (iv) causes cancer / causes mutations / radiation burns / damages cells / kills cells /  
damages DNA; [1]
- (v) lead is good at absorbing radiation / lead only lets some gamma escape /  
stops radiation harming people ; [1]

**[Total: 11]**

Page 4	Mark Scheme	Syllabus	Paper
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- 5 (a) vagina **C**  
ovary **B**  
uterus **D**  
oviduct **A**  
one mark for any two correct ; ; [2]
- (b) (i) the thickness of the uterus lining begins to decrease ; [1]  
(ii) 20th–28th ; [1]
- (c) (i) oviduct / Fallopian tube / part **A** ; [1]  
(ii) 23 ; [1]  
(iii) nucleus ; [1]
- (d) (i) virus / HIV ;  
in body fluids / description  
virus passes through mucus membrane ; [max 2]
- (ii) only one sexual partner ;  
use condom ;  
trace previous partners of anyone with AIDS ;  
person with AIDS should not have sexual intercourse ; [max 2]
- [Total: 11]**

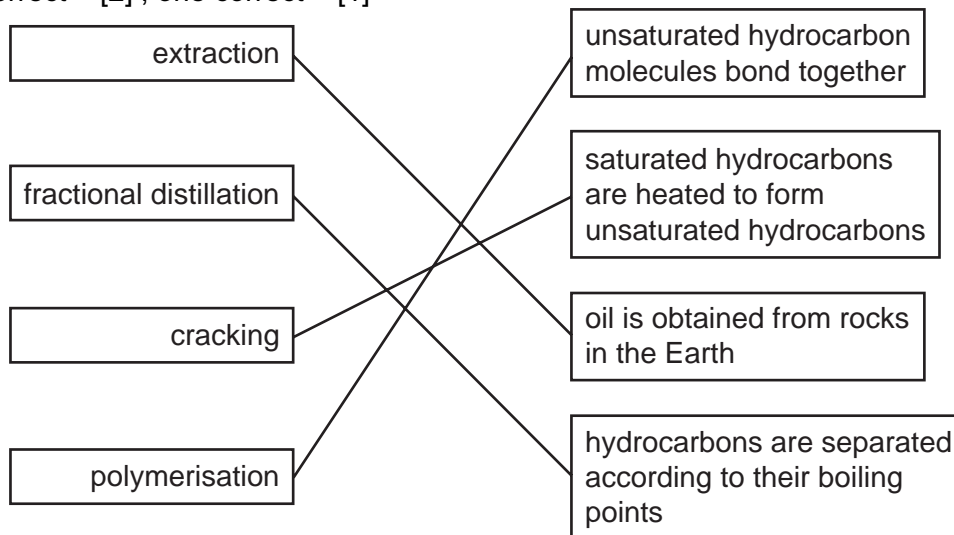
Page 5	Mark Scheme	Syllabus	Paper
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6 (a) (i) igneous ;  
metamorphic ; [2]

(ii) it is porous / permeable / description of porosity ; [1]

(b) bigger / heavier / contain more C/H atoms / longer chains ;  
reference to rings (of carbon) / suitable diagram ; [2]

(c) all correct = [2] ; one correct = [1]



[2]

(d) (i) oil and water do not mix ; [1]

(ii) detergent ; [1]

[Total: 9]

7 (a) good (thermal) insulator ; [1]

(b) (i) work = force x distance ;  
= 900 x 6 = 5 400 J ; [2]

(ii) 5 400 J ; [1]

(c) (i) any suitable ; [1]

(ii)  $3 \times 10^8$  (m/s) ; [1]

[Total: 6]

Page 6	Mark Scheme	Syllabus	Paper
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- 8 (a) (i) A carbon dioxide ;  
B oxygen ; [2]
- (ii) diffusion ; [1]
- (b) take up oxygen ;  
by diffusion ;  
oxygen combines with haemoglobin ;  
haemoglobin changes to oxyhaemoglobin ; [max 2]
- (c) (i) (at night) respiration ;  
(in day) photosynthesis ;  
more photosynthesis than respiration ; [3]
- (ii) arrow in through stoma and air space to cell P ; [1]
- (iii) transports water ;  
transports minerals ;  
support ; [max 2]
- [Total: 11]**

- 9 (a) litmus will be different colours in acid and alkali ;  
Alizarin yellow same colour in acid and alkali ; [2]
- (b) (i) substance used to colour other materials;  
which has to be manufactured / made by humans / does not occur naturally; [2]
- (ii) 1 ; [1]
- (iii) (paper) chromatography ; [1]
- (c) 3 ;  
covalent bond (in chlorine) consists of a shared pair of electrons ; [2]
- [Total: 8]**

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**10 (a)** all symbols correct ;  
ammeter in series and voltmeter in parallel with lamp ;  
everything else correct ; [3]

**(b) (i)** increase magnetic field ;  
more current / voltage / cells ;  
use more coils ;  
decrease load driven by motor ; [max 2]

**(ii)** reverse magnet / magnetic field ; [1]

**(c) (i)** (power = voltage x current) = 240 x 4 = 960 W [1]

**(ii)** Motor not 100% efficient ;  
some energy lost as heat / sound ;  
reference to friction etc. ; [2]

**[Total: 9]**

**11 (a) (i)** ionic ; [1]

**(ii)** zero / 0V / the cell does not work / owtte ;  
electrodes must be different metals (for cell to work) ; [2]

**(b) (i)** 30 ; [1]

**(ii)** it loses electrons ;  
two electrons ; [2]

**(c)** zinc ;  
has combined with oxygen / has become zinc oxide ; [2]

**[Total: 8]**