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

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International Examinations

1 **(a)** **(i)** KE = ½mv^2 ;
= ½ x 0.6 x 25 = 7.5 J ; [2]

(ii) momentum = m x v;
= 0.6 x 5 = 3.0 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 ⟶ lacebugs ⟶ 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]

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) <u>advantage</u>
no global warming / no CO_2 emissions /
small amount of fuel produces lots of energy /
no reduction in fossil fuels reserves ;

<u>disadvantage</u>
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]

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]

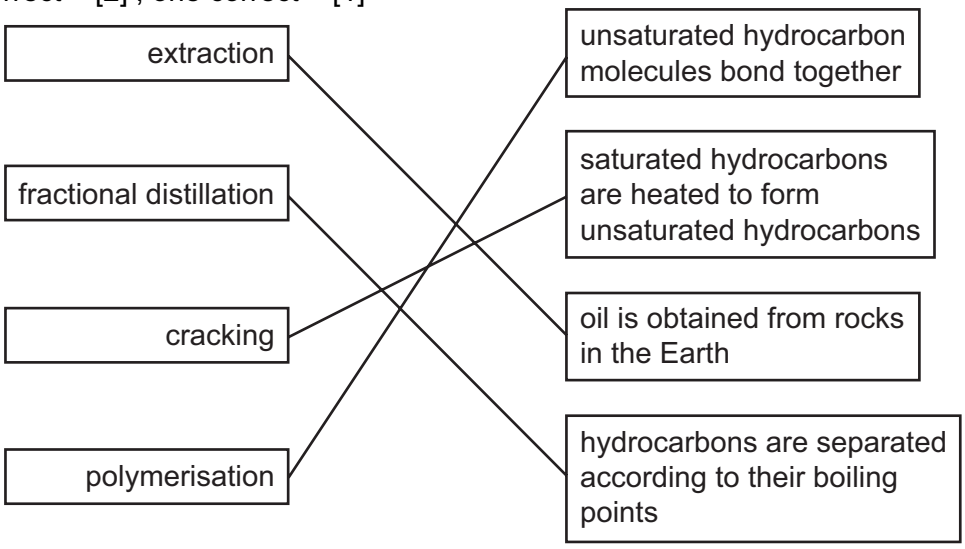
[Total: 11]

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) 3×10^8 (m/s) ; [1]

[Total: 6]

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]

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 / 0 V / 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]