CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2002

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK : 100

SYLLABUS/COMPONENT : 0654/2

CO-ORDINATED SCIENCES (CORE)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

1(a) the community / **all** the living things ;
+ the habitat / all the non-living things ; 2

(b)(i) blackjack/cotton plant ► aphid ►ladybird ► pied wagtail ; 1

(ii) cotton plant/blackjack ; 1

(c)(i) sunlight ;
photosynthesis/description of photosynthesis ; 2

(ii) jackal eats rabbit ;
energy is (stored) in food / chemical energy ; 2

(iii) black shouldered kite ;
energy lost along food chains / kite is at end of food chain; 2

2(a) gravity downwards in both;
tension upwards in fig C; 2

(b) stage B;
greatest velocity so greatest KE; 2

(c) straight line;
through origin; 2

3(a) B;
A;
D; 3

(b)(i) formed over a very long time scale;
from once living material; 2

(ii) biogas contains carbon dioxide (as well as methane);
carbon dioxide does not burn / less combustible material
in biogas so less heat evolved / owtte; 2

(c) reference to (large chain) molecules made of repeating units / monomers;
which soften / melt when heated / can be repeatedly remoulded by heating; 2

4(a)(i)	radicle ; cotyledon	2
(ii)	ovule ;	1
(b)(i)	warm temperature needed ; light not needed ;	2
(ii)	greener/more starch ; because more chlorophyll/photosynthesis ; leaning towards light ; positive phototropism / plant shoots grow towards the light ;	MAX2
5 (a)(i)	250 MJ;	1
(ii)	lost as (waste) heat/sound etc;	1
(iii)	100MW;	1
(b)(i)	cleaner/less pollution; fossil fuels have other uses apart from burning; fossil fuels are running out/non renewable;	MAX 2
(ii)	source; description;	2
(c)(i)	transformer;	1
(ii)	reduce energy losses;	1
6(a)(i)	29; 48; 29; 1;	4

(b)(i) transition; 1

(ii) reference to physical differences
e.g. copper has higher fixed points / harder / stronger
reference to chemical properties
copper less reactive / forms coloured compounds / acts as catalyst; MAX 1

(c)(i) → copper + carbon dioxide / monoxide; 1

(ii) reference to mass of oxygen lost /copper oxide has the mass of oxygen in it copper does not / owtte; 1

7(a)(i) vibrate more/faster /have more KE;
particles move further apart; 2

(ii) particles vibrate more at hot end;
KE /energy passed by collision from one particle to the next; 2

(b) **strong** attractive force between atoms 1

(c) 400 J/kg/°C;
doesn't depend on mass; 2

(d) energy supplied used to weaken bonds;
to allow particles to separate; 2

8(a) cell membrane ;
controls what goes in and out of the cell ; 2

(b)(i) line to nucleus ; 1

(ii) sperm will fuse with/fertilise egg ;
to restore 46 chromosomes ; 2

(iii) genetic material / genes ;
instructions for making proteins/determine characteristics of cell; 2

(c)(i) testes ; 1

(ii) controls puberty in males/any correct stated secondary sexual characteristic ; 1

9(a) paper;
ceramics;
steel;
glass; 4

(b)(i) atoms of different elements bonded in compound not in mixture/ elements retain properties in mixture and not in compound/ mixture has variable composition compound has formula/ often easier to separate elements in mixture; 1

(ii) increase pressure;
reduce temperature; 2

(iii) components have different boiling points; 1

(c)(i) speeds up reaction; 1

(ii) nitrogen molecules very stable / unreactive / held by strong bonds; 1

10(a) 100W; 1

(b) less resistance(brighter bulb/more current); 1

(c) electrical;
into heat;
and light; 3

(d) name ;
use; 2

11(a)(i) iodine (solution); 1

(ii) starch present inside tubing but not outside ;
starch molecules too big to get through membrane ; 2

(iii) glucose present inside tubing and outside ;
glucose diffuses through membrane ; 2

(b) breaks down/digests starch;
to maltose; 2

12(a)(i) 7; 1

(ii) pH increases;
potassium hydroxide neutralises the acid;
temperature increases;
because the reaction is exothermic / gives out heat (energy); 4

(iii) → potassium chloride; + water; 2

(b) bubbles / effervescence;
reaction produces carbon dioxide; 2