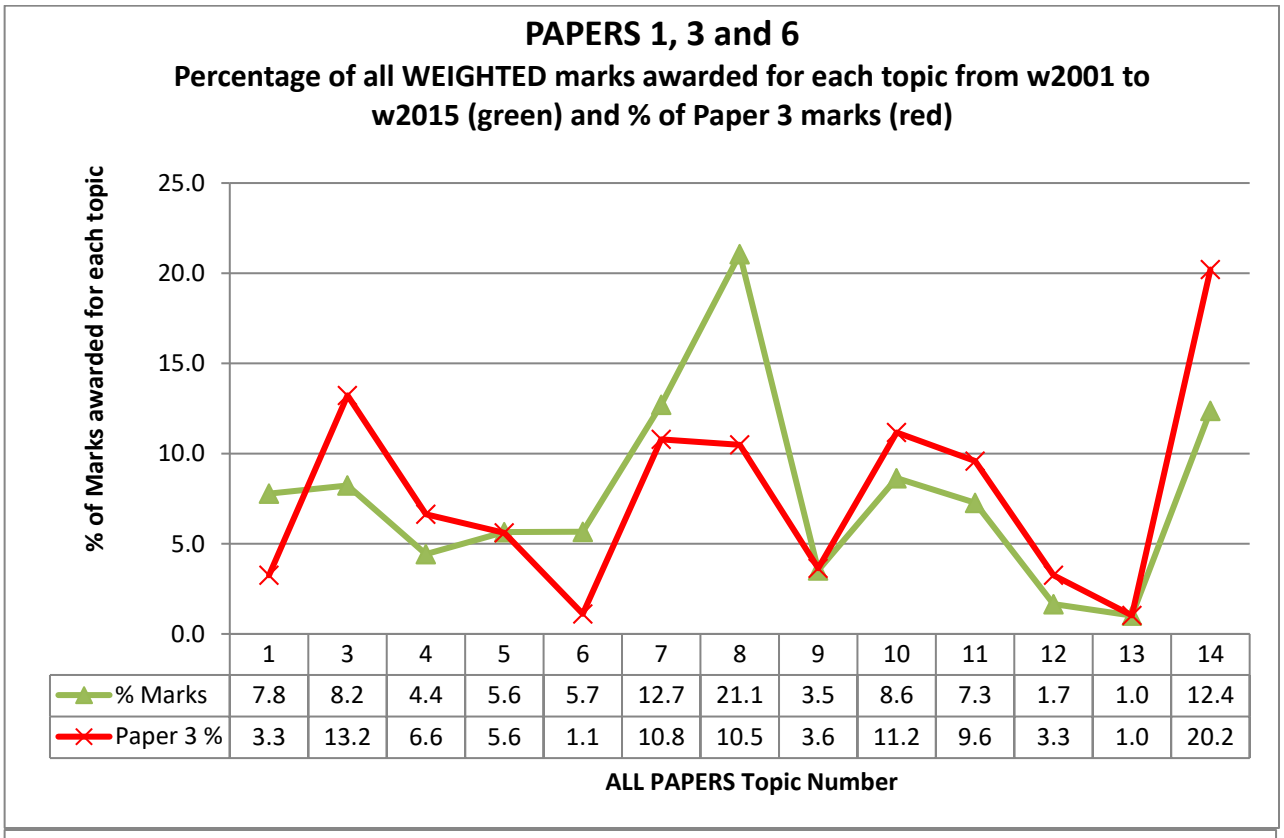
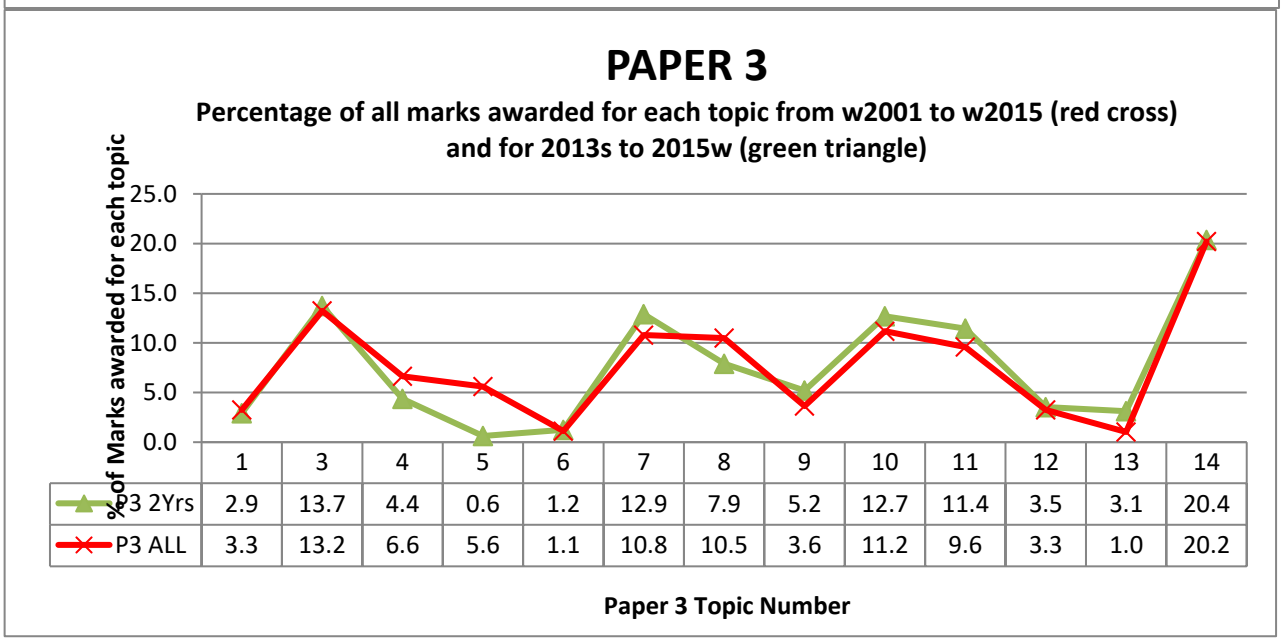
Name

iG Chem 6 EQ P3 15w to 01s 4Teachers NEW 26marks





	Total	Chem 1	Chem 3	Chem 4	Chem 5	Chem 6	Chem 7	Chem 8	Chem 9	Chem 10	Chem 11	Chem 12	Chem 13	Chem 14
Total Marks	2320	74	312	155	81	26	256	246	85	296	231	76	24	474
% of Marks	2336	3.2	13.4	6.6	3.5	1.1	11.0	10.5	3.6	12.7	9.9	3.3	1.0	20.3
# of Questions		19	59	39	18	6	47	54	19	58	48	14	5	80
Average marks per Q		**3.9**	**5.3**	**4.0**	**4.5**	**4.3**	**5.4**	**4.6**	**4.5**	**5.1**	**4.8**	**5.4**	**4.8**	**5.9**

	1st Paper	1st P rank	Last Paper	Last P rank	Total # Papers	Marks/ paper	Theor. All Papers	Actual All Marks	Difference	Weight per paper	Weight per mark
Paper 1	**2002s**	**5**	**2012w**	**26**	**22**	**40**	**880**	**869**	**-11**	**30**	**0.75**
Paper 3	**2001w**	**4**	**2015w**	**32**	**29**	**80**	**2320**	**2336**	**16**	**50**	**0.625**
Paper 6	**2001w**	**4**	**2015w**	**32**	**29**	**60**	**1740**	**1890**	**150**	**20**	**0.625**

Topic	**14**	**3**	**10**	**7**	**8**	**11**	**4**	**5**	**9**	**1**	**12**	**6**	**13**
Rank ALL Papers	2	4	5	3	1	6	9	8	11	7	12	10	13
Rank P3: A* Focus	1	2	3	4	5	6	7	8	9	10	10	12	13
All Syllabus Word Count RANK	1	2	5	3	6	4	9	7	10	8	12	11	13

CIE iGCSE Chemistry Syllabus Details

(syllabus code 0620)

The core material is examined in all three exam papers (papers 1,3 and 6) and is intended to assess understanding up to a grade C level. From 2016, the Supplement material is **examined in all three papers**, however, before 2016 papers 1 and 6 did not contain any Supplement material. If the number of marks that can be awarded above a C grade will remain the same, in practice this means that:

1. Paper 3 will contain fewer Supplement marks, so more core marks so will be easier (if you can answer the Paper 3 questions from before 2016 then you will be fine)
2. Papers 1 and 3 will contain Supplement marks, unlike in all papers before 2016, so will assess material they have not done before, so will be harder because of the questions and as there are no previous questions to practice on, will be harder because of the newness.

Material that is new or changed in 2016 is highlighted with BLACK LINES next to it.

6. Chemical energetics	
6.1 Energetics of a reaction **Core** • Describe the meaning of *exothermic* and *endothermic* reactions • Interpret energy level diagrams showing exothermic and endothermic reactions	**Supplement** • Describe bond breaking as an endothermic process and bond forming as an exothermic process • Draw and label energy level diagrams for exothermic and endothermic reactions using data provided • Calculate the energy of a reaction using bond energies
6.2 Energy transfer **Core** • Describe the release of heat energy by burning fuels • State the use of hydrogen as a fuel • Describe radioactive isotopes, such as ^{235}U, as a source of energy	**Supplement** • Describe the use of hydrogen as a fuel reacting with oxygen to generate electricity in a fuel cell (Details of the construction and operation of a fuel cell are **not** required.)

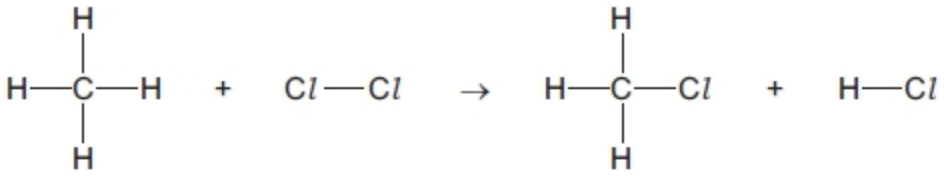
Q# 1/ iGCSE Chemistry/2013/w/Paper 31/ Q7

(b) Bond forming is exothermic, bond breaking is endothermic. Explain the difference between an exothermic reaction and an endothermic reaction.

.....

..... [2]

(c) Use the bond energies to show that the following reaction is exothermic.
Bond energy is the amount of energy (kJ / mol) which must be supplied to break one mole of the bond.



Bond energies in kJ / mol

C*l*–C*l*	+242
C–C*l*	+338
C–H	+412
H–C*l*	+431

bonds broken	energy in kJ / mol
.....	.....
.....	.....
total energy =	.....

bonds formed	energy in kJ / mol
.....	.....
.....	.....
total energy =	.....

.....

..... [4]

Q# 2/ iGCSE Chemistry/2009/s/Paper 31/

7 Hydrogen reacts with the halogens to form hydrogen halides.

(a) Bond energy is the amount of energy, in kJ, that must be supplied (endothermic) to break one mole of a bond.

bond	bond energy in kJ/mol
H–H	+436
Cl–Cl	+242
H–Cl	+431

Use the above data to show that the following reaction is exothermic.

$$H–H + Cl–Cl \rightarrow 2H–Cl$$

.....

.....

.....

.....

..... [3]

Q# 3/ iGCSE Chemistry/2006/s/Paper 3/

6 **(a)** Exothermic reactions produce heat energy.

An important fuel is methane, natural gas. The equation for its combustion is as follows.

$$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$$

(i) In chemical reactions bonds are broken and new bonds are formed.
Using this reaction give an example of

a bond that is broken, ...

a bond that is formed. ..... [2]

(ii) Explain, using the idea of bonds forming and breaking, why this reaction is exothermic, that is it produces heat energy.

.....

..... [2]

(b) Some radioactive isotopes are used as nuclear fuels.

(i) Give the symbol and the nucleon number of an isotope that is used as a nuclear fuel.

..... [2]

Q# 4/ iGCSE Chemistry/2005/w/Paper 3/ Q7

7 In 1909, Haber discovered that nitrogen and hydrogen would react to form ammonia. The yield of ammonia was 8%.

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ the forward reaction is exothermic

catalyst platinum
temperature 600 °C
pressure 200 atm

(c) (i) Complete the following table that describes the bond breaking and forming in the reaction between nitrogen and hydrogen to form ammonia.

bonds	energy change /kJ	exothermic or endothermic
1 mole of N ≡ N broken	+945	.....
3 moles of ..... broken	+1308	.....
6 moles of N – H formed	-2328	.....

[3]

(ii) Explain, using the above data, why the forward reaction is exothermic.

.....

..... [2]

Q# 5/ iGCSE Chemistry/2004/s/Paper 3/

1 It was reported from America that a turbine engine, the size of a button, might replace batteries. The engine would be built from silicon which has suitable properties for this purpose.

(a) (i) Why are batteries a convenient source of energy?

..... [1]

(ii) The engine will run on a small pack of jet fuel. What other chemical is needed to burn this fuel?

..... [1]

Q# 6/ iGCSE Chemistry/2003/s/Paper 3/Q5

(f) The reactions of these metals with oxygen are exothermic.

$$2Ba(s) + O_2(g) \rightarrow 2BaO(s)$$

(i) Give an example of bond forming in this reaction.

.....

(ii) Explain using the idea of bond breaking and forming why this reaction is exothermic.

.....

.....[3]

Mark Scheme

Q# 1/ iGCSE Chemistry/2013/w/Paper 31/ Q7

(b) exothermic reaction gives out energy [1]
endothermic reaction absorbs
takes in energy [1]

(c)

bonds broken	energy
C-H	+412
C*l*-C*l*	+242
total energy	+654 [1]

bonds formed	energy
C-C*l*	–338
H-C*l*	–431
total energy	–769 [1]
energy change	–115 [1]

negative sign indicates exothermic [1]

Q# 2/ iGCSE Chemistry/2009/s/Paper 31/

7 **(a)** (total endothermic change = 436 + 242 = +)678 kJ [1]
(total exothermic change = 2 × 431 = –)862 kJ [1]
accept correct sign/supplied/absorbed for endo etc.
accept correct sign/evolved/produced for exo etc.
change for reaction = –184 kJ [1]

not necessary to calculate –184, just show that exo change > than endo
ecf allowed provided negative
–184 kJ scores all 3 marks

Q# 3/ iGCSE Chemistry/2006/s/Paper 3/

6 (a) (i) Any bond that is broken C-H **or** O=O **[1]**

Bond that is formed C=O **or** O-H **[1]**
Do not insist on double bonds

(ii) More energy is released forming bonds **[1]**
than is used breaking bonds **[1]**
For just - more energy released than used [1]
For - energy is released forming bonds and it is used breaking bonds [1]

(b) (i) U **[1]**
235 **[1]**

Q# 4/ iGCSE Chemistry/2005/w/Paper 3/ Q7

(c)(i) H—H **[1]**
endothermic **[1]**
endothermic **[1]**
exothermic

(ii) More heat given out than taken in **[1]**
–2328 + 945 + 1308 = –75(kJ) **[1]**

OR More heat given out bond forming than taken in bond breaking **[2]**
Must mention bond breaking and forming **[2]**

Q# 5/ iGCSE Chemistry/2004/s/Paper 3/

1. (a) (i) portable **[1]**

(ii) oxygen **or** air **[1]**

Q# 6/ iGCSE Chemistry/2003/s/Paper 3/Q5

(f) **(i)** barium - oxygen or ionic [1]
(ii) bond forming energy released/exothermic [1]
bond breaking energy taken in/endothermic [1]
more energy released [1]