



Rugby  
School

Chemistry

Sixth Form Examination 2015

Mark Scheme

## Sixth Form Specimen Examination Mark Scheme - Chemistry

### Section A

- 1 B
- 2 D
- 3 B
- 4 B
- 5 A
- 6 A
- 7 D
- 8 B
- 9 E
- 10 C
- 11 C
- 12 B
- 13 C
- 14 C
- 15 B
- 16 C
- 17 D
- 18 A
- 19 D
- 20 B

### Section B

#### Q1

- a
- i) (Atom with) same number of protons (1) and different number of neutrons (1)
  - ii)

Isotope	No. of protons	No. of neutrons	No. of electrons
${}^1_1\text{H}$	1	0	1
${}^2_1\text{H}$	1	1	1
${}^3_1\text{H}$	1	2	1

b

- i) Zinc Sulfate (1)
- ii) Lighted splint (squeaky) 'pop' (1)
- iii) Copper – no reaction with acid (1). Sodium - too reactive/ too rigorous reaction (1).
- iv)  $\text{CH}_4 + \text{H}_2\text{O} \rightarrow \text{CO} + 3\text{H}_2$  (1) formulae (1) balanced
- v)  $\text{CO} + \text{H}_2\text{O} \rightarrow \text{CO}_2 + \text{H}_2$  (1) formulae (1) balanced
- vi) CO gains oxygen (1), H<sub>2</sub>O loses oxygen (1)

c

- i) Air
- ii)  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$  (1) formulae (1) balanced
- iii) Speeds up reaction (1), recovered unchanged (1)

Q2

a Highly exothermic/ produces lots of heat (1). Easy to ignite/ stays alight once ignited (1)

b Carbon or carbon monoxide

c i)  $32.5 - 19 = 13.5$

ii) 5670 J

iii) 0.0075

iv) 756 kJ/mol (-756 scores the mark)

d

i) 5604 kJ

ii) 6668 kJ

iii) (-) 1064 kJ/ two mole Allow half – 532 kJ/mole (bonus mark for mole)

iv) More energy released on the bond forming than needed to break the bonds.

e

Part c answer is greater/ more negative per mole than part d.

Part d uses average values for bond energies not the specific ones used.

f

- i) Label axis/units (1) points (1), line of best fit (1)
- ii) Increasing size (1). Increasing energy released (1).