

The Periodic Table

Mark Scheme 2

| | |
|-------------------|-------------------------|
| Level | IGCSE(9-1) |
| Subject | Chemistry |
| Exam Board | Edexcel IGCSE |
| Module | Single Award (Paper 2C) |
| Topic | Principles of Chemistry |
| Sub-Topic | The Periodic Table |
| Booklet | Mark Scheme 2 |

Time Allowed: 54 minutes

Score: /45

Percentage: /100

Grade Boundaries:

| | | | | | | | | |
|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| >90% | 80% | 70% | 60% | 50% | 40% | 30% | 20% | 10% |

| Question number | Answer | Notes | Marks |
|-----------------|--|--------------|-------|
| 1 (a) | gallium / Ga | | 1 |
| (b) | sodium / magnesium / aluminium / Na / Mg / Al | | 1 |
| (c) | fluorine / F / F ₂ | | 1 |
| (d) | nitrogen / N / N ₂ | | 1 |
| (e) | neon / argon / krypton / xenon / radon / Ne / Ar / Kr / Xe / Rn | | 1 |
| | | Total | 5 |

| Question number | Answer | Accept | Reject | Marks |
|-----------------|------------------------------|--------|--------------|----------|
| 2 (a) (i) | B | | | 1 |
| (ii) | A | | | 1 |
| (iii) | E | | | 1 |
| (iv) | C | | | 1 |
| (b) (i) | Atomic number | | | 1 |
| (ii) | Electrons in the outer shell | | | 1 |
| | | | Total | 6 |

| Question number | | | Answer | Notes | Marks |
|-----------------|---|-----|--|--|-------|
| 3 | a | i | C (neutrons and protons) | | 1 |
| | | ii | A (6) | | 1 |
| | | iii | D (11) | | 1 |
| | b | | 4 | | 1 |
| | c | i | P AND T | | 1 |
| | | ii | S | | 1 |
| | d | | (one) more electron than protons OR (one) fewer proton than electrons | Accept more electrons than protons Accept fewer protons than electrons Accept 2 electrons and 1 proton Ignore references to electron gained | 1 |
| | | | | Total 7 marks | |

| Question number | Answer | Notes | Marks | | | | | | |
|---------------------|---|---|-------|--------------------|---|---------------------|---|---|---|
| 4 a | <table border="1"> <tr> <td>Number of protons</td> <td>6</td> </tr> <tr> <td>Number of neutrons</td> <td>6</td> </tr> <tr> <td>Number of electrons</td> <td>6</td> </tr> </table> | Number of protons | 6 | Number of neutrons | 6 | Number of electrons | 6 | M1 protons and electrons correct M2 neutrons correct | 2 |
| Number of protons | 6 | | | | | | | | |
| Number of neutrons | 6 | | | | | | | | |
| Number of electrons | 6 | | | | | | | | |
| b i | 3 | | 1 | | | | | | |
| ii | M1 33 M2 Z is two places/columns/groups/positions after X OR Z is in Group 5 and X is in Group 3 | Accept has 2 more protons (than X) Ignore references to atomic number increasing by 2 Ignore number of protons increases with group number Ignore references to elements being arranged according to number of protons $31 + 5 - 3 = 33$ scores 2 marks | 2 | | | | | | |
| iii | 2.8 / 2,8 / 2 and 8 separated by other mark eg : or / or) or space | Do not accept 28 (ie no space) Accept correct sp notation | 1 | | | | | | |

| Question number | Answer | Notes | Marks |
|-----------------|---|---|-------|
| 4 b iv | <p>M1 (similarity) one electron/same number of electrons in outer shell</p> <p>M2 (difference) different number of (electron) shells / T has (one) more (electron) shell / J has (one) less (electron) shell /J has 2 shells and T has 3 /J is 2.1 and T is 2.8.1</p> | <p>Accept rings and energy levels in place of shells in M1 and M2</p> <p>Accept valence electrons in place of outer shell electrons Accept configuration ends in 1 Accept same outer shell Accept 2 electrons in first/inner shell</p> <p>Accept going down the column there is 1 more shell Ignore T has an extra number Ignore T has 8 more electrons</p> | 2 |
| | | | |
| | | Total 8 marks | |

| Question number | | | Answer | Notes | Marks |
|-----------------|---|-----|---|--|--------|
| 5 | a | i | period | Ignore number of period | 1 |
| | | ii | Any two of sodium / magnesium / aluminium | Ignore symbols Na, Mg, Al | 1 |
| | | iii | Ar / argon (it does) not easily gain/lose electrons OR has 8 electrons in outer shell | If name and symbol both given, then both must be correct Accept (it has) a full outer shell Ignore 2.8.8 Ignore inert/noble gas Ignore references to Group number Ignore stable M2 DEP on M1 | 2 |
| | b | | one electron/same number of electrons AND reference to outer/valence (shell/energy level/orbit) | Reject incorrect number of electrons Ignore similar electronic configurations Ignore actual electronic configurations | 1 |
| | c | i | C / carbon | | 1 |
| | | ii | S / sulfur | | 1 |
| | d | | 8 for both protons AND electrons 10 neutrons | Accept words Accept words | 1 1 |

(Total for Question 5 = 9 marks)

| Question number | | Answer | Notes | Marks |
|-----------------|-----|--|---|--------------------------------|
| 6 | (a) | does not easily lose / gain electrons | Accept has a complete/full outer shell/octet (of electrons) Accept has 8 electrons in outer shell Ignore references to being stable / inert / a noble gas | 1 |
| | (b) | B (2.8.18.8) | | 1 |
| | (c) | (i) M1 for idea of electron transfer / loss and gain of electron(s) M2 for direction of transfer M3 for number of electrons transferred (ii) Ca ²⁺ | 0/3 for electron sharing Ignore covalent eg calcium loses, chlorine gains electrons eg calcium loses 2, (each) chlorine gains 1 Penalise use of chloride in place of chlorine once only All marks may be scored from a correctly labelled diagram Accept Ca ⁺² / Ca ⁺⁺ Reject all other ions Penalise incorrect use of lower and upper case letters and position of charge If equation written containing calcium ion formula, the ion must be identified in some way, such as circling or underlining | 3 1 |
| | | (iii) A calcium (and) calcium | | 1 |

| Question number | | Answer | Notes | Marks |
|-----------------|-----|---|--|-----------|
| 3 | (d) | <p>M1 (step 1) dip a platinum wire into some concentrated hydrochloric acid</p> <p>M2 (step 3) place the wire and sample into non-luminous Bunsen flame</p> | <p>Accept complete statements or changes</p> <p>M1 Do not penalise references to dilute instead of concentrated Accept hydrochloric acid / HCl</p> <p>M2 Accept blue flame / roaring flame Ignore references to hot / hotter / hottest flame</p> | 2 |
| | (e) | B (lilac) | | 1 |
| | | | Total for Question 6 | 10 |