BRADFORD COLLEGE

**CHEMISTRY TEST ATOMIC STRUCTURE & Periodic Table 2014**

STUDENT NAME :\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total Marks: /40

1. There are two elements X and Y (X and Y are not the real symbols). X is in the same group as lead, but it has fewer protons than sodium. Y is an alkali metal and it is in period 4.
	1. Write down the real symbol of element X. [1]
	2. Classify X as metal, non-metal, metalloid or noble gas. [1]
	3. Write down the electronic configuration for Y. [1]
	4. Write down the symbol of the element that has a larger mass number. [1]
2. Below is the blank periodic table, label the following : [6]



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* 1. the element with 3 valence electrons and 4 shells
	2. the noble gas who is smaller than potassium but bigger than chlorine
	3. the element with the electron configuration: .
	4. the smallest element with 0 electronegativity
	5. the smallest element
	6. the element in group 15 and period 5
1. Atomic radius is a measure of atomic size.
	1. Use a diagram to define atomic radius by using hydrogen gas as an example. [2]

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* 1. Consider **sulphur, argon, calcium**. Rank them in terms of increasing size. [1]

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* 1. For part b, explain your reasons. [3]

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* 1. Consider **S2-, Ar, Ca2+**. Write down the electronic configurations for them. [1]

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* 1. Explain what **iso-electronic** means. [1]

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* 1. Rank **S2-, Ar, Ca2+** in terms of increasing size. Explain your reason. [4]

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1. Electronegativity
	1. Oxygen difluoride has a molecular formula of **F2O** (shown below). Which atom has a higher electronegativity value, **O** or **F**? Give reasons. (hint: they are in the same period) [3]

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* 1. Sulphur dioxide has a molecular formula **SO2**. Which atom has a higher eletronegativity value, **S** or **O**? Give reasons. [4]

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1. Groups 13-14 are where we can find transition metals on the periodic table.
	1. Apart from transition metals, there is a group containing all metals. What is the group number? [1]

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* 1. How many valence electrons do elements in that group (part a) have? [1]

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* 1. What is the state which all these elements are likely to be in at room temperature? [1]

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1. In group 11, there is an element which is commonly used to make wires and coins.
	1. What is the symbol of that element [1]

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* 1. People use the malleability of metals to make coins. What property is described when people make wires from metal? [1]

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1. Non-metals usually have low melting points and they cannot conduct electricity, but there are exceptions.
	1. Give one example of non-metals that has a high melting point. [1]

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* 1. Give one example of non-metals that can conduct electricity. [1]

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1. Complete the table below: [4]

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| Element  | Block | Period Number | Group Number | Metal/Non-metal/Noble gas |
| Te | P |  |  | Metalloid |
|  |  | 5 | 13 |  |
| Rb | S |  |  |  |

PERIODIC TABLE OF ELEMENTS

↓PERIOD

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|  | 1 | 2 |  |  |  |  |  |  |  |  |  |  | 13 | 14 | 15 | 16 | 17 | 18 |
| 1 | 1 H Hydrogen1.008 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2HeHelium4.003 |
| 2 | 3 Li Lithium6.941 | 4 BeBeryllium9.012 |  |  |  | ← GROUP → |  |  |  |  |  | 5BBoron10.811 | 6CCarbon12.011 | 7NNitrogen14.007 | 8OOxygen15.999 | 9FFluorine18.998 | 10NeNeon20.180 |
| 3 | 11 NaSodium22.990 | 12MgMagnesium24.305 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13AlAluminium26.982 | 14SiSilicon28.086 | 15PPhosphorus30.974 | 16SSulphur32.065 | 17ClChlorine35.453 | 18ArArgon39.948 |
| 4 | 19 KPotassium39.098 | 20 CaCalcium40.078 | 21 ScScandium44.956 | 22 TiTitanium47.867 | 23 VVanadium50.942 | 24 CrChromium51.996 | 25MnManganese54.938 | 26 FeIron55.845 | 27CoCobalt58.933 | 28 NiNickel58.693 | 29CuCopper63.546 | 30ZnZinc65.380 | 31GaGallium69.723 | 32GeGermanium72.640 | 33AsArsenic74.922 | 34SeSelenium78.960 | 35BrBromine79.904 | 36KrKrypton83.798 |
| 5 | 37 RbRubidium85.468 | 38 SrStrontium87.620 | 39 YYtrium88.906 | 40ZrZirconium91.224 | 41 NbNiobium92.906 | 42MoMolybdenum95.940 | 43TcTechnetium98.91 | 44RuRuthenium101.070 | 45RhRhodium102.906 | 46PdPalladium106.42 | 47AgSilver107.870 | 48CdCadmium112.411 | 49InIndium114.428 | 50SnTin118.710 | 51SbAntimony121.760 | 52TeTellurium127.600 | 53IIodine126.904 | 54XeXenon131.293 |
| 6 | 55 CsCaesium132.905 | 56 BaBarium137.327 | 71LuLutetium174.967 | 72HfHafnium178.490 | 73TaTantalum180.948 | 74WTungsten183.840 | 75ReRhenium186.207 | 76OsOsmium190.230 | 77IrIridium192.217 | 78PtPlatinum195.064 | 79AuGold196.967 | 80HgMercury200.590 | 81TlThallium204.383 | 82PbLead207.200 | 83BiBismuth208.980 | 84PoPolonium(209) | 85AtAstatine(210) | 86RnRadon(222) |
| 7 | 87 FrFrancium(223) | 88RaRadium226.030 | 103LrLawrencium262.100 | 104RfRutherfordium(267) | 105DbDubnium(268) | 106SgSeaborgium(271) | 107BhBohrium(272) | 108 HsHassium(269) | 109MtMeitnerium(268) | 110DsDarmstadium(271) | 111RgRoentgenium(280) | 112UubUnunbium(285) | 113UutUnuntrium(284) | 114UuqUnunquadium(289) | 115UupUnunpentium(288) | 116UuhUnunhexium(293) | 117UusUnunseptium | 118UuoUnunoctium(294) |
|  | KEY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **57****La****Lanthanum****133.905** | **Atomic** **Number****Symbol****Name** **Relative** **atomic mass** | 57 LaLanthanum138.905 | 58CeCerium140.116 | 59PrPraseodymium140.908 | 60NdNeodymium144.242 | 61PmPromethium(145) | 62SmSamarium150.360 | 63EuEuropium151.964 | 64GdGadolinium157.250 | 65TbTerbium158.925 | 66DyDysprosium162.500 | 67HoHolmium164.930 | 68ErErbium167.259 | 69TmThulium168.934 | 70YbYtterbium173.054 |  |  |
|  | **metalloids** |  | 89 AcActinium(227) | 90ThThorium232.038 | 91PaProtactinium231.036 | 92UUranium238.029 | 93NpNeptunium(237) | 94PuPlutonium(244) | 95AmAmericium(2443) | 96CmCurium(247) | 97BkBerkelium(247) | 98CfCalifornium(251) | 99EsEinsteinium(252) | 100FmFermium(257) | 101MdMendelevium(258) | 102NoNobelium(259) |  |  |