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| **Entrance Examination****May 2021** |
| **CHEMISTRY**Time allowed: 1.5 hours (90 minutes)**Answer TWO questions**You may use a calculator and a periodic table |

1. This question is associated with but-2-ene.
	1. Describe and provide a diagram showing the different types of bonding present in the molecule.
	2. Give the shape and bond angles for each carbon in but-2-ene.
	3. With examples, explain why some alkenes show geometrical isomerism.
2. You have a 25 cm3 (mL) of 0.20 M solution of sodium thiosulfate (Na2S2O3). This was titrated with 23.0 cm3 of a solution of iodine (I2). The two half-reactions are:

2 S2O32-(aq) 🡪 S4O62-(aq) + 2 e-

I2(aq) + 2 e- 🡪 2 I-(aq)

1. Give the ionic redox equation for the reaction of the thiosulfate ion (S2O32-) and I2.
2. Work out the concentration of the iodine solution in molar (M) units.
3. What mass of iodine had been dissolved in the 23.0 cm3 of solution?
4. This question concerns bonding.
	1. Draw a diagram to show bonding in potassium chloride.
	2. Draw a diagram to show bonding in water.
	3. Describe the characteristics of these compounds and relate them to the bond types.
5. With the use of diagrams, describe bonding within an amino-acid and outline the bonding that occurs between amino-acids to produce a folded, functional protein.

P a g e 1 | 1

Period

1

2

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3

4

(1091-01A)

5

6

7

**THE PERIODIC TABLE**

**1 2 Group 3 4 5 6 7 0**

s Block

Key

relative atomic

4.00

He

Helium

2

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|  |
| 1.01HHydrogen1 |

p Block

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| *A*r |  |  |
| Symbol NameZ |  |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6.94LiLithium3 | 9.01BeBeryllium 4 | massatomic numberd Block  | 10.8BBoron5 | 12.0CCarbon6 | 14.0NNitrogen7 | 16.0OOxygen8 | 19.0FFluorine9 | 20.2NeNeon10 |
| 23.0NaSodium11 | 24.3MgMagnesium12 | 27.0AlAluminium13 | 28.1SiSilicon14 | 31.0PPhosphorus15 | 32.1SSulfur16 | 35.5ClChlorine17 | 40.0ArArgon18 |
| 39.1KPotassium19 | 40.1CaCalcium20 | 45.0ScScandium21 | 47.9TiTitanium22 | 50.9VVanadium23 | 52.0CrChromium24 | 54.9MnManganese25 | 55.8FeIron26 | 58.9CoCobalt27 | 58.7NiNickel28 | 63.5CuCopper29 | 65.4ZnZinc30 | 69.7GaGallium31 | 72.6GeGermanium32 | 74.9AsArsenic33 | 79.0SeSelenium34 | 79.9BrBromine35 | 83.8KrKrypton36 |
| 85.5RbRubidium37 | 87.6SrStrontium38 | 88.9YYttrium39 | 91.2ZrZirconium40 | 92.9NbNiobium41 | 95.9MoMolybdenum42 | 98.9TcTechnetium43 | 101RuRuthenium44 | 103RhRhodium45 | 106PdPalladium46 | 108AgSilver47 | 112CdCadmium48 | 115InIndium49 | 119SnTin50 | 122SbAntimony51 | 128TeTellurium52 | 127IIodine53 | 131XeXenon54 |
| 133CsCaesium55 | 137BaBarium56 | 139 ‣ LaLanthanum57 | 179HfHafnium72 | 181TaTantalum73 | 184WTungsten74 | 186ReRhenium75 | 190OsOsmium76 | 192IrIridium77 | 195PtPlatinum78 | 197AuGold79 | 201HgMercury80 | 204TlThallium81 | 207PbLead82 | 209BiBismuth83 | (210)PoPolonium84 | (210)AtAstatine85 | (222)RnRadon86 |
| (223)FrFrancium87 | (226)RaRadium88 | (227)Ac ‣‣Actinium89 | f Block |

* Lanthanoid elements

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| 140CeCerium 58 | 141PrPraseodymium59 | 144NdNeodymium60 | (147)PmPromethium61 | 150SmSamarium62 | (153)EuEuropium63 | 157GdGadolinium64 | 159TbTerbium 65 | 163DyDysprosium66 | 165HoHolmium 67 | 167ErErbium 68 | 169TmThulium 69 | 173YbYtterbium 70 | 175LuLutetium 71 |

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elements

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| 232ThThorium 90 | (231)PaProtactinium91 | 238UUranium 92 | (237)NpNeptunium93 | (242)PuPlutonium94 | (243)AmAmericium95 | (247)CmCurium 96 | (245)BkBerkelium 97 | (251)CfCalifornium98 | (254)EsEinsteinium99 | (253)FmFermium 100 | (256)MdMendelevium101 | (254)NoNobelium 102 | (257)LrLawrencium103 |

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