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## Answers to Topic 1 Exercises

#### **Topic 1 Exercise 1**

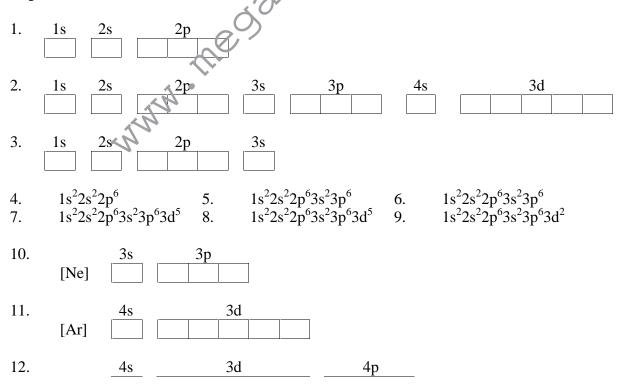
1.	1p, 0n, 1e		2.	8p, 9n, 8e	3.	2p, 2n,	0e
4.	54p, 78n, 54e		5.	13p, 14n, 10e	6.	92p, 14	3n, 92e
7.	1p, 0n, 0e		8.	21p, 24n, 18e	9.	17p, 20n, 18e	
10.	6p, 8n, 6e						
11.	${}^{39}\text{K}^+$	12.	${}^{16}\text{O}^{2}$	13. ${}^{3}H$		14.	$^{208}$ Pb $^{2+}$
15.	$^{127}$ I <sup>-</sup>						

### **Topic 1 Exercise 2**

1.	28.29	2.	107.96	3.	10.85	4.	69.80
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- 5. 91.4 (approx)
- 6. two isotopes approximately equally abundant
- 7. 22 neutrons. Other isotopes are lighter, and not very abundant
- 8. a) high voltage supply removed electrons
  - b) electric field attracts ions towards it until all have the same kinetic energy
  - c) ion drift heavier particles move more slowly than lighter particles with the same energy
  - d) detector ions land on it and create current proportional to abundance
- 9. 72 peak with largest m/z ratio must be molecular ion peak

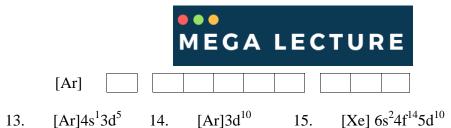
# **Topic 1 Exercise 3**



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## **Topic 1 Exercise 4**

- 1. Number of protons increases, shielding stays the same, so attraction of outer electrons to nucleus increases
- 2. Outermost electron in B is 2p, outermost electron in Be is 2s, 2p electron in B better shielded than 2s electron in Be, so it is less attracted to nucleus
- 3. 2p electron is paired in O but unpaired in N, so in O there is more repulsion in the orbital which makes the electron easier to remove
- 4. More shells, so more shielding, so attraction of outer electrons to the nucleus decreases
- 5. No shielding in 1<sup>st</sup> period so electrons closely held than in other periods, and more protons than hydrogen so greater attraction to nucleus
- 6. Less electrons, so less electron repulsion
- 7. 1<sup>st</sup> electron removed from 3s, second electron removed from 2p so much less shielding
- 8. Number of protons increases, shielding stays the same, so attraction of outer electrons to nucleus increases and they move closer
- 9. More shells, so more shielding, so attraction of outer electrons to the nucleus decreases and they are pushed further away
- 10. Less electrons, so less repulsion, so electrons can get closer to the nucleus
- 11. More electrons, so more repulsion, so electrons are pushed further away

