

# KNOWLEDGE AREA: MATTER AND MATERIALS

## Answers

### Multiple-choice questions

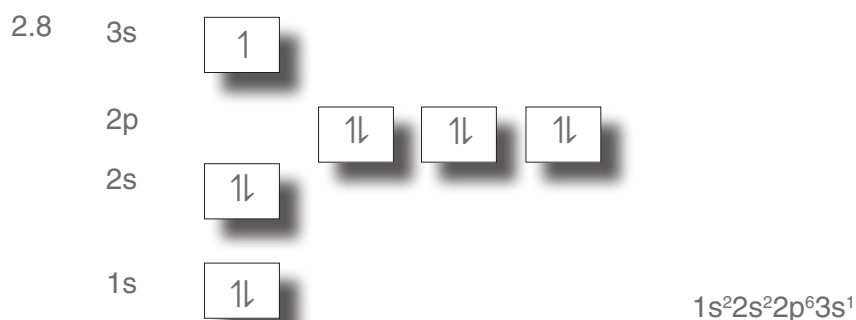
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|-------|-------|-------|-------|-------|
| 1. B  | 2. D  | 3. A  | 4. B  | 5. C  |
| 6. C  | 7. B  | 8. D  | 9. B  | 10. A |
| 11. C | 12. B | 13. D | 14. A | 15. B |
| 16. B | 17. A | 18. B | 19. C | 20. D |
| 21. B | 22. C | 23. B | 24. B | 25. B |
| 26. D | 27. B | 28. D | 29. C | 30. B |
| 31. B | 32. C | 33. A | 34. C | 35. A |
| 36. D | 37. D | 38. B | 39. A | 40. D |
| 41. B | 42. D | 43. C |       |       |

### Contextual questions

- 1.1  $\text{SO}_2$
- 1.2 Covalent bonds (polar)
- 1.3  $1s^2 2s^2 2p^6 3s^2 3p^4$
- 1.4 It dissolves in the moisture of the mucous membranes and lungs. It then forms acid that burns.
- 1.5 Homogeneous mixture:  
The iron and sulfur are clearly distinguishable, it is in the same state and the composition is not constant.
- 1.6 With a magnet:  
The iron will be attracted by the magnet and can be removed that way.
- 1.7 Iron sulphide; FeS
- 1.8 Ionic bonds
- 1.9 Metal bond
- 1.10 A grid of positive nuclei with a sea of delocalised electrons in between. It occurs in pure metals.
- 1.11 Shiny surface  
Malleable  
Extendible  
Good conductors of heat and electricity  
High melting and boiling points



- 2.1 The element consists of molecules that consist of two identical atoms.
- 2.2  $1s^2 2s^2 2p^6 3s^2 3p^5$
- 2.3 Good ventilation  
Avoid contact with eyes and skin.  
Do not inhale.
- 2.4 Sodium chloride, NaCl
- 2.5 Ionic bonds: it is a bond between a metal and a non-metal.
- 2.6 The first electron to be removed from sodium is alone in the 3s orbital.  
If it is removed, all the other orbitals are filled like the noble gas electron structure.  
Sodium will therefore give that first electron away easily and it requires little energy.  
The first electron to be removed from chlorine is one in the 3p orbital and it will not cause more stability.  
Chlorine would rather try to gain an electron to obtain the noble gas electron structure of argon.
- 2.7 The second electron to be removed from sodium will have to be one of a pair in the filled 2p orbitals. The electron structure will be made unstable again.  
Sodium therefore will not easily give away a second electron and it requires a lot of energy to do it.



- 3.1.1  $Pb(NO_3)_2$
- 3.1.2  $PbSO_4$
- 3.1.3  $PbI_2$
- 3.1.4 PbS
- 3.2 Possible answers:
- Lead stops all radioactive rays and is used for protection against radio activity.
  - Lead can be used as sinkers when fishing.  
(It is not the lead in pencils.)
  - Lead weights are used to balance the tyres of vehicles.
  - Lead is used in car batteries as electrodes