Support Worksheet – Topic 6, Worksheet 1

1 In a very simple model of the atom electrons orbit a central massive, positive nucleus. State the name of the force responsible for keeping the electrons in orbit. [1]

2 **a** Describe the Rutherford–Geiger–Marsden experiment and state which feature of this experiment led to the prediction of the existence of the atomic nucleus. [3]

b State one limitation of the Rutherford model of the atom. [1]

3 **a** State what is meant by an emission spectrum. [2]

b Outline how the existence of atomic spectra is evidence for atomic energy levels. [2]

4 State what is meant by an absorption spectrum. [2]

5 Determine the number of neutrons in the nucleus ${}^{16}_{7}\mathrm{N}$. [1]

6 State what is meant by the term **isotope**. [2]

7 One of the dominant forces acting within the nucleus is the electrostatic force. State the name(s) of the particle(s) in the nucleus this force acts on. [1]

8 Another dominant force in the nucleus is the strong nuclear force. State the name(s) of the particle(s) in the nucleus this force acts on. [1]

9 Describe what is meant by **radioactive decay**. [2]

10 Alpha, beta and gamma particles are said to be **ionising**. State what this means. [1]

11 The nucleus ${}^{218}_{84}\mathrm{Po}$ decays by alpha decay into Pb. Write down the decay equation. [2]

12 The nucleus ${}^{60}_{27}\mathrm{Co}$ decays by beta decay into Ni. Write down the decay equation. [2]

13 The nucleus ${}^{24}_{12}\mathrm{Mg}$ decays by gamma decay. Write down the decay equation. [1]

14 Radioactive decay is said to be random and spontaneous. Describe what this means. [2]

15 A quantity of 120 mg of a radioactive isotope decays with a half-life of 5.0 minutes. Calculate the amount of radioactive material that is left behind after 15 minutes. [2]