Radioactivity Answers – NAT 5

1) X – Proton, Y – Electron and Z – Neutron.

2) a) The gain or loss of electrons from an atom.

b) i) Diagram 2.

ii) Fewer electrons than protons in the ionised atom.

c) i) Alpha particles.

ii) In the treatment of cancer **or** sterilising instruments.

3) a) Gamma Rays.

b) Alpha particles.

c) Geiger- Muller Tube.

4) a) Turns the photographic film black or dark or fogs.

b) To monitor the Radiographers exposure to radiation.

5) a) Aluminium would also stop alpha particles.

b) Point away from people, shielding, short times, increased distance.

Protective clothing and point away from the body also. (**Any two**)

6) a) A helium nucleus.

b) Two protons and two neutrons.

c) Positive charge.

7) a) A fast moving electron.

b) Negative charge.

8) a) High frequency **or** high energy electromagnetic radiation.

b) Zero mass and zero charge.

9) 7.5Bq.

10) 16 seconds.

11) a) 13 hours.

b) It is a beta emitter which is absorbed within the body.

c) A larger dose is required to kill the cancerous cells.

d) Sieverts.

12) a) The radiation detector would detect a higher level of radiation.

b) i) Time taken for the **activity** of a radioactive source to be reduced by half.

ii) Source Y.

Gamma can penetrate through the metal aircraft and it has a long half - life.

c) Point away from people, shielding, short times, increased distance.

Protective clothing and point away from the body also. (Any **one**)

d) 2MBq.

13) a) 6 hours.

b) 10kBq.

c) Window allows different radiations to pass through.

Film becomes darkened/blackened/fogged.

14) 0.3Gy.

15) a) 0.2×10^{-6}Gy.

b) 2×10^{-6}Sv.

c) 62.5MBq.

16) a) 9×10^{-4}J

b) Lead absorbs X – Rays **or** lead shields the leg from the X-Rays.

c) Type of radiation **or** type of tissue.

17) a) Nuclear Fission. (Spelling is important here!!!)

b) Neutrons.

18) Nuclear waste stays highly radioactive for a long period of time.

19) Produces more energy per kilogram of fuel **or**

does not produce greenhouse gases/acidic gases.

20) a) Nuclear Fusion. (Spelling is important here!!!)

b) Energy is released.