

Radiation : Test-50

- 1) What is radiation?
- 2) How are electromagnetic waves formed?
- 3)a) Name three types of electromagnetic waves that are used in your home.
b) Which has the longer wavelength; x-rays or gamma rays?
c) Which has a lower energy; radio waves or visible light?
d) Which type has a wavelength of about 10^{-4} meters?
e) Which type of wave is used to get a suntan?
f) What is the speed (in m/s) of an electromagnetic wave?
- 4)a) What is an isotope?
b) What is radioactivity?
c) What is the half-life of a radioactive isotope?
d) A radioactive isotope is ${}_{78}^{194}\text{Pt}$
 - i) Name the element. _____
 - ii) The number of protons is _____
 - iii) The number of neutrons is _____
 - iv) The isotope is an alpha emitter. What isotope does it change into? _____ .

e) Iodine-131 has a half-life of 8 days. If we start with 6.4 grams of the isotope, give the number of grams that will be left at the following times:

i) 8 days ii) 16 days iii) 40 days

f) Give the charge and mass of an alpha particle.

g) How is radioactivity detected?

h) Give three uses for radioactive isotopes.

i) What is D.N.A.? Explain how radiation can affect D.N.A.

5)a) What is fission?

b) What is fusion?

c) Why is fission so important to us?

Answers: 1) It is the transfer of energy., 2) They are created by vibrating charges., 3)a) visible light, microwaves, radio waves, infrared (used in a TV remote control), ultraviolet (tanning lamp), (high energy waves are not used), b) x-rays, c) radio, d) infrared, e) ultraviolet (the sun's rays include visible light and ultraviolet. It is UV that causes a tan or a burn), f) 3.0×10^8 m/s, 4)a) Isotopes are atoms with differing numbers of neutrons., b) It is the emission of radiation by unstable nuclei., c) It is the time it takes half of the radioactive atoms in a sample to decay., d)i) platinum, ii) 78, iii) 116, iv) osmium-190, e)i) 3.2, ii) 1.6, iii) 0.20, f) charge = +2, mass = 4 A.M.U., g) Geiger counter, h) tracers, cancer therapy, smoke detectors, radioactive dating, and many others..., i) D.N.A. is a molecule that controls cells. It is like a computer program., Radiation can change the program. This may cause a mutation., 5)a) It is the breaking apart of a large nuclei that releases a large amount of energy., b) It is the joining of two nuclei to form a new nuclei which releases a large amount of energy., c) When it is controlled, the fission process releases a lot of energy which can be converted to heat, which can than be used to power a generator and produce electricity.