Physics - ICS Part 2 Physics Chapter 21 Short Questions Preparation

Q1. What is the function of control rods in nuclear reactor?

Ans 1: Controls rods made of Cadmium or Boron are used for the control of number of neutrons,so that of all the neutrons produced in fission ,only one neutrons produces further fission reaction.
In case of emergency or for repair purpose control rods are used to stop the chain reaction and shut down the reactor.

Q2. Differentiate between controlled and uncontrolled reaction.

Ans 1: To maintain a sustained controlled nuclear reaction,for every 2 or 3 neutrons released ,only one must be allowed to strike another uranium nucleus.it is called controlled chain reaction.

Ans 2: If more than one neutron produces further fission then it will grow uncontrolled and called uncontrolled chain reaction.

Q3. What are isotopes?What do they have common and what are their difference.

Ans 1: Isotopes are such nuclei of an element that have the same charge number Z but have different mass number A.It means,in the nucleus the number of protons is the same but the number of neutrons is different.

Q4. How energy released when 1 amu converted into energy?

Ans 1: 1 amu= 1.66 $x10^{-27}$kg

the energy of 1 amu is 1 amu =1.494 $x10^{-10}$J
1 amu= 931 MeV

Q5. Describe the principle of operation of solid state detector.

Ans 1: The principle of operation of solid state detector is based upon the production of electron-hole pair to cause a pulse of current.

Q6. Write names of hydrogen isotopes.

Ans 1: Three isotopes of hydrogen are:

1. Protium
2. Deuterium
3. Tritium

Q7. Define nuclear fission.

Ans 1: Such a reaction in which a heavy nucleus like that of uranium splits up into two nuclei of roughly equal size along with the emission of energy is called fission reaction.

Q8. If nucleus has a life of one year,does this mean that it will be completely decayed after two years?

Ans 1: No it will not decay completely after two years.
Numbers of atom at initial stage $=N_o$
number of atoms decayed after first year $=1/2N_o$

Q9. Why are heavy nuclei unstable?

Ans 1: Heavy nuclei are unstable because their binding energy per nucleon is less than lighter nuclei.So less energy is required to break heavy nuclei and they become unstable.

Q10. Discuss the advantage and disadvantage of nuclear power compare to the use of fossil fuel generated power.

Ans 1: Advantage and disadvantage of nuclear power are given below compared to the use of fossil generated power.
Advantage:

1. Much more energy is produced.
2. Produces no environmental pollution.
3. Electricity produced in this way is far cheaper than fossil fuel generated power.

Disadvantage :

1. Uranium mining is more dangerous than coal mining.
2. Nuclear waster is very injurous and harmful to living things.
3. Nuclear waste can not be transported through area of population whereas fossil fuel can be.
