National Institute of Open Schooling
Senior Secondary
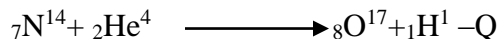**Lesson 27 – Fission and Fusion**
WORKSHEET – 27

Q1. Everyone knows that radioactivity can be dangerous to health. The cell of the body affected by exposure of radioactivity .what is the safety measure for nuclear radiation.

Q2. Name nuclear reactors are used to generate electric power,can produce radioactive isotopes Name the example of isotopes produce in nuclear reactor which are used in medical science, agriculture and industry.

Q3. A nuclear reactor is a device in which controlled chain reaction takes place. The ability of neutrons to be captured by U235 nuclei depend upon the speed of neutron. Slow neutrons are helpful to cause fission than the fast neutron. A substance known as moderator is used to slow the fission neutron. Why lighter elements are better moderators for nuclear reactor than heavier elements.

Q4. What is the power output of a $_{92}U^{235}$ reactor if it takes 30 days to end 3 kg fuel? Given that energy emitted in per fission is 150 MeV and N= $6.023 * 10^{26}$ (kilomole)$^{-1}$

Q5. Energy is conserved in aa nuclear reaction. What is meaning of positive Q value of nuclear reaction and negative value of nuclear reaction? Consider the following reaction
$$_7N^{14} + {}_2He^4 \longrightarrow {}_8O^{17} + {}_1H^1 - Q$$
m($_7N^{14}$) =14.003074 u ,m($_2He^4$)= 4.002604u,m($_8O^{17}$)=16.999133u, m($_1H^1$)=1.007825 u
Calculate the value of Q.

Q6. A nuclear reaction involves the bombarding of a target nucleus by sone incident particle and produce a product nucleus and out particle. The target nucleus is written initial position ofbracket and final product nucleus at final.inside the bracket,the incident and outgoing particle together, p,d,n,α has their usual meaning. Write a nuclear reaction for
  ❖ (p,d) reaction
  ❖ (n,α) reaction
  ❖ (d,α) reaction
  ❖ (p,n) reaction
  ❖ Photo nuclear reaction

Q7. Complete the following nuclear reaction
  ❖ $Fe^{19}_9 + H^1_1 \rightarrow O^{16}_8 + ...$
  ❖ $Al^{27}_{13} + n^1_0 \rightarrow .... + He^4_2$
  ❖ $Th^{234}_{90} \rightarrow Pa^{234}_{91} + ...$
  ❖ $Cu^{63}_{29} + D^2_1 \rightarrow Zn^{64}_{30} + ...$
  ❖ $U^{235}_{92} + n^1_0 \rightarrow Ba^{141}_{56} + Kr^{92}_{36} + ...$
  ❖ $Be^9_4 + He^4_2 \rightarrow C^{12}6 + ...$
  ❖ $Li^7_3 + H^1_1 \rightarrow He^4_2 + ...$

Q8. The temperature of the Sun has not decreased for millions of year, it remains a mystery. The question arises that what is the source of so much energy. The fusion reaction is responsible for this amount of energy. Thermo nuclear energy is responsible for the energy produced in Sun and Star. What are these two thermo nuclear energy. Explain with Chemical reaction.

Q9. Make a comparison between nuclear fission and nuclear fusion in terms of
- ❖ Process
- ❖ Energy Per Gram
- ❖ Material Used
- ❖ Availability Of Material
- ❖ Radioactive Isotopes
- ❖ Reaction

Q10. The fission of 1 nucleolus of U^{235}_{92} releases 200 MeV energy. How much fission should occur per second for producing a power of 1M?