SOLVE THE PROBLEMS

1. A painting being claimed to be an original of Raphael (1483-1520] is analysed by ^{14}C technique. A small piece of the canvas give the 14C content to be 0.95 of that is living plants. Is the painting was original one? [Given: $t_{1/2}$ ^{14}C 5577 years, Ans.412 years]

2. The skull of Prehistoric man gives the activity of 2.8 counts per minutes per gram of carbon due to 14C, while a living man gives 15.3 counts. How long ago did he live? [Given: $t_{1/2}$ ^{14}C 5730 years, Ans. 14044 years]

3. Estimate the age of a sample of pitchblend mineral in which the amount of ^{238}U is 75% and ^{206}Pb is 15%, while ^{204}Pb is totally absent. [Given: $t_{1/2}$ of ^{238}U is $4.15x10^2$ years, Ans: 124.51 years]

4. In a sample of pitchblende the ratio of ^{206}Pb : ^{238}U = 0.2:1 by weight. Calculate the age of the mineral, if half life of ^{238}U is $4.5 x 10^9$ years. (all lead originated from Uranium).[Ans.: 1.34 x 109 years]

5. What is the principle of 'Radioactive dating'? The isotopes of ^{238}U and ^{235}U occur in nature in the ratio of 140:1. Assuming that at the time of earth formation they were present in equal ratio; make an estimate of the age of the earth. Half life of ^{238}U and ^{235}U are $45x 10^9$ years and $7.13x10^8$ years respectively. [Ans.: (t) = 5.17 x10^9 Years]

6. .The ^{14}C to ^{12}C ratio in a piece of old wood is 20% to that in atmosphere. Calculate the age of the wood. [$t_{1/2}$ of ^{14}C = 5730 years, Ans.: 13307.95 years]

7. Comment on the theory of determining "Age of Fossil" Or Explain the principle of Radiocarbon dating

8. Give one example of application of radioactive isotopes in the study of the mechanism of chemical reactions.

9. Write a note on radiocarbon dating for determination the age of coal. Mention also its limitations

10. Give two examples of the application of radioactive isotopes in the study of structure determination and medical diagnosis.