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ST—456—2022

FACULTY OF SCIENCE

M.Sc. (Second Year) (Fourth Semester) EXAMINATION

JUNE/JULY, 2022

(CBCS/New Pattern)

INORGANIC CHEMISTRY

Paper XXIII (CH-544/1)

(Nuclear and Radiation Chemistry)

(Wednesday, 6-7-2022) **Time : 2.00 p.m. to 5.45 p.m.**

Time—3.45 *Hours* *Maximum Marks*—75

N.B. :— *All* questions are compulsory.

1. Solve any *three* out of six : 15

   (*a*) Explain the working of a fusion reactor.

   (*b*) Discuss the application of γ-radiation.

   (*c*) Give salient features of shell model.

   (*d*) Discuss the principle of Breeder reactor.

   (*e*) Describe the term radiation dosimetry.

   (*f*) Give application of nuclear fusion.

2. Attempt any *three* : 15

   (*a*) What is natural radioactivity ? What are the characteristics of radioactivity ?

   (*b*) Distinguish between nuclear fusion and nuclear fission.

   (*c*) What is Hydrated electron ? Explain and exemplify.

   (*d*) Write and explain the principle of radiolysis.

   (*e*) Comment on reprocessing of nuclear fuel.

   (*f*) What are the characteristics of radioactive decay of Ra^{226} ?

P.T.O.

3. Solve the following :

(*a*) Discuss the control of nuclear reactions in thermal reactor. 7

Or

Compare and distinguish the properties of β-rays with γ-rays.

(*b*) What is meant by radiation dosimetry ? Explain the various terms involved in it. 8

Or

What is the order of radioactive disintegration process ? Derive the relationship between half life and decay constant.

4. Solve the following :

(*a*) Compare and distinguish the properties of β-rays with γ-rays. 7

Or

Explain the characteristic features of liquid drop model.

(*b*) Explain the mechanism of electron capture reaction with example. 8

Or

Explain the working of natural uranium reactor.

5. Write short notes on (any *three*) : 15

(*a*) Auger effect

(*b*) (*i*) Atom bomb

(*ii*) Hydrogen bomb.

(*c*) Electron capture reaction

(*d*) Geiger-Nuttall law.