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M.Sc. 3rd Semester CBCS Scheme  
Examination, December-2022

**CHEMISTRY**  
**Paper-17CHE23GA2**  
**Inorganic Special-II**

*Time allowed : 3 hours* [Maximum marks : 80]

*Note: Question No. 1 is compulsory. Students will have to attempt four questions from the remaining eight question selecting one from each section.*

1. Answer the following in short:-
- (a) Differentiate between chemical reaction and nuclear reaction.
  - (b) Define mass defect.
  - (c) What is the principle of radiometric titrations?
  - (d) Explain the principle of neutron activation analysis?
  - (e) Define fragmentation nuclear reaction.
  - (f) How you will explain the dead time of G.M. counter?
  - (g) Explain the spallation nuclear reaction.
  - (h) Briefly explain radiative capture reactions. 2 each

**Section-A**

- 2. (a) Describe the collective model for the nuclear structure in detail. 10
- (b) Explain the nuclear stability rules? 6
- 3. (a) How will you explain the instability of the nucleus in terms of n/p ratio? 8

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- (b) Describe the liquid drop model for the nuclear structure. 8

**Section-B**

- 4. (a) Describe the principle and applications of IDA technique. 12
- (b) Explain the merits of the radiometric titrations. 4
- 5. (a) How will you explain the Photoelectric effect? Also explain the overall effect of radiation. 8
- (b) Describe the principle and applications of the Neutron Activation Analysis technique? 8

**Section-C**

- 6. (a) Draw the sketch, principle and working of the Ionization Counter. 12
- (b) Draw a well labelled diagram of G.M. counter. 4
- 7. (a) Draw the sketch of a solid-state counter and explain its working. 12
- (b) Write the application of the proportional counter. 4

**Section-D**

- 8. (a) What is the mechanism of nuclear fission reaction? Explain it through Bohr and Wheeler theory? 11
- (b) Explain about the photonuclear reactions. 5
- 9. (a) Draw diagram and explain working of Breeder reactor. 8
- (b) Explain cyclotron with its working. 8

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