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**NA—19—2023**

**FACULTY OF SCIENCE AND TECHNOLOGY**

**B.Sc. (Second Year) (Third Semester) EXAMINATION**

**NOVEMBER/DECEMBER, 2023**

**(CBCS/New Pattern)**

**CHEMISTRY**

**Paper—VII**

**(Physical and Inorganic Chemistry)**

**(Wednesday, 6-12-2023)**

**Time : 2.00 p.m. to 4.00 p.m.**

*Time—2 Hours*

*Maximum Marks—40*

*N.B. :- (i) Attempt all questions.*

*(ii) Use of logarithmic table and calculator is allowed.*

**Section—A (Inorganic Chemistry)**

1. Solve any *three* of the following : 3×5

(i) How is nuclear stability affected by odd and even numbers of protons and neutrons ? Discuss.

(ii) What do you mean by radioactivity ? Explain the properties of  $\gamma$  (Gamma) particles.

(iii) What is carbon dating ? Explain in detail.

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- (iv) (a) Explain in detail principle involved in plutonium bomb.
- (b) Discuss the importance of ignition and incineration in gravimetric analysis.
- (v) What is precipitation ? Explain the effect of temperature and solubility on precipitation.

### Section-B (Physical Chemistry)

2. Solve any *three* : 3×5

- (i) Discuss Davisson and Germer experiment to explain wave nature of electron.
- (ii) What is de-Broglie hypothesis ? Calculate the de-Broglie wavelength for a ball of 200 g mass moving with a velocity  $3 \times 10^{10}$  cm sec<sup>-1</sup> and an electron moving with the same velocity. What do these value indicate ?
- (iii) Discuss entropy change for phase transfer from one crystalline form to another.

Calculate entropy change when one mole of rhombic sulphur to monoclinic sulphur. The heat of transition of process carried out reversibly its 322.17 Jmol<sup>-1</sup> at transition temperature 95.6 °C.

- (iv) Define phase, component and degree of freedom with suitable examples.
- (v) Explain in detail phase diagram of water system.

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3. Write short notes on (any *two*) :

2×5

- (i) Compton effect
- (ii) Joule's-Thomson coefficient
- (iii) Physical significance of entropy
- (iv) Upper and lower critical solution temperature.

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