



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program :Seventh Semester – 2020

Roll No. in Fig.

Roll No. in Words.

Paper: Inorganic Chemistry (Sp. Theory-II)

Course Code: CHEM-407

Part – I (Compulsory)

Time: 15Min. Marks: 10

Attempt this Paper on this Question Sheet only.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Signature of Supdt.:

Q.1. Encircle the right answer cutting and overwriting is not allowed. (10x1=10)

Which of the following is a Lewis acid?

- a. BF_3 b. $[\text{SbF}_6]^-$ c. $[\text{AlCl}_4]^-$ d. NF_3

2. Species in an alkali metal- Al_2Cl_6 molten salt include:

- a. $[\text{AlCl}_4]^-$ and $[\text{Al}_2\text{Cl}_7]^-$ b. $[\text{AlCl}_4]^-$ and AlCl_3
c. AlCl_3 and $[\text{AlCl}_2]^+$ d. $[\text{AlCl}_4]^-$ and $[\text{AlCl}_2]^+$

3. Which statement is incorrect about liquid N_2O_4 ?

- a. Physical data confirm that N_2O_4 ionizes to give $[\text{NO}_2]^+$ and $[\text{NO}_2]^-$
b. It reacts with electropositive metals to liberate NO
c. It is a good oxidizing agent
d. It is useful for preparing complex nitrate salts

4. BF_3 reacts in liquid HF to give

- a. HBF_4 b. $[\text{BF}_2]^+$ c. $[\text{H}_2\text{F}]^+$ d. $[\text{HF}_2]^-$

5. When ^{235}U is bombarded with one neutron, fission occurs and the products are three neutrons, ^{94}Kr , and _____.

- a. ^{139}Ba b. ^{141}Ba c. ^{139}Ce d. ^{139}Xe

6. Carbon-11 is a radioactive isotope of carbon. Its half-life is 20 minutes. What fraction of the initial number of C-11 atoms in a sample will have decayed away after 80 minutes?

- a. $1/16$ b. $1/8$ c. $1/4$ d. $15/16$

7. A Geiger-Muller tube is a _____.

- a. gas ionization detector c. fluorescence detector
b. cloud chamber d. spectrophotometer

8. A positron has a mass number of _____, a charge of _____, and a mass equal to that of a(an) _____.

- a. 0, $1+$, proton c. 0, $1+$, electron
b. 1, $2+$, proton d. 1, $2+$, electron

9. Metallic oxides are

- a. basic in nature b. acidic in nature c. slightly acidic in nature d. neutral

10. As we move across period basic character of oxides

- a. increases b. remains same c. decreases d. becomes zero



ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q.2. Give short answers of the following: (10x2=20)

- (i) Give examples of molten salts system that can be used at room temperature.
- (ii) Differentiate between natural and artificial radioactivity.
- (iii) Derive a relationship between activity and number of half-lives for a radioactive substance?
- (iv) Discuss uses of MgO and TiO₂ in industry.
- (v) Give brief description of detection of radioactivity by Geiger-Muller counter.
- (vi) What do you mean by spinals? Discuss their magnetic properties.
- (vii) What are environmental issues caused by oxides of sulfur?
- (viii) Give example of neutralization reaction in HF.
- (ix) Prove that angular momentum remains constant when a beta particle is emitted from nucleus.
- (x) Discuss complex formation reactions occurring in liquid ammonia.

Q.3. Answers the following questions. (3x10=30)

- (i) Describe the role of metal oxides as high temperature super conductors.
- (ii) What is Soddy-Fajan's group displacement law?
- (iii) How reactions in molten salts can be monitored?