PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2022
(Sixth Semester)

Branch – **CHEMISTRY**

INORGANIC CHEMISTRY-II

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 x 1 = 10)

1. Knowing that the chemistry of lanthanoids (Ln) is dominated by its +3 oxidation state, which of the following statements is incorrect?
   (i) Because of the large size of the Ln(III) ions, the bonding in its compounds is predominantly ionic in character.
   (ii) The ionic sizes of Ln(III) decrease in general with increasing atomic number.
   (iii) Ln(III) compounds are generally colourless.
   (iv) Ln(III) hydroxides are mainly basic in character.

2. Which of following is radioactive element in Lanthanide Series?
   (i) Promethium (Pm) (ii) Lutetium (Lu)
   (iii) Yetterbium (Yb) (iv) Samarium (Sm)

3. Which of following series of elements are included in actinides?
   (i) Th to Lr (ii) Ac to Lr
   (iii) Ac to No (iv) Th to No

4. Electronic configuration of Americium is
   (i) $[R_n]\ 5f^4 6d^0 7s^2$ (ii) $[R_n]\ 5f^5 6d^0 7s^1$
   (iii) $[R_n]\ 5f^6 6d^0 7s^2$ (iv) $[R_N]\ 5f^6 6d^0 7s^2$

5. Which form of radioactivity is most penetrating?
   (i) alpha particles (ii) beta particles
   (iii) neutrons (iv) gamma rays

6. What particle is produced when Plutonium-242 decays to Uranium-238?
   (i) gamma (ii) alpha
   (iii) positron (iv) beta

7. An isotone of $^{14}_{6}C$ is
   (i) $^{16}_{8}O$ (ii) $^{13}_{6}C$
   (iii) $^{17}_{8}O$ (iv) $^{16}_{7}N$

8. Which of the following is false about $^{16}_{8}O$ and $^{17}_{8}O$?
   (i) both have eight protons (ii) both have eight electrons
   (iii) both have eight neutrons (iv) they have different rates of diffusion

9. Which of the following act as a ligand in complex hydrides?
   (i) H_2 (ii) H^+
   (iii) H^- (iv) H

10. Carborundum is another name of
    (i) Silicon carbide (ii) Silicon oxide
    (iii) Calcium carbide (iv) Calcium oxide

Cont...

SECTION - B (25 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 5 = 25)

11 a Describe the oxidation state of lanthanides.

OR

b Discuss the uses of lanthanide and its compounds.

12 a Describe the general characteristics of actinide elements.

OR

b Outline the preparation of transuranic elements.

13 a Explain: Half- life period and average life period

OR

b Describe working of GM counter.

14 a Define: Isotope and Isobar. Give one example of each.

OR

b Show the isotopes of chlorine and draw their structure.

15 a Highlight uses of $LiAlH_4$ and $NaBH_4$ in organic chemistry.

OR

b Explain metal ammonia solution.

SECTION -C (40 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 8 = 40)

16 a Explain the ion-exchange method of separation of lanthanide elements.

OR

b What is lanthanide contraction? Give its causes and consequences?

17 a Compare lanthanide and actinide elements.

OR

b Explain the extraction of uranium from pitchblende.

18 a What is mean by radioactive disintegration? Derive an expression for the rate of disintegration of a radioactive material.

OR

b Highlight the applications of radioactive radiation.

19 a Describe the construction, working and the use of Dempster's Mass Spectrograph.

OR

b Discuss the separation of isotopes by electromagnetic method.

20 a (i) Classify hydrides. Give an example for each case.
(ii) Differentiate between ionic and covalent hydrides.

OR

b Outline the preparation, properties and uses of ionic and covalent nitride.

Z-Z-Z END