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Reg. No. : .....

Code No. : 20060 E Sub. Code : CMCH 41

B.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2025.

Fourth Semester

Chemistry – Core

INORGANIC CHEMISTRY – II

(For those who joined in July 2021 and 2022 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Find the hard acid from the following according to SHAB principle
- (a)  $\text{OH}^-$                       (b)  $\text{NH}_3$   
(c)  $\text{BF}_3$                         (d)  $\text{F}^-$

2. State the colour of dilute metal ammonia solutions.
- (a) Blue                              (b) Red  
(c) Green                            (d) Yellow
3. Identify the d-block metal ion which has five unpaired electrons in its 3d orbital.
- (a)  $\text{Mn}^{2+}$                         (b)  $\text{Cu}^{2+}$   
(c)  $\text{Zn}^{2+}$                         (d)  $\text{Ni}^{2+}$
4. Which one of the following f-block element has stable +2 oxidation state?
- (a) Lu                                (b) Ce  
(c) Sm                                (d) Eu
5. Mention the process of heating the ore strongly in excess of air.
- (a) Magnetic separation  
(b) Calcination  
(c) Roasting  
(d) Reduction

6. Which of the following is not the ore of manganese?  
(a) Braunitite (b) Manganite  
(c) Zircon (d) Hausmanite
7. Identify the shape and type of hybridization of  $\text{XeF}_2$  from the following.  
(a) Linear; sp  
(b) Octahedral;  $\text{sp}^3\text{d}^2$   
(c) Tetrahedral;  $\text{sp}^3$   
(d) Linear;  $\text{sp}^3\text{d}$
8. Find out the pseudohalogen from the following.  
(a)  $\text{Xe F}_2$  (b)  $\text{ICl}_3$   
(c)  $(\text{CN})_2$  (d)  $\text{IF}_7$
9. Select the mode in the data, 2, 5, 5, 5, 6, 7, 8, 9.  
(a) 2 (b) 5  
(c) 6 (d) 8
10. Find the median for the data set, 1, 2, 2, 3, 6, 7, 8?  
(a) 2 (b) 3  
(c) 4.5 (d) 6

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Give any five general properties of solvents.  
Or  
(b) Distinguish between the Arrhenius and Lewis concepts of acids and bases.
12. (a) Comment on the oxidation states and magnetic properties of d-block elements.  
Or  
(b) What is meant by lanthanide contraction? Mention any three of its consequences.
13. (a) Discuss the gravity separation and Van-ArkeldeBoer methods in metallurgy.  
Or  
(b) How is  $\text{KMnO}_4$  prepared? Give any three properties of  $\text{KMnO}_4$ . Mention its any one important use.

14. (a) Give the preparation of  $\text{IF}_7$ . Explain its structure.

Or

- (b) Discuss the position of inert gases in the Periodic Table.

15. (a) What is Student's t-test? Mention its importance.

Or

- (b) What are significant figures? Explain them with suitable examples.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Elaborate any four reactions in liquid ammonia.

Or

- (b) Discuss briefly the Usanovic and Lux-Flood concepts of acids and bases with suitable examples.

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17. (a) Analyze any four general characteristics of f-block elements.

Or

- (b) Assess reducing, catalytic and complex formation properties of d-block elements.

18. (a) (i) Describe the zone refining process in metallurgy. (3)

- (ii) State the important ores of chromium? How is it extracted from its important ore? (5)

Or

- (b) (i) Explain electrolytic refining process in metallurgy. (3)

- (ii) How is thorium extracted from its important ore? (5)

19. (a) What are Clathrates? Give the preparation, any three properties and uses of them.

Or

- (b) Explain in details the shapes of  $\text{XeF}_6$  and  $\text{XeOF}_2$ .

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20. (a) What are errors? How are they classified?  
Explain them.

Or

- (b) Describe the following :

- (i) Q-test and its importance
- (ii) Accuracy and precision
- (iii) Standard deviation. (3 + 3 + 2)