

14/5 01W

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Code No. : 20318 E Sub. Code : CMCH 11

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

First Semester

Chemistry – Core

INORGANIC CHEMISTRY – I

(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. No two electrons in an atom can have the same value of all four quantum numbers, This is called
- (a) Hund's rule
  - (b) Pauli's exclusion principle
  - (c) Aufbau's principle
  - (d) Heisenberg's uncertainty principle

2. For  $l=1$ ,  $m=-1, 0, +1$  the corresponding orbitals are
- (a)  $s, p_x, p_y$
  - (b)  $s, p_z, p_y$
  - (c)  $s, p_x, d_{xy}$
  - (d)  $p_x, p_y, p_z$
3. In the Periodic table all the non-metals are under
- (a) s – block
  - (b) p – block
  - (c) d – block
  - (d) f – block
4. In this order of elements: C, N, O, F the electronegativity
- (a) decreases
  - (b) increases
  - (c) remains constant
  - (d) none of these
5. Which of the following is correct order of repulsive interactions?
- (a)  $lp-lp > lp-bp > bp-bp$
  - (b)  $lp-bp > lp-lp > bp-bp$
  - (c)  $bp-bp > lp-bp > lp-lp$
  - (d) Any of the three depending upon the type of molecules.

6. Amongst the following, covalent bonding is found in?
- (a) Sodium Chloride
  - (b) Magnesium Chloride
  - (c) Water
  - (d) Brass
7. Which one of the following allotropic forms of carbon is isomorphous with crystalline silicon?
- (a) Coal
  - (b) Diamond
  - (c) Coke
  - (d) Graphite
8. The electro negativity of Be is same as that of \_\_\_\_\_
- (a) Al
  - (b) Mg
  - (c) Na
  - (d) Li
9. In the titration of strong acid and strong base, the indicator used is
- (a) Thymol blue
  - (b) Phenolphthalein
  - (c) Methyl Orange
  - (d) None of the above
10. An inorganic mixture when introduced in flame produces crimson red Colour. It may \_\_\_\_\_
- (a) Dichromate ion
  - (b) Thiosulphate
  - (c) Strontium
  - (d) Calcium

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).  
Each answer should not exceed 250 words.

11. (a) Describe the Rutherford's model of an atom.
- Or
- (b) Write a note on Heisenberg's uncertainty principle.
12. (a) Explain:
- (i) Covalent radii
  - (ii) Vander Waals radius.
- Or
- (b) Explain briefly factors affecting the ionization energy.
13. (a) What are the factors affecting Lattice Energy?
- Or
- (b) Give the differences between VB and MO theory.

14. (a) Explain the diagonal relationship between Li & Mg and Be & Al.

Or

- (b) Describe briefly Portland cement and glass.

15. (a) What is solubility product? Discuss its applications in qualitative analysis.

Or

- (b) Explain Co-precipitation and post precipitation.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) (i) What is Aufbau principle? Give the electronic configurations of element with atomic number 17 and 22.

- (ii) Write a note on Hund's rule.

Or

- (b) Explain quantum numbers and their significance.

17. (a) Briefly explain for the following (i) Atomic radii (ii) Electron affinity.

Or

- (b) Explain determination of electronegativity using Pauling's and Mullikan's approach.

18. (a) Give an account of  $sp^2$  and  $sp^3$  hybridisation.

Or

- (b) Draw and explain the molecular orbital diagram of  $F_2$  molecule and calculate its bond order.

19. (a) Discuss the periodicity in p block elements with respect to electronic configuration, atomic and ionic size.

Or

- (b) (i) Write down the allotropes of carbon and sulphur.

- (ii) Write a note on chemistry of Zeolites.

20. (a) Write briefly acid-base titrations and complexometric titrations.

Or

- (b) (i) What is common ion effect? Explain its application in qualitative analysis.  
(ii) Explain the separation of cations into groups in qualitative analysis.
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