

(6 pages)

Reg. No. :

Code No. : 8771

Sub. Code : KCHM 12

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2016.

First Semester

Chemistry

INORGANIC CHEMISTRY — I

(For those who joined in July 2016 onwards)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer :

1. According to Fajan's rule, decrease in size of Ln^{3+} ion in $\text{Ln}(\text{OH})_3$
- (a) increases the covalent character
 - (b) decreases the covalent character
 - (c) increases the basic character
 - (d) . increases the ionic character

2. Antibonding molecular orbitals are produced by
- (a) constructive interaction of atomic orbitals
 - (b) destructive interaction of atomic orbitals
 - (c) the overlap of the atomic orbitals of two negative ions
 - (d) all of these
3. BF_3 reacts in liquid HF to give
- (a) HBF_4
 - (b) $[\text{BF}_2]^+$
 - (c) $[\text{H}_2\text{F}]^+$
 - (d) $[\text{HF}_2]^-$
4. Within the HSAB principle, a hard acid,
- (a) is not very polarizable
 - (b) has a low charge density
 - (c) shows a preference for soft bases
 - (d) shows a preference for donor atoms of low electronegativity
5. An example for metal deficiency defect is
- (a) NaCl
 - (b) AgCl
 - (c) FeS
 - (d) CsCl



6. In a simple cubic cell, each point on a corner is shared by
 (a) one unit cell (b) two unit cells
 (c) eight unit cells (d) four unit cells
7. The maximum oxidation state exhibited by Lanthanide is
 (a) +3 (b) +4
 (c) +6 (d) +7
8. The radioactive element of lanthanide is
 (a) Cerium (b) Promethium
 (c) Gadolinium (d) Lutetium
9. Loss of β -particle is equivalent to
 (a) increase of one proton only
 (b) decrease of one neutron
 (c) increase of one neutron only
 (d) both (a) and (b)
10. The most penetrating radiations are
 (a) α rays
 (b) β rays
 (c) γ rays
 (d) all are equally penetrating

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PART B — ($5 \times 5 = 25$ marks)

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

Each answer should not exceed 250 words.

11. (a) Explain Kapustinskii equation.
 Or
 (b) List out the salient features of VSEPR theory.
12. (a) Explain Born-Lande equation.
 Or
 (b) With suitable illustrations explain Fajan's rule.
13. (a) Write short notes Photovoltaic effect.
 Or
 (b) Explain Cooper electron theory.
14. (a) Bring out the similarities between actinides and lanthanides.
 Or
 (b) Explain BCS theory.

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15. (a) Write about radio chromatography.

Or

- (b) Write short notes on stellar energy.

PART C — ($5 \times 8 = 40$ marks)

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

Each answer should not exceed 600 words.

16. (a) Describe M.O. diagrams of hetero nuclear diatomic molecules.

Or

- (b) Bring out the significance of hydrogen bonding.

17. (a) Give an account of the reaction taking place in liquid SO_2 .

Or

- (b) Discuss acid base strength verses HSAB principle.

18. (a) Write short notes on Schottky and Frenkel defects.

Or

- (b) Brief account on p-n and n-p-n junctions.

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19. (a) Discuss the use of lanthanide complexes as shift reagents.

Or

- (b) Brief account on ion exchange and solvent extraction methods.

20. (a) Write about the water disposable and atomic power project in India.

Or

- (b) Explain the theory of nuclear fission.
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