SUBJECT CODE: 11CH/MC/IC14

B.Sc. DEGREE EXAMINATION, NOVEMBER 2011
BRANCH IV- CHEMISTRY
FIRST SEMESTER

REG.NO ……………………..

COURSE   : MAJOR CORE
PAPER   : INORGANIC CHEMISTRY-I
TIME   : 30 MINUTES   MAX.MARKS : 30

SECTION – A   (20x1=20)
ANSWER ON THE QUESTION PAPER ITSELF
Answer all the questions.

I   **Choose the correct answer:**

1. Effective Nuclear charge is given by the relation
   (a) $Z^* = Z - \sigma$ (b) $Z = Z^* - \sigma$ (c) $Z^* = Z - \pi$ (d) $Z^* = Z - \alpha$

2. The amount of energy required to remove the outermost shell electron from an isolated neutral gaseous atom in its ground state is called
   (a) Electron affinity   (b) Ionization energy   (c) Bond Energy   (d) electro negativity

3. The limiting radius ratio rule is
   (a) the ratio of radius of an anion to that of cation.
   (b) the ratio of radius of a cation to that of an anion.
   (c) the product of radius of a cation to that of an anion.
   (d) None of the above.

4. With the increase in the Electron affinity of an element, the tendency to form
   (a) cation increases   (b) anion increases
   (c) cation decreases and anions increases   (d) none of the above

5. Water exists as a liquid under ordinary conditions because water molecules are
   (a) dimeric   (b) polymerized   (c) condensed   (d) trimeric

6. The ability of a cation to polarize a nearby anion is called
   (a) Polarisability   (b) Polarizing ability   (c) Polarisation   (d) none of the above

7. A purification technique that is employed for preparing extremely pure metal is called
   (a) electro refining   (b) zone refining   (c) distillation   (d) Mond's process

8. A process in which the ore is heated in the absence of air is called
   (a) roasting   (b) calcination   (c) leaching   (d) None of the above

9. The reaction involving loss of electrons and simultaneously gain of electrons are known as
   (a) half reaction   (b) oxidation reaction   (c) redox reaction   (d) reduction reaction

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10. The phenomenon in which one substance while undergoing oxidation itself on exposure to air brings about oxidation of another substance also which of itself cannot take up oxygen is
    (a) Self reduction   (b) Auto reduction   (c) induced oxidation   (d) All the above

II   Fill in the blanks:

11. The distance between the nuclei of two bonded atoms of a hetrero nuclear diatomic molecule of AB type is called ---------------------

12. The similarities in properties existing between the two elements of a diagonal pair is known as -----------------------

13. Ionic compounds do not conduct electricity in the solid state because --------------------

14. The Born-Lande's equation for the lattice energy of an ionic compound is---------------

15. A covalent bond in which electrons are shared unequally between linked atoms and the linked atoms acquire fractional positive and negative charge is called a -------------

16. σ-bond is produced by the ------------------------------------ overlap of the half filled atomic orbitals of the two atoms.

17. The process of dissolving the ore leaving behind the impurities by treating the ore with a suitable reagent is called -------------------------.

18. The process of reduction of metal oxides by carbon is ----------------------.

19. An oxidant is an ------------------------------

20. The oxidation state of Cr in $K_2Cr_2O_7$ is --------------

III   State whether true or false:

21. If an element shows many positive oxidation states, the element in lower oxidation state has high electro -negativity than that in higher oxidation state.

22. The formation of an ionic bond involves a decrease in energy.

23. The greater the difference in electro negativities, the greater is the dipole moment and hence lesser is the degree of polarity in a polar covalent bond between two atoms.

24. Asimplest method in which a metal is precipitated from the solution of its ions by the addition of another metal which is more electropositive is metal displacement reduction method.

25. Always oxidation and reduction will take place simultaneously.

IV **Answer in a line or two:**

26. What is screening effect?

27. Why ionic solids are highly brittle?

28. What is a node point?

29. What is golschmidt thermite process?

30. What is an equivalent weight of a reducing agent?

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FIRST   SEMESTER

COURSE   : MAJOR CORE
PAPER   : INORGANIC CHEMISTRY-I
TIME   : 2½ HOURS   MAX.MARKS : 70

SECTION – B   (5x6=30)
Answer any five questions:

1. What are the factors affecting the magnitude of ionization potential?
2. What are the factors favoring the formation of ionic compounds?
3. What are the consequences of hydrogen bonding?
4. Discuss briefly about the Ellinghen Diagram.
5. What are redox reactions and Half-Reactions?.
6. What are the merits and demerits of VBT?
7. What is inert pair effect? Give Example

SECTION – C   (2x20=40)
Answer any two questions:

8. a. How will you determine the Lattice energy experimentally by Born-Haber cycle?
                                                                                              5 marks
    b. Calculate the effective Nuclear charge experienced by the 4s electron in a
       potassium atom.   3 marks
    c. Construct the molecular orbital diagram for NO molecule and discuss.   5 marks
    d. Discuss the refining of metals by Van-Arkel method.   4 marks
    e. What do you understand by the term "oxidation Number"? Balance the following
       equation by Number method.   3 marks
          $K_2Cr_2O_7 + FeSO_4 + H_2SO_4 \rightarrow Cr_2(SO_4)_3 + H_2O + Fe(SO_4)_3 + K_2SO_4$

9. a. Give Pauling's method of determination of electro negativity of an atom.   5 marks
     b. What are Fajan's rules? Give examples.   6 marks
     c. What are the postulates of VSEPR theory? Explain   5 marks
     d. Discuss the froth floatation technique of concentration of ores.   4 marks

10. a. Write notes on electro chemical series and Single electrode potential   5 marks
    b. Discuss the structure of NH_3 using VSEPR theory   3 marks
    c. Give a brief account of the following.   6 marks
       Alumino Thermite Process and Mond's Process
    d. How will you determine equivalent weight of an oxidizing and a reducing agent?
       Give Examples.   6 marks

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