STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2011 – 12 & thereafter)

SUBJECT CODE: 11CH/MC/IC14
B.Sc. DEGREE EXAMINATION, NOVEMBER 2014
BRANCH IV- CHEMISTRY
FIRST SEMESTER

REG.NO ……..

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

SECTION – A (30x1=30)
ANSWER ON THE QUESTION PAPER ITSELF.

Answer all the questions.

I. Choose the Correct Answer:

1. The atomic radii of the elements across the period _____ from left to right.
   a) decreases b) increases c) no change d) cannot predict

2. The oxidizing property of F, Cl, O, N is in the order of
   a) $F > Cl > O > N$ b) $F > O > Cl > N$
   c) $Cl > F > O > N$ d) $O > F > N > Cl$

3. The electron affinity of F & Cl is in the order of
   a) $F > Cl$ b) $Cl > F$ c) $F = Cl$ d) not known

4. The order of ionization energy of s,p,d,f electrons is
   a) $s > p > d > f$ b) $s < p < d < f$
   c) $s > d > p > f$ d) $s < d < p < f$

5. According to (VBT) valence bond theory, H_2O has _____ hybridisation.
   a) Sp^2 b) Sp^3 c) Sp^3d d) Sp

6. The bond order of O_2^- species is
   a) 1 b) 1.5 c) 2 d) 2.5

7. Carbo thermal reduction uses
   a) 'Ni' at very high temperature b) 'Pd' at low temperature
   c) Carbon at very high temperature d) 'H_2' at low temperature

8. Which one of the following metal uses Mond's process
   a) Al b) Cu c) Ni d) Fe

9. The balanced equation of the redox system in acidic medium is
   a) $2Cr_2O_7{}^{2-} + 16H^+ + C_2H_5OH \rightarrow 4Cr^{3+} + 2CO_2 + 11H_2O$
   b) $2Cr_2O_7{}^{2-} + 8H^+ + C_2H_5OH \rightarrow 4Cr^{3+} + 2CO_2 + 5H_2O$
   c) $Cr_2O_7{}^{2-} + 4H^+ + C_2H_5OH \rightarrow 2Cr^{3+} + 2CO_2 + 3H_2O$
   d) $Cr_2O_7{}^{2-} + 4H^+ + 2C_2H_5OH \rightarrow 2Cr^{3+} + 2CO_2 + 4H_2O$

10. The equivalent weight of $KMnO_4$ in acidic medium is
    a) 158 b) 31.6 c) 52.7 d) 316

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II. Fill in the blanks:

11. According to modern periodic law, the physical and chemical properties of the elements are periodic function of _____.
12. The standard reduction potential of Fe^{2+} to Fe is -0.44 V. This indicates that Fe^{2+}/Fe couple acts as _____ agent.
13. If the Ionisation potential of fluorine is 17.4 eV and electron affinity is 3.63 ev/atom, the electro negativity of fluorine is _____.
14. The inert pair effect is generally seen in _____ elements.
15. The paramagnetic nature of O_2 molecule is explained by _____.
16. The dipole moment of CO_2 molecule is _____.
17. Froth floatation method is used for _____ ores.
18. Smelting is a process involving _____ of ore.
19. $2KMnO_4 + 2KOH \rightarrow$ _____ + _____ + _____.
20. $K_2Cr_2O_7 + 4H_2SO_4 \rightarrow K_2SO_4 +$ _____ + _____ + _____.

III. State whether True or False:

21. Covalent radii of elements across the period increases.
22. Effective nuclear change decreases the ionisation energy as we go down a group.
23. When electro negativity of atom A is more than atom B, the product AB formed is ionic compound.
24. The dipole moemt of NH_3 is more than NF_3.
25. Magnetic separation is done for sulphide ores.

IV. Match the following:

26. electro negativity	a) hybridization
27. Born Haben cycle	b) copper
28. VBT	c) oxidation of metals
29. electrolysis	d) Rowchowscale
30. Ellingham diagram	e) Lattice energy

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SECTION – B **(5x6=30)**

Answer any FIVE questions:

1. Explain the gradation in ionic radii, ionisation energy and electro negativity across the period and down the group.

2. a) Give the Pauling's scale of electro negativity.
   b) What is inert pair effect?
   c) What is Slater rule?

3. a) What is radius ratio rule? Give its significance.
   b) Give Fajan's rule and its significance.

4. What are the consequences of H-bonding?

5. Explain Van Arkel & Froth floatation processes.

6. Draw MOT diagram for 'CO' and give its significance.

7. How is equivalent weight of oxidising and reducing agents determined? Give suitable example.

SECTION-C

Answer any TWO questions: **(2X20 = 40)**

8. a) Explain any one of the diagonal relationship in periodic table.
   b) What is electro chemical series? How is it useful in predicting the oxidising and reducing action of metals or elements?
   c) What is Lattice energy?
   d) Draw Born-Haber cycle for NaCl and explain. (4+4+2+10)

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9. a) Compare VBT & MOT.
   b) What are the significance of Bonding Antibonding and non bonding orbitals? How are they represented by wave function $'\psi'$?
   c) Explain the following process
      (i) complex formation in isolation of 'Ni'.
      (ii) auto reduction in isolation of lead – 'Pb'
      (iii) Aluminothermic process in the isolation of 'Cr'. (4+6+10)

10. a) What are redox reactions? Give an example.
    b) What is screening effect?
    c) Give Born-Lande equation?
    d) What are the factors affecting the formation of ionic compounds?
    e) Explain sp^3d and d^2sp^3 hybridisation with a suitable example. (3+3+2+6+6)

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