SUBJECT CODE: CH/MC/GC14

B.Sc. DEGREE EXAMINATION, NOVEMBER 2008
BRANCH IV- CHEMISTRY
FIRST SEMESTER

REG.NO ……………………..

COURSE : MAJOR CORE
PAPER : GENERAL CHEMISTRY
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 radius of an atomic nucleus is of the order of
a) 10^{-10} cm   b) 10^{-13} cm   c) 10^{-8} cm   d) 10^{-15} cm

2.   Which of the following relates to photons both as wave motions and as a stream of particles?
a) Interference   b) Diffraction   c) $E = Mc^2$ d) $E = h\gamma$

3.   The transition from $n = 4$ to $n = 1$ level in hydrogen atom produces a line in
a) Microwave region   b) UV   c) Visible   d) IR

4.   The number of nodal planes in p_x orbital is
a) 0   b) 1   c) 2   d) 3

5.   The element having the highest electron affinity is
a) F   b) Cl   c) Br   d) I

6.   The first ionization potential of Na, Mg, Al and Si follows the order
a) $Na < Mg > Al < Si$ b) $Na > Mg > Al > Si$
c) $Na < Mg < Al > Si$ d) $Na < Mg < Al < Si$

7.   The weakest base among the following is
a) NaOH   b) KOH   c) Ca(OH)$_2$ d) Zn(OH)$_2$

8.   The compound with greatest covalent character is
a) CaF$_2$ b) CaCl$_2$ c) CaBr$_2$ d) CaI$_2$

9.   The molecular species having the highest bond order is
a) O_2 b) O_2^- c) O_2^+ d) O_2^{2-}

10.   The nature of the bond formed when two elements react depends on
a) Electronegativity   b) Electron affinity
c) Ionization energy   d) Oxidation potential

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11.   Which of the following has Zero bond order?
       a) N_2 b) O_2 c) F_2 d) He_2

12.   Homolysis of a covalent bond produces
       a) Carbonium ion   b) Carbanion ion   c) Free radicals   d) Carbenes

13.   Which of the following will show geometrical isomerism?
       a) 2-Butene   b) 2-Methyl 2-Butene
       c) 3-Methyl 1-Butene   d) 2,3-dimethyl 2-Butene

14.   Which is Chiral?
       a) 3-Methyl hexane   b) 2-Methyl hexane   c) Neo hexane   d) n-hexane

15.   In n-Butane, the form that has lowest energy is
       a) Eclipsed form   b) Skew form   c) Gauche form   d) Staggared form

II   Fill in the blanks:
16.   An example for soft base is _____
17.   The structure of R-lactic acid is _____
18.   The shape of p-orbital is _____
19.   The percentage ionic character in HCl is _____
20.   de Broglie equation is _____

III   State whether the following are true or false:
21.   Ionization energy decreases along a period.
22.   The correct order of acid strength among HX is HF<HCl<HBr<HI
23.   Oxygen molecule shows diamagnetism.
24.   The number of neutrons in protium is zero.
25.   Ionic compounds are soluble in all solvents.

IV   Answer in one or two lines:
26.   What is Compton effect?

27.   Give the significance of ψ^2.

28.   State Pauli's exclusion principle.

29.   Define Lattice energy.

30.   What is inductomeric effect?

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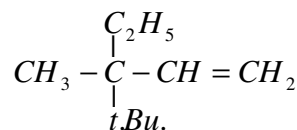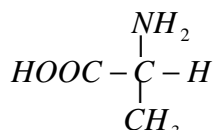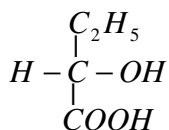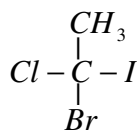
SECTION – B   (5x6=30)
Answer any five questions:

1.   Write a note on quantum numbers.

2.   How will you calculate the Lattice energy of KCl from Born-Haber cycle.

3.   Discuss the calculation of the percentage ionic character of a covalent bond.

4.   Draw the MO diagram of F_2 and CO and explain.

5.   Assign R-S configuration to the following:

$$Cl - \underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}} - I \qquad H - \underset{\underset{COOH}{|}}{\overset{\overset{C_2H_5}{|}}{C}} - OH \qquad HOOC - \underset{\underset{CH_3}{|}}{\overset{\overset{NH_2}{|}}{C}} - H \qquad CH_3 - \underset{\underset{\underline{t}.Bu.}{|}}{\overset{\overset{C_2H_5}{|}}{C}} - CH = CH_2$$

6.   Explain inductive effect with two examples.

7.   Discuss the conformations of ethane and explain the potential energy diagram.

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

8.   a) Describe the Rutherford' experiment.   (6)

       b) What are the defects of Bohr's model.   (4)

       c) Write notes on photo electric effect and uncertainty principle.   (10)

9.   a) Write the Schrodinger equation and explain the terms involved.   (6)

       b) What are Eigen values and Eigen functions. Explain with example.   (4)

       c) Discuss the Bohr's theory of atoms. How does it explain the line spectrum of

           hydrogen atom?   (10)

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10.   a) Distinguish between electron affinity and electro negativity. How do they vary in periodic table.   (6)

       b) Explain the concept of HSAB with one suitable example.   (6)

       c) Discuss the valency bond theory.   (8)

11.   a) Write briefly on steric effect and hyperconjugation.   (10)

       b) Discuss the conformation and stereo chemistry of Cis and Trans, 1,2 and 1,3 di-methyl cyclohexanes.   (10)

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