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

SUBJECT CODE: 11CH/MC/GC14

B.Sc. DEGREE EXAMINATION, NOVEMBER 2014
BRANCH IV- CHEMISTRY
FIRST SEMESTER

REG.NO ……………………..

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

Section- A
Answer all questions

Choose the correct answer: (30×1=30)

1. The de Broglie wavelength of an electron is given as
    a) $\lambda = E/mv$ b) $\lambda = h/mv$ c) $\lambda = mv/h$ d) $\lambda = E$

2. Wave nature of electron is understood from
    a) Compton effect   b) Davisson-Germer experiment
    c) Photoelectric effect   d) Rutherford model

3. If n = 2, azimuthal quantum number can have values
    a)   l = -1,o +1   b)   l = -2, -1, 0, +1, +2   c)   l = 0, 1, 2   d)   none of the above

4. Shape of orbitals are derived from
    a) Principal quantum number   b) azimuthal quantum number
    c) magnetic   quantum number   d)   spin quantum number

5. Two nuclei having the same number of neutrons but different mass number are called
    a)   isobars   b) isotopes   c) isotones   d) isomers

6. Artificial radioactivity was discovered by
    a)   Becquerel   b) Rutherford   c) Marie Curie   d)   P.Villard

7. One of the following is an aprotic solvent
    a) H_2O b) NH_3 c) DMSO   d)   Acetic acid

8. Hyper conjugation is present in
    a) Benzene   b) Naphthalene   c) methane   d) toluene

9. The hybridization of carbocation is
    a) sp^2 b) sp   c) dsp^2 d) sp^3

10. The number of optically active isomers of tartaric acid are
    a) 1   b) 2   c) 3   d) 4

Fill up the blanks:

11. Balmer series lies in the _____ region of electromagnetic spectrum.

12. If ψ is the wave function of a particle, _____ represents the probability of finding the particle.

13. The number of nodes present in 2s orbital is _____

14. The radiation with highest penetrating power is _____

15. In the Neptunium series the disintegration continues till _____ is obtained.

16. Magnesium occur as _____ rather than sulphide.

17. The most stable conformation of n-butane is _____.

18. The conjugate base of H^+ in $H_2 CO_3$ is _____.

19. The number of neutrons present in $_{92}U^{232}$ is _____.

20. Phenol is acidic because phenoxide ion is stabilized by _____.

Match the following:

21. Pauli exclusion principle   n/p ratio =1
22. Bohr's first orbit   geometric isomer
23. $_6C^{12}$ optical isomerism
24. Maleic acid   spin pairing
25. Biphenyls   0.529 A$^{\circ}$

Answer in one or two sentences:

26. State Heisenberg's Uncertainty principle.

27. What is Zeeman effect?

28. Give an example for nuclear fusion.

29. What are the different types solvents?

30. State Huckel's rule of Aromaticity.

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Section B
Answer any five questions: **(5×6=30)**.

1. Explain photoelectric effect on the basis of quantum theory.

2. What are Laplacian and Hamiltonian operators?

3. Discuss the various modes of decay of a radioactive element

4. Explain Yukawa or Meson theory of nuclear forces.

5. Arrange he following in the order of increasing acidity

    HF,HCl,HI,HBr and justify your answer.

6. Write about the formation, structure and stability of carbanions.

7. Discuss with diagram the stability of various conformations of cyclohexane.

Section C
Answer any two questions: **(2×20=40)**.

8. a) Discuss H-spectra on the basis of Bohr's model of atom.

    b) Plot the Radial probability function for 1s, 2s and 2p orbitals

    c) How will you account for the electronic configuration of chromium (Cr) the $3d^5\,4s^1$ and
    copper (Cu) $3d^{10}\,4s^1$ (8+6+6)

9. a) Illustrate with example Soddy-Fajan's group displacement law

    b) Give a detailed account of the applications of radio –isotopes in medicine and in
    studying reaction mechanism

    c) Write a note on Artificial transmutation of elements.   (8+7+5)
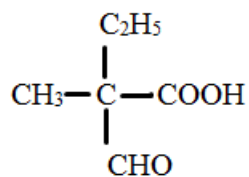
10. a) Discuss any two applications of HSAB theory

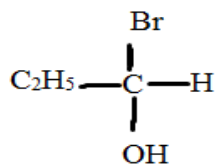   b) Write about the dissolution of alkali metals in liquid ammonia

   c) Assign R and S configuration for the following.   (7+7+6)
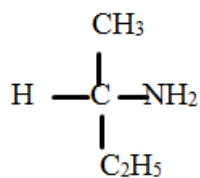

i)

$$CH_3-\underset{\underset{CHO}{|}}{\overset{\overset{C_2H_5}{|}}{C}}-COOH$$

ii)

$$C_2H_5-\underset{\underset{OH}{|}}{\overset{\overset{Br}{|}}{C}}-H$$

iii)

$$H-\underset{\underset{C_2H_5}{|}}{\overset{\overset{CH_3}{|}}{C}}-NH_2$$

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