



SN – 203

I Semester B.Sc. Examination, Nov./Dec. 2010
(Semester Scheme)
CHEMISTRY (Paper – I)

Time : 3 Hours

Max. Marks : 60

Instruction : The question paper has two parts. Answer both the parts.

PART – A

Answer **any six** of the following questions :

(6×2=12)

1. Differentiate $\cos^{-1}x$ w.r.t. 'x'.
2. Integrate e^{kx} w.r.t. x.
3. Why is caesium preferred in photoelectric cells ?
4. Calculate the maximum number of electrons present in the shell when $n = 4$.
5. What is periodicity ?
6. Calculate the oxidation number of
 - i) Mn in MnO_4^-
 - ii) Pt in K_2PtCl_6
7. What is Osmosis ?
8. Write the structures of the following compounds :
 - i) 3 – methylhex –1, 4 – diene
 - ii) 1, 2, 3 – trichloropentane.
9. What is carbonium ion ? Give one example.
10. Draw both the conformations of cyclohexane.

P.T.O.



PART – B

Answer **any eight** of the following. **Each** question carries **six** marks : (8×6=48)

11. a) Derive an expression for the energy of the first Bohr orbit in hydrogen atom.
b) Calculate the wave number of the 2nd line of the Balmer series of the hydrogen atom.
(Given : $R = 1.097 \times 10^7 \text{ m}^{-1}$). (4+2)
12. a) State Pauli's exclusion principle.
b) Write all the possible values of 'l', 'm' and 's' for n = 3. (2+4)
13. a) State Hund's rule of maximum multiplicity. Explain with an example.
b) Draw the shapes of d - orbitals. (3+3)
14. a) Write the electronic configurations of Cr^{24} and Y^{39} .
b) Define the terms :
i) Atomic radius
ii) ionization energy. (2+4)
15. Account for the following :
a) The radius of cat ion is smaller than the corresponding atom.
b) Atomic size decreases across a period.
c) The 2nd electron affinity of oxygen is positive. (2+2+2)
16. a) Give two differences between Lithium and the other group 1 elements.
b) Why is the 2nd ionization energy always greater than the 1st ionisation energy ?
c) What happens when an alkaline earth metal reacts with an acid ? Give an example. (2+2+2)
17. a) Define :
i) Oxidation number
ii) Cryoscopic constant
b) What is Van't Hoff factor ? (4+2)



18. a) Describe how the molecular weight of a non-volatile solute is determined by the elevation in boiling point method.
- b) A solution contains 23 g of alcohol and 90 g of water. What is the mole fraction of alcohol in the solution ?
- [Given : Molecular mass of alcohol = 46
Molecular mass of water = 18] (4+2)
19. a) What are electrophiles ? Give two examples.
- b) Give any two differences between inductive effect and resonance effect.
- c) Explain Wurtz reaction with an example. (2+2+2)
20. a) Write the chain isomers of C_4H_{10} .
- b) How are alkenes converted into alkanes ?
- c) Write the Corey - House synthesis of alkanes. (2+2+2)
21. a) Explain ozonolysis with an example.
- b) Explain the hydroboration - oxidation reaction of an alkane.
- c) Give one general method of preparation of alkynes. (2+2+2)
22. a) What are alicyclic hydrocarbons ? Give two examples.
- b) What is angle strain ?
- c) Why chloroacetic acid is stronger acid than acetic acid ? (2+2+2)
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