BRAINWARE UNIVERSITY

Term End Examination 2023
Programme – B.Tech.(ECE)-2018/B.Tech.(ECE)-2019
Course Name – Chemistry
Course Code - BSC(ECE)202
(Semester II)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. *Choose the correct alternative from the following :*

(i) In anilinium ion the wavelength decreases as compared to aniline due to
   a) Auxochrome
   b) Red shift
   c) Blue Shift
   d) Chromophore

(ii) In which of the following coordination entities the magnitude of Δ_0(CFSE in octahedral field) will be maximum?
   a) $[Co(H_2O)_6]^{3+}$
   b) $[Co(NH_3)_6]^{3+}$
   c) $[Co(CN)_6]^{3-}$
   d) $[Co(C_2O_4)_3]^{3-}$

(iii) Magnetic moment of a transition metal can be calculated from
   a) Number of paired electrons
   b) Number of valence electrons
   c) Number of total electrons
   d) Number of unpaired electrons

(iv) For a particle inside a box, the potential is maximum at x = ...
   a) L
   b) 2L
   c) L / 2
   d) 3L

(v) Which intermediate is formed during SN_1 reaction?
   a) Carbon radicals
   b) Carbocations
   c) Carbanion
   d) Carbene

(vi) Cannizaro reaction is shown by the compound having how many alpha hydrogens?
   a) 0
   b) 1
   c) 2
   d) 3

(vii) Which of the following notations is not used to distinguish between pairs of enantiomers?
   a) R and S
   b) E and Z
   c) + and -
   d) D and L

(viii) In an isothermal expansion of an ideal gas

a) $\Delta S=0$

b) $\Delta V=0$

c) $\Delta q=0$

d) $\Delta T=0$

(ix) The shift of absorption maxima towards higher wavelength is called-
  a) Blue shift
  b) Red shift
  c) Auxochrome
  d) Chromophore

(x) Ozonolysis of Ethylene produces
  a) Formaldehyde
  b) Acetaldehyde
  c) Butanal
  d) Acetone

(xi) What is the unit of vanderwaal's gas constant "b"?
  a) $mol\ L^{-1}$
  b) $L\ Mol^{-1}$
  c) $mol\ L$
  d) $mol^{-1}\ L^{-1}$

(xii) Which of the following is used in calomel electrode?
  a) $HgCl_2$
  b) Hg_2Cl_2
  c) $CaCl_2$
  d) $MgCl_2$

(xiii) One mole of an ideal gas expands from 5 liter to 50 liters at 298 K. The value of $\Delta S/R$ is equal to
  a) 0.693
  b) 0.2303
  c) 2.303
  d) 6.93

(xiv) Light having a single wavelength and whose electronic vector vibrates in infinite no of planes is known as
  a) Ordinary light
  b) Plane polarized light
  c) Monochromatic light
  d) All of these

(xv) The screening effect of 'd' electrons is:
  a) much less than s- electrons
  b) Much more than s-electrons
  c) Equal to s-electrons
  d) Equal to p-electrons.

Group-B
(Short Answer Type Questions)

$3 \times 5=15$

2. State and explain the Hess's law.

(3)

3. Explain crystal field stabilization energy (CFSE) with an example.

(3)

4. The volume of water expands when it freezes. Justify.

(3)

5. Define Saytzeff and Hofmann rule with examples.

(3)

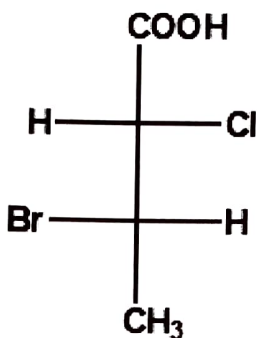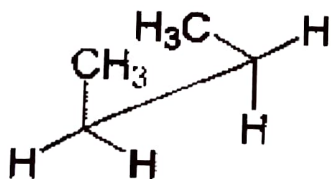6. Give the heat capacity constant value for monoatomic, diatomic and triatomic gas molecule.

(3)

OR

What is a reference electrode? Give one example.

(3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Convert the following into Newmann projection formulae. (5)

8. Deduce the metal's d orbital splitting pattern in presence of an octahedral field. (5)

9. Explain the deviations of real gases from ideal behavior. (5)

10. What is meant by standard electrode potential? Write down the Nernst equation. (5) state its utility.

11. Define the ionization potential. Why does it take more energy to remove an (5) electron from Al^+ than from Al?

12. Justify the uncertainty principle from the zero point energy view. (5)

OR

Evaluate the value of de Broglie wavelength of an electron moving with a velocity (5) of $5 \times 10^5 ms^{-1}$.

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