



SLR-ST- 150

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B.Sc. – II (Semester – IV) (CGPA) Examination, 2018
CHEMISTRY
Physical Chemistry (Paper – V) (Old)

Day and Date : Saturday, 12-5-2018
Time : 10.30 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :** i) **All questions are compulsory.**
ii) **Figures to the right indicate full marks.**
iii) **Neat diagram must be drawn wherever necessary.**
iv) **Use of logarithmic table /Scientific calculator is allowed.**

1. Choose the most correct alternative from **each** of the following and rewrite the sentence :

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- i) The equation $\lambda_V = \lambda_\infty - b\sqrt{c}$ is known as
a) Arrhenius equation b) Bragg's equation
c) Onsagar equation d) None of these
- ii) In S.I. units, dipole moment is of the order of _____ coulomb-meter.
a) 10^{-30} b) 10^{-20} c) 10^{+30} d) 10^{+20}
- iii) The unit cell of NaCl crystal contains _____ molecules.
a) one b) two c) three d) four
- iv) The mixing process is accompanied by _____ in entropy.
a) decrease b) increase
c) remains constant d) none of these
- v) Ebonite is an example of _____.
a) conductor b) insulator c) electrolyte d) none of these
- vi) Entropy of a pure crystalline solid is zero at
a) 100°C b) 300°C c) 273°C d) -273°C
- vii) Electric current is carried in the solution by
a) atoms b) ions c) molecules d) electrons

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- viii) If the plane of crystal cuts the two coordinate axes and is parallel to third axis, then it is known as _____ plane.
- a) Cubic
b) Cubic diagonal
c) Simple
d) Diagonal
- ix) H₂O and H₂S have finite values of dipole moment. Hence their structures should be
- a) angular
b) linear
c) non linear
d) none of these
- x) The sum of the transport number of cation and anion is equal to _____.
- a) 1
b) 0
c) 0.6
d) 0.5
- xi) The SI unit of entropy is
- a) cm⁻¹
b) m⁻¹
c) J.K⁻¹
d) Cal.mol⁻¹
- xii) The value of [M.P.] = [M.R.] for _____.
- a) Polar substances
b) Non-polar substance
c) Both (a) and (b)
d) None of these
- xiii) When a solution of strong electrolyte is diluted, the molar conductivity of the solution _____.
- a) increases
b) decreases
c) remains the same
d) none of these
- xiv) Which of the following is not a strong electrolyte ?
- a) NaCl
b) AgNO₃
c) NH₄OH
d) HCl

2. Solve **any seven** of the following :

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- Define specific conductivity.
- Mention different types of cubic lattices.
- What is state function ?
- What do you mean by optical exaltation ?
- Write the statement of transport number.
- Define Weiss indices.
- Mention different physical transformations.

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- viii) Why dipole moment goes on decreases from HF to HI ?
- ix) Write advantages of moving boundary method.
3. A) Attempt **any two** of the following : 10
- i) Explain in detail ionic product of water.
 - ii) For a certain ideal gas, $C_p = 20.92 \text{ J K}^{-1} \text{ mol}^{-1}$. Calculate the change in entropy suffered by 3 moles of gas being heated from 200K to 400K at constant pressure ($R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$).
 - iii) Explain specific and molecular refractivities.
- B) The specific conductance of 0.01 N LiCl solution is $9.36 \times 10^{-4} \text{ Ohm}^{-1} \text{ cm}^{-1}$. Calculate its equivalent conductance. 4
4. Attempt **any two** of the following : 14
- i) Give different applications of Kohlrausch's law. Explain how it may be applied to find the relation between ionic conductance, ionic mobility and transport number.
 - ii) Derive Bragg's equation for inter-planer distances of crystal.
 - iii) Derive an expression for entropy change for the isothermal reversible process in an isolated system.
5. Attempt **any two** of the following : 14
- i) Specific conductivity of pure water was found to be $6.2 \times 10^{-8} \text{ S.m}^{-1}$ at 298 K. The ionic conductances of H^+ and OH^- ions are 349 and 189.2 S respectively. Calculate the ionic product of water.
 - ii) Discuss Abbe's refractometer in detail.
 - iii) State and explain the laws of crystallography.
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