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CHEMISTRY PAPER-I : CH-121
Physical and Inorganic Chemistry (113201)

P. Pages : 3

Time : Two Hours

Max. Marks : 60

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicates full marks.
6. Use of logarithmic table and non- programmable calculator is allowed.

1. a) Select and write the most appropriate answer from the given alternatives for each sub-questions **any six**. 6

- i) The branch of physical science which is related with study of quantitative relationship between heat energy and other form of energy is called -----.
 a) Electrochemistry b) Thermodynamics
 c) Chemical kinetics d) Nuclear chemistry
- ii) Entropy change of isothermal reversible process is always -----.
 a) Positive b) Negative
 c) Zero d) Constant
- iii) The equivalence point in conductometric titration is obtained by -----.
 a) Indicator method b) Integration method
 c) Calculation method d) Graphical method
- iv) The unit of equivalent conductance is -----.
 a) Ohm Cm^2 b) Ohm $^{-1} \text{Cm}^2$
 c) Mho Cm^{-2} d) Ohm $^{-1} \text{Cm}^{-1}$
- v) When glass capillary dips in water the meniscus of water is -----.
 a) Concave b) Spherical
 c) Elliptical d) Linear
- vi) The unit of Viscosity coefficient is -----.
 a) Dyne $\text{Cm}^{-2} \text{Sec}$ b) Poise
 c) Newton Per meter d) Dyne Cm^{-1}

- vii) In a N_2 Molecule there are.
- a) One Sigma and one Pi – bond b) One Sigma and two Pi- bonds
c) Two Sigma and one Pi – bond d) Three Sigma bonds
- viii) The impurities present in the mineral are called -----.
- a) Flux b) Alloy
c) Gangue d) Slag

b) Answer in one sentence each **any six**.

6

- i) Give the unit of entropy.
- ii) Define – Isothermal Process.
- iii) Give the effect of dilution on equivalent Conductance of an electrolyte.
- iv) Which element is used in conductivity cell for electrical contact of the solution.
- v) Define – Viscosity Give its unit.
- vi) Which type of overlap in the formation of fluorine molecule.
- vii) Define- Ionic bond.
- viii) What is the main function of roasting?

2. Answer **any six** of the following.

12

- i) Define reversible and Irreversible Process.
- ii) Give any two statements of second law of thermodynamics.
- iii) What is cell constant?
- iv) Define and explain equivalent conductance.
- v) What is stalagmometer?
- vi) Define- Covalent bond. Give its example.
- vii) Explain S-P overlap with example.
- viii) What is smelting?

3. Answer any four of the following 12

- i) Derive an expression for the entropy change of isothermal reversible process.
- ii) Explain –
 - a) Specific resistance
 - b) Specific conductance
- iii) Define and explain surface tension of the liquid.
- iv) Give the advantages of conductometric titration.
- v) Explain the formation of Co-ordinate bond in NH_4^+ and H_3O^+ ion.
- vi) What is meant by calcination of ore?

4. Answer any three of the followings. 12

- i) Calculate the entropy change when 48 grams of oxygen gas is compressed isothermally & reversibly from 10 atm to 150 atm at 40°C . (At wt of oxygen = 16).
- ii) Equivalent conductance of 1m NaCl is 98.2 at 25°C , Calculate the degree of ionization of NaCl at this dilution (Λ_∞ of NaCl at 25°C is 131).
- iii) At 20°C , Pure water required 102.2 Sec to flow the capillary of an Ostwald Viscometer while toluene at the Same temperature required 68.9 Sec. Calculate relative Viscosity of toluene. The density of water and toluene is 0.998 and 0.866 g cm^{-3} .
- iv) Define.
 - a) Gangue
 - b) Slag
 - c) Flux
- v) Explain the formation of NaCl and CaCl_2 on the basis of ionic bond.

5. Answer any two of the followings. 12

- i) Write a short note on physical transformation.
- ii) Explain the applications of conductance measurement.
- iii) Give the assumptions of valence bond theory.
