Paper Code : CHEDSC 12L

B.Sc. II Semester Degree Examination (NEP), October 2022
Subject : CHEMISTRY
Paper : Inorganic and Physical Chemistry – I (Paper – I)

Time : 2½ Hours | Max. Marks : 60

***Instruction** : Answer **all** the Parts.*

PART – A

1. Answer **any five** of the following : **(5×2=10)**

   a) Write Schrodinger wave equation. Explain the terms involved in it.

   b) Define ionic radii and crystal radii.

   c) What is collision diameter ?

   d) Define viscosity. Write equation for coefficient of viscosity.

   e) State Heisenberg principle, give equation.

   f) Which solid defects are shown by AgBr.

   g) Surface tension of a liquid is 32 dynes/cms with density 0.86 grams/cc, calculate the parachor of the liquid (mol wt. of liquid = 78).

PART – B

Answer **any four** of the following : **(4×5=20)**

2. Explain the significance of Quantum number. **5**

3. What are the factors affecting electro-negativity of s block elements ? **5**

4. How is critical temperature of CO_2 determined by Andrew's PV isotherms ? **5**

5. Explain the principle of distribution law in Parke's process in de-silverisation of lead. **5**

P.T.O.

6. State :
   i) Hunds rule. 1
   ii) Pauli's exclusion principle. 1
   iii) Aufbau principle. 1
   iv) Write electronic configuration of copper and chromium. 2

7. What are the trends in formation of hydrides, carbides and oxides for 14th group elements ? 5

PART – C

Answer **any three** of the following : **(3×10=30)**

8. a) Explain the atomic spectrum of hydrogen. 5
   b) Derive de Broglie equation. 3
   c) Write the electronic configuration of Titanium and zinc. 2

9. a) Explain electron gain enthalpy of halogens. 5
   b) What is the variations of atomic radii and ionic radii of s block element ? 3
   c) Give equations of electronegativity scale by Mullikan and Pauling in Kcal method. 2

10. a) How is viscosity of the liquid determined by Ostwald's viscometer method ? 5
    b) Explain the behavior of real gases and they deviate from ideal behavior. 5

11. a) Derive Bragg's equation. 5
    b) Explain defects in solids. 3
    c) Give examples for sematic and disc shaped liquid crystals. 2

12. a) Using Slater's rule, calculate effective nuclear charge of silicon. 3
    b) Define covalent radii and Vander Waal radii. 2
    c) Define most probable velocity average velocity and root mean square velocity. 3
    d) What is law of constancy of interfacial angle in solids. 2

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Paper : Inorganic and Physical Chemistry – I

Time : 2½ Hours

Max. Marks : 60

***Instruction** : Answer **all** the **three** Sections.*

SECTION – I

1. Answer **any five** questions. **(5×2=10)**

   a) Write de Broglie equation and explain the terms.

   b) State Hund's multiplicity rule and write the electronic configuration of copper (Cu = 29).

   c) Define ionisation enthalpy. And which group elements have low ionisation enthalpy ?

   d) Define ionic radii and crystal radii.

   e) What are Schottky defects and Frankel defects ?

   f) How do you define unit cell and space lattice ?

   g) Define critical temperature. What is the critical temperature of CO_2 ?

SECTION – II

Answer **any four** questions. **(4×5=20)**

2. Explain the postulates of Bohr's theory.

3. To estimate the effective nuclear charge, how is Slater rule helpful ?

4. Explain the factors affecting ionisation enthalpy.

5. How is the variation in atomic radii along the group and period ?

6. Explain the behavior of real gases. How they deviate from ideal behavior ?

7. Draw the graphical representation of Maxwell-Boltzmann distribution of molecular velocities. Define average, most probable and root mean square velocity.

P.T.O.

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SECTION – III

Answer **any three** questions. **(3×10=30)**

8. a) Derive Braggs equation. **5**
   b) State and explain law of symmetry. **5**

9. a) Explain the shapes of p and d orbitals. **5**
   b) What are the significance of quantum numbers ? **5**

10. a) How is the viscosity of a liquid determined by Ostwald's viscometer method ? **5**
    b) Define parachor. How is it helpful in elucidating the structure of benzene ? **5**

11. a) What are the trends in hydride compounds of 13 to 17 groups ? **5**
    b) Explain Mullikan and Pauling electro-negativity scale. **5**

12. a) State Nernst distribution law and explain its principle in Parke's process of desilverisation of lead. **5**
    b) Define surface tension. And how is determined using Stalgmometer ? **5**