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Name.....

Reg. No.....

**SECOND SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2019**

(CUCBCSS—UG)

Chemistry

CHE 2C 02—PHYSICAL CHEMISTRY

Time : Three Hours

Maximum : 64 Marks

**Section A**

*Answer all questions.*

*Each question carries 1 mark.*

1. \_\_\_\_\_ liquid crystals show the flow behavior of liquids.
2. The number of axes of symmetry in a cubic crystal are \_\_\_\_\_.
3. The net work that can be obtained from a system at constant pressure and temperature is called \_\_\_\_\_.
4. A calomel electrode is represented as \_\_\_\_\_.
5. Write down van't Hoff equation for osmotic pressure.
6. For a reversible process, the condition for entropy change is \_\_\_\_\_.
7. The cell dimension for a triclinic crystal is \_\_\_\_\_.
8. Give an example for basic buffer solution.
9. Write the Nernst equation to find out the potential of an electrode.
10. The smallest repeating units in a space lattice is called \_\_\_\_\_.

(10 × 1 = 10 marks)

**Section B**

*Answer any seven questions.*

*Each question carries 2 marks.*

11. What is standard hydrogen electrode ?
12. Why drops of a liquid or bubbles of a gas are spherical in shape ?
13. Give any two applications of liquid crystals.
14. Differentiate between intrinsic and extrinsic properties.
15. State Boyle's law.

**Turn over**

16. What is Ostwald's dilution law ?
  17. Explain the term absolute entropy.
  18. Define reverse osmosis.
  19. What are Miller indices ? How are they determined ?
  20. By conductance measurements how will you find out the solubility of a sparingly soluble salt ?
- (7 × 2 = 14 marks)

### Section C

*Answer any four questions.  
Each question carries 5 marks.*

21. Explain the relation between specific conductance, equivalence conductance and molar conductance.
22. Comment on the criteria for spontaneity of a reaction based on free energy.
23. Calculate the r.m.s. velocity, average velocity and most probable velocity of hydrogen gas at 0°C.
24. Explain the effect of temperature and pressure on viscosity.
25. Describe the defects in crystals.
26. Write a note on conductometric titrations.

(4 × 5 = 20 marks)

### Section D

*Answer any two questions.  
Each question carries 10 marks.*

27. (i) Give the van der Waal's equation for describing the P-V-T relationship in real gases. How the equation satisfactorily explains the deviation of real gases from ideal behavior ?  
(ii) Derive Bragg's equation.
28. (i) What are fuel cells ? Describe the functioning of H<sub>2</sub>-O<sub>2</sub> fuel cell.  
(ii) Derive the degree of hydrolysis and hydrolysis constant of salt of a weak acid and strong base.
29. What are the factors influencing the solubility of gases in liquids ? Explain using Henry's law.
30. (i) What are the terms internal energy change and enthalpy change of a system ? Derive the relation between  $\Delta U$  and  $\Delta H$ .  
(ii) Calculate the entropy change in the evaporation of one mole of water at 100°C. (Heat of vaporization of water at 100°C is 2259.4 Jg<sup>-1</sup>)

(2 × 10 = 20 marks)