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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 H₂-O₂ 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 ΔU and ΔH .
(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⁻¹)

(2 × 10 = 20 marks)