C 62627 (Pages : 2) \ 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 x 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 x 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 x 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_2-O_2 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 A U and A 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^{-1})

(2 x 10 = 20 marks)