**17U232** (Pages: 2) Name………………………

Reg. No……………………

## SECOND SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2018

(Regular/Supplementary/Improvement)

(CUCBCSS – UG)

(Complementary Course: Chemistry)

### CC15U CHE2 C02 - PHYSICAL CHEMISTRY

(2015 Admission onwards)

Time: Three Hours                                                                                   Maximum: 64 Marks

### Section A

Answer *all* questions. Each question carries 1 mark.

1. An isobaric process is one in which the _____ of the system remains constant.

2. In thermodynamics, all the natural process are _____

3. According to Boyle's law volume of a given mass of gas at constant temperature is _____ proportional to its pressure.

4. How many $Na^+$ and $Cl^-$ ions are there in the *fcc* structure of NaCl ?

5. Any line passing through a point in a crystal, intersects the surface at equal distances in both direction is known as _____

6. With rise in temperature the surface tension of a liquid _____

7. The resistance of an electrolytic conductor is inversely proportional to its _____

8. The specific conductance of a solution _____ on dilution.

9. The number of basic crystal systems available are _____

10. The sign of electrode potential of metal ions above the standard electrode potential of hydrogen is _____

**(10 x 1 = 10 Marks)**

### Section B

Answer any *seven* questions. Each question carries 2 marks.

11. What is the difference between system and surroundings?

12. How does ΔH is related to ΔU?

13. What is the difference between average velocity and RMS velocity?

14. Define Bravais lattice and Miller indices.

15. The Weiss indices of a lattice plane are 3, 2 and 3. Calculate its Miller indices.

16. Calculate the molecular mass of the solute when the vapour pressure of 10% of its solution at 373 K is 750 mm.

17. Define and explain Kohlrausch's law.

18. 10 moles of an ideal gas expand reversibly from a volume of 5 $dm^3$ to 50 $dm^3$ at a temperature of 27 $^0$C. Calculate the change in entropy.

19. What are the limitations of Ostwald's dilution law?

20. What is the effect of temperature on viscosity?

**(7 x 2 = 14 Marks)**

## Section C
Answer any *four* questions. Each question carries 5 marks.

21. State the second law of thermodynamics. Derive equation for entropy change for the state of a system.

22. Explain the kinetic molecular model of gases.

23. Differentiate crystalline and amorphous solids.

24. Define Henry's law and write its applications.

25. Derive Bragg's equation.

26. Explain $H_2$–$O_2$ fuel cell with diagram.

**(4 x 5 = 20 Marks)**

## Section D
Answer any *two* questions. Each question carries 10 marks.

27. Explain various defects in crystals.

28. a) Explain buffer solution with a suitable example.

    b) What is Henderson equation and explain its applications.

    c) A buffer solution contains 0.5 mole of $NH_4OH$ and 0.25 mole of $NH_4Cl$ per liter. Calculate the pH of the solution (Dissociation constant of $NH_4OH$ at the room temperature is 1.81 x $10^{-5}$).

29. a) Describe hydrogen and calomel electrodes with diagrams.

    b) Draw the diagram and explain the working of Daniel cell.

30. Explain various types of liquid crystals with examples. What are the various applications of liquid crystals?

**(2 x 10 = 20 Marks)**

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