C 5167

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Name..............................

Reg. No..........................

FOURTH SEMESTER B.Sc. DEGREE (SUPPLEMENTARY/IMPROVEMENT) EXAMINATION, MAY 2016

(UG—CCSS)

Complementary Course

CH 4C 07—PHYSICAL CHEMISTRY—II

Time : Three Hours

Maximum : 30 Weightage

I. Answer *all* the questions. Each question carries a weightage of ¼ :

1 Which among the following is a state function ?

    (a) Heat.

    (b) Work.

    (c) Both heat and work.

    (d) Enthalpy.

2 Which of the following salt will not undergo hydrolysis ?

    (a) NaCl.

    (b) CH_3COONa.

    (c) CH_3COONH_4.

    (d) NH_4Cl.

3 Iron articles can be protected from rusting, by coating with zinc. This process is called :

    (a) Amalgamation.

    (b) Galvanisation.

    (c) Quenching.

    (d) Barrier protection.

4 The SI unit of viscosity is :

    (a) $N \, m^{-2} \, S$.

    (b) $kg \, m \, S^{-1}$.

    (c) $N \, m^{-1}$.

    (d) Poise.

5 Surface tension of a liquid is independent of :

    (a) Temperature.

    (b) Nature of the liquid.

    (c) Volume of the liquid.

    (d) The presence of dissolved solutes.

6 Osmotic pressure of a solution is affected by :

    (a) Temperature.

    (b) Concentration of the solution.

    (c) Nature of the solute.

    (d) All these.

Turn over

7   Isotonic solutions at a particular temperature will have :

   (a) Same osmotic pressure.   (b) Same molar concentration.

   (c) Same mass of solute.   (d) Both (a) and (b).

8   Aerosol is a colloidal system, where :

   (a) The dispersed phase is solid and dispersion medium gaseous.

   (b) Dispersed phase is liquid and dispersion medium gaseous.

   (c) Dispersed phase is solid or liquid and dispersion medium gaseous.

   (d) Dispersed phase is gas and dispersion medium liquid.

9   Which among the following electrolyte is most effective in causing the coagulation of negatively charged As_2S_3 sol ?

   (a) NaCl.   (b) $BaCl_2$.

   (c) $AlCl_3$.   (d) $MgCl_2$.

10 Heat absorbed by the system 'q', work done by the system 'w' and increase in internal energy of the system ΔE are related as ————.

11 At the eutectic point, the degree of freedom of the system is ————.

12 The reduced phase rule equation is written as ————.

(12 × ¼ = 3 weightage)

II. Answer *all* questions. Each question carries a weightage of 1 :

13 Write the condition for equilibrium and spontaneity in terms of ΔG and ΔS.

14 One mole of an ideal gas undergoes isothermal reversible expansion at 27°C, till the volume increased ten fold. Calculate the work done during the expansion.

15 What is meant by overvoltage ?

16 The equivalent conductance at infinite dilution of NaCl, KCl and KBr are 126.5, 150.0 and 151.5 Scm^2 eq^{-1} respectively. Calculate the λ_{eq}^{∞} of NaBr.

17 Define vapour pressure of a liquid. How is it related to the boiling point of the liquid ?

18 What are colligative properties ? Give any *two* examples.

19 The osmotic pressure of a solution of sucrose in water is 3.6 atm at 300 K. Calculate the temperature at which the osmotic pressure of the solution becomes 5.4 atm.

20 What is Brownian movement ?

21 What are emulsions ? Give examples.

$(9 \times 1 = 9$ weightage$)$

III. Answer any *five* questions. Each question carries a weightage of 2 :

22 Calculate the enthalpy of combustion of $CH_4(g)$ at 27°C. Given the standard enthalpy of formation of $CH_4(g)$, $CO_2(g)$ and $H_2O(l)$ are -75 kJ, -393.5 kJ and -286.5 kJ mol^{-1} respectively.

23 What are buffer solutions ? How are they classified ? Give examples.

24 Write the equation for molar refraction and explain the terms.

25 What is reverse osmosis ? Write any *two* applications of the process.

26 Explain any *four* applications of colloids.

27 How will you differentiate between electrophoresis and sedimentation potential ?

28 Discuss the phase diagram of Pb – Ag system.

$(5 \times 2 = 10$ weightage$)$

IV. Answer any *two* questions. Each question carries a weightage of 4 :

29 Derive Kirchhoff's equation. What is the significance of the equation ?

30 What are fuel cells ? Explain the construction and working of $H_2 - O_2$ fuel cell.

31 With the help of a neat sketch, discuss the phase diagram of water system.

$(2 \times 4 = 8$ weightage$)$