Time : 3 Hours 15 min.
Maximum Marks : 70

CHEMISTRY

Karnataka PUE, I PUC
Sample Question Papers

Sample Question Paper 1

(Examination Paper, March 2017)

Solved

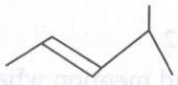
General Instructions :

1. The question paper has four parts A, B, C and D. All the parts are compulsory.
2. Write balanced chemical equations and draw labelled diagrams wherever asked.
3. Use log tables and simple calculators if necessary. (Use of scientific calculators is not allowed.)

Part 'A'

I. Answer all the questions. (Answer each question in one word or in one sentence.) **(10 × 1 = 10)**

1. State Avogadro's law.
2. Give the ideal gas equation for 'n' moles of a gas.
3. Write the conjugate base of HCO_3^-.
4. Define electronegativity.
5. Which metal can displace hydrogen from dilute acids from the following data ?
   $E^-_{zn/zn^{2+}} = -0.76V$. $E^-_{cu/cu^{2+}} = 0.34V$
6. Give the chemical formula of washing soda.
7. What is dry ice ?
8. Mention the type of hybridization of carbon in graphite.
9. Write the IUPAC name of



10. Name the organic product obtained when sodium benzoate is treated with sodalime.

Part 'B'

II. Answer any five questions. (Each question carries two marks.) **(5 × 2 = 10)**

11. Define mole. Calculate number of moles in 49 g of H_2SO_4 (Atomic Mass of H = 1, O = 16, S = 32).
12. What do you mean by critical volume (V_c) ? Give the unit of coefficient of viscosity.
13. Give any two differences between Sigma and Pi bonds.

14. What happens when sodium metal is heated in air ? Give equation.
15. Why carbon monoxide is poisonous ? Explain.
16. Write a note on geometrical isomerism in 2-butene.
17. What are electrophiles ? Give one example.
18. (i) What is meant by 'Biochemical Oxygen Demand' (BOD) ?
    (ii) Name any one gas pollutant that can pollute environment.

Part 'C'

III. Answer any five questions. (Each question carries three marks.) **(5 × 3 = 15)**

19. Write a brief note on *s*, *p* and d block elements.
20. Discuss the sp^2 hybridisation in BCl_3 molecule. Give the orbital picture.
21. Give any three postulates of 'VSEPR' theory.
22. Write the molecular orbital electronic configuration for carbon molecule. Calculate its bond order and comment on its magnetic property.
23. Balance the redox reaction by oxidation number method.
    $MnO_4^-(aq) + Br^-(aq) \rightarrow MnO_2(s) + BrO_3^-(aq)$ (Basic medium)
24. Complete the reactions
    (i) $C(s) + H_2O(g) \xrightarrow{\Delta}$ 1
    (ii) $CO(g) + H_2O(g) \xrightarrow{\Delta}$ 1
    (iii) $Zn(s) + 2H^+(aq) \longrightarrow$ 1
25. Write the equations during the preparation of sodium carbonate by solvay process.
26. (a) Graphite is a good conductor of electricity. Give reason. 1
    (b) Given the chemical formula of borazine. 1
    (c) Complete the equation 1

$$HCOOH \xrightarrow[373K]{\text{Conc. } H_2SO_4}$$

Part 'D'

IV. Answer any five questions. (Each question carries five marks.) **(5 × 5 = 25)**

27. (a) An organic compound contain 4.05% hydrogen, 24.26% carbon and 71.67% chlorine. Its molecular mass is 98.96. Find its empirical and molecular formula (Atomic mass of H = 1, C = 12, Cl = 35. 45). 4
    (b) Calculate the molar mass of glucose. 1
28. (a) Mention any three postulates of Bohr's model of an atom. 3
    (b) Give de Broglie equation. 1
    (c) Name the orbital when $n = 3$ and $l = 2$ 1
29. (a) Name the four quantum numbers and mention what they indicate. 4
    (b) State Aufbau principle. 1
30. (a) Write any three postulates of kinetic theory of gases. 3
    (b) On a ship sailing in pacific ocean where temperature is 23.4°C, a balloon is filled with 2L air what will be the volume of the balloon when ship reaches Indian ocean where temperature is 26.1°C ? 2
31. (a) State Hess's law of constant heat summation. 2
    (b) Calculate ΔG° for conversion of oxygen to ozone $\frac{3}{2}O_2(g) \rightarrow O_3$ at 298 K if $K_p = 2.47 \times 10^{-29}$. 2

(c) In the equation

$2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$, $\Delta H = -571.6$ kJ mol^{-1}

What is the enthalpy of formation of a water molecule ? 1

32. (a) The enthalpy of combustion of one mole of benzene, carbon and hydrogen are – 3267 kJ mol^{-1}, –393.5 kJmol^{-1} and – 285.8 kJ mol^{-1} respectively. Calculate the standard enthalpy of formation of benzene. 4

(b) What is the change in entropy when ice melts to give water ? 1

33. (a) Derive the ionic product of water and give its value at 25°C. 3

(b) What is buffer solution ? Give one example of acidic buffer solution. 2

34. (a) If K_a of weak acid is found to be 1.78×10^{-5} what is its pK_a value ? 2

(b) What happens to the pH of water when NH_4Cl solid is dissolved in it and why ? 2

(c) Give the Kp expression of the equation $H_2(g) + I_2(g) \rightleftharpoons 2\,HI(g)$. 1

V. ***Answer any two questions. (Each question carries five marks.)*** **(2 × 5 = 10)**

35. (a) Write the principle involved in the estimation of carbon and hydrogen. Give diagram and calculation. 2 + 1 + 1

(b) Write the resonance structure of benzene. 1

36. (a) How sulphur is estimated by Carius method and give calculation ? 3

(b) Explain position isomerism with example. 2

37. (a) Write the steps involved in the mechanism of nitration of benzene. 3

(b) Explain Wurtz reaction with example. 2

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