

Sri Bhagawan Mahaveer Jain College
V.V. Puram, Bangalore

I PUC mock preparatory Examination- Feb- 2017

Chemistry

Maximum Marks: 70

Part A

I Answer all the questions . (each question carries 1 mark)

10x1=10

1. Define atomic mass unit?
2. Write van der waals equation for 'n' moles of ideal gas.
3. First ionization enthalpy of nitrogen is higher than that of oxygen. Give reason.
4. Give any one example of solid and vapour equilibrium.
5. Name a compound in which the oxidation number of oxygen is +2.
6. Mention any one use of heavy water.
7. Give the structure of diborane.
8. Write an example of zeolite used as catalyst in petrochemical industry.
9. Arrange the following in the decreasing order of stability:
 $\cdot\text{CH}(\text{CH}_3)_2$, $\cdot\text{CH}_3\text{CH}_2$, $\cdot\text{CH}_3$, $\text{CH}_3(\text{C})_3$
10. What is lindlars's catalyst?

Part B

II Answer any five questions . (each question carries 2 mark)

5x2=10

11. What is heterogeneous mixture ? Give an example.
12. The volume of certain mass of a gas at NTP is 27.5cm^3 . What pressure will be necessary to keep the volume same at 27°C ?
13. Give any two differences between sigma and pi bonds.
14. Among lithium and sodium which is stronger reducing agent in aqueous medium and why?
15. How does aluminum react with dil HCl? Give equation .
16. 0.4 g of organic compound gives 0.2 g of AgCl precipitate from Carius method. Calculate the percentage of chlorine. (Atomic mass of Ag=108, Cl=35.5)
17. How do you convert ethyne to benzene? Give the chemical equation.
18. What is acid rain? Mention any one cause for acid rain.

Part C

III Answer any five questions . (each question carries 3 marks)

5X3=15

19. a) Give reason why size of cation is smaller than its parent atom.
b) Give any one species which is isoelectronic with Na^+ .

(2+1)

20. Mention any three salient features of hybridisation. (3)
21. a) Write the mathematical expression for dipole moment.
 b) Dipole moment of NH_3 is greater than NF_3 . Give reason. (1+2)
22. a) Write the energy level diagram for molecular orbital of oxygen molecule.
 b) Define lattice enthalpy. (2+1)
23. Balance the following chemical equation by half reaction method.

$$\text{Fe}^{2+}_{(\text{aq})} + \text{Cr}_2\text{O}_7^{2-}_{(\text{aq})} \rightarrow \text{Fe}^{3+}_{(\text{aq})} + \text{Cr}^{3+}_{(\text{aq})} \quad (\text{Acidic medium}) \quad (3)$$
24. a) Explain the reducing property of hydrogen peroxide in acidic medium with permanganate ion.
 b) Complete the reaction $\text{NaH}_{(\text{s})} + \text{H}_2\text{O}_{(\text{aq})} \rightarrow \quad + \text{H}_{2(\text{g})}$ (2+1)
25. Explain the preparation of washing soda by Solvay process with equations. (3)
26. Mention any three differences between diamond and graphite. (3)

Part D

- IV Answer any five questions . (each question carries 5 marks) 5X5=25
27. a) Define the term mole fraction . Write the expression to calculate the mole fraction of solute in solution.
 b) What are intensive properties ? Give an example. (3+2)
28. a) Calculate the wave number of a spectral line during transition of an electron in hydrogen atom from $n=5$ to $n=2$? ($R_H = 109677 \text{ cm}^{-1}$)
 b) State Heisenberg 's uncertainty principle. Give its mathematical form. (3+2)

29. a) Mention any two limitations of Rutherford 's atomic model.
- b) Write the possible values of l and m when n=3
- c) Name the sub atomic particle which has constant e/m value. (2+2+1)

30. a) Explain dipole-dipole interaction with an example.
- b) Define the following terms a) aqueous tension b) Viscosity coefficient.
- c) Write the SI unit of surface tension. (2+2+1)

31. a) Explain the Born-Haber cycle for the formation of one mole of NaCl crystal.
- b) State Hess's law of heat of summation. (3+2)

32. a) Calculate the enthalpy of formation of methane from the following data
- i. $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)} \quad \Delta H = -393.5 \text{ kJ}$
- ii. $H_{2(g)} + 1/2 O_{2(g)} \rightarrow H_2O_{(l)} \quad \Delta H = -285.0 \text{ kJ}$
- iii. $CH_{4(g)} + 2O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(l)} \quad \Delta H = -890 \text{ kJ}$
- b) Define adiabatic process. What is the value of 'q' in an adiabatic process? (3+2)

33. a) What is Bronsted Lowry base? Give an example.
- b) Calculate K_c for the reaction
- $$N_{2(g)} + 3H_{2(g)} \leftrightarrow 2NH_{3(g)}$$
- At equilibrium $[N_2] = 1.5 \times 10^{-2} \text{ M}$, $[H_2] = 3.0 \times 10^{-2} \text{ M}$, $[NH_3] = 1.2 \times 10^{-2} \text{ M}$ in a sealed vessel at 500K. (2+3)

34. a) Derive an equation for dissociation constant of a weak acid.
- b) Show that $p^H + p^{OH} = 14$. (3+2)

V Answer any two questions . (each question carries 5 marks) 2X5=10

35. a) Explain the electrophilic substitution mechanism for chlorination of benzene.

b) Write the reactions for ozonolysis of 2-methyl propene.

(3+2)

36. a) Give any two differences between inductive and electromeric effect.

b) How carbon and hydrogen are detected qualitatively by copper(II) oxide method?

c) Write the principle involved in fractional distillation.

(2+2+1)

37. a) Write the structures of cis and trans isomers of but-2-ene.

b) Explain kolbe's electrolysis method for preparation of methane.

(2+3)