I – PUC – CHEMISTRY (34)
MODEL QUESTION PAPER -1
For reduced syllabus 2020-21

Time: 3 hours 15 minutes   **Maximum Marks: 70**

Instructions:

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

PART- A

I. ANSWER ALL THE QUESTIONS. EACH QUESTION CARRIES 1 MARK.   10×1 = 10

(Answer each question in one word or one sentence)

1. 'Cisplatin' a medicine used in the treatment of which disease?

2. Write the mathematical expression for Boyle's law.

3. Give an example for gaseous reversible reaction for which Kp = Kc

4. Which group elements in the periodic table are called as noble gases?

5. What is the oxidation number of the element in its free state?

6. Write the general electronic configuration of first group elements.

7. Diamond is covalent, yet it has high melting point. Why?

8. Write the dimeric structure of $AlCl_3$.

9. Give an example for non-benzenoid compound.

10. Write a chemical reaction to show acidic nature of acetylene.

PART- B

II. ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 2 MARKS.   5×2= 10

11. Convert 37^0C to ^0F.

12. Under what conditions of temperature and pressure real gases tend to behave ideally?

13. What is dipole moment? What is its SI unit?

14. Write any two diagonal relationships between Beryllium and Aluminium.

15. Give the composition of   (a) Water gas   (b) Producer gas.

16. How is chloromethane converted into ethane?

17. Illustrate Markovnikov's rule with an example.

18. Explain decarboxylation of sodium benzoate with chemical equation.

PART- C

III. ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 3MARKS.   5×3= 15

19. i) Give reason: Ionic radius of F^- (fluoride ion) is more than atomic radius of F (fluorine atom).

   ii) How does ionization enthalpy varies down the group?

   iii) Ionization enthalpy of nitrogen is more than that of oxygen. Give reason.   1+1+1

20. With the help of MOT; write the energy level diagram of hydrogen molecule. What is its bond order and predict its magnetic property? 3

21. Calculate the formal charge of each oxygen atom of ozone molecule. 3

22. a) Give any two differences between sigma and pi bonds.

    b) What is the magnetic nature of oxygen molecule on the basis of MOT? 2+1

23. Balance the following redox reaction by oxidation number method. 3

$$MnO_2 + Br^- \rightarrow Mn^{2+} + Br_2 + H_2O \text{ (Acid medium)}$$

24. i) Explain softening of permanent hardness of water by Calgon's process.

    ii) Give an example of ionic hydride. 2+1

25. Give any three differences between lithium and other alkali metals. 3

26. Give any three anomalous properties of carbon. 3

PART –D

IV. ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 5MARKS. 5×5=25

27. a) Determine the molecular formula of an oxide of iron in which the mass percent of iron and oxygen are 69.9 and 30.1 respectively. Given that the molar mass of oxide is 159.8gmol^{-1}. (Atomic mass of iron & oxygen are 55.85u & 16u respectively)

    b) Define a mole. 4+1

28. a) Write the significance of quantum numbers n, l & m.

    b) State Pauli's exclusion principle.

    c) Write the electronic configuration of copper (Z = 29). 3+1+1

29. a) The FM station of All India Radio, Hassan, broadcast on a frequency of 1020kilohertz. Calculate the wavelength of the electromagnetic radiation emitted by transmitter.

    b) Calculate the maximum number of electrons present in third main energy level? 3+2

30. a) Give any three postulates of kinetic molecular theory of gases.

    b) On a ship sailing in Pacific Ocean where temperature is 23.40C, a balloon is filled with 2L air. What will be the volume of the balloon when the ship reaches Indian Ocean where temperature is 26.1^{0}C? 3+2

31. a) The combustion of one mole benzene takes place at 298K and 1 atm. After combustion, $CO_{2(g)}$ and $H_2O_{(l)}$ are produced and 3267.0kJ of heat is liberated. Calculate the standard enthalpy of formation of benzene. Given: Standard enthalpy of formation of $CO_{2(g)}$ and $H_2O_{(l)}$ are –393.5 kJmol^{-1} and –285.0kJmol^{-1} respectively.

    b) Write the mathematical expression for First law of thermodynamics.

    c) Give an example for isolated system. 3+1+1

32. What is lattice enthalpy? Calculate the lattice enthalpy of sodium chloride by using Born-Haber cycle. 5

33. a) The following concentrations were obtained for the formation of NH_3 from N_2 and H_2 at equilibrium at 500K. $[N_2]=1.5 \times 10^{-2}M$, $[H_2] = 3.0 \times 10^{-2}M$ and $[NH_3] = 1.2 \times 10^{-2}M$. Calculate the equilibrium constant.

   b) Define common ion effect?

   c) Write the relation between solubility and solubility product (K_{sp}) for AB_2 type of salt.   3+1+1

34. a) Define an acid and base according to Arrhenius concept?

   b) Give an example for (i) solid-vapour equilibrium (ii) liquid-vapour equilibrium

   c) Write the expression for equilibrium constant (K_c) for the equilibrium reaction:

   $$H_2 + I_2 \rightarrow 2HI$$ 2+2+1

V. ANSWER ANY TWO OF THE FOLLOWING. EACH QUESTION CARRIES 5MARKS.   2×5=10

35. a) For the molecule $CH_3CH_2CH_2OH$

   i) Identify functional group.

   ii) Write the bond line formula.

   iii) Write the succeeding homologue.

   b) Explain inductive effect with a suitable example.   3+2

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

   ii) Explain position isomerism with an example.

   b) What are nucleophiles?   4+1

37. a) Explain the mechanism of nitration of benzene.

   b) Write the Newman's projections of ethane.   3+2

I – PUC – CHEMISTRY (34)
MODEL QUESTION PAPER -2
For reduced syllabus 2020-21

Time: 3 hours 15 minutes   **Maximum Marks: 70**

Instructions:

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

PART- A

I. ANSWER ALL THE QUESTIONS. EACH QUESTION CARRIES 1 MARK.   10×1 = 10

1. Express 0.000123 in scientific notation.

2. Mention the type of intermolecular attractions that exist between non-polar molecules.

3. Give an example for homogeneous equilibrium.

4. Write the valence shell electronic configuration of d-block elements.

5. What is the oxidation state of Cr in $Cr_2O_7^{-2}$?

6. Which alkali metal is the strongest reducing agent?

7. The stability of +1 oxidation state in group-13 increases down the group. Why?

8. Name the allotropic form of carbon whose structure resembles soccer ball.

9. Write the bond line formula for the compound $(CH_3)_2CHCH_2C(CH_3)_3$.

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

PART- B

II. ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 2 MARKS.   5×2= 10

11. Calculate the number of gold atoms present in 98.5 g of gold (atomic mass of gold =197 g)

12. What will be the minimum pressure required to compress 500dm^3 of air at 1bar to 200dm^3 at 30°C?

13. What are the geometrical shapes of $BeCl_2$ and CO_2?

14. What is Plaster of Paris? How is it obtained?

15. Write any two anomalous properties of boron.

16. State Markovnikov's rule.

17. Draw cis and trans isomer of 2-butene.

18. What happens when calcium carbide is treated with water? Give equation.

PART- C

III. ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 3MARKS. 5×3= 15

19. a) Define electron gain enthalpy. How does it vary along the period?

    b) What would be the IUPAC name for the element with atomic number 108?   2+1

20. a) Write any two drawbacks of the octet theory.

    b) Write the Lewis dot structure of HNO_3.   2+1

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21. Discuss sp^2 hybridization in BCl_3 molecule. Write its orbital structure. 3

22. Write the molecular orbital electronic configuration for oxygen molecule. Calculate its bond order and comment on its magnetic property. 3

23. Balance the redox reaction by using Oxidation number method in acidic medium. 3

$$Cr_2O_7^{2-}{}_{(aq)} + SO_3^{2-}{}_{(aq)} \rightarrow Cr^{3+}{}_{(aq)} + SO_4^{2-}{}_{(aq)}$$

24. a) Give an example of metallic hydride.

b) What is molecular formula of heavy water?

c) Name any one method for softening of permanent hardness of water. 1+1+1

25. Explain the diagonal relationship between Lithium and Magnesium. 3

26. a) Write any two differences in the properties of Graphite and Diamond.

b) Give reason: The maximum covalence of boron is 4. 2+1

PART –D

IV. ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 5MARKS. 5×5=25

27. a) An organic compound contains 4.07% hydrogen, 24.27% carbon and 71.65% chlorine. Its molecular mass is 98.96g. Calculate the empirical and molecular formula.

b) What is limiting reagent? 4+1

28. a) Write any three postulates of Bohr's atomic model.

b) Explain photoelectric effect. 3+2

29. a) For an element with atomic number 29

i) Write the electronic configuration.

ii) Write the value of n and l for its electron in its valence shell.

b) Name the set of d-orbitals having the electron density along the axis. 3+2

30. a) Write any three postulates of kinetic theory of gases.

b) Write van der Waal's equation for n moles of gas. What do the symbols stands for? 3+2

31. a) Calculate the standard enthalpy of formation of liquid benzene (C_6H_6). Given the enthalpies of combustion of carbon(s), hydrogen (g) and benzene (l) are -393.5 kJ, -285.83 kJ and -3267.0 kJ respectively.

b) State first law of thermodynamics. Write its mathematical form. 3+2

32. a) What is free expansion? What is the work done during the expansion of an ideal gas both in reversible and irreversible process?

b) What are isothermal and adiabatic processes? 3+2

33. a) State Le Chatelier's principle. What is the effect of change of temperature for the reaction?

$$N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)} \quad \Delta H = -93.4kJ$$

b) Define acid and base according to Bronsted-Lowry concept. 3+2

34. a) What are Buffer solutions? Give an example for acidic buffer

b) Calculate the p^H of 0.002M H_2SO_4 by assuming complete dissociation.

c) Write the solubility product expression for$BaSO_4$. 2 + 2 + 1

V. ANSWER ANY TWO OF THE FOLLOWING. EACH QUESTION CARRIES 5MARKS.   2×5=10

35. For the compound CH_3CN

    a) Identify the number of sigma and pi bonds.

    b) Identify the functional group and hybridization of each carbon atom.

    c) Write its IUPAC Name. $2 + 2 + 1$

36. a) Write any two differences between inductive effect and electrometric effect.

    b) What are electrophiles? Give an example.

    c) Write the bond line formula of $(C_2H_5)_2O$. $2 + 2 + 1$

37. a) i) Explain cyclic polymerisation of acetylene.

     ii) Give an example for m- directing group.

    b) Write any two criteria for a compound to show aromatic character? $3 + 2$