

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 $\text{Cr}_2\text{O}_7^{2-}$?
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 $(\text{CH}_3)_2\text{CHCH}_2\text{C}(\text{CH}_3)_3$.
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

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. 4+1
- 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 $(\text{C}_2\text{H}_5)_2\text{O}$.

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

