

P.S.E.B. Chemistry Sample Paper for 2025-26

1. An unripe mango placed in a concentrated salt solution to prepare pickle, shrivels because-

- (a) It gains water due to osmosis.
 - (b) It loses water due to osmosis.
 - (c) It gains water due to reverse osmosis.
 - (d) It loses water due to reverse osmosis.
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2. In comparison to a 0.01 M solution of glucose, the depression in freezing point of a 0.01 M MgCl_2 solution is?

- (a) The same
 - (b) About twice
 - (c) About three times
 - (d) About six
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3. Isotonic solutions have:

- (a) Same boiling point
 - (b) Same vapour pressure
 - (c) Same melting point
 - (d) Same osmotic pressure
-

4. What is the final oxidation state of manganese after the electrochemical reactions in a Dry Cell?

- (a) +4

- (b) +3
 - (c) +2
 - (d) +1
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5. If the unit of specific rate constant (k) for a certain gaseous reaction is $\text{atm}^{-2} \text{s}^{-1}$, then the order of the reaction is-

- (a) Zero order
 - (b) First order
 - (c) Second order
 - (d) Third order
-

6. The coordination number of platinum in $[\text{PtCl}(\text{C}_5\text{H}_5\text{N})(\text{NH}_3)]$ is-

- (a) 3
 - (b) 4
 - (c) 5
 - (d) 6
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7. The reaction of toluene with Cl_2 in the presence of FeCl_3 gives predominantly-

- (a) Benzoyl chloride
 - (b) Benzyl chloride
 - (c) m-chlorotoluene
 - (d) o- and p-chlorotoluene
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8. Which of the following is most reactive towards nucleophilic addition reactions?

- (a) CH_3COCH_3
- (b) CH_3CHO

(c) $\text{CH}_3\text{COC}_2\text{H}_5$

(d) HCHO

9. Which of the following reagents cannot be used to distinguish between pentanal and 2-pentanone?

(a) Tollen's reagent

(b) Fehling's solution

(c) Br_2 in CCl_4

(d) I_2 in NaOH

10. Which of these is most acidic?

(a) CF_3COOH

(b) CCl_3COOH

(c) CBr_3COOH

(d) CH_3COOH

11. True/False: The compounds $[\text{CoCl}_2(\text{NH}_3)_4]\text{NO}_2$ and $[\text{CoCl}(\text{NO}_2)(\text{NH}_3)_4]\text{Cl}$ show coordination isomerism.

12. True/False: The crystal field splitting Δ_o depends on the field produced by the ligand and the charge on the metal ion.

13. True/False: The boiling point of ethers are higher than those of isomeric alcohols.

14. True/False: Benzaldehyde cannot undergo Cannizzaro reaction.

15. True/False: The red brown precipitate of aldehydes with Fehling's solution is due to the formation of Cu_2O .

16. What are carbohydrates?

17. What are Aldoses?

18. Define Monosaccharides.

19. Name a monosaccharide.

20. Glucose molecule has four asymmetric carbons. Find the total number of optical isomers in glucose.

21. The boiling point of a solution containing 1.5 g of dichlorobenzene in 100 g of benzene was higher by 0.268 K. Calculate the molar mass of dichlorobenzene. (K_b for benzene = 2.62 K molal⁻¹)

22. Calculate the number of molecules of oxalic acid ($\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$) in 100 mL of 0.2 N oxalic acid solution.

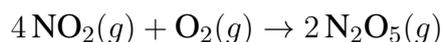
23. Shazia removed the outer hard shells of two different eggs. She then placed one egg in pure water and the other egg in a saturated solution of sucrose. What change is she likely to observe in the eggs after a few hours? Explain it.

24. Conductivity of a 0.00241 M acetic acid solution is $7.896 \times 10^{-5} \text{ S cm}^{-1}$. If Λ° for acetic acid is $390.5 \text{ S cm}^2 \text{ mol}^{-1}$, calculate its degree of dissociation (α).

25. Write down the functions of a salt bridge in an electrochemical cell.

26. The rate constant of a reaction at 500 K and 700 K are 0.02 s^{-1} and 0.07 s^{-1} respectively. Calculate the value of activation energy (E_a).

27. Consider the reaction:



In an experiment, the rate of disappearance of O_2 is $0.24 \text{ mol L}^{-1}\text{s}^{-1}$. Calculate: (i) the rate of disappearance of NO_2 and (ii) the rate of formation of N_2O_5 .

28. Define: (i) Half life of a reaction (ii) Pseudo first order reaction

29. Transition metals form alloys with other transition metals. Explain why?

30. Write down the IUPAC names of: (i) $\text{Na}[\text{PtBrCl}(\text{ONO})(\text{NH}_3)]$ (ii) $[\text{Ag}(\text{NH}_3)_2][\text{Ag}(\text{CN})_2]$

31. Define coordination number.

32. What is the hybridisation and structure of $[\text{Ni}(\text{CN})_4]^{2-}$?

33. How will you convert phenol to salicylaldehyde?

34. Explain the mechanism of acidic dehydration of ethyl alcohol to form ethene.

35. Write down the following reactions: (i) Aldol condensation (ii) HVZ reaction

36. Explain why carboxylic acids exist as associated molecules.

37. Alkylamines are more basic than ammonia. Explain why?

38. Write down the following reactions: (i) Carbylamine reaction (ii) Reaction between benzene diazonium chloride and phenol in basic medium

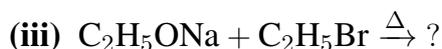
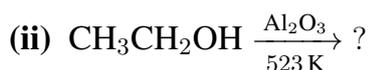
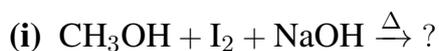
39. Differentiate between fibrous and globular proteins.

40. Three electrolytic cells A, B and C containing electrolytes of zinc sulphate, silver nitrate and copper sulphate respectively were connected in series. A steady current of 1.5 A was passed through them until 1.45 g of silver were deposited at the cathode of cell B. (i) How long did the current flow? (ii) What weight of copper and zinc get deposited?

41. The emf of the cell $\text{Zn(s)} | \text{Zn}^{2+} (0.1 \text{ M}) || \text{Cd}^{2+} (M_1) | \text{Cd(s)}$ has been found to be 0.3305 V at 298 K. Calculate the value of M_1 . Given: $E_{\text{Zn}^{2+}/\text{Zn}}^\circ = -0.76 \text{ V}$ and $E_{\text{Cd}^{2+}/\text{Cd}}^\circ = -0.40 \text{ V}$.

42. Starting from 100 g of a radioactive substance, 2.5 g was left after 5 years. If its radioactive decay follows first order kinetics, calculate: (i) Rate constant for the decay of the radioactive substance (ii) The amount of substance left after one year (iii) The time required for half of the substance to decay

43. Complete the following reactions:



44. What is Lucas reagent? Write down Lucas test for distinction between primary, secondary and tertiary alcohols.

45. Lower aliphatic amines are soluble in water. Why?

46. Write down a test to distinguish between aromatic primary amines and aliphatic primary amines.

47. Which element of the 3d transition series has the lowest enthalpy of atomisation and why?

48. Transition elements or their compounds act as catalysts. Explain why.

49. Define lanthanoid contraction.

50. Why do Ce and Tb show +4 oxidation state?

51. Write down two similarities between lanthanoids and actinoids.

52. Write down the following reactions: (a) Sandmeyer reaction (b) Hoffmann ammonolysis reaction (c) Wurtz–Fittig reaction (d) Finkelstein reaction (e) Friedel–Crafts alkylation

53. Explain the mechanism of Substitution Nucleophilic Bimolecular (SN₂) reaction of haloalkanes with a suitable example.

54. Explain giving two reasons why haloarenes are less reactive towards nucleophilic substitution reactions than haloalkanes.
