KCET 2025 Chemistry Question Paper

Time Allowed :1 Hour 20 minutes	**Maximum Marks :**180	**Total Questions :**60

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of 1 hours 20 minutes duration.
2. The question paper consists of 60 questions. The maximum marks are 180.
3. There are in the question paper consisting of Physics, having 60 questions of equal weightage.

1. In the reaction between hydrogen sulphide and acidified permanganate solution,

(1) H_2S is oxidised to SO_2, MnO_4^- is reduced to MnO_2

(2) H_2S is reduced to SO_2, MnO_4^- is oxidised to Mn^{2+}

(3) H_2S is oxidised to S, MnO_4^- is reduced to Mn^{2+}

(4) H_2S is reduced to S, MnO_4^- is oxidised to Mn^{2+}

---

2. A member of the Lanthanoid series which is well known to exhibit +4 oxidation state is

(1) Europium

(2) Erbium

(3) Cerium

(4) Samarium

---

3. In which of the following pairs, both the elements do not have

(n-1)d$^{10}ns^2configuration?$

(1) Zn, Cd

(2) Cd, Hg

(3) Ag, Cu

(4) Cu, Zn

---

4. A ligand which has two different donor atoms and either of the two ligates with the central metal atom/ion in the complex is called

(1) Unidentate ligand

(2) Polydentate ligand

(3) Ambidentate ligand

(4) Chelate ligand

---

5. Which of the following statements are true about $[NiCl_4]^{2-}$**?**

(a) The complex has tetrahedral geometry.

(b) Co-ordination number of Ni is 2 and oxidation state is +4.

(c) The complex is sp^3 hybridised.

(d) It is a high spin complex.

(e) The complex is paramagnetic.

(1) a, b, d and e

(2) b, c, and d

(3) a, b, c and d

(4) a, c, d and e

---

6. Which formula and its name combination is incorrect?

(1) $[CoCl_2(en)_2]Cl$, Dichloridobis (ethane-1, 2-diamine) cobalt(III) chloride

(2) $[Co(NH_3)_5(CO_3)]Cl$, Pentaamine carbonylcobalt (III) chloride

(3) $[Pt(NH_3)_2Cl(NO_2)]$, Diamine chloridonitrito-N-platinum(II)

(4) $K_3[Cr(C_2O_4)_3]$, Potassium trioxalatochromate(III)

---

7. In the complex ion $[Fe(C_2O_4)_3]^{3-}$, the co-ordination number of Fe is

(1) 5

(2) 6

(3) 3

(4) 4

---

8. Match List-I with List-II for the following reaction pattern:

Glucose Reagent $\rightarrow$ Product $\rightarrow$ Structural prediction

List-I (Reagents)	**List-II (Structural prediction)**
a) Acetic anhydride	i) Glucose has an aldehyde group
b) Bromine water	ii) Glucose has a straight chain of six carbon atoms
c) Hydroiodic acid	iii) Glucose has five hydroxyl groups
d) Hydrogen cyanide	iv) Glucose has a carbonyl group

Choose the correct answer from the options given below.

1) a-iii, b-i, c-ii, d-iv 2) a-i, b-ii, c-iii, d-iv

3) a-iii, b-ii, c-i, d-iv 4) a-iv, b-iii, c-ii, d-i

---

9. The correct sequence of α-amino acid, hormone, vitamin, carbohydrates respectively is

(1) Glutamine, Insulin, Aspartic acid, Fructose

(2) Arginine, Testosterone, Glutamic acid, Maltose

(3) Aspartic acid, Insulin, Ascorbic acid, rhamnose

(4) Thiamine, Thyroxine, Vitamin A, Glucose

---

10. Which examples of carbohydrates exhibit α-link (α-glycosidic link) in their structure?

(1) Amylose and Amylopectin

(2) Cellulose and Glycogen

(3) Glucose and Fructose

(4) Maltose and Lactose

---

11. In the titration of potassium permanganate ($KMnO_4$) against Ferrous ammonium sulphate (FAS) solution, dilute sulphuric acid but not nitric acid is used to maintain acidic medium, because

(1) Nitric acid doesn't act as an indicator

(2) Nitric acid itself is an oxidising agent

(3) Nitric acid is a weak acid than sulphuric acid

(4) It is difficult to identify the end point

---

12. The group reagent NH_4Cl (s) and aqueous NH_3, will precipitate which of the following ion

(1) Al^{3+}

(2) Ba^{2+}

(3) Ca^{2+}

(4) NH_4^+

---

13. In the preparation of sodium fusion extract, the purpose of fusing organic compound with a piece of sodium metal is to

(1) Convert the elements of the compound from covalent form to ionic form

(2) Convert the elements of the compound from ionic form to covalent form

(3) Decrease the melting point of the compound

(4) Convert the organic compound into vapour state

---

14. The sodium fusion extract is boiled with concentrated nitric acid while testing for halogens. By doing so, it

(1) increases the solubility of AgCl

(2) increases the concentration of NO_3^- ion

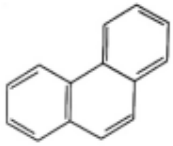
(3) decomposes Na_2S and NaCN, if formed

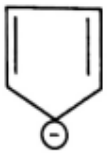
(4) helps in precipitation of AgCl

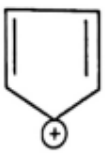
---

15. Which of the following is not an aromatic compound?

1) 

2) 

3) 

4) 

---

16. The IUPAC name of the given organic compound is $HC \equiv C - CH = CH - CH_2$.

(1) Hexa - 5-yn-1,3-diene

(2) Hexa-1,3-dien-5-yne

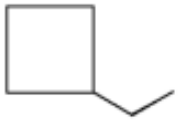
(3) Hexa - 3,5-dien-1-yne

(4) Hexa-1-yn-3,5-diene

---

17. Among the following, identify the compound that is not an isomer of hexane:

1) $CH_3 - CH_2 - CH_2 - CH_2 - CH_2 - CH_3$

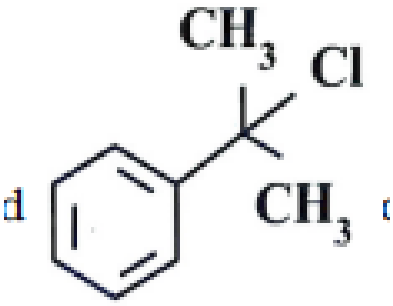
2) 

3) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - CH_2 - CH_3$

4) $CH_3 - CH_2 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - CH_3$

---

18. The organic compound can be classified as



(1) Benzyl halide

(2) Aryl halide

(3) Alkyl halide

(4) Allylic halide

---

19. Chlorobenzene reacts with bromine gas in the presence of Anhydrous $AlBr_3$ to yield p-Bromochlorobenzene. This reaction is classified as_____.

(1) Nucleophilic substitution reaction

(2) Electrophilic substitution reaction

(3) Addition reaction

(4) Elimination reaction

---

20. The organometallic compound $(CH_3)_3CMgBr$ on reaction with D_2O produces

(1) (CD)CD

(2) (CD)COD

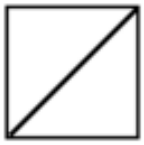
(3) (CH)CD

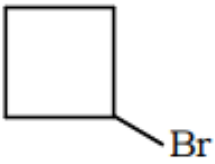
(4) (CH)COD

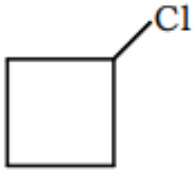
---

21. The major product formed when 1 - Bromo-3-Chlorocyclobutane reacts with metallic sodium in dry ether is

1) 

2) 

3) 

4) 

---

22. Ethyl alcohol is heated with concentrated sulphuric acid at 413 K (140°C). The major product formed is

(1) CH - O - CH

(2) CH = CH

(3) CHCOOCH

(4) CH - O - CH

---

23. Phenol can be distinguished from propanol by using the reagent

(1) Iron metal

(2) Iodine in alcohol

(3) Sodium metal

(4) Bromine water

---

24. Match the following with their pKa values

	Acid	pKa
I	Phenol	a) 16
II	p-Nitrophenol	b) 0.78
III	Ethyl alcohol.	c) 10
IV	Picric acid	d) 7.1

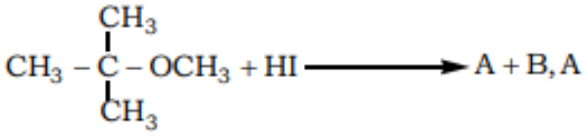
1) I - a, II - d, III - c, IV – b

2) I-a, II - b, III - c, IV – d

3) I-b, II - a, III - d, IV – c

4) I-c, II -d, III - a, IV – b

25.



Respectively are

1) $A = CH_3OH, B = CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - I$

2) $A = CH_3 - I, B = CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - I$

3) $A = CH_3OH, B = CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - OH$

4) $A = CH_3 - I, B = CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - OH$

---

26. Oxidation of Toluene with chromyl chloride followed by hydrolysis gives Benzaldehyde. This reaction is known as

(1) Kolbe reaction

(2) Stephen reaction

(3) Cannizzaro Reaction

(4) Etard Reaction

---

27. Statement-I: Reduction of ester by DIBAL-H followed by hydrolysis gives aldehyde.

Statement-II: Oxidation of benzyl alcohol with aqueous KMnO leads to the formation of benzaldehyde.

Among the above statements, identify the correct statement.

(1) Statement-I is true but statement-II is false

(2) Statement-I is false but statement-II is true

(3) Both statements-I and II are true

(4) Both statements-I and II are false

---

28. Arrange the following compounds in their decreasing order of reactivity towards nucleophilic addition reaction.

(1) CHCOCH, CHCOCH, CHCHO

(2) CHCOCH ¿ CHCOCH ¿ CHCHO

(3) CHCHO ¿ CHCOCH ¿ CHCOCH

(4) CHCHO ¿ CHCOCH ¿ CHCOCH

---

29. Which of the following has the most acidic Hydrogen?

(1) Dichloroacetic acid

(2) Trichloroacetic acid

(3) Chloroacetic acid

(4) Propanoic acid

---

30. Which of the following reagents are suitable to differentiate Aniline and N-methylaniline chemically?

(1) Br water

(2) Conc. Hydrochloric acid and anhydrous zinc chloride

(3) Chloroform and Alcoholic potassium hydroxide

(4) Acetic anhydride

---

31. Which of the following reaction/s does not yield an amine?

(I) R - X + NH $\xrightarrow{\text{alc}}$

(II) R - C N $\xrightarrow{H/Ni}$ Na (Hg)/CHOH

(III) R - C = N + HO $\xrightarrow{H}$

(IV) R - C - NH + 4 [H] $\xrightarrow{\text{LiAlH}}$ HO + H

---

32. Match the compounds given in List-I with the items given in List-II

List-I	List-II
(I) Benzenesulphonyl Chloride	(a) Zwitterion
(II) Sulphanilic acid	(b) Hinsberg reagent
(III) Alkyl Diazonium salts	(c) Dyes
(IV) Aryl Diazonium salts	(d) Conversion to alcohols

1) I-a, II-c, III-b, IV-d 2) I-c, II-a, III-d, IV-b

3) I-b. II-a. III-d. IV-c 4) I-c. II-b. III-a. IV-d

---

33. The number of orbitals associated with 'N' shell of an atom is

(1) 32

(2) 3

(3) 4

(4) 16

---

34. According to the Heisenberg's Uncertainty principle, the value of $\Delta v \cdot \Delta x$ for an object whose mass is 10^{-6} kg is

(1) $4.0 \times 10^{-26}\,\text{ms}^{-1}$

(2) $3.5 \times 10^{-25}\,\text{ms}^{-1}$

(3) $5.2 \times 10^{-29}\,\text{ms}^{-1}$

(4) $3.0 \times 10^{-24}\,\text{ms}^{-1}$

---

35. Given below are two statements.

Statement-I: Adiabatic work done is positive when work is done on the system and internal energy of the system increases.

Statement-II: No work is done during free expansion of an ideal gas.

(1) Statement-I is true but Statement-II is false.

(2) Statement-I is false but Statement-II is true.

(3) Both Statement-I and Statement-II are true.

(4) Both Statement-I and Statement-II are false.

---

36. Which one of the following reactions has

$\Delta H = \Delta U$?

(1) $C_6H_6(l) + \frac{15}{2}O_2(g) \rightarrow 6CO_2(g) + 3H_2O(l)$

(2) $2HI(g) \rightarrow H_2(g) + I_2(g)$

(3) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

(4) $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

---

37. Identify the incorrect statements among the following:

(a) All enthalpies of fusion are positive.

(b) The magnitude of enthalpy change does not depend on the strength of the intermolecular interactions in the substance undergoing phase transformations.

(c) When a chemical reaction is reversed, the value of ΔH° is reversed in sign.

(d) The change in enthalpy is dependent on the path between initial state (reactants) and final state (products).

---

38. Which of the following statements is/are true about equilibrium?

(a) Equilibrium is possible only in a closed system at a given temperature

(b) All the measurable properties of the system remain constant at equilibrium.

(c) Equilibrium constant for the reverse reaction is the inverse of the equilibrium constant for the reaction in the forward direction.

---

39. According to Le Chatelier's principle, in the reaction CO(g) +

3H$_2(g) \rightleftharpoons CH_4(g) + H_2O(g), the formation of methane is favoured by$

(a) increasing the concentration of CO

(b) increasing the concentration of H_2O

(c) decreasing the concentration of CH_4

(d) decreasing the concentration of H_2

---

40. The equilibrium constant at 298 K for the reaction $A + B \rightleftharpoons C + D$ is 100. If the initial concentrations of all the four species were 1 M each, then equilibrium concentration of D (in mol/L) will be

(1) 1.818

(2) 1.182

(3) 0.818

(4) 0.182

---

41. Among the following 0.1 m aqueous solutions, which one will exhibit the lowest boiling point elevation, assuming complete ionization of the compounds in solution?

(1) Aluminium sulphate

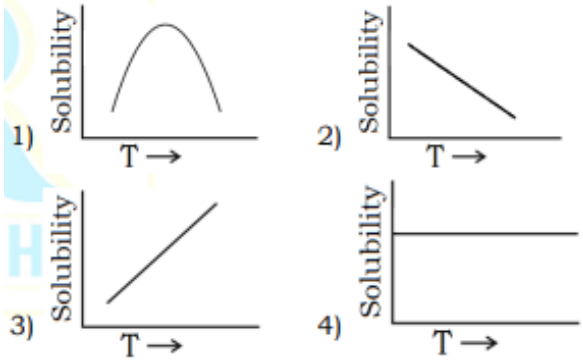
(2) Potassium sulphate

(3) Sodium chloride

(4) Aluminium chloride

---

42. Variation of solubility with temperature T for a gas in liquid is shown by the following graphs. The correct representation is



(1) (2) (3) (4)

---

43. 180 g of glucose, $C_6H_{12}O_6$, is dissolved in 1 kg of water in a vessel. The temperature at which water boils at 1.013 bar is $_{(given, K_b}$ for water is 0.52 K kg mol^{-1}). Boiling point for pure water is 373.15 K

(1) 373.15 K

(2) 373.0 K

(3) 373.202 K

(4) 373.67 K

---

44. If N_2 gas is bubbled through water at 293 K, how many moles of N_2 gas would dissolve in 1 litre of water? Assume that N_2 exerts a partial pressure of 0.987 bar.

[Given K_H for N_2 at 293 K is 76.48 K bar]

(1) 7.16×10^{-5}

(2) 7.16×10^{-4}

(3) 7.16×10^{-3}

(4) 0.716×10^{-3}

---

45. The correct statement/s about Galvanic cell is/are:

(a) Current flows from cathode to anode

(b) Anode is positive terminal

(c) If $E_{\text{cell}} < 0$, then it is spontaneous reaction

(d) Cathode is positive terminal

(1) a, b, and c

(2) a, b, and c

(3) a, b, and c

(4) a and b only

---

46. The electronic conductance depends on:

(1) The number of valence electrons per atom

(2) Concentration of the electrolyte

(3) Size of the ions

(4) Nature of electrolyte added

---

47. For a given half cell, $Al^{3+} + 3e^- \rightarrow$ Al on increasing the concentration of aluminium ion, the electrode potential will

(1) No change

(2) First increase then decrease

(3) Increase

(4) Decrease

---

48. Match the following and select the correct option for the quantity of electricity, in $Cmol^{-1}$, required to deposit various metals at the cathode.

(1) a) Ag^{+}, ii) 386000 $Cmol^{-1}$

(2) b) Mg^{2+}, iii) 289500 $Cmol^{-1}$

(3) c) Al^{3+}, iv) 96500 $Cmol^{-1}$

(4) d) Ti^{4+}, i) 193000 $Cmol^{-1}$

---

49. Catalysts are used to increase the rate of a chemical reaction. Because it

(1) Decrease the activation energy of the reaction

(2) Brings about improper orientation of reactant molecules

(3) Increases the potential energy barrier

(4) Increases the activation energy of the reaction

---

50. Half-life of a first order reaction is 20 seconds and initial concentration of reactant is 0.2M. The concentration of reactant left after 80 seconds is

(1) 0.5 M

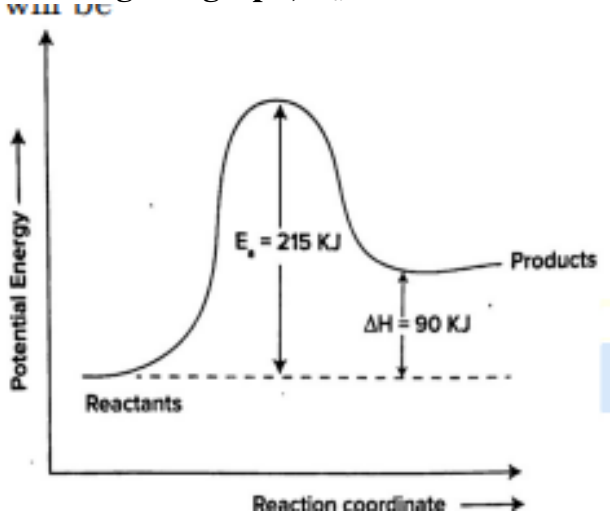
(2) 0.0125 M

(3) 0.2 M

(4) 0.1 M

---

51. In the given graph, E_a for the reverse reaction will be



(1) 215 KJ

(2) 90 KJ

(3) 305 KJ

(4) 125 KJ

52. For the reaction $2N_2O_5 \rightarrow 4NO_2(g) + O_2(g)$, the initial concentration of N_2O_5 is 2.0 mol L^{-1}, and after 300 minutes, it is reduced to 1.4 mol L^{-1}. The rate of production of NO_2 (in mol L^{-1} min^{-1}) is

(1) 4×10^{-4}

(2) 2.5×10^{-3}

(3) 4×10^{-3}

(4) 2.5×10^{-4}

---

53. Which of the following methods of expressing concentration are unitless?

(1) Molality and Mole fraction

(2) Mass percent (W/W) and Molality

(3) Molality and Molality

(4) Mole fraction and Mass percent (W/W)

---

54. Select the INCORRECT statement/s from the following:

(a) 22 books have infinite significant figures.

(b) In the answer of calculation 2.5×1.25 has four significant figures.

(c) Zero's preceding to first non-zero digit are significant.

(d) In the answer of calculation $12.11 + 18.0 + 1.012$ has three significant figures.

---

55. Given below are the atomic masses of the elements:

Element:	Li	Na	Cl	K	Ca	Br	Sr	I	Ba
Atomic Mass $(gmol^{-1})$:	7	23	35.5	39	40	80	88	127	137

Which of the following doesn't form triad?

1) Cl, Br, I

2) Cl, K, Ca

3) Li, Na, K

4) Ba, Sr, Ca

---

56. The change in hybridisation (if any) of the 'Al' atom in the following reaction is

$AlCl_3 + Cl^- \rightarrow AlCl_4^-$

(1) sp^2 to sp^3

(2) sp^3 to sp^d

(3) sp^3 to sp^2

(4) No change in the hybridisation state

---

57. Match List-I with List-II and select the correct option:

List-I (Molecule /ion)	List-II (Bond order)
(a) NO	(i) 1.5
(b) CO	(ii) 2.0
(c) O_2^-	(iii) 2.5
(d) O_2	(iv) 3.0

1) a-i, b-iv, c-iii, d-ii 2) a-ii, b-iii, c-iv, d-i

3) a-iv, b-iii, c-ii, d-i 4) a-iii, b-iv, c-i, d-ii

---

58. The electronic configuration of X and Y are given below:

X: $1s^2 2s^2 2p^6 3s^2 3p^3$

Y: $1s^2 2s^2 2p^6 3s^2 3p^5$

Which of the following is the correct molecular formula and type of bond formed between X and Y?

1) X_2Y_3, coordinate bond

2) X_3Y_3, covalent bond

3) X_2Y_3, covalent bond

4) X_3Y, ionic bond

---

59. Match List-I with List-II and choose the correct answer from the options given below.

List-I (Types of redox reactions)	List-II (Examples)
(a) Combination reaction	(i) $C\ell_{2(g)} + 2Br^-_{(aq)} \rightarrow 2C\ell^-_{(aq)} + Br_{2(\ell)}$
(b) Decomposition reaction	(ii) $2H_2O_{2(aq)} \rightarrow 2H_2O_{(\ell)} + O_{2(g)}$
(c) Displacement reaction	(iii) $CH_{4(g)} + 2O_{2(g)} \xrightarrow{\Delta} CO_{2(g)} + 2H_2O_{(\ell)}$
(d) Disproportio -nation Reaction	(iv) $2H_2O_{(\ell)} \xrightarrow{\Delta} 2H_{2(g)} + O_{2(g)}$

Choose the correct answer from the options given below.

1) a-ii, b-i, c-iv, d-iii 2) a-iii, b-iv, c-i, d-ii

3) a-iii, b-ii, c-i, d-iv 4) a-iv, b-iii, c-i, d-ii

---

60. In the following pairs, the one in which both transition metal ions are colourless is

1) V^{2+}, Ti^{3+}

2) Zn^{2+}, Mn^{2+}

3) Ti^{4+}, Cu^{2+}

4) Sc^{3+}, Zn^{2+}
