CUET UG 2025 306-Chemistry Question Paper

Time Allowed :1 Hours	**Maximum Marks :**100	**Total questions :**50

General Instructions

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i) The CUET (UG) 2025 will be conducted by the National Testing Agency (NTA) in Computer Based Test (CBT) mode.

ii) All questions will be objective type (MCQs) with four options, out of which only one will be correct.

iii) Each correct answer carries **+5 marks**, and **1 mark will be deducted** for every incorrect response. Unanswered questions will get **0 marks**.

iv) The test will consist of three sections:

- Section I: Languages
- Section II: Domain Subjects
- Section III: General Test

v) Candidates must carry their Admit Card and a valid Photo ID proof to the examination center.

vi) Rough work should be done only in the provided sheet/scribble pad, which must be returned after the test.

vii) No electronic gadgets, mobile phones, or programmable calculators are permitted inside the examination hall.

Q1. The value of van't Hoff factor, i, for CHCOOH solution in water will be

(A) Between 1 and 2

(B) Less than 1

(C) 2

(D) 1

Q2. The following solutions were prepared by dissolving 1 g of solute in 1 L of the solution. Arrange the following solutions in decreasing order of their molarity:

(A) Glucose (molar mass = 180 g mol^{-1})

(B) NaOH (molar mass = 40 g mol^{-1})

(C) NaCl (molar mass = 58.5 g mol^{-1})

(D) KCl (molar mass = 74.5 g mol^{-1})

(A) (A), (D), (C), (B)

(B) (A), (B), (C), (D)

(C) (B), (C), (D), (A)

(D) (D), (C), (A), (B)

Q3. Match List-I with List-II

Solutions	**Explanation**
(A) Saturated solution	(I) Solution having two co
(B) Isotonic solutions	(II) A solution whose osmotic pressure is
(C) Binary solution	(III) A solution which contains the maximum amount of solute that can be d
(D) Hypertonic solution	(IV) The solutions having the same osmotic pr

(A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

(B) (A) - (I), (B) - (III), (C) - (IV), (D) - (II)

(C) (A) - (II), (B) - (IV), (C) - (III), (D) - (I)

(D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Q4. Give the reason for low concentration of oxygen in the blood and tissues of people living at high altitude.

(A) Both low temperature and high atmospheric pressure

(B) Low temperature

(C) Low atmospheric pressure

(D) High atmospheric pressure

Q5. Calculate the molality of KI if the density of 20% (mass/mass) aqueous solution of KI is 1.202 g mL^{-1}.

(Molar mass of KI is 166 g mol^{-1})

(A) 1.5 mol kg^{-1}

(B) 1.2 mol kg^{-1}

(C) 1.5 mol kg^{-1}

(D) 0.12 mol kg^{-1}

Q6. The unit of E_{cell} is

(A) V m^{-1}

(B) S cm^{-1}

(C) V

(D) S cm^{-2} mol^{-1}

Q7. Match List-I with List-II

List-I	List-II	Matches
(A) Cell constant	(I) cm^{-1}	(A) - (I)
(B) Molar conductance	(II) ohm^{-1} cm^2 mol^{-1}	(B) - (II)
(C) Specific conductance	(III) ohm^{-1} cm^{-1}	(C) - (III)
(D) Conductance	(IV) ohm^{-1}	(D) - (IV)

Table 1: Matching properties with their respective units.

(A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)

(B) (A) - (I), (B) - (III), (C) - (II), (D) - (IV)

(C) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)

(D) (A) - (IV), (B) - (II), (C) - (III), (D) - (I)

Q8. The following statements describe various properties of a Mercury cell:

(A) It converts energy of combustion into electrical energy

(B) It is rechargeable

(C) The cell reaction involved is $Zn(Hg) + HgO(s) \rightarrow ZnO(s) + Hg(l)$

(D) It is a low current device used in hearing aids

(A) (A), (B) and (D) only

(B) (A) and (C) only

(C) (A), (B), (C) and (D)

(D) (C) and (D) only

Q9. Which cell is used in automobiles and inverters?

(A) Mercury cell

(B) Dry cell

(C) Lead storage cell

(D) Fuel cell

Q10. A galvanic cell behaves as an electrolytic cell when?

(A) $E_{\text{cell}} = E_{\text{ext}}$

(B) $E_{\text{cell}} = 0$

(C) $E_{\text{ext}} > E_{\text{cell}}$

(D) $E_{\text{cell}} > E_{\text{ext}}$

Q11. Which of the following does not represent a correct application of the coordination compound?

(A) cis-platin effectively inhibit the growth of tumours

(B) chlorophyll helps in photosynthesis

(C) desferrioxime B is used in treatment of lead poisoning

(D) cyanocobalamine, antipernicious anemia factor is a coordination compound of Co

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Q12. Arrange the following ions in increasing order of number of 3d-electrons:

(A) Cr^{2+}

(B) Cu^{2+}

(C) Ti^{3+}

(D) Mn^{2+}

(A) (B), (A), (C), (D)

(B) (C), (A), (D), (B)

(C) (C), (D), (A), (B)

(D) (D), (B), (C), (A)

Q13. The atomic number of Lanthanum is 57. Its electronic configuration will be .....

(A) $[Xe]5d^1 6s^2$

(B) $[Xe]4f^1 5d^1$

(C) $[Xe]4f^3$

(D) $[Xe]4f^15d^16s^2$

Q14. Match compound/elements of List-I with their uses given in List-II

List-I	**List-II**
(A) Magnesium based alloy is constituent of	(I) Bullets
(B) Lanthanoid oxide	(II) Petroleum cracking
(C) Mixed oxides of Lanthanoids are employed in	(III) Television screen
(D) Misch metal	(IV) Lanthanoid metal and iron

Table 2: Matching compounds/elements with their uses

(A) (A) - (II), (B) - (III), (C) - (I), (D) - (IV)

(B) (A) - (I), (B) - (III), (C) - (II), (D) - (IV)

(C) (A) - (II), (B) - (IV), (C) - (III), (D) - (I)

(D) (A) - (I), (B) - (IV), (C) - (III), (D) - (II)

Q15. What is the color of Fe^{3+}(aq) ion?

(A) Yellow

(B) Violet

(C) Colourless

(D) Bluepink

Q16. Why is HCl not used to make the medium acidic in oxidation reactions of $KMnO_4$ in acidic medium?

(A) $KMnO_4$ is weaker oxidizing agent than HCl

(B) $KMnO_4$ oxidises HCl into Cl_2, which is also an oxidizing agent

(C) Both HCl and $KMnO_4$ act as oxidizing agents

(D) $KMnO_4$ acts as a reducing agent in the presence of HCl

Q17. Acidified potassium dichromate oxidizes sulphides (S^{2-}) to .....

(A) SO_4^{2-}

(B) SO_3^{2-}

(C) Sulphur (S)

(D) SO_2

Q18. What is the decreasing order of field strength of given ligands?

(A) S^{2-}

(B) Ethylenediamine

(C) NCS^-

(D) CN^-

(A) (A), (C), (B), (D)

(B) (A), (B), (C), (D)

(C) (B), (C), (D), (A)

(D) (D), (C), (B), (A)

Q19. What is the IUPAC name of $[Pt(NH_3)_2Cl_2]$?

(A) Diamminedichloridoplatinum (IV)

(B) Diamminedichloridoplatinum (II)

(C) Diamminedichloridoplatinum (0)

(D) Dichloridodiammineplatinum (IV)

Q20. Select the correct statements for $[Fe(CN)_6]^{3-}$ complex:

(A) Paramagnetic

(B) sp^3d^2 hybridization

(C) Magnetic moment = 5.92 BM

(D) d^2sp^3 hybridization

(A) (A) and (D) only

(B) (A), (B) and (C) only

(C) (B), (C) and (D) only

(D) (B), (C) and (D) only

Q21. Match List-I with List-II

List-I	**List-II**
(A) Ambient nucleophiles	(I) Symmetrical object
(B) Plane polarized light	(II) Saytzeff rule
(C) Superimposable mirror image	(III) Cyanides and nitriles
(D) β-elimination reaction	(IV) Nicol Prism

(A) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

(B) (A) - (I), (B) - (III), (C) - (II), (D) - (IV)

(C) (A) - (B), (B) - (III), (C) - (I), (D) - (IV)

(D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Q22. Optically active alkyl halide undergoing S_N2 substitution involves

(A) retention of configuration

(B) racemic mixture

(C) inversion of configuration

(D) formation of carbocation

Q23. Gabriel phthalimide synthesis is used for the preparation of

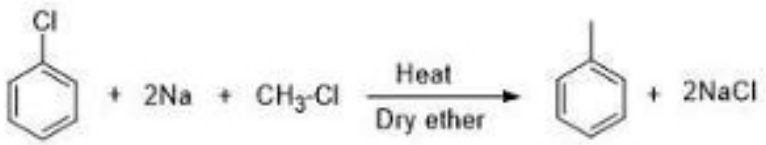
(A) tertiary amine

(B) acid synthesis

(C) primary amine

(D) secondary amine

Q24. The above reaction is an example of



(A) Sandmeyer's reaction

(B) Wurtz reaction

(C) Wurtz Fittig reaction

(D) Kolbe reaction

Q25. The reagent(s) used in hydroboration oxidation of propene are: (A) B_2H_6

(B) H_2O

(C) H_2O_2

(D) OH^-

(A) (A), (B) and (D) only

(B) (A), (B) and (C) only

(C) (A), (B), (C) and (D)

(D) (B), (C) and (D) only

Q26. The carbohydrate used as a storage molecule in plants is

(A) Starch

(B) Glycogen

(C) Cellulose

(D) Glucose

Q27. Hell-Volhard Zelinsky reaction is used for the formation of

(A) Alcohols

(B) Aldehydes

(C) Ketones

(D) α-halocarboxylic acids

Q28. What is the correct sequence of increasing reactivity of the following compounds towards nucleophilic addition reaction?

(A) Ethanal

(B) Propanone

(C) Propanal

(D) Butanone

(A) (A), (B), (C), (D)

(B) (D), (B), (C), (A)

(C) (A), (C), (B), (D)

(D) (C), (B), (D), (A)

Q29. Which of the following reagents is required for the conversion of Benzene to methyl benzoate?

(A) Br_2/$FeBr_3$

(B) Mg, dry Ether

(C) CO_2, H_3O^+

(D) Methanol, Conc. H_2SO_4

(A) (A), (B) and (C) only

(B) (A), (B) and (D) only

(C) (A), (B), (C) and (D)

(D) (B), (C) and (D) only

Q30. Which reagent will distinguish Benzophenone from acetone?

(A) Fehling's reagent

(B) Tollen's reagent

(C) 2,4-DNP reagent

(D) I_2/NaOH

Q31. The structural feature in carbonyl compound for Aldol condensation is:

(A) Presence of at least one -hydrogen

(B) Presence of at least one -hydrogen

(C) Concentrated base

(D) Lack of -hydrogen

Q32. The nitrogen atom in amines is trivalent and possess an unshared pair of electrons. The geometry of trimethyl amine is:

(A) Tetrahedral

(B) Pyramidal

(C) Square planar

(D) Triangular

Q33. What happens when CH–O–R is treated with HX?

(A) RX and CHOH are formed

(B) ROH and CHX are formed

(C) CHX and ROH are formed

(D) RX and CHX are formed

Q34. In the nitration of benzene using a mixture of conc. HSO and conc. HNO, the nitrating species is:

(A) NO

(B) NO^{2}

(C) NO

(D) NO and NO^{2}

Q35. Which of the following compounds will not give azo coupling reaction with benzene diazonium chloride?

(A) Nitrobenzene

(B) Aniline

(C) o-Toluidine

(D) Phenol

Q36. Amylose is a water-soluble part of starch. What is the percentage solubility of it?

(A) 20 to 30%

(B) 15 to 20%

(C) 30 to 60%

(D) 50 to 70%

Q37. What is an example of globular protein?

(A) Insulin

(B) Keratin

(C) Albumin

(D) Myosin

(A) (A), (B) and (D) only

(B) (A) and (C) only

(C) (A), (B), (C) and (D)

(D) (B), (C) and (D) only

Q38. Which types of bonds or interactions are found in the β-helix of protein?

(A) Ionic bond

(B) Covalent interaction

(C) H-bond

(D) Banana bond

Q39. Match the amino acid given in List-I with their one-letter code given in List-II

List-I **List-II**

Name of amino acid **One letter code**

Name of amino acid	**One letter code**
(A) Lysine	(I) W
(B) Tryptophan	(II) Q
(C) Tyrosine	(III) K
(D) Glutamine	(IV) Y

(A) (A) - (II), (B) - (I), (C) - (III), (D) - (IV)

(B) (A) - (III), (B) - (I), (C) - (II), (D) - (IV)

(C) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)

(D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Q40. Arrange the following compounds in increasing order of their acidic strength:

(A) 3-nitrophenol

(B) 3,5-Dinitrophenol

(C) 2,4,6-Trinitrophenol

(D) Phenol

(A) (D), (C), (B), (A)

(B) (C), (A), (B), (D)

(C) (D), (A), (B), (C)

(D) (A), (B), (C), (D)

Read the passage carefully and answer the questions.

The speed at which a chemical reaction takes place is called the rate of reaction. The rate of reaction depends on various factors like concentration of the reactants, temperature, etc. The relation between the rate of reaction and the concentration of reacting species is represented by the equation $r = k[A]^x[B]^y$, where x and y are the order of the reaction with respect to the reactants A and B, respectively. The overall order of the reaction is $x + y$. The rate of reaction can also be increased by the use of a catalyst which provides an alternate pathway of lower activation energy. It increases the rate of forward and backward reactions to an equal extent. It does not alter the Gibbs energy of the reaction.

Q41. The rate of a gaseous reaction is given by $r = k[A]^x[B]^y$. If the volume of the reaction vessel is suddenly reduced to $\frac{1}{4}$th of its initial value, the reaction rate relating to the initial rate will become

(A) 2 times

(B) $\frac{1}{4}$ times

(C) 16 times

(D) $\frac{1}{16}$ times

Q42. Calculate the order of a reaction whose Rate = $k[A]^{1/2}[B]^{3/2}$.

(A) second order

(B) half order

(C) first order

(D) zero order

Q43. The rate law of a reaction is given by $r = k[\mathrm{CH_3OCH_3}]^{3/2}$. If the pressure is measured in bar and time in minutes, then the unit of rate constant will be:

(A) $\mathrm{bar}^2\ \mathrm{min}^{-1}$

(B) $\mathrm{bar}^3\ \mathrm{min}^{-1}$

(C) $\mathrm{bar}^1\ \mathrm{min}^{-1}$

(D) $\mathrm{bar}^3/2\ \mathrm{min}^{-1}$

Q44. If the rate of reaction becomes twenty-seven times upon increasing the concentration of reactant by three times, the order of this reaction is

(A) 0

(B) 1

(C) 3

(D) 2

Q45. The role of a catalyst is to change:

(A) Gibbs energy of the reaction.

(B) Enthalpy of a reaction.

(C) Activation energy of a reaction.

(D) Equilibrium constant.

Read the passage carefully and answer the questions.

Replacement of a hydrogen atom in a hydrocarbon by an alkoxy or carboxyl group yields a class of compounds known as ethers. Ethers are classified as symmetrical or unsymmetrical on the basis of groups attached to the oxygen atoms. Diethyl ether, a symmetrical ether, has been widely used as an inhalation anesthetic. Ethers can be prepared by acid catalyzed intermolecular dehydration of alcohols and Williamson's synthesis. Acid catalyzed dehydration of alcohols is not generally preferred as it gives a mixture of elimination and substitution products. In Williamson's synthesis, an alkyl halide is allowed to react with sodium alkoxide. Ethers containing substituted Alkyl groups may also be prepared by this method. The C-O bond in ether is weakly polar and is cleaved under drastic conditions with excess of hydrogen halides. In electrophilic substitution, the alkoxy group deactivates the aromatic ring and directs the incoming group to ortho and para positions.

Q46. When ethanol is dehydrated in the presence of H_2SO_4 at 443K and 413K respectively, the products formed are:

(A) Ethane and ethoxythane

(B) Ethylmethyl ether and butene

(C) Ethylmethyl ether and propene

(D) Ethene and ethoxythane

Q47. The major product in the reaction of anisole with bromine in ethanoic acid is:

(A) o- bromoanisole

(B) p- bromoanisole

(C) m- bromoanisole

(D) o-bromoanisole and p-bromoanisole

Q48. In Williamson synthesis, the alkoxide ion attacks the alkyl halide via which pathway?

(A) SN_2

(B) SN_1

(C) Depends on the nature of alkoxide ion

(D) Depends on the nature of Alkyl halide

Q49. Which is the most reactive hydrogen halide for cleavage of ethers?

(A) HF

(B) HCl

(C) HBr

(D) HI

Q50. Which type of ether is anisole?

(A) Dialkyl ether

(B) Diaryl ether

(C) Phenyl Alkyl ether

(D) Alkoxy Alkyl ether
