

CUET UG 2023 Chemistry Question Paper PDF (Jun 07, 2023) (Shift 3)

Q1. Match List - I with List - II.

	List - I		List - II
(A)	Tetracarbonylnickel(0)	(I)	$[\text{CoCl}_2(\text{en})_2]^+$
(B)	Tetraammineaquachloridocobalt(III) chloride	(II)	$\text{K}_2[\text{Zn}(\text{OH})_4]$
(C)	Potassium tetrahydroxidozincate(II)	(III)	$[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})\text{Cl}]\text{Cl}_2$
(D)	Dichloridobis(ethane-1,2-diamine)cobalt(III)	(IV)	$[\text{Ni}(\text{CO})_4]$

Choose the **correct** answer from the options given below:

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

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

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

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

Q2. Match List - I with List - II.

	List - I		List - II
(A)	Cheese	(I)	Emulsions
(B)	Cell fluids	(II)	Aerosol
(C)	Hair cream	(III)	Gel
(D)	Clouds	(IV)	Sol

Choose the **correct** answer from the options given below:

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

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

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

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

Q3. Match List - I with List - II.

	List - I		List - II
(A)	Cubic	(I)	$a = b \neq c$
(B)	Tetragonal	(II)	$a \neq b \neq c$
(C)	Orthorhombic	(III)	$a = b \neq c$
(D)	Hexagonal	(IV)	$a = b = c$

Choose the **correct** answer from the options given below:

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

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

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

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

Q4. Match List - I with List - II.

	List - I		List - II
(A)	Δ_m of KCl increases on dilution	(I)	is a linear graph
(B)	Δ_m of CH_3COOH increases on dilution	(II)	is a non-linear graph
(C)	Δ_m of KCl versus $(\text{molarity})^{\frac{1}{2}}$	(III)	Due to increased degree of ionisation
(D)	Δ_m of CH_3COOH versus $(\text{molarity})^{1/2}$	(IV)	Due to weakening of interionic attractions

Choose the **correct** answer from the options given below:

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

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

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

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

Q5. Glucose on reaction with bromine water forms gluconic acid which confirms the presence of:

(a) $-\text{COOH}$ group

(b) $-\text{CHO}$ group

(c) Five $-\text{OH}$ groups

(d) Ketonic group

Q6. $\text{Ph}-\underset{\substack{| \\ \text{Cl} \\ (+)}}{\text{CH}}-\text{CH}_3 \xrightarrow[\Delta]{\text{alc.KCN}} ?$

Product formed is:

(a) $\text{Ph}-\underset{\substack{| \\ \text{CN} \\ (\pm)}}{\text{CH}}-\text{CH}_3$

(b) $\text{Ph}-\underset{\substack{| \\ \text{CN} \\ (-)}}{\text{CH}}-\text{CH}_3$

(c) $\text{Ph}-\text{CH}=\text{CH}_2$

(d) $\text{Ph}-\underset{\substack{| \\ \text{CN} \\ (+)}}{\text{CH}}-\text{CH}_3$

Q7. Which of the following hormone is also known as flight hormone?

(a) Adrenaline

(b) Androgens

(c) Thyroxine

(d) Insulin

Q8. An analysis of iron oxide shows that its formula is $\text{Fe}_{1.9}\text{O}_3$. What percentages of iron exists as Fe^{3+} and Fe^{4+} ions:

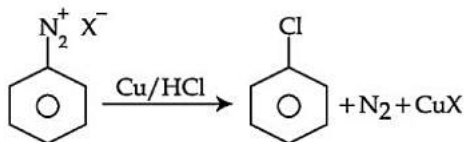
(a) $\text{Fe}^{3+} = 82.98\%$ and $\text{Fe}^{4+} = 17.02\%$

(b) $\text{Fe}^{3+} = 84.21\%$ and $\text{Fe}^{4+} = 15.79\%$

(c) $\text{Fe}^{3+} = 15.79\%$ and $\text{Fe}^{4+} = 84.21\%$

(d) $\text{Fe}^{3+} = 17.02\%$ and $\text{Fe}^{4+} = 82.98\%$

Q9. Identify the name reaction given below:



- (a) Gatterman Reaction
(b) Sandmeyer Reaction
(c) Gatterman – Koch Reaction
(d) Dow's Process

Q10. Match List – I with List – II.

	List – I		List – II
(A)	Williamson's Synthesis	(I)	$C_6H_5Cl + NaOH \xrightarrow[High\ pressure]{350^\circ C}$
(B)	Reimer Tiemann reaction	(II)	$C_6H_5OH + C_6H_5COCl \xrightarrow{aq\ NaOH}$
(C)	Dow's process	(III)	$CH_3CH_2ONa + CH_3Cl \xrightarrow{heat}$
(D)	Schotten Baumann reaction	(IV)	$C_6H_5OH + CHCl_3 + NaOH \xrightarrow{heat}$

Choose the **correct** answer from the options given below:

- (a) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)
(b) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
(c) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)
(d) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)

Q11. Which of the following is the correct range of critical micelle concentrations (CMC) for soaps?

- (a) 10^2 to 10^4 mol/L
(b) 10^{-5} to 10^{-8} mol/L
(c) 10^{-1} to 10^{-3} mol/L
(d) 10^{-4} to 10^{-3} mol/L

Q12. Match List – I with List – II.

	List – I		List – II
(A)	Element with highest second ionization enthalpy	(I)	Co
(B)	Element with highest third ionization enthalpy	(II)	Cr
(C)	M in $M(CO)_6$ is	(III)	Cu
(D)	Element with highest heat of atomization	(IV)	Zn

Choose the **correct** answer from the options given below:

- (a) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
(b) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)
(c) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)
(d) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)

Q13. Arrange the following compounds in decreasing order of acidity:

- (A) *o*-cresol
(B) Phenol
(C) *m*-nitrophenol
(D) *o*-nitrophenol
(E) Ethanol

Choose the **correct** answer from the options given below:

- (a) $D > B > C > E > A$
(b) $E > A > B > C > D$
(c) $C > D > A > B > E$
(d) $D > C > B > A > E$

Q14. The vapour pressure of pure Benzene is 0.900 bar. If a nonvolatile electrolytic solid is added, vapour pressure of the solution becomes 0.200 bar. If numbers of moles of solute is 1 and solvent is 2 respectively in solution, what is the value of van't Hoff factor (i)?

- (a) 2.33
(b) 0.56
(c) 1.56
(d) 2.00

Q15.

	Sol	Charge present
(A)	Blood	- Positive
(B)	Congo red	- Positive
(C)	Gum	- Negative
(D)	Gold sol	- Positive
(E)	$Fe(OH)_3$ sol	- negative

Choose the **correct** answer from the options given below:

- (a) (A) and (C) only
(b) (B) and (D) only
(c) (C) and (E) only
(d) (B) and (E) only

Q16. Out of the following which will not undergo S_N1 reaction pathway:

- (a) 1-Chloro-1, 1, 1-triphenylmethane
(b) 2-Iodo-2-methylpropane
(c) 1-Bromo-3, 3-dimethylbutane
(d) 3-Bromoprop-1-ene

Q17. The magnetic nature of elements depends on the presence of unpaired electrons. Identify the configuration of transition elements which shows highest magnetic moment:

- (a) $3d^7$
(b) $3d^5$
(c) $3d^8$
(d) $3d^2$

Q18. Identify incorrect statement about $H_2 - O_2$ fuel cell from the following:

- (a) At cathode O_2 is reduced to OH^-
(b) At anode H_2 is oxidized to form water
(c) The cell runs continuously even if reactants are not supplied
(d) Water is formed as a by product

Q19. Match List – I with List – II.

	List - I		List - II
(A)		(I)	Nucleophilic substitution Reaction
(B)		(II)	Elimination Reaction
(C)		(III)	Electrophilic substitution Reaction
(D)		(IV)	Redox Reaction

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

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

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

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

Q20. $A + B \rightarrow \text{Nylon 6, 6}$

Predict A and B:

(a) Ethylene glycol + adipic acid

(b) Pentamethylene diamine + adipic acid

(c) Hexamethylene amine + tartaric acid

(d) Hexamethylene diamine + adipic acid

Q21. Match List - I with List - II.

	List - I (Complex ion)		List - II (Hybridisation)
(A)	$[\text{CoF}_6]^{3-}$	(I)	d^2sp^3
(B)	$[\text{Co}(\text{CN})_4]^{2-}$	(II)	sp^3d^2
(C)	$[\text{FeCl}_4]^-$	(III)	sp^3
(D)	$[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$	(IV)	dsp^2

Choose the **correct** answer from the options given below:

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

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

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

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

Q22. Match List - I with List - II.

	List - I		List - II
(A)	Copper pyrites	(I)	Cu_2O
(B)	Malachite	(II)	Cu_2S
(C)	Cuprite	(III)	$\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$
(D)	Copper glance	(IV)	CuFeS_2

Choose the **correct** answer from the options given below:

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

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

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

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

Q23. Which of the following has the highest flocculating power?

(a) $[\text{Fe}(\text{CN})_6]^{4-}$

(b) PO_4^{3-}

(c) SO_4^{2-}

(d) Cl^-

Q24. Match List - I with List - II.

	List - I		List - II
(A)	$\text{Pbs} \rightarrow \text{PbO}$	(I)	Roasting
(B)	$\text{CaCO}_3 \rightarrow \text{CaO}$	(II)	Calcination

(C)	$\text{ZnS} \rightarrow \text{Zn}$	(III)	Carbon reduction
(D)	$\text{Cu}_2\text{S} \rightarrow \text{Cu}$	(IV)	Self reduction

Choose the **correct** answer from the options given below:

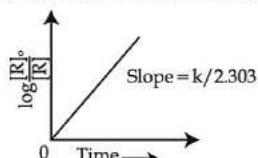
(a) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

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

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

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

Q25. For the reaction, $R \rightarrow P$, the $\log ([R]_0/[R])$ verses time (t) plot is given below. What is the order of reaction and what are the units of rate constant?



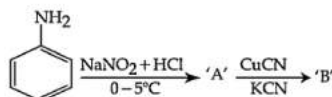
(a) Zero order, s^{-1}

(b) First order, s^{-1}

(c) Second order, $\text{mol}^{-1} \text{L s}^{-1}$

(d) Zero order, $\text{mol L}^{-1} \text{s}^{-1}$

Q26.



The compound B is:

(a) Acetanilide

(b) Benzonitrile

(c) Benzamide

(d) Benzene

Q27. Which of the following is an example of negatively charged sol?

(a) $\text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

(b) As_2S_3

(c) TiO_2

(d) Blood

Q28. Which of the following is an example of minimum boiling azeotrope?

(a) Phenol and aniline

(b) Chloroform and acetone

(c) Nitric acid and water

(d) Ethanol and acetone

Q29. The correct statement about 4f-series elements is:

(a) Paramagnetism falls to minimum in Nd.

(b) Lu^{3+} ions are bright green in aqueous solution.

(c) Promethium is artificially synthesised 4f series element.

(d) Absorption bands of Lanthanoids are broad.

Q30. Which of the following reagents, are used for denaturation of alcohol?

(a) CuSO_4 and pyridine

(b) FeSO_4 and CHCl_3

(c) FeCl_3 and pyridine

(d) CuSO_4 and freon

Q31. The correct bond order for carbon-oxygen bond in following metal carbonyls

$[\text{Cr}(\text{CO})_6]^-$, $[\text{V}(\text{CO})_6]^-$, $[\text{Mn}(\text{CO})_6]^+$ is

(a) $[\text{V}(\text{CO})_6]^- < [\text{Cr}(\text{CO})_6]^- < [\text{Mn}(\text{CO})_6]^+$

(b) $[\text{V}(\text{CO})_6]^- = [\text{Cr}(\text{CO})_6]^- = [\text{Mn}(\text{CO})_6]^+$

(c) $[\text{Mn}(\text{CO})_6]^+ < [\text{Cr}(\text{CO})_6]^- < [\text{V}(\text{CO})_6]^-$

$$(d) [Cr(CO)_6] < [V(CO)_6]^- < [Mn(CO)_6]^+$$

Q32. Which of the following is the correct formula of a colligative property?

- (a) $\frac{P_1^\circ - P_1}{P_1^\circ} = x_1$
 (b) $\Delta T_b = \frac{K_b \times 1000 \times w_2}{M_1 \times w_1}$
 (c) $\Delta T_f = \frac{K_f \times 1000 \times w_2}{M_2 \times w_1}$
 (d) $\pi = \Delta T_f RT$

Q33. Which of the following reaction has fractional order with respect to one of the reactants?

- (a) $2NO(g) + O_2(g) \rightarrow 2NO_2(g)$
 (b) $CHCl_3 + Cl_2 \rightarrow CCl_4 + HCl$
 (c) $CH_3COOC_2H_5 + H_2O \rightarrow CH_3COOH + C_2H_5OH$
 (d) $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$

Q34. The amount of radioactive substance left after 75 hrs, when 100g of it is taken initially will be:
 (half-life of radioactive substance is 15 hrs)

- (a) 12.5 g
 (b) 6.25 g
 (c) 1.5625 g
 (d) 3.125 g

Q35. The cell $Zn|Zn^{2+} (1M)||Cu^{2+} (1M)|Cu$. ($E^\circ_{cell} = 1.10 V$)
 Was allowed to be completely discharged at 298 K.
 The relative concentration of Zn^{2+}/Cu^{2+} is:

- (a) 9.65×10^4
 (b) Antilog 24.8
 (c) 37.7
 (d) $10^{37.3}$

Q36. In which of the following cases there is a change in oxidation number?

- (a) Aqueous solution of CrO_4^{2-} is acidified
 (b) SO_2 gas is passed through acidified $Cr_2O_7^{2-}$ solution
 (c) $Cr_2O_7^{2-}$ solution is made alkaline
 (d) CrO_2Cl_2 is dissolved in NaOH

Q37. Match List - I with List - II.

	List - I		List - II
(A)	Adenine	(I)	Purine
(B)	Thymine	(II)	Pyrimidine
(C)	Uracil	(III)	DNA
(D)	Deoxyribose	(IV)	RNA

Choose the **correct** answer from the options given below:

- (a) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
 (b) (A)-(I), (B)-(II), (C)-(IV), (D)-(III)
 (c) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)
 (d) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)

Q38. Match List - I with List - II

	List - I (Drug)		List - II (Use)
(A)	Phenelzine	(I)	Antibiotic
(B)	Terfenadine	(II)	Antihistamine
(C)	Codeine	(III)	Antidepressant
(D)	Salvarsan	(IV)	Analgesics

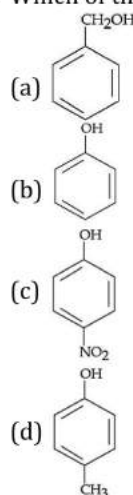
Choose the **correct** answer from the options given below:

- (a) (A)-(III), (B)-(II), (C)-(IV), (D)-(I)
 (b) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
 (c) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
 (d) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

Q39. Which of the following alkyl halides will undergo S_N2 reaction most readily?

- (a) 1-Bromo-2,2-dimethylpropane
 (b) 1-Bromo-2-methylbutane
 (c) 1-Bromobutane
 (d) 1-Bromo-3-methylbutane

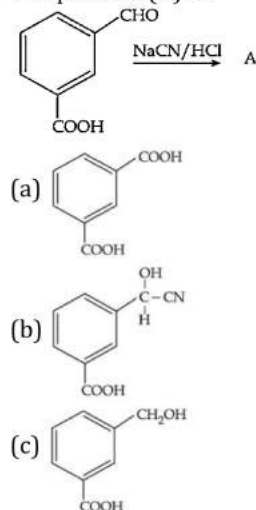
Q40. Which of the following compound is the most acidic?

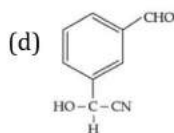


Directions (Q41 to Q45) Answer the question on basis of passage given below:

Organic compounds containing carbon -oxygen double bond ($C=O$) are called carbonyl compounds. These are highly polar molecules. Hence, their boiling points are higher than hydrocarbons and ethers. Aldehydes can be prepared from dehydrogenation or oxidation of alcohols and by reduction of acylhalides. Ketones are prepared by oxidation of secondary alcohols or by hydration of alkynes etc. Aldehydes and ketones undergo nucleophilic addition reaction with the number nucleophiles such as HCN, $NaHSO_3$ ammonia derivatives. Carboxylic acids are prepared by the oxidation of primary alcohols, aldehydes and alkenes, by hydrolysis of nitriles. Carboxylic acids are more acidic than alcohols and phenols.

Q41. The product (A) is:





Q42. The correct increasing order of acidic strength is:

- (a) $\text{C}_6\text{H}_5\text{COOH} < \text{C}_6\text{H}_5\text{CH}_2\text{COOH} < \text{NO}_2\text{CH}_2\text{COOH} < \text{FCH}_2\text{COOH}$
- (b) $\text{C}_6\text{H}_5\text{CH}_2\text{COOH} < \text{C}_6\text{H}_5\text{COOH} < \text{NO}_2\text{CH}_2\text{COOH} < \text{FCH}_2\text{COOH}$
- (c) $\text{C}_6\text{H}_5\text{CH}_2\text{COOH} < \text{C}_6\text{H}_5\text{COOH} < \text{FCH}_2\text{COOH} < \text{NO}_2\text{CH}_2\text{COOH}$
- (d) $\text{C}_6\text{H}_5\text{COOH} < \text{FCH}_2\text{COOH} < \text{C}_6\text{H}_5\text{CH}_2\text{COOH} < \text{NO}_2\text{CH}_2\text{COOH}$

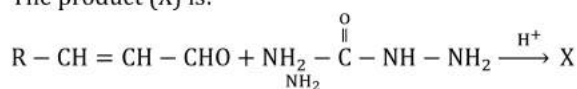
Q43. The correct sequence of reagents for the conversion of 3-nitrobromobenzene to 3-nitrobenzoic acid is:

- (a) $\text{Mg/ether}, \text{CO}_2, \text{H}_3\text{O}^+$
- (b) $\text{KCN}, \text{LiAlH}_4, \text{NaOH}$
- (c) $\text{KMnO}_4/\text{OH}^-, \text{dil. H}_2\text{SO}_4, \text{CO}_2/\text{H}^+$
- (d) AgNO_3 (Ammonical), $\text{CO}_2, \text{H}_3\text{O}^+$

Q44. Which of the following is most reactive towards nucleophilic addition reaction?

- (a) Butanone
- (b) Propanone
- (c) Ethanal
- (d) Propanal

Q45. The product (X) is:



- (a) $\text{R}-\text{CH}=\text{CH}-\text{CH}=\underset{\text{NH}_2}{\underset{|}{\text{CH}}}-\text{NH}-\text{NH}_2$
- (b) $\text{R}-\text{CH}=\text{CH}-\text{CH}=\text{N}-\overset{\text{O}}{\underset{\text{NH}_2}{\underset{|}{\text{C}}}}-\text{NH}-\text{NH}_2$
- (c) $\text{R}-\text{CH}_2-\overset{\text{O}}{\underset{\text{NH}_2}{\underset{|}{\text{C}}}}-\text{CH}=\text{N}-\text{NH}-\overset{\text{O}}{\underset{\text{NH}_2}{\underset{|}{\text{C}}}}-\text{NH}_2$
- (d) $\text{R}-\text{CH}=\text{CH}-\text{CH}=\text{N}-\text{NH}-\overset{\text{O}}{\underset{\text{NH}_2}{\underset{|}{\text{C}}}}-\text{NH}_2$

Directions (Q46 to Q50) Answer the question on basis of passage given below:

Nitrogen differs from the rest of the members of its group due to its small size, high electronegativity, high ionisation enthalpy and non-availability of d-orbitals. Nitrogen has unique ability to form $p\pi-p\pi$ multiple bonds with itself and with other elements having small size and high

electronegativity (eg. C, O) Heavier elements of this group do not form $p\pi-p\pi$ bonds as their atomic orbitals are so large and diffused that they cannot have effective overlapping.

Q46. Single bond is **not** formed by two atoms of:

- (a) P - P
- (b) N - N
- (c) As - As
- (d) Sb - Sb

Q47. Maximum covalency of Nitrogen is:

- (a) 2
- (b) 3
- (c) 4
- (d) 5

Q48. Nitrogen family show reducing characters. Least basic amongst the following is:

- (A) SbH_3
- (B) BiH_3
- (C) NH_3
- (D) PH_3

Choose the **correct** answer from the options given below:

- (a) (C) Only
- (b) (A) Only
- (c) (B) Only
- (d) (D) Only

Q49. Most stable hydride amongst the following is:

- (A) NH_3
- (B) PH_3
- (C) AsH_3
- (D) SbH_3
- (E) BiH_3

Choose the **correct** answer from the options given below:

- (a) (A) Only
- (b) (B) Only
- (c) (C) & (D) Only
- (d) (D) & (E) Only

Q50. Nitrogen family show reducing characters. Least basic amongst the following is:

- (a) SbH_3
- (b) BiH_3
- (c) NH_3
- (d) PH_3