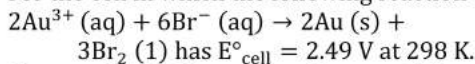


CUET UG 2023 Chemistry Question Paper PDF (Jun 10, 2023) (Shift 1)

Q1. For the cell in which the following reaction occurs:



The standard Gibbs energy change will be

- (a) -1742 kJ
- (b) -1642 kJ
- (c) -1542 kJ
- (d) -1442 kJ

Q2. Match List I with List II.

	List - I		List - II
A.	PCl_3	I.	See-saw shaped
B.	SF_4	II.	Square planar
C.	BrF_3	III.	Trigonal pyramidal
D.	XeF_4	IV.	Bent T Shape

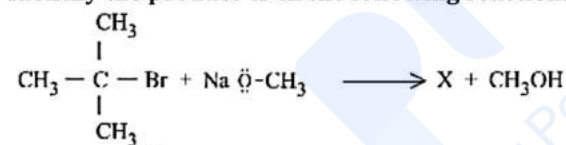
Choose the correct answer from the options given below:

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

Q3. An organic compound 'X' on treatment with methyl magnesium bromide gives a compound 'Y' which on hydrolysis gives ethanol. The compound 'X' is:

- (a) CH_3CHO
- (b) CH_3COCH_3
- (c) HCHO
- (d) CH_3OH

Q4. Identify the product 'X' in the following reaction.



- (a) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{OCH}_3 \\ | \\ \text{CH}_3 \end{array}$
- (b) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 = \text{C} - \text{OCH}_3 \\ | \\ \text{CH}_3 \end{array}$
- (c) $\begin{array}{c} \text{CH}_2 \\ | \\ \text{CH}_3 = \text{C} - \text{OH} \\ | \\ \text{CH}_3 \end{array}$
- (d) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 = \text{C} - \text{CH}_2 \\ | \\ \text{CH}_3 \end{array}$

Q5. Match List I with List II.

	List - I		List - II
A.	λ_m of KCl increases on dilution	I.	is a linear graph.
B.	λ_m of CH_3COOH increases on dilution	II.	is a non-linear graph.
C.	λ_m of KCl versus (molarity) $^{1/2}$	III.	due to increased degree of ionization.
D.	λ_m of CH_3COOH versus (molarity) $^{1/2}$	IV.	Due to weakening of interionic attraction.

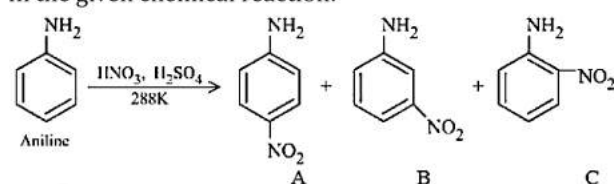
Choose the correct answer from the options given below:

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

Q6. When methyl bromide is treated with sodium *tert*-butoxide, the compound formed is:

- (a) Diethyl ether
- (b) *tert*-Butyl methyl ether
- (c) Diethylbromide
- (d) Methyl propyl ether

Q7. In the given chemical reaction:



The mixture of three compound, A, B and C is formed respectively in the what ratio?

- (a) 51%, 2%, 47%
- (b) 47%, 2%, 51%
- (c) 51%, 47%, 2%
- (d) 2%, 51%, 47%

Q8. Complete the following reaction:



- (a) $5\text{SO}_4^{2-}, 4\text{H}^+, 2\text{Mn}^{2+}$
- (b) $5\text{SO}_3^{2-}, 4\text{OH}^-, 2\text{Mn}^{2+}$
- (c) $5\text{SO}_4^{2-}, 4\text{H}^+, 2\text{Mn}^{3+}$
- (d) $5\text{S}_2\text{O}_3^{2-}, 4\text{H}^+, 2\text{MnO}_2$

Q9. Which of the following transition elements of 3d series has the lowest melting point?

- (a) Ti (At.No -22)
- (b) V (At.No -23)
- (c) Cr (At.No -24)
- (d) Mn (At.No -25)

Q10. The vapour pressure of chloroform, (CHCl_3) and dichloromethane (CH_2Cl_2) at 298 K are 400 mm Hg and 615 mm Hg, respectively. What is the mole fraction of CHCl_3 in vapour phase in solution prepared by mixing 30 g of CHCl_3 and 45 g of CH_2Cl_2 ?

- (a) 0.76
- (b) 0.23
- (c) 0.82
- (d) 0.18

Q11. The transition element having least number of unpaired electrons, is:

- (a) Fe
- (b) Cr
- (c) Zn
- (d) Sc

Q12. Colligative properties depend on

- (a) the nature of solvent particles present in solution.
- (b) the nature of solute particles present in solution.
- (c) the number of solute particles in the solution.

(d) the physical properties of the solute particles present in solution.

Q13. Match List I with List II.

	List - I		List - II
A.	XeF ₆	I.	sp ³ d ³ – Distorted octahedral
B.	XeO ₃	II.	sp ³ d ² – Square planer
C.	XeOF ₄	III.	sp ³ – Pyramidal
D.	XeF ₄	IV.	sp ³ d ² – Square pyramidal

Choose the correct answer from the options given below:

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

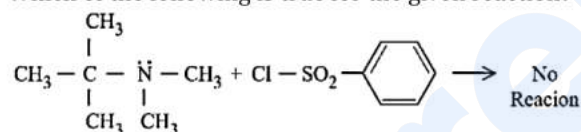
Q14. Match List I with List II.

	List - I		List - II
A.	Liquation	I.	As, Mn, P
B.	Distillation	II.	Cu, Ag
C.	Oxidation	III.	Sn, Pb, Hg
D.	Bessemerisation	IV.	Hg, Cd, Zn

Choose the correct answer from the options given below:

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

Q15. Which of the following is true for the given reaction?



- (a) Tertiary amines do not contain any replaceable 'H' on amino group.
 (b) It is very bulky due to many –CH₃ groups
 (c) Lone pair of electron on nitrogen does not allow this reaction
 (d) SO₂ is eliminated and stops the reaction

Q16. Match List I with List II

	List - I		List - II
A.	Raoult's Law	I.	$\Delta T_b = k_b \cdot m$
B.	Henry's Law	II.	$\Delta T_f = k_f \cdot m$
C.	Elevation in boiling point	III.	$p = x_1 p^\circ_1 + x_2 p^\circ_2$
D.	Depression in freezing point	IV.	$P = K_H \cdot x$

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

Q17. The reaction of toluene with Cl₂ in the presence of FeCl₃ gives X and reaction in presence of light gives. Y Thus, X and Y are

- (a) X = Benzyl chloride, Y = *m* - Chlorotoulene
 (b) X = Benzal chloride, Y = *o* - Chlorotoulene
 (c) X = *m* - chloroloulene, Y = *p* - Chlorotoulene

(d) X = *o* and *p* - chlorotoulene, Y = trichloromethylbenzene

Q18. Which of the following statements are correct?

- A. An amino acid contains amino (–NH₂) and (–COOH) functional groups.
 B. All amino acids are optically active
 C. All amino acids are solid at room temperature.
 D. In aqueous solution amino acids exist as zwitter ions.

Choose the correct answer from the options given below:

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

Q19. The number of electrons constituting 1.5 Faradays charge are:

- (a) 9.03×10^{23}
 (b) 9.03×10^{22}
 (c) 9.03×10^{24}
 (d) 9.03×10^{25}

Q20. Which of the following statement/s is/are wrong?

- A. Methylamine is more basic than ammonia.
 B. Amines form hydrogen bonds.
 C. Ethylamine has higher boiling point than propane.
 D. Dimethylamine is less basic than methylamine.
 E. Amines are soluble in organic solvents like alcohol.

Choose the correct from the options given below:

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

Q21. Arrange the following pentaoxides in order of their increasing acidic strengths.

- A. Bi₂O₅
 B. Sb₂O₅
 C. P₂O₅
 D. As₃O₅
 E. N₂O₅

Choose the correct answer from the options given below:

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

Q22. Choose the **incorrect** statement about ethylenediaminetetraacetate ion.

- (a) It is a hexadentate ligand.
 (b) It forms chelate when binds with metal ion.
 (c) It can bind through two nitrogen and four oxygen atoms.
 (d) It is an ambident ligand.

Q23. Which one of the following drugs is an antibiotic?

- A. Morphine
 B. Equanil
 C. Chloramphenicol
 D. Valium

Choose the correct answer from the options given below:

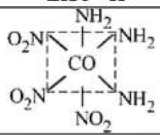
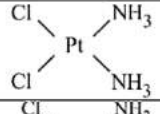
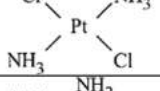
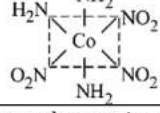
- (a) A only
(b) C only
(c) D only
(d) B only

Q24. Which one of the following Lanthanoid ions is diamagnetic?

[At.no. of Ce = 58, Sm = 62, Eu = 63, Yb = 70]

- (a) Yb^{2+}
(b) Ce^{2+}
(c) Sm^{2+}
(d) Eu^{2+}

Q25. Match List I with List II.

	List - I		List - II
A.	Geometrical Isomerism (<i>cis</i>)	I.	
B.	Geometrical Isomerism (<i>trans</i>)	II.	
C.	Geometrical Isomerism (<i>facial</i>)	III.	
D.	Geometrical Isomerism (<i>meridional</i>)	IV.	

Choose the correct answer from the options given below:

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

Q26. 2-Bromopentane is heated with alcoholic KOH. Which is the correct statement for this reaction?

- A. Only pent-2-ene is formed.
B. Only pent-1-ene is formed.
C. Both pent-2-ene and pent-1-ene are formed.
D. pent-2-ene will be major product as it is more stable.

Choose the correct answer from the options given below:

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

Q27. What type of defect is shown by ZnO ?

- (a) Frenkel defect
(b) Metal excess defect due to the presence of extra cations at interstitial site.
(c) Schottky defect
(d) Metal excess defect due to anionic vacancies

Q28. Which one of the following ions is paramagnetic in nature?

- (a) Sc^{3+}
(b) Ti^{4+}
(c) Zn^{2+}
(d) V^{2+}

Q29. Match List I with List II. Match nitrogen oxides with their oxidation number of nitrogen

	List - I		List - II
A.	NO	I.	+4
B.	N_2O_4	II.	+2
C.	N_2O_3	III.	+5
D.	N_2O_5	IV.	+3

Choose the correct answer from the options given below:

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

Q30. Which of the following compounds gives iodoform test?

- (a) CH_3OH
(b) $\text{CH}_3\text{CH}_2\text{OH}$
(c) $\text{C}_2\text{H}_5\text{COC}_2\text{H}_5$
(d) HCHO

Q31. Water soluble vitamins are excreted out of our body through urination. Identify the vitamin which is stored in our body for a number of years?

- (a) Vitamin B_2
(b) Vitamin B_6
(c) Vitamin B_{12}
(d) Vitamin C

Q32. Insulin deficiency in human beings causes diabetes. Excess of which hormone causes an increase in blood pressure?

- (a) Adrenal Cortex hormones
(b) Steroid hormones
(c) Thyroid hormones
(d) Corpus luteum hormones

Q33. A first order reaction requires 6.96 months for the concentration of reactant A to be reduced to 25% of its original value. The half-life of the reaction is:

- (Given $\log 2 = 0.3010$)
(a) 6.96 months
(b) 3.48 months
(c) 1.74 months
(d) 27.8 months

Q34. For the reaction $x + y \rightarrow z$,

rate law expression is $\text{rate} = k [x] [y]^3$.

If the volume of the vessel is reduced to $\frac{1}{3}$ of its original volume, then rate of reaction will

- (a) decrease 81 times.
(b) increase 81 times.
(c) decrease 9 times.
(d) increase 27 times.

Q35. In p-type semiconductors, the conductivity is due to:

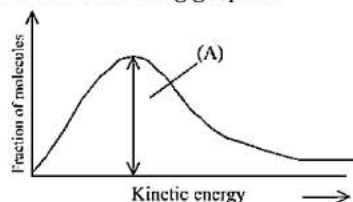
- (a) negative holes.
(b) positive holes.
(c) valence electrons.
(d) mobile electrons.

Q36. Which of the following element is used for vulcanisation of rubber?

- (a) S

- (b) Si
(c) Se
(d) /

Q37. A in the following graph is



- (a) Threshold energy
(b) Most probable kinetic energy
(c) Effective collisions
(d) Temperature coefficient

Q38. The crystal field stabilization energy for low spin d^6 octahedral complex is:

- (a) $-2.0\Delta_o$
(b) $-2.4\Delta_o$
(c) $-0.4\Delta_o$
(d) $-1.6\Delta_o$

Q39. Match List I with List II

	List - I		List - II
A.	Cr^{3+}	I.	d^3 Configuration
B.	Mn^{4+}	II.	d^{10} Configuration
C.	Cu^+	III.	Paramagnetic
D.	V^{2+}	IV.	Diamagnetic

Choose the correct answer from the options given below:

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

Q40. Which one of the following is most reactive towards substitution nucleophilic unimolecular (S_N1) reaction?

- (a) $\text{C}_6\text{H}_5\text{CH}(\text{C}_6\text{H}_5)\text{Br}$
(b) $\text{C}_6\text{H}_5\text{CH}(\text{Br})\text{CH}_3$
(c) $\text{C}_6\text{H}_5\text{C}(\text{CH}_3)(\text{C}_6\text{H}_5)\text{Br}$
(d) $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$

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

Adsorption arises due to the fact that the surface particles of the adsorbent are not in the same environment as the particles inside the bulk. The extent of adsorption increases with the increase of surface area per unit mass of the adsorbent at a given temperature and pressure. Another important factor featuring adsorption is the heat of adsorption. During adsorption, there is always a decrease in residual forces of the surface, therefore it is invariably an exothermic process of ΔH and ΔS are always negative. There are mainly two types of adsorptions of gases on solids. In physisorption, the attractive forces are mainly Van der Waals forces while in chemisorption, actual bonding occurs between the particles of adsorbent and adsorbate. Generally, easily liquefying gases are adsorbed more easily on the surface of a solid as compared to the gases which are liquified with difficulty. Freundlich gave an empirical relationship between the quantity of gas adsorbed by unit

mass of solid adsorbent and pressure, at a particular temperature.

Q41. Which two parameters from the following are plotted to give a straight line on Freundlich adsorption isotherm?

- (a) $\frac{x}{m}$ Vs $\frac{1}{p}$
(b) $\log \frac{x}{m}$ Vs p
(c) $\frac{x}{m}$ Vs p
(d) $\log \frac{x}{m}$ Vs $\log p$

Q42. Rate of physisorption increases with

- (a) decrease in pressure.
(b) decrease in surface area.
(c) increase in temperature.
(d) decrease in temperature.

Q43. Which of following is not an example of adsorption?

- (a) Retaining the colour of the ink on the surface of the chalk stick
(b) Drying of the substance using anhydrous calcium chloride
(c) Decolourisation of the crude sugar
(d) Drying of air in the presence of silica gel

Q44. Identify the correct order of ease of adsorption of the following gases on the surface of charcoal

- A. CH_4
B. H_2
C. NH_3
D. CO_2

Choose the correct answer from the options given below:

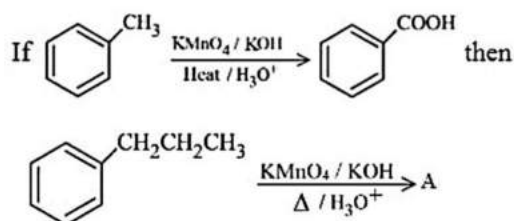
- (a) $B > A > D > C$
(b) $A > D > C > B$
(c) $D > C > B > A$
(d) $C > D > A > B$

Q45. Entropy during adsorption is negative because

- (a) the disorderness in the system increases.
(b) the disorderness in the system decreases.
(c) bond formation results in more disorderness.
(d) disorderness remains unaffected.

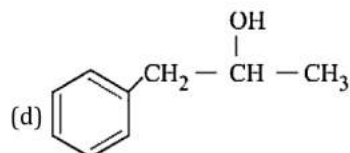
Direction (Q46. to Q50.) Answer the question on the basis of passage given below:

Aldehydes are generally more reactive than ketones in nucleophilic addition reactions due to steric and electronic reasons. Sterically, the presence of two relatively large substituents in ketones hinders the approach of nucleophile to carbonyl carbon than in aldehydes having only one such substituent. Electronically, aldehydes are more reactive than ketones because two alkyl groups reduce the electrophilicity of the carbonyl more effectively in the former.



Q46. A will be:

- (a)
- (b)
- (c)



Q47. For preparation of phenylethanoic acid from benzyl alcohol, reagents required are

- A. HBr
B. CO_2
C. KCN
D. $\Delta/\text{H}_3\text{O}^+$
E. AgNO_3

Choose the correct answer from the options given below:

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

Q48. Match List I with List II.

	List - I		List - II
A.	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO} \longrightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$	I.	$\text{CrO}_3 - \text{H}_2\text{SO}_4$
B.		II.	$\text{H}_3\text{O}^+/\Delta$
C.	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH} \longrightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$	III.	Ammonical AgNO_3
D.	$\text{CH}_3\text{CONH}_2 \longrightarrow \text{CH}_3\text{COOH}$	IV.	$\text{KMnO}_4 - \text{H}_2\text{SO}_4/\Delta$

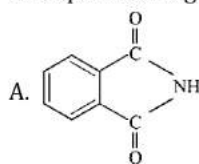
Choose the correct answer from the options given below:

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

Q49. 4-Hydroxy-4-methylpentan-2-one and 4-methylpent-3-en-2-one are the products obtained from A by aldol condensation. A is

- (a) CH_3COCH_3
(b) CH_3CHO
(c) $\text{H}_3\text{C} - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CHO}$
(d) $\text{H}_3\text{C} - \text{CH}_2 - \text{CH}_2 - \text{CHO}$

Q50. In the reaction of carboxylic acids with ammonia to give the imides, the reaction proceeds in the sequence of steps involving the following compounds.



- B.
- C.
- D.

The correct sequence of the compounds formed will be:

Choose the correct answer from the options given below:

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