

PAPER-5

KCET - 2024

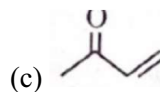
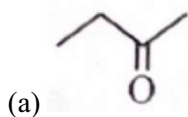
1. Propanone and Propanal are:

- (a) Position isomers (b) Functional isomers
(c) Chain isomers (d) Geometrical isomers

2. Sodium ethanoate on heating with soda lime gives 'X'. Electrolysis of aqueous solution of sodium ethanoate gives 'Y'. 'X' and 'Y' respectively are:

- (a) Methane and Ethane (b) Methane and Methane
(c) Ethane and Methane (d) Ethane and Ethane

3. But-1-yne on reaction with dil. H_2SO_4 in presence of Hg^{2+} ions at 333 K gives:



4. In the reaction Aniline $\xrightarrow[\text{dil. HCl}]{\text{NaNO}_2, \text{P}}$ Phenol \rightarrow Q, NaOn

'Q' is :

- (a) $\text{C}_6\text{H}_5\text{N}_2\text{Cl}$ (b) ortho-hydroxyazobenzene
(c) para-hydroxyazobenzene (d) meta-hydroxyazobenzene

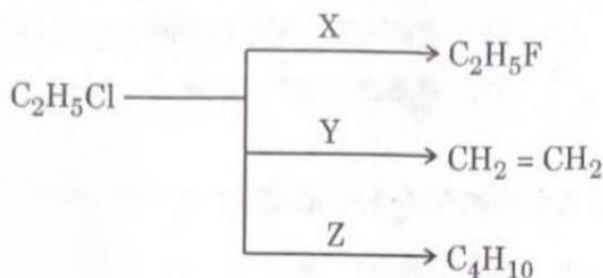
5. The type of linkage present between nucleotides is:

- (a) Phosphoester linkage (b) Phosphodiester linkage (c) Amide linkage (d) Glycosidic linkage

6. α -D-(+)-glucose and β -D-(+)-glucose are:

- (a) Enantiomers (b) Conformers (c) Epimers (d) Anomers

7. In the following scheme of reaction,



X, Y and Z respectively are:

- (a) AgF , alcoholic KOH and benzene (b) HF, aqueous KOH and Na in dry ether
(c) Hg_2F_2 , alcoholic KOH and Na in dry ether (d) CoF_2 , aqueous KOH and benzene

8. 8.8 g of monohydric alcohol added to ethyl magnesium iodide in ether liberates 2240 cm^3 of ethane at STP. This monohydric alcohol when oxidised using pyridinium-chlorochromate, forms a carbonyl compound that answers silver mirror test (Tollens' test). The monohydric alcohol is:
- (a) butan-2-ol (b) 2, 2-dimethyl propan-1-ol
(c) pentan-2-ol (d) 2, 2-dimethyl ethan-1-ol
9. When a tertiary alcohol 'A' ($\text{C}_4\text{H}_{10}\text{O}$) reacts with $20\% \text{H}_3\text{PO}_4$ at 358 K , it gives a compound 'B' (C_4H_8) as a major product. The IUPAC name of the compound 'B' is:
- (a) But-1-ene (b) But-2-ene (c) Cyclobutane (d) 2-Methylpropene
10. PCC is:
- (a) $\text{K}_2\text{Cr}_2\text{O}_7 + \text{Pyridine}$ (b) $\text{CrO}_3 + \text{CHCl}_3$
(c) $\text{CrO}_3 + \text{H}_2\text{SO}_4$ (d) A complex of chromium trioxide with pyridine +HCl
11. On treating 100 mL of 0.1 M aqueous solution of the complex $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ with excess of AgNO_3 , 2.86 g of AgCl was obtained. The complex is;
- (a) $[\text{Cr}(\text{H}_2\text{O})_3 \text{Cl}_3] \cdot 3\text{H}_2\text{O}$ (b) $[\text{Cr}(\text{H}_2\text{O})_4 \text{Cl}_2] \text{Cl} \cdot 2\text{H}_2\text{O}$
(c) $[\text{Cr}(\text{H}_2\text{O})_5 \text{Cl}] \text{Cl}_2 \cdot \text{H}_2\text{O}$ (d) $[\text{Cr}(\text{H}_2\text{O})_6 \text{Cl}_3]$
12. The complex compounds $[\text{Co}(\text{NH}_3)_5 \text{SO}_4] \text{Br}$ and $[\text{Co}(\text{NH}_3)_5 \text{Br}] \text{SO}_4$ are:
- (a) Coordination isomers (b) Geometrical isomers
(c) Optical isomers (d) Ionisation isomers
13. Which of the following statements are true about $[\text{CoF}_6]^{3-}$ ion?
- I. The complex has octahedral geometry.
II. Coordination number of Co is 3 and oxidation state is +6 .
III. The complex is $\text{sp}^3 \text{d}^2$ hybridised.
IV. It is a high spin complex.
- (a) I, II and IV (b) I, III and IV (c) II and IV (d) II, III and IV
14. A haloalkane undergoes $\text{S}_{\text{N}}2$ or $\text{S}_{\text{N}}1$ reaction depending on:
- (a) Solvent used in the reaction (b) Low temperature
(c) The type of halogen atom (d) Stability of the haloalkane
15. 2-Methyl propane can be prepared by Wurtz reaction. The haloalkanes taken along with metallic sodium and dry ether are:
- (a) chloromethane and 2-chloropropane (b) chloroethane and chloromethane
(c) chloroethane and 1-chloropropane (d) chloromethane and 1-chloropropane

16. In the analysis of III group basic radicals of salts, the purpose of adding $\text{NH}_4\text{Cl}_{(s)}$ to NH_4OH is:
- to increase the concentration of OH^- ions.
 - to precipitate the radicals of group IV and V.
 - to suppress the dissociation of NH_4OH .
 - to introduce Cl^- ions.
17. Solubility product of CaC_2O_4 at a given temperature in pure water is $4 \times 10^{-9} (\text{mol L}^{-1})^2$. Solubility of CaC_2O_4 at the same temperature is:
- $6.3 \times 10^{-5} \text{ molL}^{-1}$
 - $2 \times 10^{-5} \text{ molL}^{-1}$
 - $2 \times 10^{-4} \text{ molL}^{-1}$
 - $6.3 \times 10^{-4} \text{ molL}^{-1}$
18. In the reaction between moist SO_2 and acidified permanganate solution:
- SO_2 is oxidized to SO_4^{2-}
 MnO_4^- is reduced to Mn^{2+}
 - SO_2 is reduced to S
 MnO_4^- is oxidized to MnO_4
 - SO_2 is oxidized to SO_3^{2-}
 MnO_4^- is reduced to MnO_2
 - SO_2 is reduced to H_2S
 MnO_4^- is oxidized to MnO_4
19. 0.48 g of an organic compound on complete combustion produced 0.22 g of CO_2 . The percentage of C in the given organic compound is:
- 25
 - 50
 - 12.5
 - 87.5
20. 34. In the given sequence of reactions, identify ' P ', ' Q ', ' R ' and ' S ' respectively
- $$\text{CH}_2 = \text{CH}_2 \xrightarrow{\text{P}} \begin{array}{c} \text{—CH}_2\text{—CH}_2\text{—} \\ | \quad | \\ \text{Br} \quad \text{Br} \end{array} \xrightarrow{\text{Q}} \text{CH}_2 = \text{CH} - \text{Br} \xrightarrow{\text{R}} \text{CH} \equiv \text{CH} \xrightarrow{\text{S}} \text{C}_6\text{H}_6$$
- Br_2 , Alc. KOH , NaOH , Al_2O_3
 - HBr , Alc. KOH , CaC_2 , KMnO_4
 - HBr , Alc. KOH , NaNH_2 , Red hot iron tube
 - Br_2 , Alc. KOH , NaNH_2 , Red hot iron tube
21. The first chlorinated organic insecticide prepared is:
- Gammexane
 - Chloroform
 - COCl_2
 - DDT
22. Vapour pressure of a solution containing 18 g of glucose and 178.2 g of water at 100°C is:
(Vapour pressure of pure water at $100^\circ\text{C} = 760 \text{ torr}$)

- (a) 76.0 torr (b) 752.4 torr (c) 7.6 torr (d) 3207.6 torr
23. A mixture of phenol and aniline shows negative deviation from Raoult's law. This is due to the formation of:
- (a) Polar covalent bond (b) Non-polar covalent bond
(c) Intermolecular Hydrogen bond (d) Intramolecular Hydrogen bond
24. Which one of the following pairs will show positive deviation from Raoult's Law?
- (a) Water -HCl (b) Benzene – Methanol
(c) Water - HNO₃ (d) Acetone - Chloroform
25. How many Coulombs are required to oxidise 0.1 mole of H₂O oxygen?
- (a) $1.93 \times 10^5 \text{ C}$ (b) $1.93 \times 10^4 \text{ C}$ (c) $3.86 \times 10^4 \text{ C}$ (d) $9.65 \times 10^3 \text{ C}$
26. A current of 3 A is passed through a molten calcium salt for 1 hr 47 min 13 sec . The mass of calcium deposited is : (Molar mass of Ca = 40 g mol⁻¹)
- (a) 6.0 g (b) 2.0 g (c) 8.0 g (d) 4.0 g
27. The value of ' A ' in the equation $\lambda_m = \lambda_m^\circ - A\sqrt{C}$ is same for the pair:
- (a) NaCl and CaCl₂ (b) CaCl₂ and MgSO₄ (c) NaCl and KBr (d) MgCl₂ and NaCl
28. For the reaction, A \rightleftharpoons B, $E_a = 50 \text{ kJ mol}^{-1}$ and $\Delta H = -20 \text{ kJ mol}^{-1}$. When a catalyst is added, E_a decreases by 10 kJ mol^{-1} . What is the E_a for the backward reaction in the presence of catalyst?
- (a) 60 kJ mol^{-1} (b) 40 kJ mol^{-1} (c) 70 kJ mol^{-1} (d) 20 kJ mol^{-1}
29. For the reaction $\text{PCl}_5 \rightarrow \text{PCl}_3 + \text{Cl}_2$, rate and rate constant are $1.02 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$ and $3.4 \times 10^{-5} \text{ s}^{-1}$ respectively at a given instant. The molar concentration of PCl₅ at that instant is:
- (a) 8.0 mol L^{-1} (b) 3.0 mol L^{-1} (c) 0.2 mol L^{-1} (d) 2.0 mol L^{-1}
30. Which one of the following does not represent Arrhenius equation?
- (a) $\log k = \log A - \frac{E_a}{2.303RT}$ (b) $k = Ae^{-E_a/RT}$
(c) $\ln k = -\frac{E_a}{RT} + \ln A$ (d) $k = Ae^{E_a/RT}$
31. For which one of the following mixtures is composition uniform throughout?
- (a) Sand and water (b) Grains and pulses with stone
(c) Mixture of oil and water (d) Dilute aqueous solution of sugar
32. The energy associated with first orbit of He⁺ is:

- (a) 0 J (b) -8.72×10^{-18} J (c) -4.58×10^{-18} J (d) -0.545×10^{-18} J

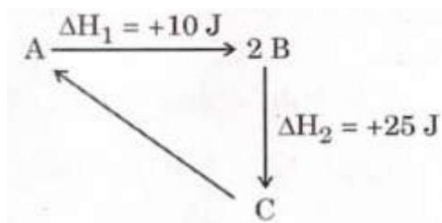
33. A metalloid is:

- (a) Bi (b) Sb (c) P (d) Se

34. A pair of isoelectronic species having bond order of one is:

- (a) N_2, CO (b) N_2, NO^+ (c) O_2^{2-}, F_2 (d) CO, NO^+

35. From the diagram



$\Delta_r H$ for the reaction $C \rightarrow A$ is:

- (a) +35 J (b) -15 J (c) -35 J (d) +15 J

36. The transition element ($\approx 5\%$) present with lanthanoid metal in Misch metal is:

- (a) Mg (b) Fe (c) Zn (d) Co

37. Match the following:

I.	Zn^{2+}	i.	d^8 configuration
II.	Cu^{2+}	ii.	colourless
III.	Ni^{2+}	iii.	$\mu = 1.73 \text{ BM}$

Codes:

	I	II	III
(a)	i	ii	iii
(b)	ii	iii	i
(c)	ii	i	iii
(d)	i	iii	ii

38. Which of the following statements related to lanthanoids is incorrect?

- (a) Lanthanoids are silvery white soft metals.
 (b) Samarium shows +2 oxidation state.
 (c) Ce^{+4} solutions are widely used as oxidising agents in titrimetric analysis.
 (d) Colour of Lanthanoid ion in solution is due to $d-d$ transition.

39. The correct decreasing order of boiling point of hydrogen halides is:

- (a) $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$
(c) $\text{HF} > \text{HI} > \text{HBr} > \text{HCl}$
- (b) $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$
(d) $\text{HI} > \text{HF} > \text{HBr} > \text{HCl}$
40. When a mixture of solid NaCl and Solid $\text{K}_2\text{Cr}_2\text{O}_7$ is heated with concentrated H_2SO_4 , deep red vapours are obtained. This is due to the formation of:
- (a) Chromous chloride (b) Chromyl chloride (c) Chromic chloride (d) Chromic sulphate
41. When NH_4Cl is added to a solution of NH_4OH :
- (a) The dissociation of NH_4OH increases.
(b) The concentration of OH^- increases.
(c) The concentration of both OH^- and NH_4^+ increase.
(d) The concentration of OH^- ion decreases.
42. Nessler's reagent is used to detect.
- (a) CrO_4^{2-} (b) PO_4^{3-} (c) MnO_4^- (d) NH_4^+
43. How many milliliters of 0.1 N H_2SO_4 solution will be required for complete reaction with a solution containing 0.125 g of pure Na_2CO_3 :
- (a) 23.6 mL (b) 25.6 mL (c) 26.3 mL (d) 32.6 mL
44. If equal volumes of 0.1 M KMnO_4 and 0.1 M $\text{K}_2\text{Cr}_2\text{O}_7$ solutions are allowed to oxidise Fe^{2+} to Fe^{3+} in acidic medium, then Fe^{2+} oxidized will be:
- (a) more by KMnO_4 (b) more by $\text{K}_2\text{Cr}_2\text{O}_7$
(c) equal in both cases (d) cannot be determined
45. The number of moles of oxalate ions oxidized by one mole of MnO_4^- ions in acidic medium is:
- (a) 5/2 (b) 2/5 (c) 3/5 (d) 5/3
46. If 25 mL of a H_2SO_4 solution reacts completely with 1.06 g of pure Na_2CO_3 , what is the normality of this acid solution:
- (a) 1N (b) 0.5 N (c) 1.8 N (d) 0.8 N
47. How many litres of Cl_2 at STP will be liberated by the oxidation of NaCl with 10 g KMnO_4 in acidic medium (Atomic weight: Mn =55 and K =39)
- (a) 3.54 (b) 7.08 (c) 1.77 (d) None of these
48. The isomers which can be converted into one another by free rotation about carbon-carbon bond are called:
- (a) conformers (b) Optical isomers (c) Stereoisomers (d) Diastereomers
49. Which of the following is the electron deficient molecule?

- (a) C_2H_6 (b) B_2H_6 (c) SiH_4 (d) PH_3
50. A pair of compound which have odd electrons in the group NO, CO, ClO_2 , N_2O_5 , SO_2 and O_3 are
(a) NO and ClO_2 (b) CO and SO_2 (c) ClO_2 and CO (d) SO_2 and O_3
51. Energy required to completely separate one mole of a solid ionic compound into gaseous constituent ions is called
- (a) Ionisation enthalpy (b) Electron gain enthalpy
(c) Bond dissociation enthalpy (d) Lattice enthalpy
52. The molecule which has zero dipole moment is
(a) CH_3Cl (b) NF_3 (c) BF_3 (d) ClO_2
53. Complete the following statements. With A in bond order, B increases and C decreases.
(a) A = increase, B = bond length, C = bond enthalpy
(b) A = decrease, B = bond enthalpy, C = bond length
(c) A = increase, B = bond enthalpy, C = bond length
(d) A = increase, B = bond angle, C = bond enthalpy
54. The number of possible resonance structures for CO_3^{2-} is
(a) 2 (b) 3 (c) 6 (d) 9
55. Among species H, Li^{2+} , He^{3+} , Be^{3+} and Al^{3+} Bohr's model was able to explain the spectra of
(a) All of these (b) None of these
(c) all other species except Be^{3+} (d) all other species except Al^{3+}
56. Arrange the following elements in the order of ease of detection of wave properties, in the de Broglie experiment. H, Li, Be, B, K
(a) $H < Be, B < Li < K$. (b) $H > Li > K > Be > B$
(c) $H > Li > Be > B > K$ (d) $H < Li < Be < B < K$
57. Which of the following levels of H and He^+ have same energy respectively?
(A) 1, 2 (B) 3, 4 (C) 2, 4 (D) 3, 6
(a) A and D (b) A and B (c) C and D (d) A, C and D
58. Addition of H^+ to an alkene is an example of
(a) +E effect (b) -E effect (c) +M effect (d) -I effect
59. Orbital interaction between sigma bonds of a substituent group and a neighbouring π -orbital or empty p-orbital is known as

- (a) hyperconjugation
(b) inductive effect
(c) Steric effect
(d) dipole-dipole interactions
60. Which of the following does not show electromeric effect?
- (a) Alkenes
(b) Ethers
(c) Aldehydes
(d) Ketones

