

CUET UG 2023 Chemistry Question Paper PDF (May 21, 2023) (Shift 3)

1. The solubility of a gas in a liquid
- Decreases with increase of pressure
 - Decrease with increase of both temperature and pressure
 - Increase with increase of both pressure and temperature
 - Increase with decrease of temperature

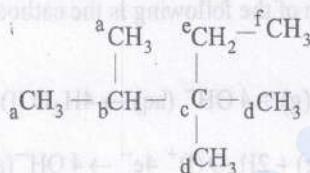
2. Arrange the following compounds in decreasing order of their boiling points

A. Ethoxyethane B. n-Butane
C. Pentanal D. Pentan-1-ol

Choose the correct answer from the options given below:

- $B > A > C > D$
- $D > C > A > B$
- $C > D > A > B$
- $A > B > D > C$

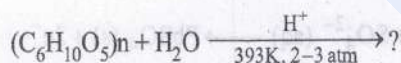
3. Consider the following alcohol:



Identify tertiary carbon:-

- aC
- eC
- bC
- cC

4. Complete the following reaction.



- $nC_6H_{12}O_6$
- $nC_{12}H_{22}O_{11}$
- $nC_2H_4O_2$
- $nCHO$

5. Arrange the following in the decreasing order of their magnetic moment values:

A. Sc B. V C. Mn D. Fe
E. Ni

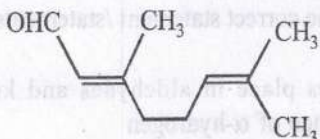
Choose the correct answer from the option given below:

- $C > D > B > A > E$
- $C > D > A > E > B$
- $D > C > B > A > E$
- $C > D > B > E > A$

6. Least basic compound among the following would be

- $La(OH)_3$
- $Lu(OH)_3$
- $Ce(OH)_3$
- $Gd(OH)_3$

7. What will be the IUPAC name of the following compound?



- 3, 7, 7-Trimethylhepta-2, 6-dienal
- 2, 6-Dimethylocta-2, 6-dienal
- 3, 7-Dimethylocta-2, 6-dienal
- 2, 6-Dimethylhepta-1, 5-dien-1-al

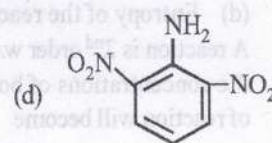
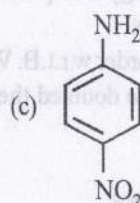
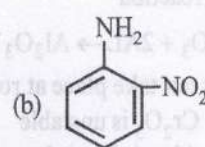
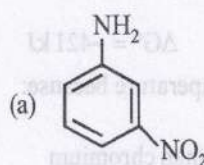
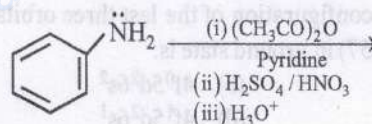
8. Match List I with List II

List I	List II
A. $[Co(H_2NCH_2CH_2NH_2)_3]^{3+}$	I. Tetra-carbonylnickel(0) (SO_4) ₃
B. $[Ni(CO)_4]$	II. Mercury tetrathiocyanatocobaltate(III)
C. $[CoCl_2(en)_2]^+$	III. tris(ethane-1,2-diamine) cobalt (III) sulphate
D. $Hg[Co(SCN)_4]$	IV. Dichloridobis(ethane-1,2-diammine) cobalt (III)

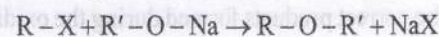
Choose the correct answer from the options given below:

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

9. The major product of the following reaction will be



10. Which of the following reaction mechanism is involved in Williamson synthesis for the preparation of symmetrical and unsymmetrical ethers?

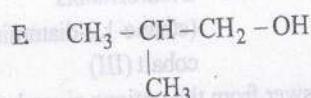
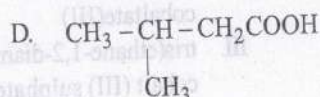
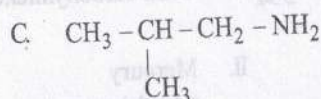
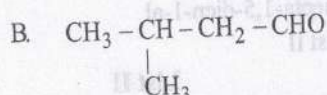
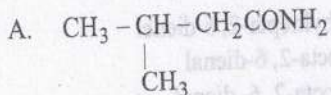


If $R=CH_3$

- S_N1
- S_N2
- S_N1 and S_N2 both
- Addition reaction

11. Identify the solution which is nearly ideal in behaviour
 (a) Ethanol and Acetone
 (b) Phenol and Aniline
 (c) Bromoethane and Chloroethane
 (d) Chloroform and Acetone

12. Choose the correct sequential order for the conversion of 3-methyl butan-1-ol to 2-methyl propanal



Choose the correct answer from the options given below:

- (a) C, D, E, A, B (b) B, D, A, C, E
 (c) D, A, B, E, C (d) A, C, D, B, E
13. The electronic configuration of the last three orbitals in cerium (At.No-57) in ground state is:
 (a) $4f^1 5d^1 6s^2$ (b) $4f^0 5d^2 6s^2$
 (c) $4f^2 5d^0 6s^2$ (d) $4f^1 5d^2 6s^1$
14. The reaction
 $\text{Cr}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Cr} \quad \Delta G^\circ = -421 \text{ kJ}$
 does not take place at room temperature because:
 (a) Cr_2O_3 is unstable
 (b) Aluminium is less reactive than chromium
 (c) Certain amount of activation energy is required
 (d) Entropy of the reaction decreases
15. A reaction is 2nd order w.r.t.A. and 1st order w.r.t.B. When the concentrations of both A and B are doubled the rate of reaction will become

- (a) 4 times (b) $\frac{1}{4}$ times
 (c) $\frac{1}{8}$ times (d) 8 times

16. Identify the correct products formed during the oxidising reaction of permanganate ion with sulphite ion in acidic solution.

- A. 2OH^- B. 2Mn^{2+}
 C. $3 \text{H}_2\text{O}$ D. MnO_2
 E. 5SO_4^{2-}

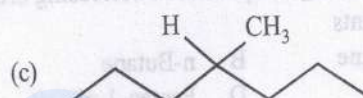
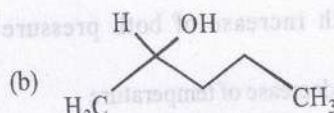
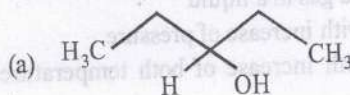
Choose the correct answer from the option given below:

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

17. The only carboxylic acid which gives positive Tollen's test is

- (a) Acetic acid (b) Formic acid
 (c) Oxalic acid (d) Phthalic acid

18. Which of the following is an optically active compound?



19. Which one of the following is the cathodic reaction in a fuel cell?

- (a) $2\text{H}_2(\text{g}) + 4\text{OH}^-(\text{aq}) \rightarrow 4\text{H}_2\text{O}(\text{l}) + 4\text{e}^-$
 (b) $\text{O}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l}) + 4\text{e}^- \rightarrow 4\text{OH}^-(\text{aq})$
 (c) $\text{PbO}_2(\text{s}) + \text{SO}_4^{2-}(\text{aq}) + 4\text{H}^+(\text{aq}) + 2\text{e}^- \rightarrow \text{PbSO}_4(\text{s}) + 2\text{H}_2\text{O}(\text{l})$
 (d) $\text{Pb}(\text{s}) + \text{SO}_4^{2-}(\text{aq}) \rightarrow \text{PbSO}_4(\text{s}) + 2\text{e}^-$

20. Match List I with List II

- | List I | List II |
|--|---------------------------------|
| A. Decomposition of H_2O_2 | I. Second order reaction |
| B. Decomposition of H_2 in the presence of Hg and light | II. Pseudo first order reaction |
| C. Hydrolysis of ester by alkali | III. First order reaction |
| D. Hydrolysis of ester in excess of acid | IV. Photosensitisation |

Choose the correct answer from the options given below:

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

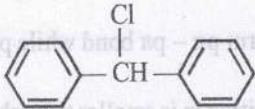
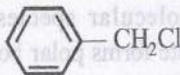
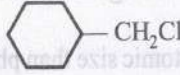
21. Choose the correct statement /statements for Cannizzaro reaction.

- A. Takes place in aldehydes and ketones having absence of α -hydrogen
 B. Takes place in aldehydes having absence of α -hydrogen

- C. It is a disproportionation reaction
 D. Get a mixture of carboxylic acid, salt and ethers
 Choose the correct answer from the options given below:

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

22. The most reactive halide towards S_N1 reaction is

- (a) 
 (b) 
 (c) 
 (d) $CH_2=CH-CH_2-Cl$

23. At what temperature a solution containing 5.60 g of glucose per 1000 g of water would boil at 1.013 bar? (k_b for water is $0.52 \text{ K kg mol}^{-1}$).

- (a) 203.321 K (b) 273.15 K
 (c) 303.202 K (d) 373.166 K

24. Which one of the following statements is not correct

- A. D (-) fructose exists in furanose structure
 B. D (+) glucose exists in pyranose structure
 C. In sucrose the two monosaccharides are held together by peptide linkage
 D. Maltose is a reducing sugar
 E. Pentaacetate of glucose does not react with hydroxylamine

Choose the correct answer from the options given below:

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

25. How many C mol^{-1} are required to convert 1 mol of MnO_4^- to Mn^{2+} ?



[1F = 96500 C]

- (a) 96500 C mol^{-1} (b) 193000 C mol^{-1}
 (c) 386000 C mol^{-1} (d) 482500 C mol^{-1}

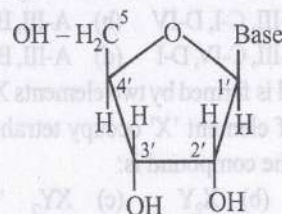
26. Which statement is/are true for Gabriel phthalimide synthesis?

- A. It is used for the preparation of primary and secondary amines
 B. It is only used for the preparation of primary amines
 C. Aromatic primary amines can not be prepared by this method
 D. Only tertiary amines can be prepared

Choose the correct answer from the options given below:

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

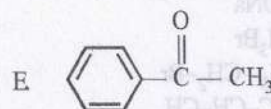
27. Identify the given structure



- (a) Nucleotide (b) Nucleoside
 (c) Vitamins (d) Amino Acid

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

- A. CH_3CHO B. $\text{CH}_3\text{CH}_2\text{CHO}$
 C. CH_3COCH_3 D. $\text{CH}_3\text{COCH}_2\text{CH}_3$



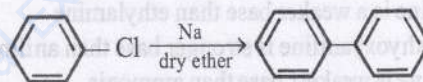
Choose the correct answer from the options given below:

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

29. Ultra pure silicon can be obtained by

- (a) Distillation
 (b) Electrolytic refining
 (c) Vapour phase refining
 (d) Zone refining

30. Consider the following reaction-



Name of the reaction is:

- (a) Balz-Schiemann reaction
 (b) Wurtz reaction
 (c) Wurtz-Fittig reaction
 (d) Fittig reaction

31. $[\text{CuSO}_4(\text{NH}_3)_2]$ and $[\text{Cu}(\text{NH}_3)_2\text{Br}_2]\text{SO}_4$ are:

- (a) Coordination isomers
 (b) Linkage isomers
 (c) Geometrical isomers
 (d) Ionisation isomers

32. The pressure of H_2 required to make the potential of H_2 electrode zero in pure water at 298K is (Given $E^\circ_{\text{cell}} = 0.0 \text{ V}$)

- (a) 10^{-4} atm (b) 10^{-14} atm
 (c) 10^{-12} atm (d) 10^{-10} atm

33. Magnetic moment of Co^{2+} will be

- (a) 3.87 BM (b) 2.84 BM
 (c) 1.73 BM (d) 5.92 BM

34. Match List I with List II

- | List I | List II |
|----------------------------|--------------------|
| A. Pain killers | I. Antipyretics |
| B. Treatment of infections | II. Analgesics |
| C. Reducing fever | III. Antibiotics |
| D. Treatment of depression | IV. Tranquillizers |

Choose the correct answer from the options given below:

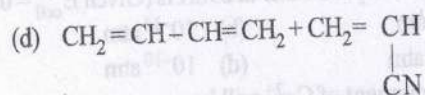
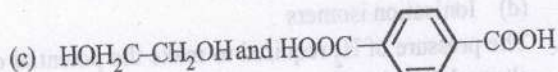
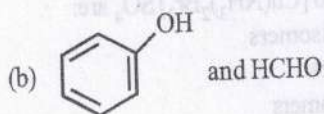
- (a) A-II, B-III, C-I, D-IV (b) A-III, B-II, C-I, D-IV
(c) A-II, B-III, C-IV, D-I (d) A-III, B-II, C-IV, D-I
35. A compound is formed by two elements X and Y make *ccp* and those of element 'X' occupy tetrahedral voids. The formula of the compound is:
(a) XY (b) X_2Y (c) XY_2 (d) X_2Y_3
36. The rate constant for a reaction $P \rightarrow Q$ is $0.8 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$. If the concentration of P is 10 M, then the concentration of Q after 40 minutes is
(a) 1.92 mol L^{-1} (b) 1.46 mol L^{-1}
(c) 1.23 mol L^{-1} (d) 0.24 mol L^{-1}
37. 2-Methyl propene can be prepared by the reaction of
(a) $(\text{CH}_3)_3\text{C}-\text{Br} + \text{CH}_3\text{ONa}$
(b) $(\text{CH}_3)_3\text{C}-\text{ONa} + \text{CH}_3\text{Br}$
(c) $(\text{CH}_3)_3\text{C}-\text{ONa} + \text{CH}_3-\text{CH}_2-\text{Br}$
(d) $(\text{CH}_3)_3\text{C}-\text{ONa} + \text{H}_3\text{C}-\text{CH}=\text{CH}_2$
38. ZnS, AgCl, AgBr and AgI show which of the following defect
(a) Frenkel Defect (b) Schottky Defect
(c) Impurity Defect (d) Metal Excess Defect
39. Which of the following statements are correct?
A. *p*-Nitroaniline is a stronger base than aniline
B. Aniline is weaker basic than *o*-nitro aniline
C. Aniline is a weaker base than ethylamine
D. *p*-methoxyaniline is stronger base than aniline
E. Aniline is weaker base than ammonia

Choose the correct answer from the options given below:

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

40. Monomers of terylene are

- (a) $\text{HOOC}-(\text{CH}_2)_4-\text{COOH}$ and $\text{H}_2\text{N}-(\text{CH}_2)_6-\text{NH}_2$



DIRECTIONS : (Qs. 41 - 45) : Answer the following questions on the basis of passage given below :

Second period elements of p-Block differs from the rest of their group members due to their small atomic size, high electronegativity, high ionization enthalpy and absence of d-Orbitals.

The elements from the second period like C, N, O have unique property of forming $p\pi-p\pi$ multiple bonds whereas other heavier elements of p-block form $d\pi-p\pi$ multiple bonds. This changes the properties of second period elements to great extent. Also the

single bond strength of the p-block elements with own atoms gets affected by their atomic size and presence of lone pairs.

Inert pair effect also affects the properties of the p-Block elements especially for those elements which are present from 4th period onward and this happens due to poor screening effect of inner $(n-1)d$ subshell electrons.

41. N_2 is a gas wherein P_4 is a solid, because-

- (a) Nitrogen is having higher electronegativity than phosphorus
(b) Nitrogen can form $p\pi-p\pi$ bond while phosphorus cannot do so.
(c) Atomic size of nitrogen is smaller than phosphorus
(d) N_2 is a non-polar molecular species whereas phosphorus in solid state forms polar bonds

42. Catenation tendency of Nitrogen is weaker than Phosphorus, because-

- (a) Nitrogen is smaller in atomic size than phosphorus
(b) Nitrogen forms multiple bonds whereas phosphorus does not
(c) N-N bond strength is weaker than P-P bond strength
(d) N-N bond strength is stronger than P-P bond strength

43. Phosphorus forms PF_5 but nitrogen cannot form NF_5 as:

- (a) Small sized nitrogen cannot accommodate five fluorine atoms around it
(b) N-F bond is stronger than P-F bond
(c) Phosphorus is less electronegative than nitrogen
(d) Nitrogen cannot extend its octet due to absence of d-orbitals in it

44. The decreasing order of melting point of the following elements will be:-

- A. Nitrogen(N) B. Phosphorus (P)
C. Arsenic (As) D. Antimony(Sb)
E. Bismuth (Bi)

Choose the correct answer from the options given below:

- (a) $\text{As} > \text{Sb} > \text{Bi} > \text{P} > \text{N}$ (b) $\text{Sb} > \text{Bi} > \text{As} > \text{P} > \text{N}$
(c) $\text{Bi} > \text{Sb} > \text{As} > \text{P} > \text{N}$ (d) $\text{Bi} > \text{As} > \text{Sb} > \text{P} > \text{N}$

45. Among the elements mentioned below, some are not stable in their +3 oxidation state and undergoes disproportionation reactions easily

- A. N B. P C. As D. Sb
E. Bi

Choose the correct answer from the options given below:

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

DIRECTIONS : (Qs. 46 - 50) : Answer the following questions on the basis of passage given below :

Adsorption is a surface phenomenon which can be expressed by means of an empirical relationship known as Freundlich Adsorption isotherm. The relationship given by

$$\frac{x}{m} = K p^{\frac{1}{n}} \quad (n > 1)$$

x = Mass of the gas adsorbed

m = Mass of adsorbent

p = Pressure at which adsorption takes place K and n are constant

Gas	C_2H_6	SO_2	Cl_2	H_2
Critical Temperature (in K)	210	630	243	33

On the basis of given data which one of the following gases shows maximum absorption on a definite amount of charcoal

- (a) C_2H_6 (b) SO_2 (c) Cl_2 (d) H_2

47. When water is the dispersion medium, the colloidal system is called

- (a) Sol (b) Organosol
(c) Aquasol (d) Aerosol

48. Which electrolyte/ electrolytes can coagulate a ferric hydroxide sol most effectively?

- A. $K_3[Fe(CN)_6]$ B. Na_3PO_4
C. Na_2SO_4 D. KNO_3
E. KI

Choose the correct answer from the options given below:

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

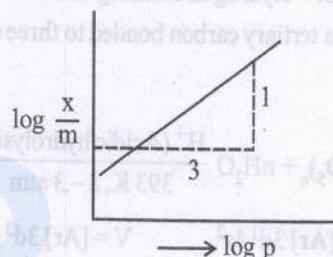
49. Choose the incorrect statement with reference to physical adsorption

- (a) It is non-specific in nature
(b) Enthalpy of adsorption value = 80–240 kJ/mol
(c) It is reversible in nature
(d) It arises due to van der Waals forces

50. The curve of above relationship indicates that at a fixed pressure there is a decrease in physical adsorption with increase in temperature. At high pressure, curves become parallel to pressure axis, indicating saturation of the surface of adsorbent.

Adsorption of a gas follows Freundlich isotherm shown below.

$\frac{x}{m}$ is proportional to



- (a) p^3
(b) p
(c) $p^{1/3}$
(d) Independent of pressure