

CUET (UG)
Chemistry Sample Paper - 6
Solved

Time Allowed: 45 minutes

Maximum Marks: 200

General Instructions:

1. The test is of 45 Minutes duration.
2. The test contains 50 questions out of which 40 questions need to be attempted.
3. Marking Scheme of the test:
 - a. Correct answer or the most appropriate answer: Five marks (+5).
 - b. Any incorrectly marked option will be given minus one mark (-1).
 - c. Unanswered/Marked for Review will be given zero mark (0).

Attempt any 40 questions

1. Which of the following defects is also known as a dislocation defect? [5]
 - a) Schottky defect
 - b) Frenkel defect
 - c) Non-stoichiometric defect
 - d) Simple interstitial defect

2. Diamond CANNOT be classified as _____. [5]
 - a) non-conducting solid
 - b) network solid
 - c) molecular solid
 - d) covalent solid

3. Example of ferromagnetic substance is [5]
 - a) Co
 - b) NaCl
 - c) Fe₃O₄
 - d) KMnO₄

4. Which among the following is not an example of amorphous solids? [5]
 - a) Quartz
 - b) Plastic
 - c) Glass
 - d) Coke

5. The boiling point of a solvent containing a non-volatile solute: [5]
 - a) None of these
 - b) does not change
 - c) is elevated
 - d) is depressed

6. Which among the following is an example of liquid in solid? [5]

- a) Aerated drinks
c) Sugar solution
- b) Mercury in zinc
d) Alloys

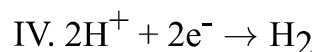
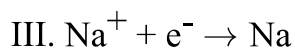
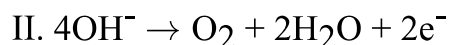
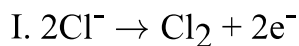
7. An azeotropic mixture of two liquids will have a boiling point lower than either of the two liquids when it [5]

- a) shows a positive deviation from Raoult's law
c) is saturated
- b) forms an ideal solution
d) shows a negative deviation from Raoult's law

8. When the soda bottle is opened, some of the dissolved carbon dioxide gas escapes because of: [5]

- a) to reach a new equilibrium condition required for the higher pressure.
c) some of the undissolved carbon dioxide gas in the soda bottle.
- b) difference in solubility of carbon dioxide at different pressures.
d) difference in solubility of carbon dioxide at different temperatures.

9. Four half reactions I to IV are shown below: [5]



Which two of these reactions are most likely to occur when concentrated brine is electrolysed?

- a) I and IV
c) II and IV
- b) II and III
d) I and III

10. The unit of molar conductivity is [5]

- a) $\text{S cm}^{-2} \text{ mol}^{-1}$
c) $\text{S cm}^2 \text{ mol}^{-1}$
- b) $\text{S cm}^2 \text{ mol}$
d) $\text{S}^{-1} \text{ cm}^2 \text{ mol}^{-1}$

11. The passage of electricity in the Daniell cell when Zn and Cu electrodes are connected: [5]

- a) from Cu to Zn outside the cell b) from Zn to Cu inside the cell
c) from Zn to Cu outside the cell d) from Cu to Zn inside the cell

12. Which of the following rate laws is third order overall? [5]

- a) rate = $K[A]^5[B]^2$ b) rate = $K[A][B]^2$
c) rate = $K[A]^3[B]^3$ d) rate = $K[A]^3[B]^1$

13. The units for the rate constant for the second order reaction (concentration: mol litre⁻¹ time: s) are: [5]

- a) s⁻¹ b) mol litre⁻¹s⁻¹
c) mol litre⁻²s⁻¹ d) mol⁻¹litre s⁻¹

14. The rate law for a particular reaction is given as rate = $k[A][B]^2$. How is the rate of reaction affected if we double the concentration of B? [5]

- a) becomes half ($\frac{1}{2}$) b) three times
c) two times d) four times

15. Peptization is a process of: [5]

- a) dispersing the precipitate into colloidal state b) purifying colloidal particles
c) dispersing the precipitate into non colloidal state d) precipitating colloidal particles

16. Which is not correct for catalyst? It: [5]

- a) changes enthalpy of reaction b) enhances the rate of reaction in both directions
c) reduces activation energy of reaction d) specific in nature

17. Adsorption of gas on solid surface depends upon: [5]

- a) temperature and pressure b) nature of gas
c) all of these d) surface area of adsorbent

- a) S_N1 as well as S_N2 reaction b) S_N1 reaction
 c) Neither S_N2 nor S_N1 reaction d) S_N2 reaction

34. Chloromethane on treatment with excess of ammonia yields mainly [5]

- a) Methanamine (CH_3NH_2) b) Mixture containing all these in equal proportion
 c) N-methylmethanamine ($CH_3-NH-CH_3$) d) N, N-Dimethylmethanamine
 $(CH_3-N \begin{matrix} \nearrow CH_3 \\ \searrow CH_3 \end{matrix})$

35. Aspirin is obtained by the acetylation of which of the following compounds? [5]

- a) Acetyl salicylic acid b) Salicylaldehyde
 c) Salicylic acid d) Phenol

36. Grignard reagent (CH_3MgBr) on reaction CH_3OH will give: [5]

- a) Aldehyde b) Ethane
 c) Ester d) Methane

37. Benzene reacts with CH_3COCl in the presence of $AlCl_3$ to give: [5]

- a) $C_6H_5COCH_3$ b) C_6H_5COCl
 c) $C_6H_5CH_3$ d) C_6H_5Cl

38. Aldol condensation will not take place in: [5]

- a) CH_3CHO b) CH_3COCH_3
 c) $HCHO$ d) CH_2CH_2CHO

39. Which of the following should be most volatile? [5]

- I. $CH_3CH_2CH_2NH_2$
 II. $(CH_3)_3N$
 III. $\begin{matrix} CH_3CH_2 \\ CH_3 \end{matrix} > NH$
 IV. $CH_3CH_2CH_3$

c) Nylon - 6

d) Glyptal

47. Vulcanization of rubber is done by mixing of: [5]

a) Carbon

b) Sodium

c) Both Carbon and Sulphur

d) Sulphur

48. Sodium – bi – carbonate is not a preferred antacid because [5]

a) It is insoluble in water

b) It is a very mild antacid

c) It causes irritation and pain

d) It increases the pH above neutrality

49. Artificial sweetening agents are given to diabetics because [5]

a) They add flavor to sweets

b) They get easily metabolized in the body

c) They add calories but do not get metabolized in the body

d) They do not get metabolized and hence don't add calories

50. Soaps are not Ca^{2+} and Mg^{2+} salts of long-chain acids because [5]

a) These soaps make the water soft

b) These salts change the pH of water which decreases its cleansing action

c) These salts are insoluble in water

d) These salts cannot be obtained by saponification

Solutions

1. **(b)** Frenkel defect
Explanation: Frenkel defect is also known as dislocation defect because in Frenkel defect atom present in the crystal lattice is dislocated to an interstitial site. In Frenkel defect density of solid does not change.

2. **(c)** molecular solid
Explanation: Diamond is a covalent or network solid and is a poor conductor of electricity.

3. **(a)** Co
Explanation: Co is attracted very strongly by a magnetic field and can be permanently magnetized.

4. **(a)** Quartz
Explanation: Quartz is not amorphous solids because unlike amorphous solids it has long range order. Quartz is a crystalline solid.

5. **(c)** is elevated
Explanation: When a non volatile solute is added the elevation in BP takes place with decrease in vapour pressure.

6. **(b)** Mercury in zinc
Explanation: Mercury in zinc amalgam is Liquid - solid binary solution.

7. **(a)** shows a positive deviation from Raoult's law
Explanation: If the azeotropic solution has a lower boiling point than either of its two liquids then it shows positive deviation from Raoult's law.

8. **(b)** difference in solubility of carbon dioxide at different pressures.
Explanation: Soda water, like other carbonated beverages, contains carbon dioxide that has dissolved under pressure. When the pressure is released by opening the soda container, the liquid cannot hold as much carbon dioxide, so the excess bubbles out of the solution. If the soda is left open, additional carbon dioxide will slowly escape into the air. Under warm conditions, the carbon dioxide leaves the solution faster.

9. **(d)** I and III
Explanation: On electrolysis of brine solution
at anode $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$ (oxidation)

at cathode $\text{Na}^+ + \text{e}^- \rightarrow \text{Na}$

10. **(c)** $\text{S cm}^2 \text{ mol}^{-1}$

Explanation: Unit of molar conductivity is $\text{S cm}^2 \text{mol}^{-1}$

11. (a) from Cu to Zn outside the cell

Explanation: In Daniell cell, Zn acts as an anode and Cu acts as cathode, electron flow takes place from anode to cathode and hence, electricity flows from Cu to Zn outside the cell.

12.

(b) $\text{rate} = K [A] [B]^2$

Explanation: $\text{rate} = K [A] [B]^2$

since the rate of a given reaction is first-order wrt A reactant and second-order wrt B reactant.

order of the reaction is the sum of powers of each reactant in rate law expression.

so, the order of reaction = $1+2 = 3$ (a chemical reaction in which the rate of reaction is proportional to the concentration of each of three reacting molecules).

13.

(d) $\text{mol}^{-1} \text{litre s}^{-1}$

Explanation: unit of rate constant for nth order of reaction are:

unit of k for nth order = $(\text{molL}^{-1})^{1-n} \text{s}^{-1}$

put $n=2$ for second order reaction.

14.

(d) four times

Explanation: four times

15. (a) dispersing the precipitate into colloidal state

Explanation: Peptization is a process of passing a precipitate into colloidal particles on adding a suitable electrolyte. The electrolyte added is known as a peptizing agent.

For example A reddish-brown colored colloidal solution is obtained by adding a small quantity of ferric chloride solution to the freshly precipitated ferric hydroxide.

16. (a) changes enthalpy of reaction

Explanation: changes enthalpy of reaction

17.

(c) all of these

Explanation: all of these

18.

(c) selectivity

Explanation: selectivity

19.

(b) FeSiO_3

Explanation: FeO is present as impurity and SiO_2 is flux added.

$\text{FeO} + \text{SiO}_2 \rightarrow \text{FeSiO}_3$ (slag)

20.

(d) $\text{K}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$

Explanation: Feldspars ($\text{KAlSi}_3\text{O}_8 - \text{NaAlSi}_3\text{O}_8 - \text{CaAl}_2\text{Si}_2\text{O}_8$) are a group of rock-forming minerals that make up about 41% of the earth's continental crust by weight

21. (a) Sn

Explanation: Cassiterite is a tin dioxide mineral. It is generally opaque, but it is translucent in thin crystals. Its luster and multiple crystal faces produce a desirable gem. Cassiterite has been the chief tin ore throughout ancient history and remains the most important source of tin today.

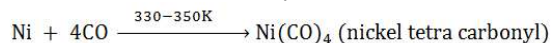
22.

(d) CO

Explanation:

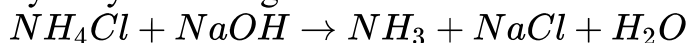
The Mond process is a method for refining nickel, impure nickel is treated with CO it forms Nickel Tetra Carbonyl.

Nickel Tetra Carbonyl is then heated to give pure solid Nickel and CO.



23. (a) Ammonium chloride with sodium hydroxide

Explanation: On a small scale ammonia can be prepared by treating ammonium chloride or ammonium sulphate with sodium hydroxide or calcium hydroxide. It is also prepared by hydrolysis of magnesium nitride.



24.

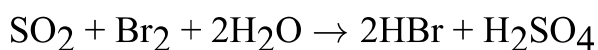
(d) Fluorine

Explanation: Fluorine is the most electronegative element, it shows only -1 oxidation state.

25.

(b) SO₂

Explanation: SO₂. It is because, bromine water, being a good oxidizing agent oxidizes SO₂ to H₂SO₄.



26. (a) Zn

Explanation: Zinc, cadmium, and mercury of group 12 have full d¹⁰ configuration in their ground state as well as in their common oxidation states and hence, are not regarded as transition metals. However, being the end members of the three transition series, their chemistry is studied along with the chemistry of the transition metals.

27.

(c) Variable oxidation states

Explanation: Variable oxidation states is associated with their catalyst activity.

28.

(c) CuI₂

Explanation: CuI₂ is not known

29.

(b) [Cr(NH₃)₆][Co(CN)₆]

Explanation: Coordination isomerism arises from the interchange of ligands between cationic and anionic entities of different metal ions present in a complex. Here interchange

of CN^- and NH_3 ligands is possible between Cr and Co to give $[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{CN})_6]$. So this complex can exhibit coordination isomerism.

30.

(c) Hexadentate ligand

Explanation: Ethylenediaminetetraacetate ion is a hexadentate ligand as it can bind to the central metal atom/ion through 6 donor atoms i.e. 2 N and 4 O atoms.

31. (a) ionization isomerism

Explanation: The isomers which form different ions in solution, although, they have same the composition, are called ionization isomers.

32.

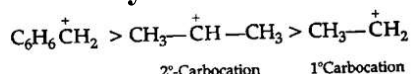
(d) Benzyl chloride

Explanation: The $\text{S}_{\text{N}}1$ is carried out in two steps:

Step (i) : Formation of carbocation (based on its stability).

Step (ii) : Attack of nucleophile.

Stability order of carbocation :



Thus due to formation of stable carbocation benzyl chloride undergo $\text{S}_{\text{N}}1$ mechanism.

33.

(d) $\text{S}_{\text{N}}2$ reaction

Explanation: Inversion of configuration occur in $\text{S}_{\text{N}}2$ reaction

34. (a) Methanamine (CH_3NH_2)

Explanation: $\text{CH}_3\text{Cl} + \text{NH}_3 \rightarrow \text{CH}_3\text{NH}_2 + \text{HCl}$

Ammonia molecule is a nucleophile in nature as it has unpaired electrons. This nucleophile attacks the chloromethane CH_3Cl molecule and forms methylamine or methenamine by a nucleophilic substitution reaction mechanism. The carbon atom is partially positive in the molecule, due to the electronegativity of the halide attached which is partially negative. The electron-rich nucleophile attacks the positive ion, causing the halide ion to be separated from the molecule.

35.

(c) Salicylic acid

Explanation: Salicylic acid

36.

(d) Methane

Explanation: CH_3MgBr reacts with CH_3OH and form CH_4 .

Grignard Reagent act as both base as well as a nucleophile. In the presence of alcohol, H_2O or other groups having acidic hydrogen Grignard reagent act as base and abstract acidic H.

37. (a) $\text{C}_6\text{H}_5\text{COCH}_3$

Explanation: $\text{C}_6\text{H}_6 + \text{CH}_3\text{COCl} \xrightarrow{\text{AlCl}_3} \text{C}_6\text{H}_5\text{COCH}_3$

This is known as Friedel craft acylation reaction. AlCl_3 acts as a lewis acid and will generate CH_3CO^+ carbocation and this will attack benzene to give $\text{C}_6\text{H}_5\text{COCH}_3$.

38.

(c) HCHO

Explanation: Those aldehydes which do not have α -hydrogen atom like HCHO, does not give alcohol condensation reaction.

39. (a) IV

Explanation: Hydrocarbon are more volatile than the amine.

40. (a) Coupling reaction

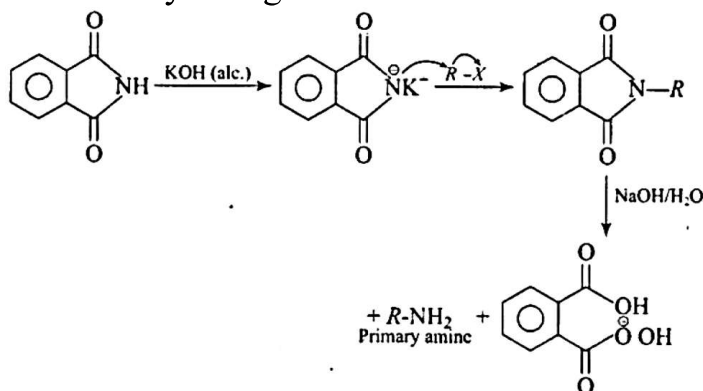
Explanation: The reaction is known as Coupling reaction.

41.

(c) Gabriel phthalimide synthesis

Explanation:

Gabriel phthalimide synthesis is used to get primary amine is prepared from alkyl halide without any change in the number of carbon atoms.



42.

(b) Lactose

Explanation: Lactose is a disaccharide consisting of glucose and galactose and is found naturally in milk.

43.

(d) secondary structure

Explanation: Alpha helices and beta sheets are the two most known secondary structures of protein, As the protein folds into a three-dimensional structure, the secondary structure forms an intermediate.

44.

(b) Maltose

Explanation: Sucrose has glucose and fructose, maltose has two units of glucose, raffinose has glucose, fructose and galactose. Galactose is a monosaccharide.

Hence, on hydrolysis maltose gives only glucose.

45. (a) sulphur cross-links are introduced

Explanation: The process of vulcanisation consists of heating a mixture of raw rubber with sulphur and an appropriate additive at a temperature range between 373 K to 415 K. On vulcanisation, sulphur forms cross links at the reactive sites of double bonds and thus the rubber gets stiffened.

46.

(c) Nylon - 6

Explanation: Nylon - 6 is obtained by heating caprolactum with water at a high temperature (533 K-543 K)

47.

(d) Sulphur

Explanation: Sulphur

48.

(d) It increases the pH above neutrality

Explanation: Excessive hydrogencarbonate can make the stomach alkaline and trigger the production of even more acid. Metal hydroxides are better alternatives because of being insoluble, these do not increase the pH above neutrality. These treatments control only symptoms, and not the cause. Therefore, with these metal salts, the patients cannot be treated easily. In advanced stages, ulcers become life threatening and its only treatment is removal of the affected part of the stomach.

49.

(d) They do not get metabolized and hence don't add calories

Explanation: Artificial sweetening agents like saccharin are not metabolized in the body and hence don't add calories. So use of artificial sweeteners is of great value to diabetic persons and people who need to control intake of calories.

50.

(c) These salts are insoluble in water

Explanation: Calcium and magnesium ions form insoluble calcium and magnesium soaps respectively which separate as scum in water and are useless as a cleansing agent. In fact these are hinderance to good washing.