

CUET (UG)
Chemistry Sample Paper - 7
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. Cations are present in the interstitial sites in: **[5]**
 - a) Vacancy defect
 - b) Metal deficiency defect
 - c) Frenkel defect
 - d) Schottky defect
2. Brass is an example of **[5]**
 - a) metallic crystal
 - b) molecular crystal
 - c) ionic crystal
 - d) covalent crystal
3. Amorphous solids are also known as **[5]**
 - a) None of these
 - b) True solids
 - c) Poly crystalline solids
 - d) Pseudo solids
4. Substances which are weakly repelled in magnetic field are known as **[5]**
 - a) Paramagnetic
 - b) Diamagnetic
 - c) Ferromagnetic
 - d) Ferrimagnetic
5. A compound $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$ undergoes complete dissociation in water. The Van't Hoff factor **i** is: **[5]**
 - a) 6
 - b) 3
 - c) 4
 - d) 9

6. Out of the following 1.0 M aqueous solutions, which one will show largest freezing point depression? [5]

a) 3 b) 4

c) 9 d) 6
7. Which of the following units is useful in relating the concentration of a solution with its vapour pressure? [5]

a) mole fraction b) parts per million

c) mass percentage d) molality
8. A compound undergoes complete tetramerization in a given organic solvent. The Van't Hoff factor i is: [5]

a) shows a negative deviation from Raoult's law b) forms an ideal solution

c) shows a positive deviation from Raoult's law d) is saturated
9. How many Faradays are required to reduce 1 mol of MnO_4^- to Mn^{2+} ? [5]

a) 3 b) 5

c) 6 d) 4
10. In voltaic cell, when salt bridge is removed the voltage _____. [5]

a) increases to maximum b) remains constant

c) drops to half d) drops to zero
11. Saturated solution of KNO_3 is used to make 'salt bridge' because [5]

a) KNO_3 is highly soluble in water b) velocity of K^+ is greater than that of NO_3^-

c) velocity of NO_3^- is greater than that of K^+ d) velocity of both K^+ and NO_3^- are nearly the same.
12. The ionic reactions are generally very fast because [5]

- a) It does not involve bond breaking
- b) The number of collisions between ions are very large
- c) Reactions are highly exothermic
- d) The energy of interaction between charged ion is greater than between neutral molecules

13. Value of Henry's constant K_H : [5]

- a) increases with decrease in temperature.
- b) remains constant.
- c) increases with increase in temperature.
- d) decreases with increase in temperature.

14. For a reaction $2A \rightarrow 3B$, rate of reaction $-\frac{d[A]}{dt}$ is equal to [5]

- a) $\frac{+3}{2} \frac{d[B]}{dt}$
- b) $+\frac{2}{3} \frac{d[B]}{dt}$
- c) $\frac{+1}{3} \frac{d[B]}{dt}$
- d) $\frac{+2}{3} \frac{d[B]}{dt}$

15. Promoters enhance activity of catalyst. The promoter in Haber's process for the production of ammonia is _____. [5]

- a) Cu
- b) Fe
- c) Mo
- d) Cr_2O_3

16. The basic principle of Cottrell precipitator is [5]

- a) Peptization
- b) Le Chatelier's principle
- c) Neutralization of charge on colloids
- d) Stabilisation

17. Artificial smoke screens used in the warfare are colloidal dispersion of [5]

- a) Aluminium oxide
- b) Titanium oxide
- c) Lead oxide
- d) Sodium oxide

18. Which adsorption takes place at low temperature? [5]

- a) Chemical
- b) Can not say
- c) Physical
- d) Both Physical and Chemical

19. The refining method used to obtain highly pure silicon is _____. [5]

a) electrolysis b) zone refining

c) distillation d) crystallization
20. Which of the following chemical is used as a depressant in separating ZnS from PbS in froth floatation process? [5]

a) ZnSO_2 b) NaCl

c) NaCN d) BaCl_2
21. Which type of ores occur in sea and oceans? [5]

a) Sulphides b) All of these

c) Oxides d) Halides
22. Percentage of carbon in cast iron is [5]

a) 7% b) 10%

c) 4% d) 3%
23. Fluorine reacts with conc. NaOH to produce: [5]

a) NaF and O_2 b) NaF and O_2F

c) NaF and OF_2 d) NaF and O_3
24. Fluorine reacts with H_2S to produce [5]


a) SF_6 and HF b) SF_4 and HF

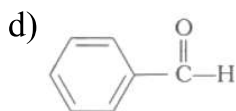
c) SF_2 and HF_4 d) SF_6 , S and HF
25. Noble gases have atmospheric abundance in dry air is ~ 1% by volume of which _____ is the major constituent. [5]
Select option to fill the blank space.

a) Radon b) Neon

c) Xenon d) Argon

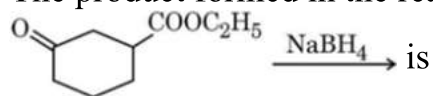
26. Which of the following is amphoteric oxide? [5]
 Mn_2O_7 , CrO_3 , Cr_2O_3 , CrO , V_2O_5 , V_2O_4 .
- a) V_2O_5 , V_2O_4 b) V_2O_5 and Cr_2O_3
c) Mn_2O_7 , CrO_3 d) CrO , V_2O_5
27. On addition of small amount of KMnO_4 to concentrated H_2SO_4 , a green oily compound is obtained which is highly explosive in nature. Identify the compound from the following. [5]
- a) MnO_2 b) Mn_2O_7
c) MnSO_4 d) Mn_2O_3
28. Interstitial compounds are formed when small atoms are trapped inside the crystal lattice of metals. Which of the following is not the characteristic property of interstitial compounds? [5]
- a) They retain metallic conductivity. b) They have high melting points in comparison to pure metals.
c) They are chemically very reactive. d) They are very hard.
29. What is used as the complexing agent in volumetric analysis of ions like Mg^{2+} and Ca^{2+} ? [5]
- a) DMG b) EDTA
c) All of these d) KSCN
30. The crystal field splitting energy in tetrahedral crystal field (Δ_t) is equal to: [5]
- a) $\frac{4}{3}\Delta_0$ b) $\frac{4}{9}\Delta_0$
c) $\frac{9}{4}\Delta_0$ d) $2\Delta_o$
31. The compounds $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$, $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$ and $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$ exhibit: [5]
- a) Linkage isomerism b) Hydrate isomerism
c) Ionization isomerism d) Geometrical isomerism

- c) 



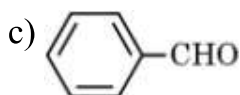
38. The product formed in the reaction:

[5]



a) HCHO

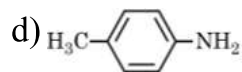
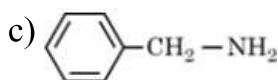
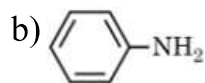
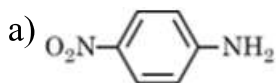
b) $(\text{CH}_3)_3\text{C} - \text{CHO}$



d) $(\text{CH}_3)_2\text{CH} - \text{CHO}$

39. Among the following, which is the strongest base?

[5]



40. The reaction of Benzene diazonium chloride with aniline yields

[5]

a) o - aminoazobenzene

b) p - aminoazobenzene

c) mixture of ortho and para - aminoazobenzene

d) m - aminoazobenzene

41. Aniline does not undergo one of the following:

[5]

a) Bromination

b) Nitration

c) Sulphonation

d) Friedal Craft Reaction

42. The action of nitrous acid on ethylamine gives mainly:

[5]

a) ethyl alcohol

b) ethyl nitrite

c) nitroethane

d) ethane

43. The glycosidic linkage involved in linking the glucose units in amylase part of starch is: [5]

a) $\text{C}_1 - \text{C}_4 \beta$ linkage

b) $\text{C}_1 - \text{C}_6 \beta$ linkage

c) $\text{C}_1 - \text{C}_4 \alpha$ linkage

d) $\text{C}_1 - \text{C}_6 \alpha$ linkage

44. The two hormones which together regulate the glucose level in the blood [5]
- a) Insulin and thyroxine b) Insulin and epinephrine
c) Insulin and glucagon d) Insulin and adrenaline
45. Which of the following monomers form biodegradable polymers? [5]
- a) Both Glycine + amino caproic acid and 3-hydroxybutanoic acid + 3 - hydroxypentanoic acid b) Glycine + amino caproic acid
c) 3 – hydroxybutanoic acid + 3 – hydroxypentanoic acid d) Ethylene glycol + phthalic acid
46. The given polymer is: [5]
- $$\left(\overset{\text{H}}{\underset{|}{\text{N}}} - (\text{CH}_2)_6 - \overset{\text{H}}{\underset{|}{\text{N}}} - \overset{\text{O}}{\parallel} \text{C} (\text{CH}_2)_4 - \overset{\text{O}}{\parallel} \text{C} \right)_n$$
- a) Nylon 6,6 b) Buna-N
c) Nylon 6 d) Bakelite
47. One of the following is used in speciality packaging, orthopaedic devices and in controlled release of drugs [5]
- a) Buna – N b) Buna – S
c) Polyvinyl chloride d) PHBV
48. Sodium carbonate added to soap acts as a [5]
- a) builder b) foaming agent
c) scouring agent d) filler
49. Shaving soaps contain [5]
- a) sodium silicate b) glycerol
c) borax d) sodium carbonate
50. Alkyl benzenesulphonate, an anionic detergent is widely used in [5]
- a) Liquid dish – washing detergents b) Household detergents

c) Germicides

d) Hand sanitizer

Solutions

1.
(c) Frenkel defect
Explanation: A Frenkel defect or dislocation defect is a type of defect in crystalline solids wherein an atom is displaced from its lattice position to an interstitial site, creating a vacancy at the original site and an interstitial defect at the new location without any changes in chemical properties. In this defect, the cation is displaced from its lattice site to an interstitial site.
2. (a) metallic crystal
Explanation: Brass shows all the characteristics of Metallic Crystal.
3.
(d) Pseudo solids
Explanation: Amorphous solids are also known as pseudo solid. They have a tendency to flow, though very slowly. Therefore, they are also known as supercooled liquids.
4.
(b) Diamagnetic
Explanation: Diamagnetism is shown by those substances in which all the electrons are paired and there are no unpaired electrons. Pairing of electrons cancels their magnetic moments and they lose their magnetic character.
5.
(b) 3
Explanation: A compound $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$ undergoes complete dissociation in water. The Van't Hoff factor i is: 3
6. (a) 3
Explanation: A compound $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$ undergoes complete dissociation in water. The Van't Hoff factor i is: 3
7. (a) mole fraction
Explanation: Mole fraction is useful in relating vapour pressure with a concentration of the solution. According to Raoult's law, the partial vapour pressure of each component in the solution is directly proportional to its mole fraction present in solution.
A is one component.
$$p_A \propto x_A, x_A = \frac{n_A}{n_A + n_B}$$
8.
(c) 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.
9.
(b) 5

Explanation: $\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \rightarrow \text{Mn}^{2+} + 5\text{H}_2\text{O}$

1 mole of MnO_4^- requires 5 mole of electrons = 5 faradays.

10.

(d) drops to zero

Explanation: drops to zero

11.

(d) velocity of both K^+ and NO_3^- are nearly the same.

Explanation: Saturated solution of KNO_3 is used in salt bridge because of same mobility of K^+ and NO_3^- . if the velocities would not have been the same then the ions would not have been able to neutralise the charge equally in both half cells. consequently, an opposing force would be developed that restricts the flow of current.

12. (a) It does not involve bond breaking

Explanation: Ionic reactions do not involve bond breaking, energy is directly used in completing the reaction, therefore they are fast.

13.

(c) increases with increase in temperature.

Explanation: Value of henry constant increases with increase in temperature.

14.

(d) $\frac{+2}{3} \frac{d[B]}{dt}$

Explanation: $\frac{+2}{3} \frac{d[B]}{dt}$

15.

(c) Mo

Explanation: Mo

16.

(c) Neutralization of charge on colloids

Explanation: It is used for decreasing air pollution by neutralizing the colloid.

17.

(b) Titanium oxide

Explanation: Artificial smoke screens used in the warfare are colloidal dispersion of Titanium oxide. It usually produce white smoke. Coloured smoke can be produced by replacement of titanium oxide by other substances.

18.

(c) Physical

Explanation: Physical adsorption is favoured at low temperature because it involves only Vander walls interactions between adsorbate and adsorbent.

19.

(b) zone refining

Explanation: zone refining

20.

(c) NaCN

Explanation: NaCN combines with Zn to form water soluble complex which prevents it from coming to froth and it makes sure that PbS comes to the froth.

21.

(d) Halides

Explanation: Metal halides ores occur in sea and oceans, since they are soluble in water.

22.

(d) 3%

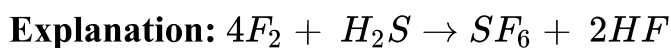
Explanation: Cast iron is made by melting pig iron with scrap iron and coke using a hot air blast. It has slightly low carbon about 3% of carbon content and is extremely hard and brittle.

23. (a) NaF and O₂

Explanation: Fluorine reacts with concentrated NaOH to produce NaF and O₂. But with cold diluted 2NaOH, it forms OF₂ and NaF.



24. (a) SF₆ and HF



25.

(d) Argon

Explanation: Argon

26.

(b) V₂O₅ and Cr₂O₃

Explanation: V₂O₅, Cr₂O₃ are amphoteric oxides because both react with alkalies as well as acids.

Remember: In lower oxides, the basic character is predominant while in higher oxides, the acidic character is predominant.

27.

(b) Mn₂O₇



28.

(c) They are chemically very reactive.

Explanation: Interstitial compounds are chemically inert not reactive.

29.

(b) EDTA

Explanation: EDTA (ethylenediaminetetraacetate) is a hexadentate ligand and it forms a stable chelate complex with given metal ions. The selective estimation of these ions can be done due to the difference in stability constants of complexes of these ions with EDTA.

30.

(b) $\frac{4}{9}\Delta_0$

Explanation: Since splitting in tetrahedral complex is 2/3rd of octahedral complex, so for one ligand splitting in OH

$$\frac{4}{9}\Delta_0$$

31.

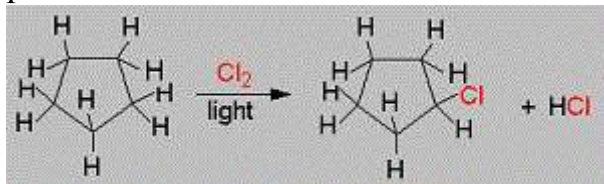
(b) Hydrate isomerism

Explanation: The compounds $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$, $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$ and $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$ exhibit Hydrate isomerism

32.

(d) Cyclopentane

Explanation: Cyclopentane is nearly inert chemically, they react with halogens in the presence of light through the substitution of one hydrogen atoms. Since the cyclic structure confers a high degree of symmetry on the molecule, only one monochloro cyclopentane is possible.



33.

(d) $\text{Cl}_2/\text{UV light}$

Explanation: Production of alkyl chlorides from alkanes can be carried out by chlorination under the presence of UV light. Chlorine molecule (Cl_2) under the influence of UV light forms free radicals, which react with alkanes to form a mixture of isomeric monohaloalkane and polyhaloalkanes.

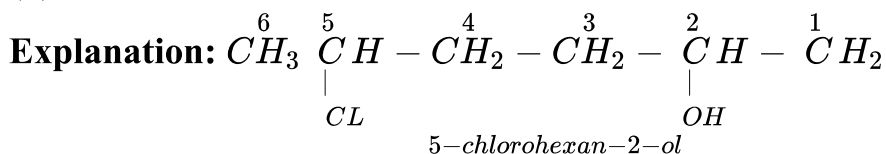
34.

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

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

35.

(b) 5 – Chlorohexan – 2 – ol



-OH is given preference over -Cl so numbering is done so that -OH gets the lowest number.

36.

(c) $1^\circ < 2^\circ < 3^\circ$

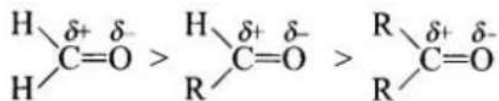
Explanation: Correct order of reactivity of alcohol is $1^\circ < 2^\circ < 3^\circ$

37. (a) $\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{H}$

Explanation:

CH_3CHO is most reactive towards nucleophilic addition reactions. Carbonyl compounds are polar with the positive charge on a carbon atom which is attacked by nucleophiles. Two electron releasing alkyl groups in ketones make carbon less electron deficient than aldehydes. Benzene (C_6H_6) ring exhibits +R-effect which thereby decreases the ease of nucleophilic addition reaction in benzaldehyde and acetophenone. Hence the reactivity

order is as follows

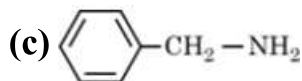


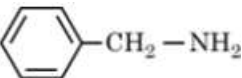
38.

(d) $(\text{CH}_3)_2\text{CH} - \text{CHO}$

Explanation: $(\text{CH}_3)_2\text{CH} - \text{CHO}$ doesn't give cannizaro reaction.

39.

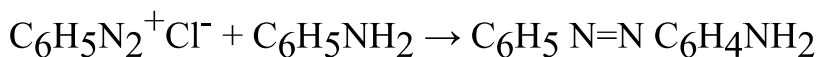


Explanation:  is the strongest base.

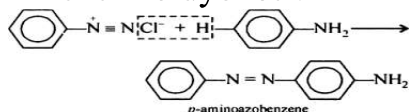
40.

(b) p - aminoazobenzene

Explanation: This is a coupling reaction in which two benzene derivatives are held by -N=N- linkage resulting in the formation of an azo compound.



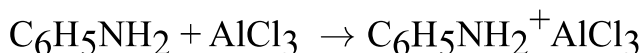
This is azo dye test.



41.

(d) Friedal Craft Reaction

Explanation: The F.C. alkylation and F.C. acylation reaction take place in the presence of anhydrous AlCl_3 , which is a Lewis base as it is electron deficient, it attacks the lone pair on nitrogen in aniline and forms an insoluble complex which precipitates out and reaction does not happen further.



42. (a) ethyl alcohol

Explanation: The nitrous acid thus produced reacts with ethyl amine and produces ethyl alcohol and nitrogen gas

43.

(c) $\text{C}_1 - \text{C}_4$ α linkage

Explanation: Amylose is a glucose polymer linked through $\text{C}_1 - \text{C}_4$ α glycosidic linkage

44.

(c) Insulin and glucagon

Explanation: The role of insulin is to keep the blood glucose level within the narrow limit. Insulin is released in response to the rapid rise in blood glucose level. On the other hand hormone glucagon tends to increase the glucose level in the blood. The two hormones together regulate the glucose level in the blood.

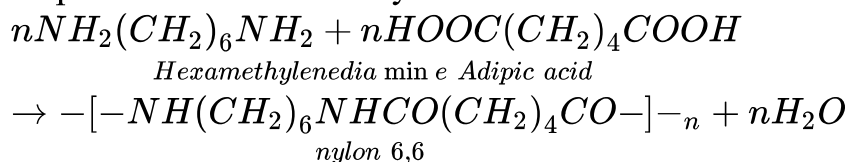
45. (a) Both Glycine + amino caproic acid and 3-hydroxybutanoic acid + 3 - hydroxypentanoic acid

Explanation: Polymer formed from Glycine and amino caproic acid is nylon 2-nylon 6

and polymer formed from 3 – hydroxybutanoic acid and 3 – hydroxypentanoic acid is PHBV. Both of them are biodegradable.

46. (a) Nylon 6,6

Explanation: Nylon 6,6 type of polyamide or nylon. It is formed by copolymerization of adipic acid and hexamethylenediamine.



47.

(d) PHBV

Explanation: PHBV is used in speciality packaging, orthopaedic devices and in controlled release of drugs. PHBV undergoes bacterial degradation in the environment.

48. (a) builder

Explanation: Builders like sodium carbonate and trisodium phosphate make the soaps act more rapidly.

49.

(b) glycerol

Explanation: Shaving soaps contain glycerol to prevent rapid drying.

50.

(b) Household detergents

Explanation: Anionic detergents are sodium salts of sulphonated long chain alcohol or hydrocarbons. In anionic detergents, the anionic part of the molecule is involved in the cleansing action. They are mostly used for household work.