Sample Paper- 02

NEET XII (2024)

CHEMISTRY

SECTION-A

1. **Statement I:** Raoult's law is applicable for dilute solutions only.

Statement II: Henry's law is applicable for solution of gas in liquid.

(1) Statement I and statement II both are correct.
(2) Statement I and statement II both are incorrect.
(3) Statement I is true but statement II is false.
(4) Statement I is false but statement II is true.

2. The rate law for a reaction between the substances A and B is given by rate = $K[A]^n[B]^m$. On doubling the concentration of A and halving the concentration of B, the ratio of the new rate to the earlier rate of the reaction will be as;

(1) $1/2^{(m+n)}$ (2) $(m + n)$
(3) $(n - m)$ (4) $2^{(n-m)}$

3. Hydrogen electrode is immersed in two solutions of pH = 3 and pH = 8 respectively and linked through a salt bridge. The operative emf of the working cell would be;

(1) 0.327 V (2) 0.208 V
(3) 0.295 V (4) 0.250 V

4. A current is passed through two voltmeters connected in series. The first voltmeter contains $XSO_4(aq)$ while second voltameter contains $Y_2SO_4(aq)$. The relative atomic masses of X and Y are in the ratio 2 : 1. The ratio of the mass of X liberated to the mass of Y liberated is;

(1) 1 : 1 (2) 1 : 2
(3) 2 : 1 (4) None of these

5. On dissolving sugar in water at room temperature solution feels cool to touch. Under which of the following cases dissolution of sugar will be most rapid?

(1) Sugar crystals in cold water
(2) Sugar crystals in hot water
(3) Powdered sugar in cold water
(4) Powdered sugar in hot water

6. Half-life of a first order reaction is 10 minutes. What percentage of reaction will be complete in 100 minutes?

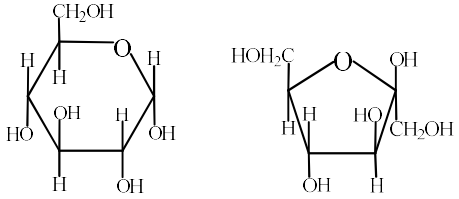
(1) 25% (2) 50%
(3) 99.9% (4) 75%

7. **Assertion (A):** The rate constant for a zero-order reaction is equal to rate of reaction.

Reason (R): $t_{1/2}$ for zero order reaction is directly proportional to initial concentration.

(1) **Assertion (A)** and **Reason (R)** both are true and **Reason (R)** is the correct explanation of **Assertion (A)**.
(2) **Assertion (A)** and **Reason (R)** both are true and **Reason (R)** is not the correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true but **Reason (R)** is false.
(4) **Assertion (A)** and **Reason (R)** both are false.

8. The relation between following two compounds is;



(1) Anomers
(2) C-3 epimers
(3) Functional isomers
(4) Position isomers

9. For $BaSO_4$,

I. $\Lambda_m^\infty = \Lambda_m^\infty$ of $(BaCl_2 + H_2SO_4 - 2HCl)$

II. $\Lambda_m^\infty = \Lambda_m^\infty$ of $(BaCl_2 + H_2SO_4 - HCl)$

III. $\Lambda_{equiv.}^\infty = \Lambda_{equiv.}^\infty$ of $(BaCl_2 + H_2SO_4 - 2HCl)$

IV. $\Lambda_{equiv.}^\infty = \Lambda_{equiv.}^\infty$ of $(BaCl_2 + H_2SO_4 - HCl)$

Select **correct** values;

(1) I, III (2) II, III
(3) I, IV (4) II, IV

10. An ideal solution has two components A and B. A is more volatile than B, i.e., $P_A^\circ > P_B^\circ$ and $P_A^\circ > P_{total}$. If X_A and Y_A are mole fractions of component A in liquid and vapour phases, then;

(1) $X_A = Y_A$ (2) $X_A > Y_A$
(3) $X_A < Y_A$ (4) Data insufficient

11. Electrolysis can be used to determine atomic masses. A current of 0.550 A deposits 0.55 g of a certain metal in 100 minutes. Calculate the atomic mass of the metal if eq. mass = mol. mass/3.

(1) 100 (2) 45.0
(3) 48.25 (4) 144.75

12. When acetaldehyde is heated with Fehling's reagent, it gives a red precipitate of;

(1) Cu (2) CuO
(3) $CuSO_4$ (4) Cu_2O

13. **Statement I:** In presence of DMSO, the rate of S_N2 reaction increases.
Statement II: DMSO is a polar protic solvent.

(1) Statement I and statement II both are correct.
(2) Statement I and statement II both are incorrect.
(3) Statement I is true but statement II is false.
(4) Statement I is false but statement II is true.

14. Sucrose is made up of;

(1) D-glucose + L-fructose
(2) D-glucose + D-fructose
(3) D-fructose + L-glucose
(4) L-fructose + L-glucose

15. Thermally most stable compound is;

(1) $HClO_4$ (2) $HClO_3$
(3) HOCl (4) $HClO_2$

16. **Assertion (A):** Formic acid is the strongest mono carboxylic acid.
Reason (R): Trifluoroacetic acid is weaker than formic acid.

(1) **Assertion (A)** and **Reason (R)** both are true and **Reason (R)** is the correct explanation of **Assertion (A)**.
(2) **Assertion (A)** and **Reason (R)** both are true and **Reason (R)** is not the correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true but **Reason (R)** is false.
(4) **Assertion (A)** and **Reason (R)** both are false.

17. The crystal field stabilization energy (CFSE) is highest for;

(1) $[CoF_4]^{2-}$ (2) $[Co(NCS)_4]^{2-}$
(3) $[Co(NH_3)_6]^{3+}$ (4) $[CoCl_4]^{2-}$

18. The degenerate orbital of $[Cr(H_2O)_6]^{3+}$ are;

(1) d_{z^2} and d_{xz} (2) d_{yz} and d_{z^2}
(3) d_{xz} and d_{yz} (4) $d_{x^2-y^2}$ and d_{xy}

19. Which of the following is the strongest base?

(1) AsH_3 (2) SbH_3
(3) PH_3 (4) NH_3

20. Which one of the following does **not** exist?

(1) $XeOF_4$
(2) NeF_2
(3) XeF_2
(4) XeF_6

21. Which of the following does **not** react with oxygen directly?

(1) Zn
(2) Ti
(3) Pt
(4) Fe

22. Bleaching properties of bleaching powder are due to its:

(1) oxidizing properties
(2) reducing properties
(3) basic properties
(4) disinfecting properties

23. **Assertion (A):** The valency and oxidation number of sulphur in S_8 respectively are 2 and 0.
Reason (R): S_8 rhombic is the most stable allotropic form of sulphur.

(1) **Assertion (A)** and **Reason (R)** both are true and **Reason (R)** is the correct explanation of **Assertion (A)**.
(2) **Assertion (A)** and **Reason (R)** both are true and **Reason (R)** is not the correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true but **Reason (R)** is false.
(4) **Assertion (A)** and **Reason (R)** both are false.

24. Match the following:

Column-I		Column-II	
(A)	Ethyl amine	(I)	3° amine
(B)	Dimethyl amine	(II)	1° amine
(C)	Triethyl amine	(III)	2° amine
(D)	Benzyl amine	(IV)	Aryl amine

	A	B	C	D
(1)	(II)	(I)	(IV)	(III)
(2)	(II)	(IV)	(I)	(III)
(3)	(II)	(III)	(I)	(II)
(4)	(IV)	(III)	(II)	(I)

25. Which among the following is not diamagnetic?

(1) Cu^{2+} (2) Zn^{2+}

(3) Ag^{+} (4) Cd^{2+}

26. $K_2Cr_2O_7$ on heating gives;

(1) Cr_2O_3

(2) K_2CrO_4

(3) O_2

(4) All of these

27. Match the following:

Column-I		Column-II	
(A)	Chloroethene	(I)	Aryl halide
(B)	Benzyl chloride	(II)	Benzylic halide
(C)	Chlorobenzene	(III)	Alkyl halide
(D)	Chloroethane	(IV)	Vinylic halide

	A	B	C	D
(1)	(ii)	(i)	(iv)	(iii)
(2)	(ii)	(iv)	(i)	(iii)
(3)	(ii)	(iii)	(i)	(ii)
(4)	(iv)	(ii)	(i)	(iii)

28. Stephen's reduction will covert CH_3CH_2CN to;

(1) EtOH

(2) EtCHO

(3) MeCHO

(4) MeCOMe

29. Which of the oxide is neutral?

(1) CO (2) SnO_2

(3) ZnO (4) SiO_2

30. Zr and Hf have almost equal atomic and ionic radii because;

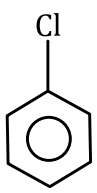
(1) of diagonal relationship

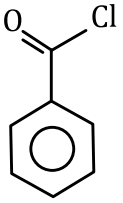
(2) of lanthanide contraction

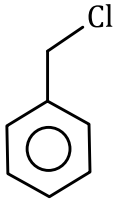
(3) of actinide contraction

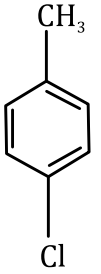
(4) both belong to same transition series

31. When benzyl alcohol is treated with thionyl chloride, the product formed is;

(1) 

(2) 

(3) 

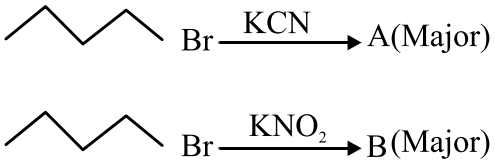
(4) 

32. Total number of optically active isomers of 2, 3-Dibromobutane will be;

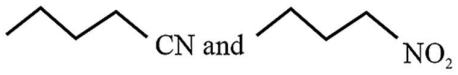
(1) 2 (2) 3

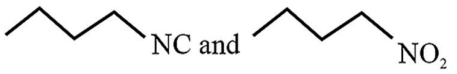
(3) 4 (4) 1

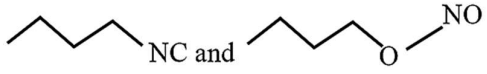
33. Consider the following reactions:

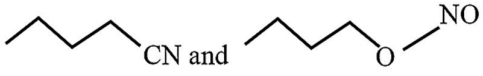


Products A and B respectively are:

(1) 

(2) 

(3) 

(4) 

34. Most suitable reagent for following conversion is

$R - OH \rightarrow R - Cl$

(1) Anhyd. $ZnCl_2$ + HCl

(2) PCl_5

(3) $SOCl_2$

(4) NaCl

35. Benzylidene chloride is;

(1) $C_6H_5CH_2Cl$

(2) $C_6H_5-CH=CH$ (Cl)

(3) $C_6H_5CHCl_2$

(4) $C_6H_5CCl_3$

SECTION-B

36. Rosenmund's reduction is used for the preparation of;

(1) Ketone

(2) Aldehyde

(3) Carboxylic acid

(4) Alcohol

37. Which is **incorrectly** matched?

(1) $[Ni(CO)_4]$: sp^3

(2) $[Cr(NH_3)_6]^{3+}$: d^2sp^3

(3) $[Fe(CN)_6]^{4-}$: d^2sp^3

(4) $[Cu(NH_3)_4]^{2+}$: sp^3

38. CFSE values of $[Fe(CN)_6]^{3-}$ and $[Fe(H_2O)_6]^{3+}$ respectively are;

(1) 0 and 20 Dq

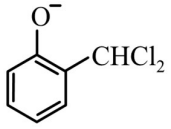
(2) –2 Dq and 0

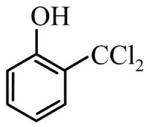
(3) –20 Dq and –20 Dq

(4) 0 and 0

39. In Reimer-Tiemann reaction when phenol is treated with chloroform in presence of NaOH, which of the following species act as reaction intermediate?

(1) $:CCl_2$

(2) 

(3) 

(4) Both (1) and (2)

40. In a set of reaction, propanoic acid yielded compound (D):

$$CH_3CH_2COOH\ (A) \xrightarrow{SOCl_2} (B) \xrightarrow{NH_3} (C) \xrightarrow[Br_2]{KOH} (D)$$

The formula of compound (D) is:

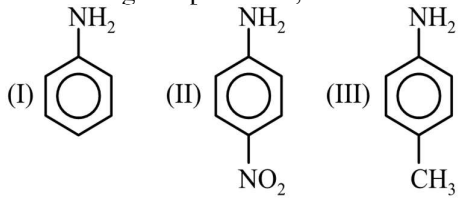
(1) $CH_3CH_2CH_2NH_2$

(2) $CH_3CH_2CONH_2$

(3) $CH_3CH_2NHCH_3$

(4) $CH_3CH_2NH_2$

41. The **correct** increasing order of basic strength for the following compounds is;



(1) III < I < II (2) III < II < I

(3) II < I < III (4) II < III < I

42. During denaturation of protein, the structure which does **not** get affected is?

(1) Primary (2) Secondary

(3) Tertiary (4) Quaternary

43. Which of the following is a reducing sugar?

(1) Maltose (2) Sucrose

(3) Starch (4) Cellulose

44. The boiling point of 0.1 m KCl solution in water having ebullioscopic constant (K_b) of 0.51 K kg mol^{-1} is;

(1) 100.102°C (2) 99.49°C

(3) 100.051°C (4) 99.949°C

45. Consider a first order gas phase reaction $A(g) \rightarrow B(g) + C(g)$. If 10 atm is the initial pressure of A and 12 atm is the total pressure after 20 minutes, then rate constant of this reaction is equal to;

(1) $\frac{2.303}{12}\log\left(\frac{20}{10}\right)$

(2) $\frac{2.303}{20}\log\left(\frac{12}{10}\right)$

(3) $\frac{2.303}{10}\log\left(\frac{20}{12}\right)$

(4) $\frac{2.303}{20}\log\left(\frac{10}{8}\right)$

46. Which of the following is water-soluble?

(1) Vitamin E (2) Vitamin K

(3) Vitamin A (4) Vitamin B

47. The reagent used to convert acetamide into methyl amine is;

(1) $NaOH / Br_2$ (2) Soda lime

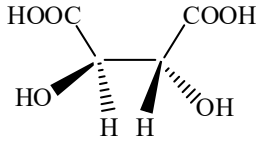
(3) Hot conc. H_2SO_4 (4) PCl_5

48. The change in optical rotation of a freshly prepared solution of glucose with time is called _____.

(1) Specific rotation (2) Optical inversion

(3) Mutarotation (4) Racemization

49. The absolute configuration of the following compound is;



(1) R, R (2) S, S

(3) S, R (4) R, S

50. Consider the following complexes:

$[Co(NH_3)_6]Cl_3$, $[Co(NH_3)_4Cl_2]^+$,

$[Ni(CO)_4]$, $[Cr(H_2O)_6]^{3+}$,

$[Pt(NH_3)_2Cl(NO_2)]$, $[Co(H_2O)_2Cl_2(py)]$,

$[Ni(en)_3]^{2+}$, $[Pt(NH_3)_2Cl_2]$

The total number of homoleptic complexes is;

(1) 4

(2) 6

(3) 8

(4) 5