Sample Paper-01

Dropper NEET (2024)

CHEMISTRY

SECTION-A

1. On treating a mixture of two alkyl halides with sodium metal in dry ether, 2-Methylpropane was obtained. The alkyl halides are;
(1) 2-Chloropropane & Chloromethane
(2) 2-Chloropropane & Chloroethane
(3) Chloromethane & Chloroethane
(4) Chloromethane & 1-Chloropropane

2. The energy absorbed by each molecule (A_2) of a substance is 4.4×10^{-19} J and bond energy per molecule is 4.0×10^{-19} J. The kinetic energy of the molecule per atom will be;
(1) 2.2×10^{-19} J (2) 2.0×10^{-19} J
(3) 4.0×10^{-20} J (4) 2.0×10^{-20} J

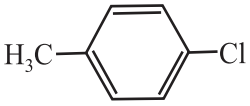
3. De-Broglie wavelength for electron is related to applied voltage as;
(1) $\lambda = \frac{12.3}{\sqrt{h}}$ Å (2) $\lambda = \frac{12.3}{\sqrt{V}}$ Å
(3) $\lambda = \frac{12.3}{\sqrt{r}}$ Å (4) $\lambda = \frac{12.3}{\sqrt{m}}$ Å

4. The group having trigonal planar structures is;
(1) NCl_3, BCl_3, SO_3
(2) CO_3^{2-}, NO_3^-, SO_3
(3) NH_3, SO_3, CO_3^{2-}
(4) BF_3, NF_3, CO_3^{2-}

5. For the reaction,
$H_2(g) + I_2(g) \leftrightharpoons 2HI(g)$
$K_C = 66.9$ at 350°C and $K_C = 50.0$ at 448°C. The reaction has;
(1) $\Delta H > 0$
(2) $\Delta H < 0$
(3) $\Delta H = 0$
(4) ΔH sign cannot be determined

6. The formation of oxide ion, O^{2-} (g) requires first an exothermic and then an endothermic step as shown below:
$O(g) + e^- \rightarrow O^-(g)$; $\Delta H° = -142$ kJ mol^{-1}
$O^-(g) + e^- \rightarrow O^{2-}(g)$; $\Delta H° = 844$ kJ mol^{-1}
This is because;
(1) Oxygen is more electronegative
(2) Oxygen has high electron affinity
(3) O^- ion will tend to resist the addition of another electron
(4) O^- has comparatively larger size than oxygen atom

7. The IUPAC name of the following compound is;



(1) 4-Methylchlorobenzene
(2) 4-Chlorotoluene
(3) 2-Chloro-4-methylbenzene
(4) 1-Methyl-4-chlorobenzene

8. Solution of 0.1 M NH_4OH and 0.1 M NH_4Cl has pH 9.25, The pK_b of NH_4OH is;
(1) 9.25 (2) 4.75
(3) 3.75 (4) 8.25

9. The reducing character of hydrides of group 14 elements is;
(1) Maximum for CH_4 and minimum for PbH_4
(2) Maximum for CH_4 and minimum for SnH_4
(3) Maximum for PbH_4 and minimum for SiH_4
(4) Maximum for PbH_4 and minimum for CH_4

10. The reaction,

$$R_2CO + 4[H] \xrightarrow[\text{Conc.HCl}]{\text{Zn–Hg}} R_2CH_2 + H_2O$$

is well known as;
(1) wurtz reaction
(2) rosenmund reduction
(3) kolbe reaction
(4) clemmensen reduction

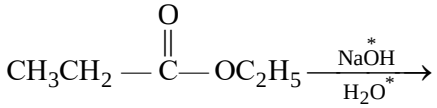
11. A compound (80 g) on analysis gave C = 24 g, H = 4 g, O = 32 g. Its empirical formula is;
(1) $C_2H_2O_2$ (2) C_2H_2O
(3) CH_2O_2 (4) CH_2O

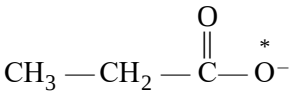
12. **Assertion (R):** Scandium and zinc are two members of first transition series which do not form coloured compounds.
Reason (R): Scandium compounds have $3d^0$ configuration in + 3 state while zinc compounds have $3d^{10}$ configuration in + 2 state due to which there is no d-d transition.
(1) If both assertion and reason are true and reason is the correct explanation of assertion.
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.
(3) If assertion is true but reason is false.
(4) If both assertion and reason are false.

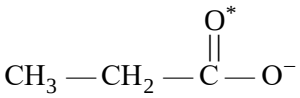
13. Which of the following major product will be obtained when neopentyl alcohol is treated with conc. HCl in presence of $ZnCl_2$?

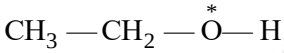
(1) t-Butyl chloride
(2) Isobutylene
(3) t-Pentyl chloride
(4) Neopentyl chloride

14. Product of the given reaction contains;



(1) 

(2) 

(3) 

(4) Both (1) and (2)

15. Denaturation of protein;

(1) is always irreversible
(2) disrupts the secondary and tertiary structures only
(3) will not affect the original biological activity
(4) none of these

16. The **incorrect** statement regarding an octahedral complex is;

(1) central metal cation with d^6 configuration is diamagnetic in strong ligand field.
(2) central metal cation with d^5 configuration has one unpaired electron in both weak and strong ligand field.
(3) central metal cation with d^8 configuration has two unpaired electrons in weak, strong and also in mixed ligand field.
(4) central metal cation with d^4, d^5, d^6 and d^7 configuration have different number of unpaired electrons in weak and strong ligand field.

17. The colour of light absorbed by an aqueous solution of $CuSO_4$ is;

(1) Orange-Red (2) Blue-Green
(3) Yellow (4) Violet

18. Which of the following material is **not** present in a dry cell?

(1) MnO_2 (2) NH_4Cl
(3) $ZnCl_2$ (4) KCl

19. If specific rotation of glucose solution is 52° and that of fructose solution is –92° then what will be the specific rotation of invert sugar?

(1) –20° (2) +20°
(3) –72° (4) +72°

20. The shape of ClO_3^- is;

(1) Pyramidal
(2) Tetrahedral
(3) Triangular planar
(4) Triangular bipyramidal

21. Match the List-I with List-II:

List-I (Reaction)		List-II (K_P/K_c)	
A	$A_2(g) + 3B_2(g) \rightleftharpoons 2AB_3(g)$	P	$(RT)^{-2}$
B	$A_2(g) + B_2(g) \rightleftharpoons 2AB(g)$	Q	$(RT)^0$
C	$A(s) + \frac{3}{2}B_2(g) \rightleftharpoons AB_3(g)$	R	$(RT)^{1/2}$
D	$AB_2(g) \rightleftharpoons AB(g) + \frac{1}{2}B_2(g)$	S	$(RT)^{-1/2}$

(1) A → P, B → Q, C → R, D → S
(2) A → P, B → Q, C → S, D → R
(3) A → S, B → R, C → Q, D → P
(4) A → Q, B → R, C → P, D → S

22. An inorganic salt is strongly heated the residue is yellow when hot and white when cold. The salt contains

(1) Cu^{2+} (2) Zn^{2+}
(3) Co^{2+} (4) Fe^{2+}

23. The number of spectral lines that are possible when electrons in 7^{th} shell in different hydrogen atoms return to the 2^{nd} shell is;

(1) 12 (2) 15
(3) 14 (4) 10

24. Which of the following statements is in accordance with the Arrhenius equation?

(1) Rate of a reaction has no effect with increase in temperature.
(2) Rate of a reaction increases with decrease in activation energy.
(3) Rate constant decreases exponentially with increase in temperature.
(4) Rate of reaction decreases with decrease in activation.

25. An electrochemical cell consists of two half-cell reactions:

$AgCl(s) + e^- \rightarrow Ag(s) + Cl^-(aq)$

$Cu(s) \rightarrow Cu^{2+}(aq) + 2e^-$

The mass of copper (in grams) dissolved on passing 0.5 A current for 1 hour is (Given : Atomic mass of Cu is 63.6 ; F = 96500 C mol^{-1}) ;

(1) 0.88 g
(2) 1.18 g
(3) 0.29 g
(4) 0.56 g

26. Solubility of AgCl in water, in 0.01M $CaCl_2$, in 0.01M NaCl and in 0.05M $AgNO_3$ are S_1, S_2, S_3 and S_4 respectively, then;

(1) $S_1 < S_2 < S_3 < S_4$
(2) $S_1 > S_3 > S_2 > S_4$
(3) $S_1 > S_2 = S_3 > S_4$
(4) $S_1 > S_3 > S_4 > S_2$

27. **Statement-1:** The reciprocal of time in which 66% of the reactant is converted to product is equal to the rate constant of first order reaction.

Statement-2: The rate constant for first order reaction depends on initial concentration of reactants.

(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.

28. **Statement-1:** Carbonyl compounds take part in nucleophilic addition reactions.

Statement-2: These reactions are initiated by nucleophilic attack at the electron deficient carbon atom.

(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.

29. The solution which maintains its pH constant even upon addition of small amounts of acid or base, is called buffer solution. Which can act as a buffer?

(1) $NH_4Cl + NH_4OH$
(2) $CH_3COOH + CH_3COONa$
(3) 40 mL of 0.1M NaCN + 20 mL of 0.1M HCN
(4) All of these

30. **Assertion:** The pK_a of acetic acid is lower than that of phenol.

Reason: Phenoxide ion is more resonance stabilized than acetate ion.

(1) If both assertion and reason is true and reason is the correct explanation of assertion.
(2) If both assertion and reason is true but reason is not the correct explanation of assertion.
(3) If assertion is true but reason is false.
(4) If both assertion and reason are false.

31. Basic strength of $CH \equiv \overset{\Theta}{C}$ (I); $CH_2 = \overset{\Theta}{C}H$ (II) and $CH_3\overset{\Theta}{C}H_2$ (III) will be in order:

(1) I < II < III (2) II < III > I
(3) III < II < I (4) III < I < II

32. Match the following lists:

List-I		List-II	
A	Ethane	P	2 sp carbons
B	Ethylene	Q	6 sp^2 carbons
C	Acetylene	R	2 sp^3 carbons
D	Benzene	S	2 sp^2 carbons
		T	1 sp and 1 sp^2 carbons

(1) A → R, B → S, C → P, D → Q
(2) A → S, B → T, C → R, D → Q
(3) A → R, B → P, C → Q, D → T
(4) A → Q, B → R, C → S, D → T

33. **Statement-1:** Fluorine molecule has bond order one.

Statement-2: The number of electrons in antibonding molecular orbitals is two less than in bonding molecular orbitals.

(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.

34. At 25°C, the values of rate constant, activation energy and Arrhenius constant of a reaction are 3×10^{-4} sec^{-1}, 129 kJ/mol and 2×10^{15} sec^{-1} respectively.

The value of rate constant as $T \rightarrow \infty$ is;

(1) zero (2) 2×10^{15}
(3) 3×10^{-4} (4) 6×10^{11}

35. Which of the following statements regarding actinides is **correct**?

(1) Pu^{4+} disproportionates to Pu^{3+} and PuO_2^{2+} in strongly acidic medium.
(2) Maximum oxidation state of Np is +7.
(3) UO_2^{2+} is stable.
(4) All of the above statements are correct.

SECTION-B

36. The synthesis of alkyl fluorides is best accomplished by:

(1) Swarts reaction
(2) Free radical fluorination
(3) Finkelstein reaction
(4) Sandmeyer reaction

37. In the following reaction 'A' is;

$$C_2H_5MgBr + H_2C-CH_2 \xrightarrow{H_2O} A$$
(O)

(1) $C_2H_5CH_2CHO$
(2) $C_2H_5CH_2CH_2OH$
(3) $C_2H_5CH_2OH$
(4) C_2H_5CHO

38. The amount of Al deposited on passage of 2F charge through molten Al_2O_3 is;
[Atomic mass of Al = 27 u]

(1) 9 g (2) 15 g
(3) 18 g (4) 37 g

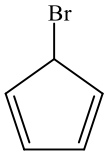
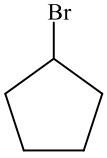
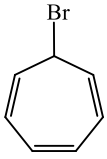
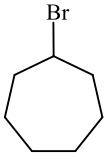
39. The oxidation state of chromium in the final product formed by the reaction between KI and acidified $K_2Cr_2O_7$ solution is;

(1) + 4 (2) + 6
(3) + 2 (4) + 3

40. Tollens' reagent is:

(1) Alkaline mercuric chloride
(2) Alkaline potassium permanganate
(3) Ammoniacal silver nitrate
(4) Ammonium citrate

41. The compound which will react fastest with $AgNO_3$ solution is:

(1) 
(2) 
(3) 
(4) 

42. A mixture showing negative deviation from Raoult's law is:

(1) Hexane + Heptane
(2) Benzene + Toluene
(3) Water + Ethanol
(4) Nitric acid + Water

43. Non-reducing sugar out of the given molecules is/are:

(1) Maltose (2) Lactose
(3) Sucrose (4) Both (1) and (3)

44. Consider the following redox reaction:

$$Cu_2S(s) + MnO_4^-(aq) \xrightarrow{H^+} Cu^{2+}(aq) + SO_4^{2-}(aq) + Mn^{2+}(aq)$$

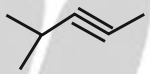
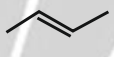
The number of moles of MnO_4^- ion that will be needed to oxidise one mole of Cu_2S completely is:

(1) 2 (2) 5
(3) $\frac{2}{5}$ (4) $\frac{5}{2}$

45. Molarity and molality of a solution of caustic soda are respectively 11.12M and 94.12m. The density of the solution is:

(1) 0.556 g mL^{-1} (2) 5.56 g mL^{-1}
(3) 55.6 g mL^{-1} (4) None of these

46. Which of the following will give white precipitate with ammoniacal silver nitrate solution?

(1) $CH_3-C\equiv C-CH_3$
(2) 
(3) 
(4) 

47. Enthalpy of neutralisation of four acids A, B, C and D with NaOH are –10.5, –13.7, –5.9 and –12.7 kcal eq^{-1} respectively. Out of A, B, C and D the strongest acid is:

(1) C (2) A
(3) D (4) B

48. What is the pH of the resulting solution when 100 ml of 0.1M CH_3COOH is mixed with 50 ml of 0.1M NaOH solution?
[pK_a of CH_3COOH = 4.74]

(1) 4.44 (2) 4.74
(3) 5.04 (4) 9.37

49. 5 moles of an ideal gas at 27°C expands isothermally and reversibly from a volume of 6 L to 60 L. The work done in kJ is:

(1) –14.7 (2) –28.72

(3) +28.72 (4) –56.72

50. The number of geometrical isomers of $[Co(NH_3)_3(NO_2)_3]$ are :

(1) 2 (2) 3

(3) 4 (4) nil

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