SWAMI VIVEKANAND ACADEMY

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Class – XII – Chemistry –Test Paper – Date: 25.12.2019

General Instructions:

(i) *All questions are compulsory.*

(ii) *This question paper contains 37 questions.*

(iii) *Questions 1 – 20 in* ***Section A*** *are objective type-very short answer type questions carrying* ***1 mark*** *each.*

(iv) *Questions 21 – 27 in* ***Section B*** *are short answer type questions carrying* ***2 marks*** *each.*

(v) *Questions 28 – 34 in* ***Section C*** *are long-answer I type questions carrying* ***3 marks*** *each.*

(vi) *Questions 35 – 37 in* ***Section D*** *are long-answer II type questions carrying* ***5 marks*** *each.*

(vii) *33% internal choices have been given in each section.*

Section 'A'

1. The values of colligative properties of colloidal solution are of small order in comparison to those shown by true solutions of same concentration because of colloidal particles .

(a) exhibit enormous surface area.

(b) remain suspended in the dispersion medium.

(c) form lyophilic colloids.

(d) are comparatively less in number. **1**

2. When 0.1 mol $CoCl_3(NH_3)_5$ is treated with excess of $AgNO_3$, 0.2 mol of AgCl are obtained. The conductivity of solution will correspond to

(a) 1 : 3 electrolyte.

(b) 1 : 2 electrolyte.

(c) 1 : 1 electrolyte.

(d) 3 : 1 electrolyte. **1**

OR

The electronic configuration of Cu(II) is $3d^9$ whereas that of Cu(I) is $3d^{10}$. Which of the following is correct ?

(a) Cu(II) is more stable

(b) Cu(II) is less stable

(c) Cu(I) and Cu(II) are equally stable

(d) Stability of Cu(I) and Cu(II) depends on nature of copper salts **1**

AI **3.** The commercial name of polyacrylonitrile is _____.

(a) Dacron

(b) Orlon (acrilan)

(c) PVC
(d) Bakelite 1

4. In the preparation of compounds of Xe, Bartlett had taken $O_2^+ PtF_6^-$ as a base compound. This is because
   (a) both O_2 and Xe have same size.
   (b) both O_2 and Xe have same electron gain enthalpy.
   (c) both O_2 and Xe have same ionisation enthalpy.
   (d) both Xe and O_2 are gases. 1

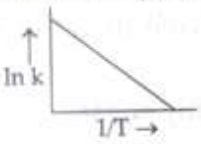
5. Amongst the following, the strongest base in aqueous medium is _____.
   (a) CH_3NH_2
   (b) $NCCH_2NH_2$
   (c) $(CH_3)_2NH$
   (d) $C_6H_5NHCH_3$ 1

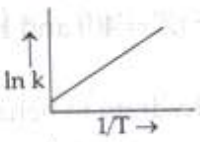
OR

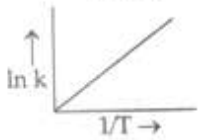
Chloromethane on treatment with excess of ammonia yields mainly
   (a) N, N-Dimethylmethanamine ($CH_3 - N(CH_3)_2$)
   (b) N–methylmethanamine ($CH_3 - NH - CH_3$)
   (c) Methanamine (CH_3NH_2)
   (d) Mixture containing all these in equal proportion 1

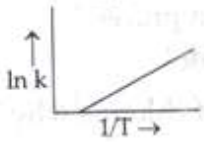
6. Which of the following compounds will react with sodium hydroxide solution in water ?
   (a) C_6H_5OH
   (b) $C_6H_5CH_2OH$
   (c) $(CH_3)_3COH$
   (d) C_2H_5OH 1

7. According to Arrhenius equation rate constant k is equal to $Ae^{-Ea/RT}$. Which of the following options represent the graph of : ln k versus 1/T

(a) 

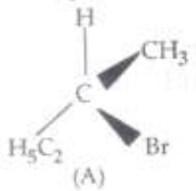
(b) 

(c) 

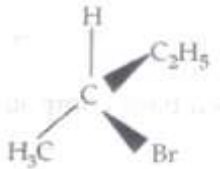
(d) 

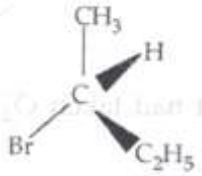
8. $\Lambda^0_{m(NH_4OH)}$ is equal to .....
   (a) $\Lambda^0_{m(NH_4OH)} + \Lambda^0_{m(NH_4Cl)} - \Lambda^0_{(HCl)}$
   (b) $\Lambda^0_{m(NH_4Cl)} + \Lambda^0_{m(NaOH)} - \Lambda^0_{(NaCl)}$
   (c) $\Lambda^0_{m(NH_4Cl)} + \Lambda^0_{m(NaCl)} - \Lambda^0_{(NaOH)}$
   (d) $\Lambda^0_{m(NaOH)} + \Lambda^0_{m(NaCl)} - \Lambda^0_{(NH_4Cl)}$ 1

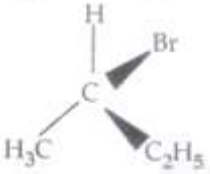
9. Which of the following structures is enantiomeric with the molecule (*A*) given below?

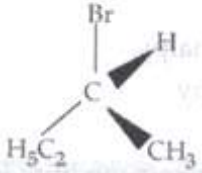


(A)

(a) 

(b) 

(c) 

(d) 

1

10. The values of van't Hoff factors for KCl, NaCl and K_2SO_4, respectively are:

(a) 2, 2 and 2

(b) 2, 2 and 3

(c) 1, 1 and 2

(d) 1, 1 and 1 1

OR

On the basis of data given below predict which of the following gases shows least adsorption on a definite amount off charcoal ?

Gas	CO_2	SO_2	CH_4	H_2
Critical	304	630	190	33

(a) CH_2

(b) SO_2

(c) CH_4

(d) H_2 1

AI **11.** What is meant by narrow spectrum antibiotics ? 1

12. Write the difference between DNA and RNA. 1

13. How would you account for the following? Zr (Z = 40) and Hf (Z = 72) have almost identical radii. 1

14. What structural feature is required for a carbohydrate to behave as reducing sugar ? 1

15. What is the role of depressant in froth flotation process? 1

OR

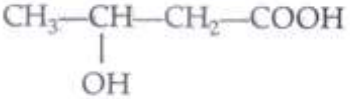
Bond enthalpy of fluorine is lower than that of chlorine why ? 1

16. Give reason why a finely divided substance is more effective as an adsorbent. 1

OR

Why a mixture of Carbon disulphide and acetone shows positive deviation from Raoult's law ? 1

17. Write IUPAC name of :



1

OR

Write the structure of 3-Bromo-2-methylprop-1-ene. 1

AI **18.** Why does the rate of a reaction increase with rise in temperature? 1

19. Which one of the following compounds is more easily hydrolyzed by KOH and why ? 1

$CH_3CHClCH_2CH_3$ Or $CH_3CH_2CH_2Cl$

20. For which type of reactions, order and molecularity have the same value ? 1

Section 'B'

21. Although chlorine is an electron withdrawing group, yet it is *ortho-*, *para*-directing in electrophilic aromatic substitution reactions. Explain why it is so ? 2

OR

Give reasons :

(i) Aniline is a weaker base than cyclohexylamine.

(ii) It is difficult to prepare pure amines by ammonolysis of alkyl halides. 2

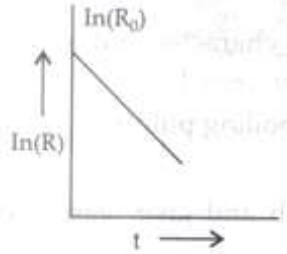
22. Complete the following chemical equation :

(i) $MnO_4^-(aq) + S_2O_3^{2-}(aq) + H_2O(l) \longrightarrow$

(ii) $Cr_2O_7^{2-}(aq) + Fe^{2+}(aq) + H^+(aq) \longrightarrow$ 2

23. What does the negative sign in the expression $\frac{Zn}{Zn^{+2}} = -0.76V$ mean? 2

24. For a chemical reaction $R \rightarrow P$, variation in ln [R] vs time (t) plot is given below:



For this reaction :

(i) Predict the order of reaction.

(ii) What is the unit of rate constant (k)? 2

25. Explain the significance of leaching in the extraction of aluminium. 2

26. Give reasons for the following observations :

(i) Leather gets hardened after tanning.

(ii) It is necessary to remove CO when ammonia is prepared by Haber's process. 2

AI 27. Explain the following terms :

(i) Rate constant (k)

(ii) Half-life period of reaction ($t_{½}$). 2

OR

What is meant by positive deviations from Raoult's law ? Give an example. What is the sign of $\Delta_{mix}H$ for positive deviation ? 2

Section 'C'

28. Give reasons :

(i) n-Butyl bromide has higher boiling point than t-butyl bromide.

(ii) Racemic mixture is optically active.

(iii) The presence of nitro group ($-NO_2$) at o/p positions increases the reactivity of haloarenes towards nucleophilic substitution reactions. 3

29. Two reactions of the same order have equal pre-exponential factors but their activation energies differ by 24.9 kJ mol^{-1}. Calculate the ratio between the rate constants of these reactions at 27°C. (Gas constant, R = 8.314 JK^{-1} mol^{-1}). 3

OR

Calculate the boiling point of solution when 2g of Na_2SO_4 (M = 142 g mol^{-1}) was dissolved in 50 g of water, assuming Na_2SO_4 undergoes complete ionization. 3

30. Write the therapeutic action of following on human body and mention the class of drugs to which each of these belong :
    (i) Equanil
    (ii) Aspirin
    (iii) Chloramphenicol 3

AI 31. Write the structures of the main products when benzene diazonium chloride reacts with the following reagents:
    (a) CuCN
    (b) CH_3CH_2OH
    (c) Cu / HCl 3

OR

How do you convert the following :
    (i) Phenol to anisole
    (ii) Propan–2–ol to 2–methylpropan–2–ol
    (iii) Aniline to phenol 3

32. For the complex ion $[CoF_6]^{3-}$ write the hybridization type, magnetic character and spin nature. [Atomic number: Co = 27] 3

33. (i) Arrange the following compounds in the increasing order of their boiling points :
    CH_3CHO, CH_3CH_2OH, CH_3OCH_3, CH_3COOH
    (ii) Arrange the following in decreasing order of their acidic strength and give reason for your answer.
    CH_3CH_2OH, CH_3COOH, $ClCH_2COOH$, FCH_2COOH, $C_6H_5CH_2COOH$. 3

34. (i) Account for the following:
    (a) Transition metals form large number of complex compounds.
    (b) The lowest oxide of transition metal is basic whereas the highest oxide is amphoteric or acidic.
    (c) E° value for the Mn^{3+}/Mn^{2+} couple is highly positive (+1.57 V) as compared to Cr^{3+}/Cr^{2+}. 3

Section 'D'

35. How can you remove the hard calcium carbonate layer of the egg without damaging its semipermeable membrane? Can this egg be inserted into a bottle with a narrow neck without distorting its shape? Explain the process involved. 5

36. (i) Give two reactions that show the acidic nature of phenol. Compare acidity of phenol with that of ethanol.
    (ii) Alcohols react with active metals *e.g.* Na, K, etc. to give corresponding alkoxides. Write down the decreasing order of reactivity of sodium metal towards primary, secondary and tertiary alcohols. 5

OR

    (i) Distinguish between :
    (a) $C_6H_5 - COCH_3$ and $C_6H_5 - CHO$, (b) CH_3COOH and HCOOH.
    (ii) Arrange the following in the increasing order of their boiling points :
    CH_3CHO, CH_3COOH, CH_3CH_2OH.
    (iii) Arrange the following in the increasing order of their reactivity towards nucleophilic addition reaction :
    $C_6H_5COCH_3$, $CH_3 - CHO$, CH_3COCH_3
    (iv) Write the chemical reaction involved in Wolff-Kishner reduction. 5

37. (i) Using valence bond theory explain the geometry and magnetic behaviour by $[Cr(NH_3)_6]^{3+}$. (At. no. Cr = 24)

(ii) Write the IUPAC name of ionization isomer of $[Ni(NH_3)_3NO_3]Cl$.

(iii) Specify the oxidation numbers of the metals in the the following coordination entities :

(a) $[Co(H_2O)(CN)(en)_2]^{2+}$ **(b)** $[CoBr_2(en)_2]^+$ **5**

OR

The elements of 3*d* transition series are given as :

Sc Ti V Cr Mn Fe Co Ni Cu Zn

Answer the following :

(i) Write the element which is not regarded as a transition element. Give reason.

(ii) Which element has the highest m.p.?

(iii) Write the element which can show an oxidation state of + 1.

(iv) Which element is a strong oxidizing agent in + 3 oxidation state and why? **5**