



2018 VI 11

1430

Seat No. :

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Time : 2½ Hours

CHEMISTRY (New Pattern)

Subject Code

H	7	0	3
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Total No. of Questions : 27

(Printed Pages : 4)

Maximum Marks : 55

- INSTRUCTIONS:**
- 1) **All questions are compulsory, however question numbers 14, 21, 26 and 27 have internal choice.**
 - 2) **Section – A consists of 9 questions of 1 mark each.**
Section – B consists of 10 questions of 2 marks each.
Section – C consists of 6 questions of 3 marks each.
Section – D consists of 2 questions of 4 marks each.
 - 3) **Every question should be attempted only once.**
 - 4) **Use of calculator is not permitted, however logarithmic table will be provided on request.**

SECTION – A

1. The Van't Hoff factor 'i' for a solution of acetic acid in benzene will be _____ [1]
 - greater than one
 - less than one
 - equal to one
 - zero
2. The bond that stabilises the secondary structure of protein is _____ [1]
 - covalent bond
 - coordinate bond
 - ionic bond
 - hydrogen bond
3. When 2-chlorobutane reacts with hot alcoholic KOH, the major product formed is _____ [1]
 - But – 1 – ene
 - Butan – 1 – ol
 - But – 2 – ene
 - Butan – 2 – ol
4. Among the following oxides of manganese, the acidic oxide is _____ [1]
 - MnO
 - Mn₃O₄
 - Mn₂O₃
 - Mn₂O₇
5. The monomeric units of the given polymer $-(\text{NH} - \text{CO} - \text{NH} - \text{CH}_2 -)_n-$ are _____ [1]
 - glycine and formaldehyde
 - urea and formaldehyde
 - urea and ethanol
 - glycine and adipic acid



6. Write any two characteristics of molecular solids. [1]
7. Arrange the following alcohols in the decreasing order of their boiling points : [1]
Pentan – 1 – ol, 2 – Methylbutan – 2 – ol,
3 – Methylbutan – 2 – ol
8. Write chemical equation for the preparation of Buna – N. [1]
9. Give reason why aromatic carboxylic acids do not undergo Friedel – Crafts reaction. [1]

SECTION – B

10. Draw neat labelled diagram of the stoichiometric defect observed in ionic solids having ions of similar size. What is the effect of this defect on the density of the crystal ? [2]
11. Derive the integrated rate equation for a first order reaction. [2]
12. Calculate the activation energy of a reaction whose rate constants are $1.2 \times 10^{-3} \text{ s}^{-1}$ and $2.4 \times 10^{-3} \text{ s}^{-1}$ at 30°C and 40°C respectively. [$R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$] [2]
13. a) Draw a neat labelled diagram of hydrogen – oxygen fuel cell.
b) Predict the products of electrolysis of dilute sulphuric acid at the respective electrodes. [2]
14. Calculate the emf at 25°C of an electrochemical cell in which the following reaction occurs :

$\text{Mg(s)} + \text{Cu}^{2+}(\text{aq}) \longrightarrow \text{Mg}^{2+}(\text{aq}) + \text{Cu(s)}$ and the concentration of Mg^{2+} ions is 100 times more than Cu^{2+} ions.

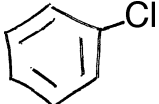
Given $E^\circ_{\text{Cu}^{2+}/\text{Cu}} = 0.34 \text{ V}$, $E^\circ_{\text{Mg}^{2+}/\text{Mg}} = -2.37 \text{ V}$ [2]

OR

Calculate the equilibrium constant for the following cell at 25°C :

$\text{Ni} | \text{Ni}^{2+}(\text{aq}) || \text{Ag}^+(\text{aq}) | \text{Ag}$

Given $E^\circ_{\text{Ni}^{2+}|\text{Ni}} = -0.25 \text{ V}$, $E^\circ_{\text{Ag}^+|\text{Ag}} = 0.80 \text{ V}$

15. Complete the following equations and write the name of the major products 'A' and 'B'
- a) $\text{CH}_3 - \text{CH}_2 - \text{CH} = \text{CH}_2 + \text{HBr} \longrightarrow \text{A}$
- b)  + Na $\xrightarrow{\text{dry ether}}$ B [2]



16. Name the following :
- The vitamin responsible for blood coagulation.
 - The linkage that holds the nucleotides together in nucleic acids.
 - The dipolar ion formed by aminoacids in aqueous solution.
 - Water insoluble component on starch. [2]
17. An organic compound 'A' with molecular formula C_7H_8O reacts with HI and forms compound 'B'. Compound 'B' on heating with zinc dust gets converted to the simplest aromatic hydrocarbon. Write equations for the above reactions and name the compounds 'A' and 'B'. [2]
18. a) Give two examples of broad spectrum antibiotics.
b) What type of detergents are used for dish washing ? [2]
19. Complete the following reactions :
- $XeF_4 + O_2F_2 \longrightarrow$
 - $Ca(OH)_2 + Cl_2 \longrightarrow$ [2]

SECTION – C

20. Draw a graph depicting the deviation from Raoult's law exhibited by a solution prepared by mixing ethanol and acetone.
Calculate the molar mass of a non volatile solute 1.8 grams of which have been dissolved in 25 grams of acetone and the solution boils at $56.86^\circ C$. Pure acetone boils at $56.38^\circ C$. The molal elevation constant for acetone is $1.72 \text{ k kg mol}^{-1}$. [3]
21. Draw a neat labelled diagram of the electrophoresis of gold sol. Define sorption. Give two points of distinction between lyophilic and lyophobic colloids with respect to stability and reversibility. [3]

OR

Draw a neat labelled diagram to show the preparation of colloids by Bredig arc method. What is peptization ? Give two points of distinction between physisorption and chemisorption with respect to specificity and nature of forces between adsorbate and adsorbent.

22. Write chemical equations for the conversion of each of the following :
- Acetamide to methylamine.
 - Benzene diazonium chloride to phenol.
 - Aniline to sulphanilic acid. [3]
23. Give reasons for the following :
- There is a steady decrease in atomic or ionic radii of lanthanoids from Lanthanum to Lutetium.
 - Transition elements exhibit catalytic properties.
 - Paramagnetic character in the first transition series increases upto manganese and then decreases. [3]



24. Draw the structures of optical isomers of $[\text{Pt Cl}_2 (\text{en})_2]^{2+}$. Using Valence Bond Theory, deduce the hybridization scheme of the outer orbital complex $[\text{Co F}_6]^{3-}$. Comment on its magnetic behaviour. [3]
25. Draw a neat labelled diagram of Froath floatation process used for the concentration of sulphide ores. State the principle behind (a) zone refining (b) chromatographic methods, used for refining elements. [3]

SECTION – D

26. Answer the following :
- Draw the structure of PCl_5 .
 - Write any two reasons for anomalous behaviour of nitrogen.
 - Name the allotrope of phosphorous that exhibits chemiluminescence.
 - Arrange the hydrides of group 15 elements in the decreasing order of their basicity. [4]

OR

Answer the following :

- Draw the structure of H_2SO_3 .
 - Write any 2 anomalous properties of oxygen.
 - Name the allotrope of sulphur that is stable at room temperature.
 - Arrange the dioxides of group 16 elements in the decreasing order of their reducing property.
27. Write labelled chemical equations to show what happens when :
- Sodium propionate is heated with sodalime.
 - Acetone reacts with sodium hypoiodite.
 - Benzaldehyde reacts with a nitrating mixture.
 - Ethanenitrile reacts with stannous chloride and HCl followed by hydrolysis. [4]

OR

Write labelled chemical equations to show what happens when :

- Toluene reacts with chlorine in the presence of light followed by hydrolysis at 373 K.
- Acetophenone reacts with zinc amalgam and hydrochloric acid.
- Formaldehyde reacts with phenylmagnesium bromide followed by hydrolysis.
- Vapours of Butan-2-ol are passed over heated copper at 573 K.