



2018 III 09

1000

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 number **16, 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. Nucleic acids are polymers of _____ [1]
- nucleosides
 - globulins
 - nucleons
 - nucleotides
2. The metal which has the lowest melting point is _____ [1]
- cesium
 - mercury
 - manganese
 - copper
3. The most basic amine from amongst the following is _____ [1]
- CH_3NH_2
 - $(\text{CH}_3)_2\text{NH}$
 - $(\text{CH}_3)_3\text{N}$
 - $\text{C}_6\text{H}_5\text{NH}_2$



4. Acetic acid can be converted to ethyl alcohol by using _____ [1]
- LiAlH_4 in ether, followed by acid hydrolysis
 - PCC
 - heating with P_2O_5
 - $\text{CrO}_3/\text{H}_2\text{SO}_4$
5. The polymer in which the monomers are joined by ester linkages is _____ [1]
- Nylon 6
 - Bakelite
 - Terylene
 - PVC
6. State why 1, 4 – dichlorobenzene melts at a higher temperature than 1, 2 – dichlorobenzene. [1]
7. Draw a neat diagram to show the alignment of domains of an antiferromagnetic substance under the influence of magnetic field. [1]
8. Why does the conductivity of a solution of an electrolyte decrease with dilution ? [1]
9. What are biodegradable polymers ? [1]

SECTION – B

10. State Raoult's Law for a binary solution containing volatile solute and solvent. Draw a graph of the deviation from Raoult's Law shown by the solution of phenol and aniline. [2]
11. Do as directed : [2]
- Arrange the hydrogen halides of group 17 elements in the increasing order of their acidic strength.
 - Why do noble gases have large positive values of electron gain enthalpy ? [2]
12. A piece of wood shows C^{14} activity which is 20% of the activity found today. If the decay follows first order kinetics, calculate the age of the wood sample. (Given $t_{1/2}$ for $^{14}_6\text{C} = 5770$ years. [2]
13. A solution is prepared by dissolving 1.05 grams of glucose in 160 grams of water. If molal depression constant for water is $1.86 \text{ K Kg mol}^{-1}$, calculate the freezing point of the solution. [2]
14. Name the type of defect observed in ionic crystals in which there is a large difference in the size of ions. [2]
- A solid is made up of 2 elements P and Q. Atoms Q are in ccp arrangement, while P atoms occupy all the tetrahedral sites. What is the formula of the compound ? [2]
15. What are monosaccharides ? What happens when a protein is subjected to denaturation ? [2]



16. Write chemical equations to show how you will convert :
- Ethyl chloride to nitroethane
 - Chlorobenzene to 4-chlorotoluene. [2]

OR

Write chemical equations to show how you will convert :

- 2 – chloropropane to 2 – iodopropane
 - Benzene diazonium chloride to chlorobenzene.
17. Write chemical equations to show the following reactions :
- Hoffmann bromamide degradation of propanamide.
 - Carbylamine reaction of aniline. [2]
18. Derive the integrated rate law expression for a zero order reaction. [2]
19. Distinguish between bacteriocidal and bacteriostatic antibiotics. Name the analgesic which also finds use in the prevention of heart attack. [2]

SECTION – C

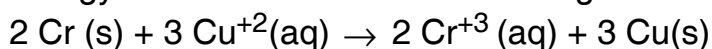
20. Draw a neat labelled diagram to show electro dialysis of a colloidal solution. Define emulsion. Give one point of distinction between physisorption and chemisorption. [3]
21. Draw a neat labelled diagram of the H_2/O_2 fuel cell. Calculate the e.m.f. at 298K of an electrochemical cell which is represented as :



(Given $E^\circ Al^{+3}/Al = - 1.66V$ and $E^\circ Cu^{+2}/Cu = + 0.34 V$) [3]

OR

Draw a neat labelled diagram of the dry cell. Calculate the standard Gibbs free energy for a cell in which the following reaction occurs :



(Given $E^\circ Cr^{+3}/Cr = - 0.74 V$

and $E^\circ Cu^{+2}/ Cu = 0.34 V$

$F = 96500 C$)

22. Using the VBT concept deduce the structure of $[Ni (CN)_4]^{2-}$ and comment on its geometry. Draw the structures of the geometrical isomers of Tetrammine dibromido cobalt (III) ion. [3]
23. Draw a neat labelled diagram of the magnetic separation for the concentration of an ore. State the role of the following in metallurgical processes :
- Limestone in the extraction of iron.
 - Pine oil in the froth floatation process. [3]



24. Draw the structure of the manganate iron. Give reasons for the following :
- a) Transition metals form a large number of complexes.
 - b) Zirconium and Hafnium are difficult to separate. [3]
25. Write chemical equations to show what happens when :
- a) Phenol is heated with zinc dust.
 - b) 2-ethoxy – 2 – methyl propane is treated with HI.
 - c) Tertiary butyl alcohol vapours are passed over heated copper tubes at 573 K. [3]

SECTION – D

26. Attempt the following : [4]
- a) Draw the structure of ortho phosphoric acid.
 - b) Why is BiH_3 a stronger reducing agent than NH_3 ?
 - c) Write equation to show the action of concentrated nitric acid on copper.
 - d) Give two properties to show the anomalous behaviour of nitrogen.

OR

Attempt the following :

- a) Draw the structure of sulphuric acid.
 - b) Why is ozone used as a powerful oxidising agent ?
 - c) Write equation to show the action of sulphuric acid on sugar.
 - d) Give two reasons for the anomalous behaviour of oxygen.
27. Write chemical equations for the following and label the reactant product : [4]
- a) Cannizzaro reaction using benzaldehyde.
 - b) Preparation of propanal from a suitable ester.
 - c) Stephen reaction using ethane nitrile.
 - d) Preparation of acetic acid from dry ice.

OR

Write chemical equations for the following and label the reactant /product :

- a) Gattermann Koch reaction using benzene.
- b) Action of dilute base on acetaldehyde followed by heating.
- c) Hell – Volhard Zelinsky reaction using propanoic acid and bromine.
- d) Preparation of 2 – methyl propane from an aldehyde.