SET–1

Roll No. | | | | | | | |

CBSE 2019 Sample Question Paper

CHEMISTRY

Time allowed: 3 hours ***Maximum marks: 70***

General Instructions:

(i) *All question are compulsory.*
(ii) *This question paper contains 30 questions.*
(iii) *Question number **1** to **10** in Section A very short-answer type questions carrying **1** mark each.*
(iv) *Questions number **11** to **16** in Section B short-answer type questions carrying **2** marks each.*
(v) *Questions number **17** to **27** in Section C are long-answer type questions carrying **3** marks each.*
(vi) *Questions number **28** to **30** in Section D are Descriptive type questions carrying **5** marks each.*

Section A

1. Define activation energy.

2. What is meant by chemisorptions ?

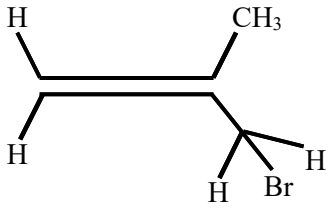
3. Complete the following equation. $Cu + HNO_3(dilute) \rightarrow$

4. Why is NO a stronger ligand than Cl ?

5. How is that alcohol and water are miscible in proportions ?

6. Name the purines present in DNA.

7. Write the IUPAC name of the following.



8. Give sample tests to distinguish between the following pair of compounds : Pentan-2-one and pentan-3-one

9. Calculate the packing efficiency of a metal crystal for a simple cubic lattice.

10. Explain the following terms with one suitable example of each.
    (i) Electrical properties of solid
    (ii) Paramagnetism

Section B

11. Calculate the emf for the given cell at 25°C

    $Cr \mid Cr^{3+}(0.1M) \parallel Fe^{2+}(0.1M) \mid Fe$

    [Given, $E^{\circ}_{Cr^{3+}/Cr} = -0.74\ V, \quad E^{\circ}_{Cr^{2+}/Fe} = -0.44\ V$]

OR

Explain with examples the term weak and strong electrolytes.

12. What are pseudo first order reactions ? Give one example of such reaction.

13. Explain the terms.
    (i) Elementary step in a reaction.
    (ii) Rate determining step of a reaction.

14. Draw the structure of
    (i) hypochlorous acid
    (ii) chlorous acid

15. Explain the following observations
    (i) Oxygen is gas but sulphur is a solid.
    (ii) The halogen are coloured.

16. Describe the shape and magnetic behaviour of the following complexes.
    (i) $[Co\ (NH_3)_6]^{3+}$
    (ii) $[Ni\ (CN)_4]^{2-}$

Section C

17. How will you convert
    (i) nitrobenzene to aniline ?
    (ii) aniline to iodobenzene ?
18. Write equation for
    (i) Sandmeyer's reaction
    (ii) Coupling reaction

19. A solution of $CuSO_4$ is electrolysed for 16 min with a current of 1.5 A. What is the mass of copper deposited at the cathode ?

20. Differentiate among a homogeneous solution, a suspension and a colloidal solution. Give suitable example of each.

21. Describe how the following changes are brought about ?
    (i) Pig iron into steel
    (ii) Zinc oxide to metallic zinc
    (iii) Impure titanium into pure titanium

OR

Dr. Saxena, head of metallurgical division always insisted for refining of copper by electrolytic method, instead of other convenient methods, though it is power consuming and takes longer time. Based on the passage, answer the following questions
    (i) Is electrolytic refining environmental friendly or economical ?

22.
    (i) What prompted Bartlett to the discovery of noble gas compounds ?
    (ii) State two important uses of noble gases.

23.
    (i) Write the mechanism of the following reaction.

$$n\text{-BuBr} + CN \xrightarrow{EtOH,\ H_2O} n\text{-BuCN}$$

    (ii) Why is the dipole moment of chlorobenzene lower than that of cyclohexylchloride ?

24. How would you obtain the following ?
    (i) Benzoquinone from phenol
    (ii) 3°-alcohol from methyl magnesium bromide
    (iii) Propan-2-ol from propene

25. Define the following as related to proteins.
    (i) Polypeptides
    (ii) Primary structure
    (iii) Fibrous proteins

26. Write chemical equation for the synthesis of
    (i) Nylon-6
    (ii) Nylon-6, 6
    (iii) Polythene

27. There is growing interest in the use of chelate therapy is medicinal chemistry. An example is the treatment of problems caused by the presence of metals in toxic proportions in plant/animal systems. Detection of cations through coloured complex formation is done in qualitative analysis. Read the above passage and answer the following questions.
    (i) Name the chelating agents that can remove copper, iron and lead from water.
    (ii) Name the compound that inhibits the growth of tumours.
    (iii) Recent studies show that *cis*-platin can cause serious effects; including severe kidney damage. What is the alternative medicine ?
    (iv) What values do you get form this passage ?

Section D

28.
    (i) Calculate the molarity and molality of a 15% solution (by weight) of sulphuric acid of density 1.020 g cm^{-3}.
    (Atomic masses of H = 1, 0 = 16, S = 32 u)
    (ii) Explain why a solution of chloroform and acetone shows negative deviation from Raoult's law ?

OR

    (i) Henry's law constant for CO_2 dissolving in water is 1.67×10^8 Pa at 298 K. Calculate the quantity of CO_2 in 1 L of soda water when packed under 2.5 atm CO_2 pressure at 298 K.
    (ii) Define the term 'molarity' of a solution. State one disadvantage in using the molarity as the unit of concentration.

29.
    (i) Complete the following chemical reaction equations.
    - $Fe^{2+}(aq) + MnO^{-}_{4}(aq) + H^{+}(aq) \rightarrow$
    - $Cr_2O_7^{2-}(aq) + I^{-}(aq) + H^{+}(aq) \rightarrow$

    (ii) Explain the following observations.
    - Transition elements are known to form many interstitial compounds.
    - With the same d^4, *d*-orbital configuration Cr^{2+} ion is reducing while Mn^{3+} ion is oxidising.
    - Cu^{+} ion is unstable in aqueous solutions.

OR

(i) Complete the following chemical equations
- $Cr_2O_7^{2-}(aq) + H_2S(g) + H^+(aq) \rightarrow$
- $Cu^{2+}(aq) + I^-(aq) \rightarrow$

(ii) How would you account for the following?
- The oxidising power of oxoanions are in the order
  $VO_2^+ < Cr_2O_7^{2-} < MnO_4^-$
- First ionisation enthalpy of Cr is lower than that of Zn.
- Cr^{2+} is a strong reducing agent than Fe^{2+}.

30.

(i) How will you prepare the following compounds starting with benzene ?
- Benzaldehyde
- Acetophenone

(ii) How will you bring about the following conversions ?
- Propanone to propene
- Ethanol to 3-hydroxy butanal
- Benzaldehyde to benzophenone

OR

An organic compound A on treatment with acetic acid in the presence of sulphuric acid produces an ester B. A on mild oxidation gives C. C with 50% KOH followed by acidification with dil. HCl generates A and D. D with PCl_5 followed by reaction with ammonia gives E. E on dehydration produces hydrocyanic acid. identify the compound A, B, C, D, and E.