BOARD QUESTION PAPER: MARCH 2019
CHEMISTRY

Notes:

i. All questions are compulsory.

ii. Draw neat, labelled diagrams and write balanced chemical equations wherever necessary.

iii. Question paper consists of **29** questions divided into **FOUR** sections, namely **A, B, C** and **D.**

iv. **Section A:** Select and write the most appropriate answer from the given alternatives for Q. No **1** to **4** of **multiple choice** type questions carrying **one mark** each. Q. No **5** to **8** are **very short answer** type questions carrying **one mark** each.

v. **Section B** contains Q. No. **9** to **15** of **short answer-I** type questions carrying **two marks** each. Internal choice is provided to **only one** question.

vi. **Section C** contains Q. No. **16** to **26** of **short answer-II** type questions carrying **three marks** each. Internal choice is provided to **only one** question.

vii. **Section D** contains Q. No. **27** to **29** of **long answer** type questions carrying **five marks** each. Internal choice is provided to **each** question.

viii. For **each MCQs**, correct answer must be written along with its alphabet,
e.g., (A) ……. / (B) ……. / (C) ……. / (D) ……. etc.

ix. In case of **MCQs,** (i.e. Q. No. **1** to **4**), evaluation would be done for the first attempt only.

x. Start each section on new page.

xi. Figures to the right indicate full marks.

xii. Use log table if necessary. Use of calculator is **not** allowed.

Given:

$R = 8.314\ J\ K^{-1}\ mol^{-1}$,

Atomic weights: H = 1, C = 12, N = 14, O = 16, Cl = 35.

SECTION A

Q.1 A compound used as pistachio flavour in ice cream is _____. (1) **[8]**

(A) vanillin (B) acetophenone

(C) muscone (D) butyraldehyde

Q.2 Oxidation states of scandium are _____. (1)

(A) + 1, + 2 (B) +1, +3

(C) + 2, + 3 (D) +3, + 4

Q.3 In Van Arkel method for refining zirconium or titanium, the halogen used is _____. (1)

(A) fluorine (B) chlorine

(C) bromine (D) iodine

Q.4 A system absorbs 6 kJ of heat and does 1.5 kJ of work on its surroundings. The change in internal energy is _____. (1)

(A) – 7.5 kJ (B) – 4.5 kJ

(C) + 4.5 kJ (D) + 7.5 kJ

Q.5 Write the molecular formula of novestrol. (1)

Q.6 Write the number of hydroxyl groups present in α–D– (+) – Glucopyranose (trans). (1)

Q.7 What is Nessler's reagent? (1)

Q.8 What is the ratio of octahedral holes to the number of anions in hexagonal closed packed structure? (1)

SECTION B

Q.9 What are ethers? How are they classified? (2) **[14]**

Q.10 What are antacids? Write the main constituents of dettol. (2)

Q.11 Draw a neat, labelled diagram of electrolytic cell for the extraction of aluminium. (2)

Q.12 How many faradays of electricity are required to produce 6 g of Mg from $MgCl_2$? (2)

OR

The molar conductivity of 0.05 M $BaCl_2$ solution at 25 °C is 223 Ω^{-1} cm^2 mol^{-1}. What is its conductivity?

Q.13 Derive van't Hoff general solution equation. (2)

Q.14 Write the conditions for maximum work done by the system. (2)

Q.15 Write balanced chemical equations for the following: (2)

(i) Action of sodium metal on ethanol

(ii) Action of zinc dust on phenol

SECTION C

Q.16 Write chemical reactions to prepare the following polymers: (3) **[33]**

(i) Teflon

(ii) Nylon – 6

(iii) Dextron

Q.17 How is glucose prepared by commercial method? How is peptide linkage formed? (3)

Q.18 Write a short note on Hoffmann elimination. (3)

Q.19 What is the action of the following on ethyl bromide (3)

(i) alcoholic solutions of potassium hydroxide

(ii) moist silver oxide

(iii) silver acetate?

Q.20 What is effective atomic number? Calculate effective atomic number of copper (Z = 29) in $[Cu(NH_3)_4]^{2+}$. (3)

Q.21 Write chemical reactions for differen steps in the manufacture of sulphuric acid by lead chamber process. Draw the structure of phosphorus pentachloride. (3)

Q.22 Write Arrhenius equation. Derive an expression for temperature variations. (3)

Q.23 Define electrochemical series. Write its applications. (3)

Q.24 Calculate the work done in the following reaction at 50 °C. State whether work is done on the system or by the system. (3)

$$SO_{2(g)} + \frac{1}{2}O_{2(g)} \longrightarrow SO_{3(g)}$$

OR

The standard enthalpy of combustion of formaldehyde is $\Delta_c H° = -517$ kJ. How much heat will be evolved in the formation of 22 g of CO_2?

Q.25 Define the following terms: (3)

(i) Isotonic solution

(ii) Hypertonic solution

(iii) Hypotonic solution

Q. 26 Define Anisotropy. Distinguish between crystalline solids and amorphous solids. (3)

SECTION D

Q. 27 (A) Write the structure of phenylmethanamine. (1) **[15]**

(B) Write chemical equation for the following: (4)

(i) Gatterman–Koch formylation

(ii) Rosenmund reduction

(iii) Fischer esterification

(iv) Hell–Vohlard–Zelinsky reaction

OR

(A) What are amines? (1)

(B) How will you convert (4)

(i) calcium acetate to acetaldehyde

(ii) acetone to acetone cynohydrin

(iii) sodium acetate to methane

(iv) benzoic acid to m-bromobenzoic acid?

Q. 28 (A) Define Enantiomers. (1)

(B) How is potassium dichromate prepared from chrome iron ore? (4)

OR

(A) What is Grignard reagent? (1)

(B) Explain the position of actinoids in the periodic table. (4)

What is the action of sulphur on lanthanoids?

Calculate the magnetic moment of divalent ion in aqueous solution if its atomic number is 24.

Q. 29 (A) The rate of a first order reaction, A→B is 5.4×10^{-6} Ms^{-1} when [A] is 0.3 M. Calculate the rate constant of the reaction. (1)

(B) Explain the following properties of group 16 elements: (4)

(i) Electronegativity

(ii) Melting and boiling points

(iii) Metallic character

(iv) Allotropy

OR

(A) The half life period of a first order reaction is 6.0 h. Calculate the rate constant. (1)

(B) What are oxides? (4)
Write different types of oxides with one example each.