Before answering the question paper the candidate should ensure that they have been supplied the correct question paper. Complaints in this regard, if any, shall not be entertained after the examination.

Note: Question No. 1 is Compulsory and attempt two questions from each section. All questions carry equal marks.

1(a) Explain types of water. Write different sources of water.
(b) Define acid and base. Write the properties of acids and bases
(c) Explain isotopes and isobars with examples.
(d) Explain catenation. Write functional group of the following compounds:
   (i) Aldehyde (ii) Carboxylic acid (iii) Ketone (iv) Alcohol

Section – A

2(a) Define symbol. How they are represented? Explain different steps used in writing the symbol of an element with example. (8)
(b) Define solute, solvent and solution. Explain various methods of expressing the concentration of solutions? (12)

3(a) What is meant by ionic bond? Differentiate between Ionic bond and covalent bond. (6)
(b) What is meant by sigma and pi bond? Write the names of four blocks of periodic tables (4)
(c) Write electronic Configurations and atomic models of the following elements –
   5B$^{10}$, 13Al$^{27}$, 19K$^{39}$, 20Ca$^{40}$, 1H$^1$, 2He$^4$, 7N$^{14}$, 11Na$^{23}$, 3Li$^7$, 12Mg$^{24}$ (10)

Section – B

4(a) Explain Arrhenius concept, Bronsted-Lowery concept and Lewis concept of acids and bases. (10)
(b) Explain pH and pH scale in detail. Find out the pH of a 0.001 M HCl. (6)
(c) Define buffer solutions. Write types of buffer solutions. (4)

5(a) Define hardness and write types of hardness. Explain Zeolite method for removal of hardness of water. (10)
(b) A sample of hard water contains 240 mg of MgSO4 per liter. Calculate the hardness in terms of CaCO3 equivalents. (4)
(c) Write short notes on the following terms -
   (i) Priming and foaming  (ii) Full for of EDTA, PPM and EBT (iii) Scale and sludge formation.

6(a) Define electrolyte and non electrolyte. Explain working of dry cell with diagram. (10)
(b) State and explain Faraday’s first and second Laws of electrolysis. (10)

7(a) Explain the following terms with examples: (6)
   (i) Homologues series (ii) Tetra valency of carbon (iii) Functional group
(b) Explain catenation with example. (4)
(c) Write full form of IUPAC. Write the formula and suffixes of alkanes, alcohols, aldehydes and carboxylic acids. Write IUPAC names of all alkanes, alkenes, and alkynes containing carbon 1 to 10 (C=1 to C=10). (10)