23014

C23-AEI/BM/CHST/CHOT/CHPC/
CHPP/EE/EEVT/TT– **104**

23014

BOARD DIPLOMA EXAMINATION, (C-23)

MARCH/APRIL—2025

DAEI-FIRST YEAR EXAMINATION

ENGINEERING CHEMISTRY AND ENVIRONMENTAL STUDIES

Time : 3 hours] [*Total Marks* : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define atomic number and mass number.

2. Write the electronic configurations of oxygen, aluminium and calcium.

3. Calculate the equivalent weight of HCl, NaOH and Na_2CO_3.

4. Define pH. Calculate the pH of 0·001M HCl solution.

5. Define conductor, insulator and electrolyte.

6. What is stress cell? Explain with an example.

7. Which salts are responsible for the hardness of water?

8. Define condensation polymerization. Give an example.

9. What are primary fuels and secondary fuels? Give examples.

10. Define dissolved oxygen, BOD and COD.

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PART—B

10×5=50

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

11. What are quantum numbers? Explain the significance of four quantum numbers. 10

12. Explain the Arrhenius theory of acids and bases with examples. Give its limitations. 10

13. *(a)* Write any five differences between Ionic and Covalent compounds. 5

(b) Define normality. Find the volume of water to be added to 250 ml of 0·05 N Na_2CO_3 solution to make it 0·01 N solution. 5

14. *(a)* Explain electrolysis of fused NaCl with a neat diagram and relevant chemical equations. 6

(b) Write any four differences between metallic and electrolytic conduction. 4

15. Explain sacrificial anode and impressed voltage methods of prevention of corrosion. 10

16. *(a)* Calculate the temporary and permanent hardness of a water sample containing the following salts. 6

(i) $Ca(HCO_3)_2$ = 40·5 ppm

(ii) $Mg(HCO_3)_2$ = 36·5 ppm

(iii) $CaSO_4$ = 34 ppm

(iv) $MgSO_4$ = 30 ppm

(b) Write any four disadvantages of using hard water in industries. 4

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17. *(a)* Write a method of preparation and two uses of *(i)* Buna-S and *(ii)* Neoprene rubber. 6

(b) Define Nanomaterials. Write any two examples and applications. 4

18. *(a)* What are renewable and non-renewable sources of energy? Give examples. 6

(b) Write any four principles of green chemistry. 4

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