C16–EC–**104**

5143

BOARD DIPLOMA EXAMINATION, (C–16)
MARCH/APRIL—2018
DECE—FIRST SEMESTER EXAMINATION

ENGINEERING CHEMISTRY AND
ENVIRONMENTAL STUDIES—I

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

PART—A 2×15=30

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

(2) Each question carries **two** 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 set of quantum numbers for the differentiating electron of sodium (Na) $3s$?

3. What is Pauli's exclusion principle?

4. Define coordinate covalent bond. Give example.

5. Calculate the oxidation number of Mn in $KMnO_4$ and 'Cr' in $K_2Cr_2O_7$.

6. Define the terms 'solute' and 'solvent' and give examples.

7. Find the number of moles present in 90 grams of water.

8. Calculate the equivalent weight of NaOH and Ca(OH)$_2$.

9. Define saturated and unsaturated solutions.

10. What is conjugate acid-base pair? Give an example.

11. Define ionic product of water. Give its value.

12. Calculate the pH of 0·01 M HCl solution.

13. Write any two limitations of Arrhenius acid-base theory.

14. Define soft water and hard water.

15. List the salts that causes hardness to water with their formulae.

16. Define degree of hardness of water and give its units.

17. Define reverse osmosis.

18. Define the term 'environment'. Name the segments of environment.

19. What are renewable energy sources? Give examples.

20. Write any two threats to biodiversity.

PART—B   10×5=50

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

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

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

21. *(a)* Write the postulates of Bohr's atomic model and mention its limitations.   8

(b) Write the electronic configurations of $_{24}$Cr and $_{29}$Cu.   2

22. *(a)* Briefly explain four quantum numbers and their significances.   8

(b) Write any two differences between orbit and orbital.   2

23. *(a)* State the postulates of electronic theory of valency.   5

     (b) Explain ionic bond formation in NaCl molecule.   5

24. *(a)* What is normality? Calculate the weight of Na_2CO_3 present in 500 ml of 0·02 *N* solution.

     (Gram molecular weight of Na_2CO_3 = 106 g)   5

     (b) Define molarity. Calculate the molarity of 200 ml of solution containing 3·65 gm of HCl solution.

     (Gram molecular weight of HCl = 106 g)   5

25. *(a)* Explain Lewis theory of acids and bases.   5

     (b) What is buffer solution? Give three applications of it.   5

26. *(a)* Explain softening of hard water by zeolite process with neat diagram.   6+1=7

     (b) Explain chlorination with equation.   3

27. *(a)* State the disadvantages of using hard water in industries.   5

     (b) Write any five essential qualities of drinking water.   5

28. *(a)* Define the following terms and give examples :   5+5=10

        Pollutant, contaminant, receptor, sink, particulates

     (b) Write a note on ecosystem. What are its components?

★ ★ ★