



C16-EE-104

5150

BOARD DIPLOMA EXAMINATION, (C-16)
MARCH/APRIL—2018
DEEE—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. What are Quantum Numbers? Name the four quantum numbers.
2. Write the electronic configuration of Sc(21) and Zn(30).
3. Write any four properties of ionic compounds.
4. Find the oxidation number of Cr in $K_2Cr_2O_7$.
5. Write two differences between orbit and orbital.
6. Define solution and solute.

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7. Calculate the gram equivalent weight of Na_2CO_3 .
8. Find the number of moles present in 90 g of water.
9. Define saturated and unsaturated solutions.
10. What is a buffer solution? Give two examples.
11. Find the pH of 0.001M HNO_3 solution.
12. Define ionic product of water.
13. Mention any two limitations of Arrhenius theory of acids and bases.
14. Name the salts responsible for permanent hardness of water.
15. What are the disadvantages of using hard water in boilers?
16. Calculate the hardness of a litre of water sample containing 34 mg of CaSO_4 .
17. Write any four essential qualities of drinking water.
18. Define the terms particulates and dissolved oxygen (DO).
19. Define ecosystem.
20. Mention any four threats to biodiversity.

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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 criterion for valuation is the content but not the length of the answer.

- 21.** (a) State the postulates of electronic theory of valency. 6
(b) State and explain Hund's rule. 4
- 22.** (a) Give the shapes of *s*, *p* and *d* orbitals. 6
(b) Distinguish between oxidation number and valency. 4
- 23.** (a) Define a covalent bond. Explain covalent bond formation in H₂, O₂ and N₂ molecules by Lewis dot model. 7
(b) Define coordinate covalent bond and explain with an example. 3
- * **24.** (a) Give the classification of solutions based on the physical states of solute and solvent. 6
(b) Find the molarity of a solution containing 171 g of sugar (sucrose) in 2 litres (GMW of sucrose = 342 g). 4
- 25.** (a) Explain Bronsted-Lowry theory of acids and bases with examples. 8
(b) Write any two limitations of Bronsted-Lowry theory. 2
- 26.** (a) Explain permutit process of softening of hard water. 6
(b) Define sterilization of water and explain chlorination with chemical reactions. 4

- 27.** (a) ^{*} Explain with a neat labelled diagram of ion exchange process of softening hard water. 8
- (b) Define reverse osmosis. 2
- 28.** (a) What are the types of energy sources? Give examples. 4
- (b) Define producers, consumers and decomposers with examples. 6

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