



A/AA/CHST/EI/MET/MNG/  
IT/TT/PKG/—104

**5104**

**BOARD DIPLOMA EXAMINATION, (C-16)**

**MARCH/APRIL—2018**

**FIRST YEAR (COMMON) EXAMINATION**

ENGINEERING CHEMISTRY AND  
ENVIRONMENTAL STUDIES

*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. Draw the shapes of *S* and *P* orbitals.
2. Write the electronic configuration of chromium ( $z=24$ ), copper ( $z=29$ ).
3. Write the four quantum number values for the differentiating electron in Al.
4. Define oxidation state. Calculate the oxidation state of S in  $H_2SO_4$ .
5. Define coordinate covalent bond. Give one example.

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6. Define <sup>\*</sup>solute and solvent. Give one example each.
7. Define molarity. Write its formula and units.
8. Calculate the equivalent weight of NaOH.
9. Calculate the number of moles in 3.65 gms of HCl  
(At. wts. H = 1, Cl = 35.5)
10. Define Arrhenius acid and base theory with examples.
11. Define conjugate acid-base pair with example.
12. What is ionic product of water? Write its value and units.
13. Calculate the pH of 0.001 M HCl solution.
14. Write the names of salts and their formulae which are responsible for temporary and permanent hardness.
- <sup>\*</sup>
15. What is chlorination. Give its chemical equations.
16. Define degree of hardness of water and mention different units.
17. Define osmosis and reverse osmosis.
18. Define pollutant and contaminant with examples.
19. Define producers and consumers with examples.
20. Write 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) Write the postulates of Bohr's atomic theory. 6  
(b) Explain Pauli's exclusion principle with one example. 4
- 22.** (a) Define covalent bond. Explain the formation of O<sub>2</sub> and N<sub>2</sub> with the help of Lewis dot method. 5  
(b) Write five differences between ionic and covalent compounds. 5
- 23.** (a) Explain four quantum numbers. 8  
(b) Define oxidation and reduction with example. 2
- 24.** (a) Define saturated, unsaturated and supersaturated solutions. 6  
(b) Calculate the weight of Na<sub>2</sub>CO<sub>3</sub> present in 100 ml of 0.5 N solution (Na<sub>2</sub>CO<sub>3</sub>GMW = 106, valency = 2). 4
- 25.** (a) Explain Lewis theory of acids and bases. 6  
(b) Define buffer solution and write three applications of buffer solution. 4
- 26.** (a) Explain permutit process with neat diagram. 7  
(b) Write any three disadvantages of using hard water in industries. 3
- 27.** (a) Explain municipal treatment of water for drinking. 7  
(b) Write any three essential qualities of drinking water. 3
- 28.** (a) Explain renewable and non-renewable energy sources with examples. 6  
(b) What are the growing needs of energy? 4

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