

**6054**  
**BOARD DIPLOMA EXAMINATION**  
**JUNE - 2019**  
**DIPLOMA IN MECHANICAL ENGINEERING**  
**ENGINEERING CHEMISTRY & ENVIRONMENTAL STUDIES**  
**FIRST YEAR EXAMINATION**

Time: 3 Hours

Total Marks: 80

**PART - A (3m x 10 = 30m)**

Note 1: Answer all questions and each question carries 3 marks

2: Answers should be brief and straight to the point and shall not exceed 5 simple sentences

1. State Pauli's exclusion principle? Explain with a suitable example
2. Calculate the oxidation number of underlined atoms in the following: (1)  $\text{KMMnO}_4$  (2)  $\text{H}_2\text{HSO}_4$  (3)  $\text{ClO}_4^{-1}$
3. Calculate the no of moles in the following
  - (1) 10gm of NaOH
  - (2) 5.3 gm of  $\text{Na}_2\text{CO}_3$
  - (3) 6.3 gm of  $\text{HNO}_3$
4. What is Ionic product of water? write its value and units at  $25^\circ\text{C}$
5. Define Electrolyte, Non – Electrolyte and metallic conductor
6. What are the salts that responsible for temporary and permanent hardness of water .
7. Write the preparation and uses of poly-ethylene
8. Classify the fuels based on their physical state with examples
9. Define BOD and COD
- \* 10. Suggest any three methods to control water pollution

**PART - B (10m x 5 = 50m)**

Note 1: Answer any five questions and each carries 10 marks

2: The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

11. a) State the important postulates of Bohr's atomic theory. 6M
- b) Explain the significance of Azimuthal quantum number 4M
- 12A. Define Molarity. Calculate the Molarity of a solution containing 5.3gms of  $\text{Na}_2\text{CO}_3$  in 250ml volumetric flask 5M
- \* B. Define Buffer solution. Write the applications of Buffer solutions 5M

13. (a) Write any five differences between characteristics of metals and non-metals 5M  
(b) Define (1) Mineral (2)Ore (3)Gangue (4) Flux (5) Slag 5M
14. (a) Define and explain Faraday's laws of electrolysis 6M  
(b) Same quantity of charge is passed through Sodium Chloride and Silver Nitrate. Find the weight of Sodium deposited on cathode? If Silver deposited is 1.85 g (Atomic Weight of Cu =63, Atomic Weight of Na =23 ) 4M
15. a) Explain impressed voltage method as Cathodic protection method. 4M  
b) Define corrosion. List out the factors which influence rate of corrosion 6M
16. a) Explain the concept of Reverse Osmosis with an example 3M  
b) Explain the softening of hard water by ion exchange process 7M
17. (a) Write any five characteristics of vulcanized rubber. 5M  
(b) What are Thermoplastics and Thermo setting plastics? Explain with examples. 5M
18. a) Explain the effects of air pollution on human beings, plants and animals 6M  
b) Write a short note on Acid rain and Global warming 4M

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