7051

BOARD DIPLOMA EXAMINATION, (C-20)

JUNE/JULY—2022

DME - 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.   How many electrons, protons and neutrons are present in Mg^{+2} ion? (Mass number = 24)

2.   Define molarity. What is the effect of temperature on molarity?

3.   What is ionic product of water? Write its units.

4.   Define electromotive force. How is it calculated?

5.   Define temporary and permanent hardness of water.

6.   Write the preparation and any two uses of Buna-S rubber.

7.   Explain the classification of fuels with examples.

8.   What are soaps and detergents?

9.   Write any three threats to biodiversity.

10.   Define producer, consumer and decomposer.

PART—B   8×5=40

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

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

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

11. *(a)* State and explain Aufbau principle and Hund's rule with an example for each.

(OR)

(b) Define covalent bond. Explain the formation of hydrogen, oxygen and nitrogen molecules.

12. *(a)* Explain normality. How much excess water is required to dilute 100 ml of 0·1 N HCl solution into 0·05 N HCl solution?

(OR)

(b) Explain buffer solutions. Write any three applications of buffer solutions.

13. *(a)* Define ore, mineral, gangue, flux, slag, metallurgy, roasting and calcination.

(OR)

(b) State and explain Faraday's laws of electrolysis. The same amount of current passed through $AgNO_3$ solution and $CuSO_4$ solution deposited 2·35 grams of Ag at cathode. Find the weight of Cu deposited at cathode. (Atomic weights of Cu and Ag are 63·5 and 108 respectively).

14. *(a)* Define cathodic protection. Explain the prevention method of corrosion by sacrificial anode method.

(OR)

(b) What is softening of hard water? Explain the softening of hard water by Permutit process.

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15. *(a)* Define thermoplastic and thermosetting plastic. Write any six differences between thermoplastics and thermosetting plastics.

(OR)

(b) Define air pollution. Explain any six controlling methods of air pollution.

PART—C 10×1=10

Instructions : (1) Answer the following question.

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

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

16. Construct a galvanic cell by the following chemical reaction :

$$Mg(s) + Cd^{+2}(aq) \rightarrow Mg^{+2}(aq) + Cd(s)$$
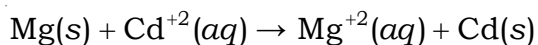
(a) Which of the electrode acts as anode and cathode?

(b) What is the individual reaction at electrodes?

(c) What is cell representation?

(d) Calculate emf produced by the cell when SRP values of Mg and Cd electrodes are –2·37 V and –0·40 V respectively.

(e) What is the direction of flow of electricity?

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