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# DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE —APRIL, 2019

## **ENGINEERING CHEMISTRY - II**

[Time: 3 hours

(Maximum marks: 100)

#### PART — A

(Maximum marks: 10)

Marks

- I Answer all questions in one or two sentences. Each question carries 2 marks.
  - 1. State Hund's rule of maximum multiplicity.
  - 2. What are strong electrolytes and weak electrolytes?
  - 3. Give the functional group of
    - (a) Ketone
- (b) Alcohol
- 4. Define galvanization.
- 5. Define calorific value of fuel.

 $(5 \times 2 = 10)$ 

## PART — B

(Maximum marks: 30)

- II Answer any five of the following questions. Each question carries 6 marks.
  - 1. (a) Explain hydrogen bonding with an example.
    - (b) State Aufbau principle.
  - 2. (a) What is a primary cell? Give two examples.
    - (b) State Faraday's first law of electrolysis.
  - (a) Reduction potentials of Zn and Ag electrodes are -0.76 V and 0.8 V respectively.
    - (i) Compute the emf if a cell is constructed using these electrodes.
    - (ii) Which metal displaces the other from its salt solution? Give reason.
    - (b) Explain dry corrosion.
  - 4. (a) Distinguish between organic and inorganic compounds.
    - (b) Give monomer(s) of the following polymers.
      - (i) PVC
- (ii) Natural rubber
- 5. (a) What is catalytic cracking? Mention any two advantages of it.
  - (b) Give any two harmful effects of acids rain.



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- 6. (a) What are the qualities of a good fuel?
  - (b) What are synthetic fuels? Give one example.
- 7. (a) Give any two differences between addition polymerization and condensation polymerization.
  - (b) Define polymerization.

 $(5 \times 6 = 30)$ 

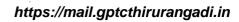
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## PART --- C

(Maximum marks: 60)

(Answer one full question from each unit. Each full question carries 15 marks.)

|     |     | Unit — I   |   |
|-----|-----|--|---|
| Ш   | (a) | State Pauli's exclusion principle. Calculate the de-Broglie wave length for an electron moving with a velocity of $10^3$ m s <sup>-1</sup> (h=6.625 × $10^{-34}$ Kg m <sup>2</sup> s <sup>-1</sup> , |   |
|     |     | $m=9.1 \times 10^{-31} \text{Kg}$  | 6 |
|     | (b) | State octet rule. Explain the bond formation in NaCl.  | 5 |
|     | (c) | What is a co-ordinate bond? Give two examples.   | 4 |
|     |     | OR   |   |
| IV  | (a) | State Heisenberg's uncertainty principle. Calculate the uncertainty in the velocity of an electron, if the uncertainty in position is 10 <sup>-10</sup> m.   |   |
|     |     | $(h = 6.625 \times 10^{-34} \text{ Kg m}^2 \text{ s}^{-1}, \text{ m}_e = 9.1 \times 10^{-31} \text{Kg})$   | 6 |
|     | (b) | How is a covalent bond formed? Give three examples.  | 5 |
|     | (c) | Differentiate between orbit and orbital.   | 4 |
|     |     | Unit — II  | ÷ |
| V   | (a) | Explain the process of electrolysis by taking molten NaCl as an example.   | 6 |
|     | (b) | What is a salt bridge? Give the functions of salt bridge.  | 5 |
|     | (c) | What are secondary cells? Give two examples.   | 4 |
|     |     | OR   |   |
| VI  | (a) | What are the factors that influence rate of corrosion? Explain.  | 6 |
|     | (b) | What is electrochemical theory of corrosion?   | 5 |
|     | (c) | How is corrosion prevented by cathodic protection method? Explain.   | 4 |
|     |     | Unit — III   |   |
| VII | (a) | Distinguish between Thermoplastics and Thermosetting plastics.   | 6 |
|     | (b) | What are refractories? Give their functions.   | 5 |
|     | (c) | Mention four characteristics of refractories.  | 4 |





|      |   |   |                                 |                                    | •                             | Marks |
|------|---|---|---------------------------------|------------------------------------|-------------------------------|-------|
| VIII | (a)   | Def   | ne vulcanization? Give any      | four pro                           | perties of vulcanized rubber. | 6     |
|      | (b)   | Wha   | at is optical fibre? Give three | e uses of                          | it.                           | 5     |
|      | (c)   | Exp   | lain homo polymer and co-po     | olymer w                           | rith one example for each.    | 4     |
|      |   |   |                                 | Unit -                             | - IV                          |       |
| IX   | (a)   | (a) Compare solid, liquid and gaseous fuels.              |                                 |                                    |                               | 6     |
|      | (b)   | Defi  | ne pollutant. Explain the ma    | jor sourc                          | es of water pollution.        | 5     |
|      | (c)   | Wha   | at are primary fuels? Give tw   | vo exam                            | ples.                         | 4     |
|      |   |   |                                 | Or                                 |                               |       |
| X    | (a) What do you understand by Green house effect? What are its consequences? Mention two ways to reduce it. |   |                                 | effect? What are its consequences? | 6                             |       |
| ,    | (b)   | Give the major components present in the following fuels. |                                 |                                    |                               |       |
|      |   | (i)   | L P G                           | (iv)                               | Water gas                     |       |
|      |   | (ii)  | Producer gas                    | (v)                                | CNG                           |       |
|      |   | (iii)   | Natural gas                     |                                    |                               | 5     |
|      | (c)   | Write a short note on ozone layer depletion.              |                                 |                                    | 4                             |       |