Code No. 2958/AICTE/M

# FACULTY OF ENGINEERING

**B.E. (ECE/M/P/AE/CSE/CME/IT) (AICTE) II-Semester (Backlog) Examination, December 2020**

**Subject: Chemistry**

**Time : 2 Hours** **Max. Marks: 70**

## PART – A

**Note: Answer any five questions.** **(5 x 2 = 10 Marks)**

1 Define knocking and how can it be minimized.

2 What is meant by exhaust of ion exchangers? How can the cation and anion exchangers can be regenerated?

3 Define functionality of monomer and degree of polymerisation.

4 Explain the significance of octane and cetaine numbers.

5 What is carbon neutrality of biodiesel?

6 Define single and standard electrode potentials.

7 Write the synthesis of an elastomer BUNA-S. Mention.

8 Give an account of catalysis.

9 'Corrosion of water filled steel tanks occur below the waterline'. Justify.

10 Mention two half-cell reactions of methanol-orxygen fuel cell.

## PART – B

**Note: Answer any four questions.** **(4 x 15 = 60 Marks)**

11 (a) Classify the reference electrodes with suitable examples.
(b) How do you determine the pH of a solution by using glass electrode?

12 (a) A sample of hardwater on analysis is found to contain 13.6 mg/lit of calcium sulphate, 7.3 mg/lit of magnesium bicarbonate, 12 mg/lit of magnesium sulphate, 9.5 mg/lit of magnesium chloride and 100 mg/lit of organic matter. Calculate total, permanent and temporary hardness of water in °French and °Clarke.
(b) Discuss the following with suitable examples.
(i) sacrificial anodic protection (ii) Impressed current cathodic method

13 (a) Explain the mechanism of conduction and write the applications of conducting polymers.
(b) Explain the preparation, properties and Engineering applications of NYLON 6 : 6 and Kevlar.

14 (a) Explain the proximate analysis of coal to ascertain its quality and its significance.
(b) An oil on analysis gave the following results. C = 85% ; H = 12% and oxygen = 3%. Find the weight of minimum air required for burning of 1kg of fuel.

15 (a) Describe the process of fractional distillation of petroleum. Mention the composition and uses of petroleum fractions.
(b) Describe the process of moving bed catalytic cracking. Write its advantages over fixed bed catalytic cracking.

16 (a) Explain the twelve principles of green chemistry. Give examples of clean technology.
(b) Write the properties and applications of reinforced composite materials.

17 (a) Discuss the reverse osmosis method for desalination of brackish water. Mention its advantages.
(b) Explain any six factors influencing the rate of corrosion.

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Code No: 11608/B

# FACULTY OF ENGINEERING

**B.E. I – Semester (AICTE) (Supple.) Examination, May/ June 2019**

**Subject: Chemistry**

**Time: 3 Hours** **Max. Marks: 70**

**Note: Answer all questions from Part A & any Five questions from Part B.**

## PART – A (10x2 = 20 Marks)

| | | |
|---|---|---|
| 1) | Write cell notation and cell reaction for $Z_n$-Ag cell. | 2 |
| 2) | What are the advantages of Lithium-ion batteries? | 2 |
| 3) | Distinguish between temporary and permanent hardness of water. | 2 |
| 4) | Explain Waterline corrosion. | 2 |
| 5) | What is Co-polymerization? Give an example. | 2 |
| 6) | Explain the mechanism of conduction in polyactylene. | 2 |
| 7) | What are chemical fuels? Give two examples. | 2 |
| 8) | Define octane number and give its significance. | 2 |
| 9) | What is the concept of Green Chemistry? | 2 |
| 10) | What are the advantages of composites? | 2 |

## PART – B (50 Marks)

| | | |
|---|---|---|
| 11. | (a) What is Quinhydrone electrode? Write electrode potential equation using Nernst equation. | 6 |
| | (b) Calculate the electrode potential of Cu electrode immersed in 0.01M $Cu^{+2}$ ion solution. | 4 |
| 12. | (a) What is alkalinity of water? Explain an experimental method of its determination. | 5 |
| | (b) Define corrosion and discuss the factors which influence the rate of corrosion. | 5 |
| 13. | (a) Differentiate between addition and condensation polymerization. | 4 |
| | (b) Explain the preparation, properties and applications of Kelvar and Buna-s rubber. | 6 |
| 14. | (a) Describe the fractional distillation of petroleum with a well labeled diagram. | 6 |
| | (b) What is ranking of coal? How proximate and ultimate analysis useful for it? | 4 |
| 15. | (a) Write any six principles of Green chemistry and explain their importance. | 6 |
| | (b) Explain the concept of trans-esterification in biodiesel formation. | 4 |
| 16. | (a) What are fuel cells? Describe the construction and working of $CH_3OH$-$O_2$ fuel cell. | 5 |
| | (b) Describe the method of softening of hard water by Reverse Osmosis. | 5 |
| 17. | (a) Write a note on Biodegradable polymers. | 5 |
| | (b) What are composites? Give their applications. | 5 |

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Code No: 11608/B/M

# FACULTY OF ENGINEERING

## B.E. II– Semester (AICTE) (Main) Examination, May / June 2019

## Subject: Chemistry

**Time: 3 Hours** **Max. Marks: 70**

**Note: Answer all questions from Part A & any Five questions from Part B.**

### PART – A (10 x 2 = 20 Marks)

1) Differentiate between Electrolytic and Galvanic cells. 2
2) Write the expressions for $\Delta H$ abd $\Delta S$ interms of cell e. m. f. 2
3) How are exhausted Ion-exchange resins regenerated? 2
4) What is pitting corrosion? Explain. 2
5) Write the structures of Nylon 6:6 and Buna-S rubber. 2
6) Explain the mechanism of conduction in poly acetylene. 2
7) What are the requirements of a good fuel? Explain. 2
8) What is LPG? What is its composition? 2
9) Write the properties of Biodiesel. 2
10) Discuss the applications of composites. 2

### PART – B (50 Marks)

11. (a) Calculate the equilibrium constant for the following reaction at 298K.

$$Sn + CuSO_4 \rightleftharpoons Cu + SnSO_4$$ 5

$$E^0_{Cu^{2+}/C_u} = 0.337V\,;\, E^0_{Sn^{2+}/Sn} = -0.136V$$

(b) Explain construction and applications of Methanol-Oxygen fuel cell. 5

12. (a) How do you estimate temporary and permanent hardness of water by EDTA method? Explain. 5
(b) What are the various methods of cathodic protection? Discuss impressed current Method? 5

13. (a) Write preparation, properties and uses of silicone rubber. 5
(b) Compare thermoplastics and thermosetting resins. 5

14. (a) Calculate the gross and net calorific value of coal having the following compositions: Carbon = 85%, hydrogen = 8%, Sulphur = 1%, nitrogen = 2%, ash = 4%. Latent heat of steam = 587 Cal $g^{-1}$ 5
(b) What is Cracking? Explain catalytic cracking by moving bed method. 5

15. (a) Explain the concept of Quinhydrone electrodes and write electrodic reactions when they are used as anodes and cathodes in a cell. 5
(b) What are green catalysts? Give two examples. What is Atom economy? 5

16. (a) What are fuel cells? Describe the construction and working of $CH_3OH$-$O_2$ fuelcell. 6
(b) Derive Nern'st equation and mention its applications. 5

17. (a) Explain desalinations of water by Reverse Osmosis method. 5
(b) Write the composition and uses of Gasoline and Diesel. 5

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2453-19-733745

Code No. 2878 / AICTE

# FACULTY OF ENGINEERING

## B.E. I – Semester (AICTE) (Main & Backlog) Examination, December 2019

**Time: 3 Hours** **Subject: Chemistry** **Max.Marks: 70**

**Note: Answer all questions from Part-A and any five questions from Part-B**

### PART – A (10x2 = 20 Marks)

1 Write the cell reaction for the cell consisting of Calomel electrode and Quinhydrone electrode.
2 How are free energy change of cell reaction and electrical work done by the cell are related?
3 Give few reasons for preferring ozone to chlorine in disinfection of water.
4 When copper is in contact with Iron what will be corroded and why?
5 What is the requirement for a simple organic compound to function as a monomer?
6 Give the polymerization reaction for silicone rubber.
7 Give Dulong's formula and relate HCV to LCV.
8 What is the effect of hydrogen and oxygen on the calorific value of fuel?
9 Give examples of clean technology.
10 Explain carbon neutrality of bio-diesel.

### PART – B (5x10 = 50 Marks)

11 a) Analyze the determination of thermodynamic parameters for cell reaction taking place in the galvanic cell? (6)
b) For a cell $Pt|H_2(1atm)|H^+(0.1M)||Cu^{2+}(0.01M)|Cu$, calculate emf of the cell if standard electrode potentials of copper electrode and hydrogen electrode are +0.34V and 0.00V respectively. (4)

12 a) Explain factors influencing the rate of corrosion. (6)
b) A 100ml of sample water required 60ml of 0.02M HCl upto phenolpthalein end point and then required 40ml of 0.02M HCl upto methyl orange end point. Calculate the type of alkalinity present in the water? (4)

13 a) Give preparation, properties and uses of (3+3
1) Kevlar
2) Silicone rubber
b) Give preparation, properties and applications of polylactic acid. (4)

14 a) Explain ultimate analysis of coal with its significance. (6)
b) Calculate GCV and NCV of a coal sample having a chemical composition of C=80%, H=7%, S=3.5%, N=2.1%, O=3%, and ash=4.4%. (4)

15 a) Give principles of Green chemistry and explain atom economy and catalysis with examples. (6)
b) Explain properties of matrix and reinforcement phases of composite materials with examples. (4)

16 a) Describe fractional distillation of petroleum and discuss the uses of petroleum fractions? (6)
b) Explain purification of sea water by reverse osmosis? (4)

17 a) Explain proximate analysis of coal with its significance. (6)
b) Explain determination of octane number and give the relation of octane number to composition of the petrol? (4)

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Code No: 11608/A

# FACULTY OF ENGINEERING

## B.E. I – Semester (Group-B) (Main) Examination, December 2018

### Subject: Chemistry

**Time: 3 Hours** **Max. Marks: 70**

**Note: Answer all questions from Part A and Five questions from Part B.**



### PART – A (10x2 = 20 Marks)

1) Represent the Calomel electrode and write its electrode reaction.
2) Distinguish between primary and secondary batteries.
3) What is break point chlorination? Explain.
4) Explain the principle of Cathodic protection of corrosion.
5) What is homo and copolymer? Give one example to each.
6) Write a short note on bio-degradable polymers.
7) What are the requirements of good fuel?
8) Write the advantages of gaseous fuels?
9) Explain atom economy in green chemistry by taking suitable example.
10) Differentiate between Matrix and Reinforcement in a composite.

### PART – B (50 Marks)

11. (a) Explain the determination of $p^H$ of a solution by using Quinhydrone electrode. 5
    (b) Write the cell reaction and calculate the EMF of the cell $Cu/Cu^{+2}(0.1M)//H^{+}(0.01M), H_2(g,1\ atm)/Pt$. 5
12. (a) What are the disadvantages of hard water? Explain the method of removal of hardness of water by Ion-Exchange method. 6
    (b) What are different types of corrosion? Explain the mechanism of Electrochemical corrosion. 4
13. (a) What is the analysis of Coal? Explain the Proximate analysis of coal and its importance. 6
    (b) Calculate the amount of air required for complete combustion of 0.5kg of coal. 4
14. (a) Distinguish between thermoplastics and thermosetting resins. 4
    (b) Give the preparation, properties and engineering applications of the polymers:
    (i) Bakelite (ii) Nylon-6,6 6
15. (a) Explain any six important principles of Green Chemistry. 6
    (b) Write a note a Trans-esterification in Biodiesel formation. 4
16. (a) What are composite materials? Giver their classification with examples. 6
    (b) Write the applications of conducting polymers. 4
17. (a) What are lithium ion batteries? Write their applications. 4
    (b) How will you determine the hardness of water by EDTA method? 6

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Code No. 2958/AICTE/M

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## PART – A

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2 What is meant by exhaust of ion exchangers? How can the cation and anion exchangers can be regenerated?

3 Define functionality of monomer and degree of polymerisation.

4 Explain the significance of octane and cetaine numbers.

5 What is carbon neutrality of biodiesel?

6 Define single and standard electrode potentials.

7 Write the synthesis of an elastomer BUNA-S. Mention.

8 Give an account of catalysis.

9 'Corrosion of water filled steel tanks occur below the waterline'. Justify.

10 Mention two half-cell reactions of methanol-orxygen fuel cell.

## PART – B

**Note: Answer any four questions.** **(4 x 15 = 60 Marks)**

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(b) How do you determine the pH of a solution by using glass electrode?

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