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M V B.Tech (Regular/Supplementary) DEGREE EXAMINATION

April, 2022

First Semester

Time: Three Hours

Common to CSE, ECE, EIE and IT

Engineering Chemistry

Maximum: 70 Marks

Answer Question No. 1 compulsorily.

(1X14 = 14 Marks)

Answer ONE question from each unit.

(4X14=56 Marks)

(1X14=14 Marks)

1. Answer all questions:
- |                                                                   |     |
|-------------------------------------------------------------------|-----|
| a) What are the ions responsible for permanent hardness in water? | CO1 |
| b) Differentiate between scale and sludge.                        | CO1 |
| c) How an exhausted cation exchange resin can be regenerated?     | CO1 |
| d) What is meant by electro dialysis?                             | CO1 |
| e) What is electrode potential?                                   | CO2 |
| f) Define Galvanic corrosion.                                     | CO2 |
| g) Define Corrosion.                                              | CO2 |
| h) Explain the effect of pH on rate of corrosion.                 | CO2 |
| i) Distinguish between gross and net calorific value of a fuel.   | CO3 |
| j) What is meant by knocking?                                     | CO3 |
| k) Write any two advantages of LPG over gasoline.                 | CO4 |
| l) What is anti-Markownikoff's rule?                              | CO4 |
| m) Write the preparation of PVC with reaction.                    | CO4 |
| n) What are biodegradable polymers? Give examples.                | CO4 |

## UNIT I

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|------------------------------------------------------------------------------------------|----|
| 2. a) Define alkalinity of water. Determine the alkalinity of water using a strong acid. | 8M |
| b) Explain scale and sludge formation in boilers.                                        | 6M |
| (OR)                                                                                     |    |
| 3. a) Describe softening of water by ion exchange method with neat diagram.              | 8M |
| b) How desalination is carried out by reverse osmosis? Explain.                          | 6M |

## UNIT II

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|-------------------------------------------------------------------------------------------|----|
| 4. a) Derive Nernst's equation for single electrode potential and write its applications. | 8M |
| b) Write the mechanism of electrochemical (wet) corrosion.                                | 6M |
| (OR)                                                                                      |    |
| 5. a) Define electroless plating. Explain the mechanism of electroless plating of nickel. | 8M |
| b) What are the factors influence the rate of corrosion?                                  | 6M |

## UNIT III

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|-----------------------------------------------------------------------------------------------------------------------|----|
| 6. a) Illustrate the experimental method for the determination of calorific value of coal sample by bomb calorimeter. | 8M |
| b) What is the significance of octane number and cetane number?                                                       | 6M |
| (OR)                                                                                                                  |    |
| 7. a) What are biofuels? Write any two methods of preparation and advantages.                                         | 8M |
| b) Write brief note on LPG and CNG.                                                                                   | 6M |

## UNIT IV

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|------------------------------------------------------------------------------------------------|----|
| 8. a) Compare and contrast the mechanism of $SN^1$ and $SN^2$ reactions with suitable example. | 8M |
| b) Describe the synthesis and mechanism of Aspirin.                                            | 6M |
| (OR)                                                                                           |    |
| 9. a) Explain the mechanism of conduction in polyaniline with necessary chemical reaction.     | 8M |
| b) Write preparation, properties and uses of Bakelite.                                         | 6M |