

**SREE VIDYANIKETHAN ENGINEERING COLLEGE**

(An Autonomous Institution, Affiliated to JNTUA, Ananthapuramu)

**I B.Tech II Semester (SVEC-19) Regular Examinations, December – 2020****ENGINEERING CHEMISTRY****[Electrical and Electronics Engineering, Electronics and Communication Engineering,  
Electronics and Instrumentation Engineering]****Time: 3 hours****Max. Marks: 60****Answer One Question from each Unit****All questions carry equal marks****UNIT-I**

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|----|----|--|---------|----|-----|-----|
| 1. | a) | Explain Schrodinger wave equation and write the significance of $\phi$ and $\phi^2$ .        | 8 Marks | L2 | CO1 | PO1 |
|    | b) | Recall the conditions required for the formation of molecular orbitals from atomic orbitals. | 4 Marks | L1 | CO1 | PO1 |

**(OR)**

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|----|--|--|----------|----|-----|-----|
| 2. |  | Explain postulates of VSEPR theory for the shapes of molecules with suitable examples. | 12 Marks | L2 | CO1 | PO2 |
|----|--|--|----------|----|-----|-----|

**UNIT-II**

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|----|----|---|---------|----|-----|-----|
| 3. | a) | Discuss the conversion of hard water into soft water by Ion exchange process. | 8 Marks | L2 | CO2 | PO2 |
|    | b) | Explain any two methods for prevention of scale formation.                    | 4 Marks | L2 | CO2 | PO2 |

**(OR)**

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|----|----|--|---------|----|-----|-----|
| 4. | a) | Explain defluoridation by Nalgonda method.               | 8 Marks | L2 | CO2 | PO6 |
|    | b) | What are the reasons for formation of scales in boilers? | 4 Marks | L2 | CO2 | PO2 |

**UNIT-III**

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|----|----|--|---------|----|-----|-----|
| 5. | a) | Explain the construction and working of Glass electrode with chemical equations. | 6 Marks | L2 | CO3 | PO1 |
|    | b) | Explain oxidation corrosion.   | 6 Marks | L2 | CO3 | PO1 |

**(OR)**

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|----|----|---|---------|----|-----|-----|
| 6. | a) | Explain the construction and working of Lithium Ion battery with chemical equations for discharging and charging. | 8 Marks | L2 | CO3 | PO1 |
|    | b) | Discuss impressed current cathodic protection method for protection of metals from corrosion.                     | 4 Marks | L2 | CO3 | PO1 |

**UNIT-IV**

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|----|----|--|---------|----|-----|-----|
| 7. | a) | Explain the working of IR spectrophotometer with neat diagram. | 8 Marks | L2 | CO4 | PO1 |
|    | b) | Discuss any two applications of UV –Visible spectroscopy.      | 4 Marks | L2 | CO4 | PO1 |

**(OR)**

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|----|----|--|---------|----|-----|-----|
| 8. | a) | Write the principle and applications of SEM.     | 8 Marks | L2 | CO4 | PO1 |
|    | b) | Explain different types of molecular vibrations. | 4 Marks | L2 | CO4 | PO1 |

**UNIT-V**

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|----|----|--|---------|----|-----|-----|
| 9. | a) | Discuss preparation of synthetic petrol by using Bergius process.                  | 8 Marks | L2 | CO5 | PO1 |
|    | b) | Explain the following properties of Lubricants.<br>i) Cloud point. ii) Pour point. | 4 Marks | L2 | CO5 | PO1 |

**(OR)**

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|-----|----|---|---------|----|-----|-----|
| 10. | a) | Calculate the minimum amount of air required for the complete combustion of 1 kg of a fuel containing C=90%, H <sub>2</sub> =3.5%, S=0.5%, O <sub>2</sub> =3 % N <sub>2</sub> =0.5% and ash 1.5%. | 6 Marks | L3 | CO5 | PO1 |
|     | b) | Explain the concept of knocking. How do you minimize it using anti-knocking agents? Give examples.  | 6 Marks | L2 | CO5 | PO1 |

