**18EED51**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **April,2023** | **Electrical & Electronics Engineering** | | |
| **Eighth Semester** | **Energy Storage Systems** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

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| 1. | a) | Quote the current research and development areas in the field of Energy Storage? | CO1(L1) | **1M** |
|  | b) | Correlate any two batteries and their capacities | CO1(L2) | **1M** |
|  | c) | Prioritize the factors depends on charging and discharging rate of a battery? | CO2(L3) | **1M** |
|  | d) | What is the battery technology used in modern EV’s | CO2(L3) | **1M** |
|  | e) | **What is the cell voltage of lead acid battery?** | CO2(L2) | **1M** |
|  | f) | Write the key measures of merit for batteries. | CO1(L4) | **1M** |
|  | g) | Paraphrase Storage Characteristics of Hydrogen | CO3(L2) | **1M** |
|  | h) | What is Bio-gas | CO3(L2) | **1M** |
|  | i) | Tell the substrate used for biogas production? | CO3(L1) | **1M** |
|  | j) | Relate the applications of super capacitors | CO4(L1) | **1M** |
| **Unit - I** | | | | |
| 2. | a) | Defend the essential criteria for comparing energy storage methods | CO1(L3) | **5M** |
|  | b) | Describe the necessity of various energy storage systems | CO1(L1) | **5M** |
|  |  | **(OR)** |  |  |
| 3. |  | Identify different types of thermal energy storage systems and explain in detail | CO1(L4) | **10M** |
| **Unit - II** | | | | |
| 4. | a) | **Memorize The capacity of a lead-acid cell? Write the** Advantages and Disadvantages of Lead–Acid Batteries | CO2(L1) | **5M** |
|  | b) | Illustrate the components of a battery energy storage system | CO2(L4) | **5M** |
|  |  | **(OR)** |  |  |
| 5. | a) | Compare the differences between modern batteries , zinc-Air, Nickel Hydride, Lithium Battery | CO2(L2) | **5M** |
|  | b) | Explain about following parameters of batteries i) SOC ii) energy density | CO2(L1) | **5M** |

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| **Unit - III** | | | | | | |
| 6. | a) | Explain about Hydrogen storage systems and its types | | CO3(L1) | | **5M** |
|  | b) | Explain about Bio-gas storage system and list out its applications | | CO3(L4) | | **5M** |
|  |  | **(OR)** | |  | |  |
| 7. | a) | Write the potential uses of hydrogen and its connection to energy storage options? | | CO3(L4) | | **5M** |
|  | b) | **Articulate Why aren't we doing more with biogas? What are the barriers to increasing biogas production and use?** | | CO3(L3) | | **5M** |
| **Unit - IV** | | | | | | |
| 8. | a) | Explain how a flywheel energy storage system works. | CO4(L1) | | **5M** | |
|  | b) | Classify compressed-air storage systems and explain each. | CO4(L2) | | **5M** | |
|  |  | **(OR)** |  | |  | |
| 9. | a) | Describe the concept of Hybridization of energy storage systems | CO4(L2) | | **5M** | |
|  | b) | Write the applications for various types of Super Capacitors Storage Mechanisms. | CO4(L3) | | **5M** | |

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