

Duration: 3hrs

[Max Marks: 80]

- N.B. :** (1) Question No 1 is Compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

- 1 **Attempt any FOUR** [20]
 a Define Electrical Energy Storage
 b Compare battery with fuel cell.
 c Compare the characteristics of supercapacitor with battery.
 d Elaborate advantages and limitations of Flywheel system.
 e What is PCM in mechanical storage system
- 2 a Give classification of mechanical energy storage system along with appropriate examples [10]
 b Elaborate compressed air energy storage system in detail [10]
- 3 a Justify the need of energy storage in renewable energy sources system. [10]
 b Explain V2X, G2V and V2G modes of operation of Electric vehicles. [10]
- 4 a Illustrate the various design considerations for sizing of different types of energy storage systems for various applications [10]
 b Elaborate seasonal energy storage. [10]
- 5 a Elaborate Pumped Hydro storage system in detail. [10]
 b Enlist fuel cells and elaborate any one in detail [10]
- 6 a Give the significance of “electrical double layer” in supercapacitor. [10]
 b Draw Schematic of superconducting magnetic energy storage and elaborate it's working. [10]
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