



M.Tech III Semester Regular Examinations, February 2024

ENERGY STORAGE TECHNOLOGIES
(Power Electronics)

Maximum Marks: 60

Date: 15.02.2024 Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A		CO	Bloom Tx
All the following questions carry equal marks (10x1M=10 Marks)			
1.a)	What is the role of smart grid in ESS?	1	L1
b)	Which is better off-grid ESS system or on-grid ESS system? Justify.	1	L2
c)	List out the various Mechanical EES systems?	2	L2
d)	Explain the principle of Superconducting magnetic energy storage (SMES)?	2	L2
e)	What is significance of Renewable energy generation in present trend?	3	L2
f)	What is the role of Electric vehicles in present market?	3	L2
g)	Draw the internal control architecture for a battery storage system?	4	L2
h)	What is the significance of "Battery SCADA" in EES?	4	L2
i)	What is Conventional Stabilization?	5	L1
j)	List out any two suggested methods to improve EES market potential in the future?	5	L1
Part-B			Bloom Tx level
Answer All the following questions. (5X10M=50Marks)			
2	a. Explain in detail about the Electricity and the roles of EES in High generation cost during peak-demand periods? [5M]	1	L2
	b. Discuss in detail about the Electricity and the roles of EES in Long distance between generation and consumption. [5M]	1	L2
OR			
3	a. Explain in detail about the Emerging needs for Energy storage system in more renewable energy, less fossil fuel case? [5M]	1	L2
	b. Discuss in detail about the Emerging needs for Energy storage system in Smart Grid uses? [5M]	1	L2
OR			
4	Explain in detail about the Mechanical storage systems with suitable diagrams? [10M]	2	L3
OR			
5	Write briefly on any four secondary type Electrochemical storage systems? [10M]	2	L3

6	a. Discuss in detail the consumer use in uninterruptable power supply for large consumers? [5M]	3	L2
	b. Explain in detail about the role of Smart Microgrid in ESS systems? [5M]	3	L2
OR			
7	Explain in detail the role of either of any two Renewable energy generation in ESS systems? [10M]	3	L3
8	a. Discuss briefly the aggregating EES systems and distributed generation (Virtual Power Plant)? [5M]	4	L2
	b. Explain in detail about the Power System Dispatch Model Method? [5M]	4	L2
OR			
9	a. Explain in detail about the Management and control hierarchy of storage systems in EES? [5M]	4	L2
	b. Explain the Relationship between balancing services and variable energy resources? [5M]	4	L2
10	Briefly discuss the EES market potential estimation for introduction of renewable energies. [10M]	5	L3
OR			
11	a. Explain in detail about the Vehicle to grid concept in EES systems? [5M]	5	L2
	b. Write a short on EES market potential estimation by the IEA? [5M]	5	L2