



M.Tech III Semester Regular Examinations, January 2025

ENERGY STORAGE TECHNOLOGIES
(Power Electronics)

Maximum Marks: 60

Date:30.01.2025

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)	Write any two characteristics of electricity in ESS technologies?	1	2
b)	List out the merits of Smart Grid in ESS?	1	2
c)	List out the Standards for EES systems?	2	2
d)	What is the significance of Pumped hydro storage ESS systems?	2	2
e)	List out the factors used for conventional power generation, grid operation & service?	3	2
f)	Distinguish between Smart Grid and Smart Micro grid?	3	1
g)	What is the significance of Management?	4	2
h)	Define SCADA.	4	1
i)	What is the role of IEA in the EES market?	5	2
j)	What is the concept of V2G systems?	5	2
Part-B			Bloom Tx level
Answer All the following questions. (5X10M=50Marks)			
2	Discuss in detail the roles of from the viewpoint of a utility in electrical energy storage technologies? [10M]	1	2
OR			
3	A. Discuss in detail the roles of from the viewpoint of consumers in electrical energy storage technologies? [5M]	1	2
	B. Discuss in detail the roles of generators of renewable energy in electrical energy storage technologies? [5M]	1	2
4	A. Explain in detail about the Vanadium Redox Flow Battery with suitable diagram? [5M]	2	2
	B. Discuss in detail the Double-layer capacitors (DLC) Electrical storage systems? [5M]	2	1
OR			
5	A. Explain in detail about the overall concept for the use of hydrogen and SNG Chemical energy storage systems? [5M]	2	2

	B. Comparison of rated power, energy content and discharge time of different EES technologies? [5M]	2	2
6	Explain in detail about the concept of smart house role in EES technologies? [10M]	3	2
	OR		
7	Briefly discuss the Electrical vehicle role in present scenario among PV power generation in ESS systems. [10M]	3	2
8	A. Explain in detail about the external connection of EES systems? [5M]	4	2
	B. Discuss the concept of Market Price Method? [5M]	4	2
	OR		
9	A. Explain in detail about the "Battery SCADA" aggregation of many dispersed batteries? [5M]	4	2
	B. Write a short note on Variable Generator Control? [5M]	4	
10	Explain the EES market potential for the given estimation applications i) Boston Consulting Group (BCG), ii) Sandia National Laboratory (SNL) and iii) Li-ion batteries-Panasonic Group. [10M]	5	2
	OR		
11	Briefly explain the suggested methods to improve the EES market potential in the future. [10M]	5	2