



B.Tech VII Semester Regular Examinations, November 2025

ENERGY STORAGE SYSTEMS
(EEE)

Maximum Marks: 60

Date: 01.12.2025

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

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	BloomTx
1.a)	Name one reason why electricity costs are higher during peak hours.	1M	1	1
b)	Why are high voltages used for long-distance power transmission?	1M	1	1
c)	How does renewable energy generation affect system frequency control?	1M	1	1
d)	What is meant by time shifting in utility energy storage?	1M	1	1
e)	Define the basic working principle of a pumped hydro storage system.	1M	2	1
f)	Why is methane preferred over hydrogen for gas grid transport?	1M	2	1
g)	In which type of power plants is thermal storage mainly used?	1M	2	1
h)	State the typical efficiency range of DLCs.	1M	2	1
i)	What is the role of EES in grid frequency regulation?	1M	3	1
j)	How does a solar farm handle excess generation that local load cannot consume in real time?	1M	3	1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BloomTx
2	Enumerate the consequences happening in power grid due to day-by-day congestion.	10M	1	2
OR				
3	a) Discuss the importance of cable transmission in electrical systems and how EES contributes to mobile or isolated applications.	5M	1	2
	b) Explain what is meant by congestion in power grids and discuss its causes.	5M		2
4	Discuss how EES systems contribute to improving the efficiency of thermal power plants when integrated with renewable energy.	10M	1	2

	OR			
5	Discuss the importance of EES as an emergency power source in consumer applications such as hospitals, data centers, and semiconductor manufacturing.	10M	1	2
6	a) Discuss about Vanadium Redox flow Battery with neat sketch. b) Explain the classification of Electrical Energy Storage systems based on the form of stored energy.	5M 5M	3	2 2
	OR			
7	a) Explain in detail how lithium-ion battery technology supports the development of electric vehicles and renewable energy systems. b) Discuss the advantages and limitations of using the hydrogen-SNG pathway for large-scale energy storage.	5M 5M	2	2 2
8	a) Discuss the importance of developing international standards for energy storage systems. b) Discuss the importance of thermal energy storage systems.	5M 5M	2	2 2
	OR			
9	Explain with suitable example how different electrical energy storage technologies vary in terms of maturity and nominal power range.	10M	2	3
10	a) How do you plan to adopt renewable energy generation systems in your college? What are the factors that influence the selection of renewable sources? b) Explain two distinct ways EES is expected to help residential customers use energy more efficiently and reliably in a Smart House.	5M 5M	3	2 2
	OR			
11	Describe the function of Battery SCADA systems in aggregating and monitoring many dispersed batteries in a distributed network.	10M	3	2