Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S8 (R,S) Exam April 2025 (2019 Scheme)

Course Code: EET438

Course Name: ENERGY STORAGE SYSTEMS

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks. Marks

1		Why do we need Energy storage systems in Power Systems?	(3)
2		What factors are considered while selecting an energy storage system in power system?	(3)
3		Explain different storage media used in Thermal Energy Storage Systems.	(3)
4		Explain any one industrial method to produce hydrogen.	(3)
5		What is Primary and secondary battery? Give examples.	(3)
6		Write down the basic principle of superconducting magnetic energy storage system.	(3)
7		What are the main features of renewable energy systems?	(3)
8		Write notes on Wave energy conversion system.	(3)
9		What do you mean by distributed energy storage? What are its applications?	(3)
10		What is demand response?	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	How do you model a storage system mathematically? Explain with relevant equations.	(10)
	b)	With suitable example, discuss the power transformation of energy storage system.	(4)

OR

12	a)	With schematic diagram, explain different components of energy storage system.	(6)
	b)	Explain static duty of energy storage plant.	(8)

Module II

13	a)	What is the basic principle behind CAES? With a neat labelled diagram explain the working of a Compressed Air Energy Storage System.	(8)

	b)	Explain sensible heat storage and latent heat storage.	(6)

OR

14	a)	With schematic diagram, discuss the possibility of using Thermal energy storage with conventional coal- and nuclear-fired power plant.	(7)
	b)	Explain different storage methods of hydrogen?	(7)

Module III

15	a)	With a neat labelled diagram and suitable equations explain the working of Fuel cell.	(8)
	b)	Draw and explain typical voltage–discharge profile for a battery cell.	(6)

OR

16	a)	With necessary diagrams, describe basic principle and working of supercapacitors.	(8)
	b)	Explain the working of Li-ion batteries using proper chemical equations.	(6)

Module IV

17	a)	Discuss the role of storage in an isolated power system with renewable power sources.	(10)
	b)	Explain photovoltaics system.	(4)

OR

18	a)	With necessary diagram, explain small-scale hydroelectric energy system.	(6)
	b)	Explain Vertical axis and Horizontal axis wind turbines with neat diagrams.	(8)

Module V

19	a)	Explain the key features of Smart grid.	(6)
	b)	What is Virtual power plant? Explain VPP control strategies.	(8)

OR

20	a)	Explain, how Battery Electric vehicle acts as a distributed energy storage system.	(7)
	b)	With a neat labelled diagram explain the main components and working of a Battery SCADA System.	(7)

****