

**MASTER OF SCIENCE
(RENEWABLE ENERGY AND
ENVIRONMENT) (MSCRWEE)**

Term-End Examination

June, 2026

MRWE-002 : ENERGY STORAGE

Time : 3 Hours

Maximum Marks : 70

Note : (i) Attempt any **five** questions.

(ii) All questions carry equal marks.

1. (a) What is energy storage ? Why is it important in the context of renewable energy ? 7

- (b) How do policy and regulatory frameworks influence the deployment and adoption of energy storage systems ? 7

2. (a) Discuss the functions and importance of the enclosure in a flywheel energy storage system. 7
- (b) Discuss the concept of redox flow batteries and their advantages over other battery technologies. 7
3. (a) Explain the safety aspects associated with hydrogen in detail. 7
- (b) Compare different types of fuel cells based upon efficiency, operating temperature and fuel used. 7
4. (a) Explain the working principle of a Superconducting Magnetic Energy Storage (SMES) system. 7
- (b) Discuss the various factors needed to be considered while designing Phase Change Materials (PCM) based energy storage systems. 7
5. Enlist the innovative strategies used for solar thermal energy storage. Describe any *two* of them in detail. 14

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6. (a) Describe the role of grid connected energy storage in integrating renewable energy systems. 7
- (b) Discuss the economic viability of implementing sensible heat storage systems in various sectors. 7
7. Write short notes on any *four* of the following : $4 \times 3.5 = 14$
- (a) Lithium-ion batteries
 - (b) Pumped storage hydropower
 - (c) Magon spintronics
 - (d) Stratified storage system
 - (e) Aquifer thermal energy storage system
 - (f) Synthetic fuel energy storage system

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