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MRWE-002

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

Term-End Examination

December, 2023

MRWE-002 : ENERGY STORAGE

Time : 3 Hours

Maximum Marks : 70

Note : (i) Answer any **seven** questions.

(ii) All questions carry equal marks.

1. Explain the concept of sound trip efficiency.
Why is it considered important for energy
storage systems ? 10

2. (a) Discuss the role of control systems in
flywheel energy storage system. 5

- (b) What is chemical energy storage ? Why is
it important in the context of renewable
energy ? 5

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3. (a) Explain the importance of advanced materials in the development of energy storage systems. 5
- (b) How is battery recharged ? Explain in detail. 5
4. Discuss the challenges and potential solutions for the storage and transportation of hydrogen at large scale. 10
5. (a) Explain the function of electrolyte in a fuel cell. 5
- (b) What are the ways to improve the efficiency of a fuel cell ? 5
6. What is superconducting magnetic energy storage ? Discuss the limitations or challenges associated with it. 10
7. (a) Explain the working principle of phase change materials. 5
- (b) How does conduction affect heat loss ? What are the factors that influence the rate of heat loss ? 5
8. (a) Discuss the potential environmental impacts of solar energy storage technologies and strategies to mitigate them. 5
- (b) Discuss the role of energy storage in grid stability and reliability. 5

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9. (a) How can latent heat thermal energy storage (LHTES) systems contribute to energy conservation ? 5

(b) Describe the potential of utilizing waste heat from industrial process in sensible heat storage systems. 5

10. Write short notes on any *four* of the following :

2.5×4=10

(a) Pumped hydroenergy storage

(b) Energy storage in aquifers

(c) Greenhouse heating system

(d) Cryogenically cooled refrigerator

(e) Molten salt batteries

(f) Biochemical energy storage