R22 Regulation *Subject code:4O6HA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VI Semester Supplementary Examinations, April 2026

RENEWABLE ENERGY SOURCES
(CSE(DS))

Maximum Marks: 60 Date:25.04.2026 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	Bloom Tx
1.a)	What type of turbine uses aerodynamic lift to generate power?	1M	1	L1
b)	Why is speed control important in wind power generators?	1M	1	L1
c)	What is the purpose of a reformer in a fuel cell system?	1M	2	L1
d)	Name one type of low-temperature fuel cell.	1M	2	L1
e)	What does a magnetizing curve represent in the context of self-excited induction generators?	1M	3	L1
f)	What is self-excitation in induction generators?	1M	3	L1
g)	Which energy storage device is known for its high power density and rapid charge/discharge capability?	1M	4	L1
h)	What is the main working principle of a flywheel energy storage system?	1M	4	L1
i)	What is meant by power injection in renewable energy systems?	1M	5	L1
j)	Name one parameter controlled in instantaneous active and reactive power control.	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	Describe in detail the process of calculating electricity generation costs?	10M	1	L2
	OR			
3	Explain about selecting an appropriate location for a wind power plant?	10M	1	L2
4	Explain in detail about construction and operation of Proton Exchange Membrane (PEM) fuel cells?	10M	2	L2
	OR			
5	Explain how temperature affects the performance of a photovoltaic cell. Include a discussion of the PV cell's output characteristics and thermal behavior.	10M	2	L2
6	Discuss the different types of power losses in an induction generator. How do these losses affect overall efficiency and performance?	10M	3	L2

	OR			
7	What is a Self-Excited Induction Generator (SEIG)? Describe its working principle and the conditions necessary for self-excitation.	10M	3	L2
8	Discuss the characteristics, advantages, and limitations of ultra capacitors.	10M	4	L2
	OR			
9	Explain the principle and operation of flywheel energy storage systems. Include their design features, benefits, and typical use cases.	10M	4	L2
10	Evaluate the key technical and operational considerations when interconnecting renewable energy sources to the grid. Include examples to support your answer.	10M	5	L2
	OR			
11	Discuss the standards and codes relevant to the interconnection of renewable energy sources. Why are they important for safe and efficient operation?	10M	5	L2