Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination May-2023

OE00066 Renewable & Photovaltaic System

Programme: B.Tech. Branch/Specialisation: All

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. Renewable energy is known as "green energy" because- **1**

(a) It is green in colour

(b) It is produced from green plants only

(c) It is produced from wet fuels

(d) It does not produce harmful pollutants

ii. What is the % share of fossil fuel in global consumption of primary energy? **1**

(a) 82 % (b) 50 % (c) 10 % (d) 99 %

iii. A solar cell is the electrical device that can directly convert- **1**

(a) Photons energy into chemical energy

(b) Photons energy into mechanical energy

(c) Photons energy into electricity

(d) None of these

iv. A solar cell is basically- **1**

(a) A voltage source controlled by flux of radiation

(b) A current source controlled by flux of radiation

(c) A voltage source controlled by current source

(d) A voltage source controlled by voltage source

v. MPPT represents the- **1**

(a) Maximum power point tracking

(b) Minimum power point tracking

(c) Maximum power point transformation

(d) Minimum power point transformation

P.T.O.

vi. P&O stands for- **1**
(a) Profit and Overhead
(b) Personnel and Organization
(c) Perturb and Observe
(d) Pickled and Oiled

vii. The capacity of a battery is expressed in terms of- **1**
(a) Current rating (b) Voltage rating
(c) Ampere hour rating (d) None of these

viii. Why is energy storage required? **1**
(a) To match energy supply and demand in time domain
(b) To conserve energy
(c) To increase energy consumption
(d) None of these

ix. This is also called a biogas- **1**
(a) Biobutanol (b) Biodiesel
(c) Bioethanol (d) Biomethane

x. Which of the following converts energy from the combustion of fuel directly to the electrical energy? **1**
(a) Fuel cell (b) Solar cell
(c) Photo diode (d) None of these

Q.2 i. Explain the importance of renewable energy sources. **4**
ii. What is the status of non-conventional energy sources in India? What are their future prospects? **6**
OR iii. Explain Greenhouse effect and global warming. **6**

Q.3 i. Draw the equivalent circuit of practical solar cell. **4**
ii. Explain mechanism of photoconduction in a PV cell. Also write the advantages and disadvantages of PV system. **6**
OR iii. Explain the solar photovoltaic systems with the help of block diagram. **6**

Q.4 i. Describe the function of buck converter. **4**
ii. List out various types of Maximum power point techniques. Explain about perturb and observe method. **6**
OR iii. Explain Incremental conductance MPPT algorithm with algorithm flow chart. **6**

Q.5 i. State the main application of flywheel energy storage. **4**
ii. Describe the different methods of energy storage system and explain the solar energy storage system. **6**
OR iii. Define Mechanical Energy Storage system. Explain pumped storage system. **6**

Q.6 Attempt any two:
i. Explain the working principle of biomass energy system. **5**
ii. Explain the working principle of Fuel Cell Technology. **5**
iii. Explain the working principle of Hydrogen energy system. **5**

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Marking Scheme
OE00066 Renewable and Photovoltic Systems

Q.1	i)	Renewable energy is known as "green energy" because (d) it does not produce harmful pollutants	**1**
	ii)	What is the % share of fossil fuel in global consumption of primary energy? (a) 82%	**1**
	iii)	A solar cell is the electrical device that can directly convert (c) photons energy into electricity	**1**
	iv)	A solar cell is basically (b) A current source controlled by flux of radiation	**1**
	v)	MPPT represents the- (a) Maximum power point tracking	**1**
	vi)	P&O stand for (c) Perturb and observe	**1**
	vii)	The capacity of a battery is expressed in terms of (c) Ampere hour rating	**1**
	viii)	Why is energy storage required? (a) To match energy supply and demand in time domain	**1**
	ix)	This is also called a biogas- (d) Biomethane	**1**
	x)	Which of the following converts energy from the combustion of fuel directly to the electrical energy? (a) Fuel cell	**1**
Q.2	i.	Explain the importance of Renewable Energy Sources. List of various renewable energy sources ----- 2M their importance ------ 2M	**4**
	ii.	What is the status of non-conventional energy sources in India, and what are their future prospects? status ----- 3M their future prospects ------ 3M	**6**
OR	iii.	Explain about Green house effect? definition ---- 2M its effect on climate and nature ----- 4M	**6**
Q.3	i.	Draw the equivalent circuit of practical solar cell. equivalent circuit ---- 2M its explanation -------- 2M	**4**
	ii.	Explain mechanism of photoconduction in a PV cell? circuit diagram ---- 2M mechanism --------- 4M	**6**

OR	iii.	Explain the Solar Photovoltaic systems. PV system diagram ------ 2M explanation ---------- 4M	**6**
Q.4	i.	Describe the function of buck converter. circuit diagram ----- 2M function explanation ----- 2M	**4**
	ii.	List out various types of Maximum power point techniques. Explain about perturb and observe method. list of various types of MPPT techniques ------ 2M explanation about P&O method ------ 4M	**6**
OR	iii.	Explain Incremental conductance MPPT algorithm with algorithm flow chart. Algorithm ----- 4M Flowchart ----- 2M	**6**
Q.5	i.	State the main application of flywheel energy storage. 4 applications ---- 4M	**4**
	ii.	Describe the different methods of energy storage system and explain the solar energy storage system. list of different methods of energy storage system ----- 2M explanation of solar energy storage system ---------- 4M	**6**
OR	iii.	Define Mechanical Energy Storage system. Explain pumped storage system. definition of mechanical energy storage system ---- 2M explanation of pumped storage system ---------- 4M	**6**
Q.6		Attempt any two:	
	i.	Explain the working principle of biomass energy system. principle of operation ------ 5M	**5**
	ii.	Explain the working principle of Fuel Cell Technology. principle of operation ------ 5M	**5**
	iii.	Explain the working principle of Hydrogen energy system. principle of operation ------ 5M	**5**

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