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

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2022

OE00066 Renewable & Photovoltaic 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.

Q.1	i.	Which year is said to be the starting point for large scale planning of renewable energy globally? (a) 1973 (b) 1942 (c) 1850 (d) 1991	**1**
	ii.	Global warming would lead to- (a) Increase of agriculture production (b) Acid rains (c) Change of climate pattern (d) Increase efficiency of heat engine	**1**
	iii.	The efficiency of commercial solar cell is in the range of- (a) 10 to 20% (b) 20 to 30% (c) 30 to 40% (d) 40 to 50%	**1**
	iv.	A solar cell is basically (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	**1**
	v.	MPPT represents the- (a) Maximum power point tracking (b) Minimum power point tracking (c) Maximum power point transformation (d) Minimum power point transformation	**1**
	vi.	An MPPT is basically- (a) Switch (b) Regulator (c) Amplifier (d) None of these	**1**
	vii.	In a reversible chemical energy storage, the input energy in the form of- (a) Electrical energy (b) Thermal energy (c) Chemical energy (d) Mechanical energy	**1**

P.T.O.

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. What is the significance of sustainable energy source? **2**

ii. Write the difference between renewable and non-renewable energy sources. **3**

iii. India is one of the leading countries to generate the electricity from renewable energy source. Justify your answer. **5**

OR iv. Renewable energy system provides positive effect on the environment. Justify your answer. **5**

Q.3 i. Write the advantages of solar energy system. **2**

ii. With the help of block diagram explain the working of solar power plant. **8**

OR iii. Write the short note on the following: **8**
(a) Basic principle of solar cell
(b) Series and parallel connection of module

Q.4 i. Write the significance of maximum power point tracking. **3**

ii. Explain the concept of Incremental conductance MPPT algorithm with the help of an example **7**

OR iii. With the help of block diagram explain the working of DC-DC converter for MPPT. **7**

Q.5 i. Write the advantages and limitation of lead acid batteries. **4**

ii. What are the necessity of energy storage and also explain concept of mechanical energy storage? **6**

OR iii. Explain the concept of electrochemical energy storage and chemical energy storage. **6**

Q.6 Attempt any two:

i. Explain the working principle, advantages, and disadvantages of biomass energy system. **5**

ii. Explain the working principle, advantages, and disadvantages of Fuel Cell Technology. **5**

iii. Explain the working principle, advantages, and disadvantages of Hydrogen energy system. **5**

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Marking Scheme - OE00066 Renewable & Photovoltaic System

Q.1	i.	Which year is said to be the starting point for large scale planning of renewable energy globally? (a) 1973		**1**
	ii.	Global warming would lead to- (c) Change of climate pattern		**1**
	iii.	The efficiency of commercial solar cell is in the range of- (a) 10 to 20%		**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.	An MPPT is basically- (b) Regulator		**1**
	vii.	In a reversible chemical energy storage, the input energy in the form of- (b) Thermal energy		**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.	Significance of sustainable energy source	2 marks	**2**
	ii.	Any 3 difference	(1*3) marks	**3**
	iii.	Justify your answer		**5**
		As per explanation	5 marks	
OR	iv.	Justify your answer.		**5**
		As per explanation	5 marks	
Q.3	i.	At least 4 advantages of solar energy system	(0.5*4)	**2**
	ii.	With the help of block diagram	3 marks	**8**
		Working of solar power plant	5 marks	
OR	iii.	Write the short note on the following:		**8**
		(a) Basic principle of solar cell	4 marks	
		(b) Series and parallel connection of module	4 marks	
Q.4	i.	Significance of maximum power	3 marks	**3**
	ii.	Concept of Incremental conductance MPPT	5 marks	**7**
		An example	2 marks	
OR	iii.	With the help of block diagram	3 marks	**7**
		Working of DC-DC converter for MPPT	4 marks	
Q.5	i.	Advantages of lead acid batteries	2 marks	**4**
		Limitation of lead acid batteries	2 marks	
	ii.	Necessity of energy storage	2 marks	**6**
		Concept of mechanical energy storage	4 marks	
OR	iii.	Concept of electrochemical energy storage	3 marks	**6**
		Chemical energy storage	3 marks	
Q.6		Attempt any two:		
	i.	Working principle of biomass energy	3 marks	**5**
		Advantages	1 mark	
		Disadvantages	1 mark	
	ii.	Working principle of fuel cell	3 marks	**5**
		Advantages	1 mark	
		Disadvantages	1 mark	
	iii.	Working principle of hydrogen	3 marks	**5**
		Advantages	1 mark	
		Disadvantages	1 mark	

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