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

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2022

ME3EE06 Utilization of Solar Energy

Programme: B.Tech. Branch/Specialisation: ME

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. The sun radiate energy on normal sunny day on earth surface is- **1**

(a) 1320 W/m^2 (b) 100 W/m^2

(c) 1520 W/m^2 (d) 1 W/m^2

ii. Which of the following is not one of the field of application of photoelectric cell? **1**

(a) Street lightning

(b) Reproduction of light in motion picture

(c) Burglar alarms

(d) Counting machines

iii. In terms of cost, solar panel cookers use _____ material. **1**

(a) Low-cost

(b) Specially designed expensive

(c) Low-cost inefficient

(d) Expensive and extremely efficient

iv. What is the most popular use of solar dryer? **1**

(a) Water (b) Food

(c) Chemicals (d) Industrial substances

v. The function of a solar collector is of converting solar energy into **1**

(a) Radiations (b) Electrical energy directions

(c) Thermal energy (d) All of these

vi. In a solar collector, the transparent cover is provided to- **1**

(a) Protect the collector from dust

(b) Reduce the heat losses from collector beneath to atmosphere

(c) Transmit solar radiation only

(d) All of these

P.T.O.

vii. Which of the following determines complexity and size of solar water heating system? **1**

(a) Food (b) Changes in ambient temperature
(c) Chemicals (d) Solar radiation constant

viii. What is freeze protection in a solar water heating system? **1**

(a) Ensures that the system is frozen
(b) Prevents the operation of drainback system
(c) Prevents damage to system due to freezing of transfer fluid
(d) Ensures that the transfer fluid is frozen

ix. The principle of operation of solar cell is- **1**

(a) Thermoelectric (b) Photovoltaic
(c) Piezoelectric (d) Skin

x. Following are the most common solar cell types using silicon semiconductor material (Si), except- **1**

(a) Tetra crystalline Si cell (b) Poly crystalline Si cell
(c) Mono crystalline Si cell (d) Amorphous Si cell

Q.2 i. What is black body radiation? **3**
ii. Explain the various approaches of utilization of solar energy. **7**
OR iii. Explain the factors governing availability of solar energy on earth. **7**

Q.3 Attempt any two:
i. What is solar cooker? Explain with a diagram. **5**
ii. Write the classification of solar dryers & explain one of them. **5**
iii. Explain SK type solar cooker. **5**

Q.4 Attempt any two:
i. What is stationary collector? Explain one of them. **5**
ii. Explain Sun tracking concentrating collectors. **5**
iii. Explain Fresnel collectors. **5**

Q.5 Attempt any two:
i. Explain solar water heating system. **5**
ii. Explain thermal siphon heating system. **5**
iii. Difference between direct & indirect circulation system. **5**

Q.6 Attempt any two:
i. Name the different types of photovoltaic panels. Define semiconductors. **5**
ii. Explain photovoltaic system. **5**
iii. Name the equipment related to photovoltaic technology & explain any one of them. **5**

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Scheme of Marking

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Note: The Paper Setter should provide the answer wise splitting of the marks in the scheme below.

Q.1	i)	d ✓	1
	ii)	b ✓	1
	iii)	a ✓	1
	iv)	b ✓	1
	v)	c ✓	1
	vi)	d ✓	1
	vii)	b ✓	1
	viii)	c ✓	1
	ix)	b ✓	1
	x)	a ✓	1
Q.2	i.	03 marks for definition	3
	ii.	Approach name-2, Explanation-5	7
OR	iii.	Factor name-2, Explanation 5	7
~~OR~~	~~iv~~	-	
Q.3	i.	Explanation-2.5, Diagram-2.5	5
	ii.	classification-2, Explanation-3	5
OR	iii.	Explanation-2.5, Diagram 2.5	5
Q.4	i.	Explanation 2.5, Diagram 2.5	5
	ii.	Explanation-3 Diagram 2	5
OR	iii.	Explanation 2.5, Diagram-2.5	5
Q.5	i.	Atleast classification-2 Explanation 3.	5
	ii.	Explanation-2.5 Diagram-2.5	5
OR	iii.	1 mark for each difference	5
Q.6			
	i.	03 for name, 02 for semiconductor	5
	ii.	Explanation-3.0, Diagram-2	5
	iii.	02 for name, 03 for explanation	5

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