

**STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 86**  
(For candidates admitted from the academic year 2023 – 2024)

**BACHELOR OF VOCATIONAL DEGREE EXAMINATION, APRIL 2024**  
**DEPARTMENT OF SUSTAINABLE ENERGY MANAGEMENT**  
**SECOND SEMESTER**

**COURSE : MAJOR CORE**  
**PAPER : ENERGY CONVERSION TECHNIQUES**  
**SUBJECT CODE: 23VS /VM/ET26** **MAX. MARKS : 100**  
**TIME : 5 HOURS** **(Theory: 50marks +Practical: 50 marks)**

<b>Q. No.</b>	<b>SECTION A (5 x 2 = 10) All Questions To Be Answered</b>	<b>CO</b>	<b>KL</b>
1	State the first law of thermodynamics.	1	1
2	What is the advantage of direct energy conversion?	1	1
3	What is the difference between renewable and non-renewable energy sources?	1	1
4	What is photocatalytic reaction?	1	1
5	How can chemical energy be converted into electrical energy?	1	1
<b>Q. No.</b>	<b>SECTION B (4 x 3=12) Answer FOUR</b>	<b>CO</b>	<b>KL</b>
6	(a) How does a dam harness the energy from the gravitational pull on stored water to generate electricity? (or) (b) What is the working principle of Nernst effect generator?	2 2	2 2
7	(a) What are some examples of thermal energy being converted into heat energy? (or) (b) How is electricity generated using hydrogen?	2 2	2 2
8	(a) What is the significance of the Seebeck effect in energy conversion? (or) (b) What are the various applications of ultra-capacitors?	3 3	3 3
9	(a) What are the disadvantages of energy conversion? (or) (b) What is electrochemical energy storage?	3 3	3 3
<b>Q. No.</b>	<b>SECTION C (2 x 4 = 8) Answer TWO</b>	<b>CO</b>	<b>KL</b>
10	(a) Describe how a thermomagnetic generator operates. (or) (b) Compare and contrast pseudo capacitor and super capacitor.	4 4	4 4
11	(a) Explain the operation of a bio reactor. (or) (b) Outline how solar pumps operate and mention few of its advantages.	4 4	4 4

Q. No.	SECTION D (4 x5 =20)	CO	KL
12	<p><b>Answer any TWO</b></p> <p>(a) What is Peltier effect? Elaborate few of its applications.</p> <p>(b) Discuss the mechanical ways of energy storage.</p> <p>(c) Describe how dye-sensitized solar cells work and discuss their significance compared to silicon solar cells.</p> <p>(d) Explain the principle and working of a solar water heater.</p>	5 5 5 5	5 5 5 5
13	<p><b>Answer any TWO</b></p> <p>(a) Classify the types of energy conversion and give examples.</p> <p>(b) Discuss the various applications of a thermionic converter.</p> <p>(c) Explain the process involved in photocatalytic water splitting.</p> <p>(d) Explain the working principle of ferroelectric converter.</p>	5 5 5 5	6 6 6 6

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