Department of Electrical and Electronics Engineering
Mar Athanasius College of Engineering, Kothamangalam

First Sessional Examination - August 2026

B24EE3P12- RENEWABLE ENERGY SYSTEMS AND APPLICATIONS

S5 EA & EB

Time: 1.5 Hrs. Max Marks: 40

Answer all questions from Part A and Part B

Part A [4*3 =12 marks]

1. What are the objectives and significance of the United Nations Framework Convention on Climate Change (UNFCCC) in addressing environmental challenges? **(CO1)**
2. Explain the terms a) Zenith angle b) Declination angle c) Tilt angle **(CO1)**
3. Define Photovoltaic effect with necessary equation. **(CO2)**
4. What are the advantages and disadvantages of solar PV system? **(CO2)**

Part B [2*14 = 28 marks]

5.a) With a neat diagram, explain the construction and working of a flat plate type solar thermal collector system. Mark all the parts in the diagram and give the common materials used for the different parts. [7 Marks] **(CO1)**

b) Illustrate how a central tower collector type solar thermal collector system can be used for electrical generation. [7 Marks] **(CO1)**

6.(a) Explain the classification of solar cell based on junction structure and type of active material used with necessary examples. [10 Marks] **(CO2)**

(b) Describe photovoltaic conversion and photo conduction process. [4 Marks] **(CO2)**

CO 1: Student will be able to explain the environmental aspects of energy systems, global climate frameworks, classify energy resources and analyze solar radiation principles along with the working characteristics of solar thermal systems.

CO 2: Student will be able to Analyze the characteristics and performance of solar photovoltaic systems and apply design principles for stand-alone and grid-connected PV applications.