

SUBJECT: SOLAR INSTALLATION AND MAINTENANCE (SIAM)**CLASS XII
SEMESTER – III****THEORY****FULL MARKS – 20****(MCQ Type Question)**

UNIT	Topic	No of periods assigned	Marks
1	Fundamental of non-conventional energy	14	7
2	Solar Geometry	10	4
3	Solar Collector	15	7
4	Solar Cooker	6	2

DETAIL SYLLABUS

UNIT	Topic / Sub Topic	No of periods assigned
Unit 1: Fundamental of non- conventional energy	Recognize different sources of conventional & Non-conventional energy.	14
	Differentiate between conventional & non-conventional energy with their limitations.	
	Advantages & disadvantages of Non- conventional energy.	
	Reasons for popularity of Non- conventional energy.	
	Site selection criteria and Potentials sites for development of Non-conventional energy in India.	
	Know about various applications of solar energy.	
	Identify the various scopes of employment and entrepreneurship in solar energy sector.	
Unit 2: Solar Geometry	Concept of solar geometry with different angles: solar time, angle of latitude, declination angle, hour angle, inclination angle, zenith angle, solar azimuth angle, tilt angle, surface azimuth angle, angle of incidence,	10
	State nature of sun movement in a day, in a year.	
	Summer solstice and winter solstice.	
	Direct, diffuse and global solar radiation.	
Unit 3: Solar Collector	Classify the types of solar collectors available in the market	15
	Concentrating type solar collectors: Type, working principle and their applications. Focusing type collector: working and application.	
	Cylindrical parabolic type solar collector: principle of operation with applications.	
	Solar hot water system: working principle; evacuated tube collectors (ETC): working principle; thermo Siphon process.	
	Solar hot water system: working principle using copper flat plate collectors	
Unit 4: Solar Cooker	Solar cooker: working principle, limitation	6
	Categorize the designs of solar cooker available in the market.	
	Total	45

SUBJECT: SOLAR INSTALLATION AND MAINTENANCE**CLASS XII
SEMESTER – IV****THEORY****FULL MARKS – 30****(LAQ and SAQ Type Question)**

UNIT	Topic	No of periods assigned	Marks
1	Solar Thermal	16	8
2	Solar PV	16	8
3	Storage	12	5
4	Solar Lighting system	19	9

DETAIL SYLLABUS

UNIT	Topic / Sub Topic	No of periods assigned
Unit 1: Solar Thermal	Solar air heater system: components and working principle.	16
	Heat storage-Sensible heat & Latent heat	
	Solar green house: working principle and applications	
	Solar distillation (Desalination of water): working principle.	
Unit 2: Solar PV	Solar PV cell: construction and working principle	16
	Differentiate solar PV module, PV panel and PV array.	
Unit 3: Storage	Storage battery: different components and working of lead acid, lithium ion battery	12
	Explain the working of a storage battery.	
	Construction & working of Hydrometer.	
Unit 4: Solar Lighting system	Solar photovoltaic lighting system: working, main parts	19
	Charge controller: components and operation.	
	Components of inverter and understand its operation.	
	Nature of faults in solar lighting system and find out their remedies.	
	Total	63

Practical/ Project: 144 Periods [Practical – 40, Project – 10]

1. Measure daily solar radiation (direct and diffuse) on horizontal surface with the help of Pyranometer. Calculate solar radiation on any plane using the measured data.
2. Collect information on solar cooker manufacturers in India
3. How to introduce solar cookers for house hold & community applications.
4. Identify the components required for maintenance of solar cooker.
5. Identify the components required for maintenance of flat plate collectors.
6. Follow the steps for installation of solar hot water system and execute it – using copper flat plate collectors. Measure its parameters after commissioning.
7. Make arrangements to install solar air heater in multistoried buildings.
8. Understand the working principle Solar pond and its application.
9. Assemble solar PV array from PV module.
10. Execute the operations for installation of Solar PV module along street.
11. List the types of fault occur in a SPV array and their remedy.
12. Install solar PV array with other accessories for solar power generation.
13. Make connection of battery in series & parallel.
14. Identify the probable faults in a battery and their remedies.
15. Execute the operations for installation of solar street lighting system.
16. Draw wiring plan & location of loads & charge controllers & solar PV modules to avoid loss.
17. Perform the necessary tests before and after commissioning the solar lighting system.