

Code No: R1631022

R16

SET - 1

III B. Tech I Semester Regular Examinations, October/November - 2018 RENEWABLE ENERGY SOURCES

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

		Note: 1. Question Paper consists of two parts (Part-A and Part-B) 2. Answer ALL the question in Part-A 3. Answer any FOUR Questions from Part-B					
<u>PART –A</u>							
1.	a)b)c)d)	Distinguish between the term irradiance and irradiation. What do you understand by Solar thermal Energy? Distinguish between a Solar cell, Module, Panel and Array. Explain the variation of Wind speed with consideration of height from the ground.	[2M] [2M] [2M] [3M]				
	e) f)	Give the classification of small hydro Power stations. What are the various losses occurring in the fuel cell?	[3M] [2M]				
	PART -B						
2.	a)	Explain the following terms used in Solar radiation analysis:	[7M]				
	b)	i)Hour angle ii) Solar azimuth angle iii) Declination angle Explain the terms extraterrestrial radiation and terrestrial radiation w.r.t solar radiation.	[7M]				
3.	a)	Explain in detail about the Flat plate Collectors and give its advantages and	[7M]				
	b)	Disadvantages. Draw the schematic diagram for Solar pond based electric plant along with its working.	[7M]				
4.	a)	Derive an expression for efficiency and power produce by PV cell. Explain the various factors that affect the performance of cell.	[7M]				
	b)	Explain the significance of Perturb and Observe MPPT method and how it can realized.	[7M]				
5.	a)	Find the tip – speed ratio if a 6 m diameter rotor has rotation of 20 rpm and the wind speed is 4 m/s. What is the implication of tip speed ratio?	[7M]				
	b)	Discuss the aerodynamic considerations in wind mill design in detail.	[7M]				
6.	a)	Explain the basic components of Tidal Power Plants and give their	[7M]				
	b)	significance. List the advantages and limitations of Small scale Hydroelectric Units.	[7M]				
7.	a)	Explain the current - voltage characteristics of Fuel Cell and give its	[7M]				
	b)	Significance. What are the advantages and disadvantages of geothermal energy?	[7M]				



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SET - 2

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Note: 1. Question Paper consists of two parts (Part-A and Part-B)

2. Answer **ALL** the question in **Part-A** 3. Answer any **FOUR** Questions from **Part-B** PART -A Distinguish between Conventional resources and Non-conventional sources. 1. a) [2M] What are Solar thermal Energy applications? b) [2M] What is the depletion layer in p - n junction? c) [2M] List the factors responsible for distribution of wind energy on the surface of the d) [3M] earth? e) Explain the basic principle of Tidal Power. [3M] List the various Biomass Resources. f) [2M] PART-B Explain in detail about the Beam radiation and diffuse radiation. 2. [7M] a) Determine the Local Apparent Time corresponding to 1500 h (IST) b) [7M] Mumbai (19⁰07', 75⁰ 51 E) on 1 July. In India, IST is based on 82.50⁰ E. On 1 July, equation of time correction is equal to -4. Compare between the concentrating collector over Flat collector. 3. [7M] a) b) Explain the working of Solar Water heater with component based diagram. [7M] Explain the effect of radiation intensity and temperature on the short circuit 4. [7M] a) current, open circuit voltage and power generated by PV cell. Explain with a neat algorithm of Hill climbing MPPT Technique and give its b) [7M] merits. Explain Betz model of expanding air stream tube to determine extraction of 5. a) [7M] wind energy by windmill. Explain the working of Wind Energy Conversion System (WECS) with main b) [7M] components. Explain the basic components of Small hydroelectric scheme with a layout 6. a) [7M] arrangement. Derive an expression for Power generated by a Tidal System. b) [7M] 7. Explain the principle of working of a $H_2 - O_2$ fuel cell. [7M] a) b) Explain about dry, wet and Hot water geo thermal systems? [7M]

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SET - 3

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		Note: 1. Question Paper consists of two parts (Part-A and Part-B) 2. Answer ALL the question in Part-A 3. Answer any FOUR Questions from Part-B					
<u>PART -A</u>							
1.	a) b) c) d) e) f)	List the different forms of Renewable Energy sources. Enumerate the different types of Concentrating Solar collectors. Draw and explain briefly about equivalent circuit of a Solar cell. What are the relative features of drag and lift type machines in Windmills. List the difficulties in tidal power developments. Explain the various characteristics of Fuel cell.	[2M] [2M] [2M] [3M] [3M] [2M]				
	PART -B						
2.	a)	What do you understand by Solar radiation data? What is the need of Solar radiation data?	[7M]				
	b)	Calculate the number of day light hours in Srinagar for 1 January and 1 July. Take latitude of Srinagar as 34 ⁰ 05' N.	[7M]				
3.	a)	Explain the significance of following factors in Flat Plate collectors: i)Fin efficacy factor ii)Collector heat removal factor.	[7M]				
	b)	Explain the working of a Solar furnace with the help of a neat sketch.	[7M]				
4.	a)	Explain the various factors contributing to losses in Solar cell. How is the efficiency reduced due to these factors.	[7M]				
	b)	Explain the PV system configuration and signify the importance of the converter circuit and MPPT block in it.	[7M]				
5.	a)	Derive an expression for the total power of a wind stream taking in to all considerations m/sec, air density as.	[7M]				
	b)	Find the maximum power output of a turbine if wind speed is 10 m/sec, air density as 1.4 Kg/m ³ and rotor diameter as 64 m.	[7M]				
6.	a) b)	List the advantages and limitations of Tidal power generation. Explain how the electric power is generated from hydro Power with necessary equations.	[7M] [7M]				
7.	a) b)	Explain the process of Single stage gasifier in detail. Compare between Geothermal Power plant and Conventional thermal Power plant.	[7M] [7M]				

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		Note: 1. Question Paper consists of two parts (Part-A and Part-B) 2. Answer ALL the question in Part-A 3. Answer any FOUR Questions from Part-B					
	PART -A						
1.	a)b)c)d)e)f)	List the various applications of PV system? Explain the working of a solar thermal pump. What do you understand by Valence band, Conduction band and Forbidden band w.r.t. a semiconductor. How can windmills be classified? List the advantages of Small hydro power. Explain the process of Photosynthesis.	[2M] [2M] [2M] [3M] [3M] [2M]				
		PART -B					
2.	a)	Define Solar constant. What are the reasons for variation in solar radiation reaching the earth and that received outside the earth atmosphere?	[7M]				
	b)	Calculate the i) Zenith angle and ii) Solar azimuth angle for a place with latitude 43° at 9.30 AM solar time on Feb 13.	[7M]				
3.	a)	Explain the different factors that affect the performance of a Flat plate collector.	[7M]				
	b)	A cylindrical parabolic concentrator is 9 m long and 2 m wide. The diameter of absorber tube is 10 cm. Find the concentration ratio.	[7M]				
4.	a)	Explain the current – voltage characteristics of a Solar cell and define Fill factor and give its significance.	[7M]				
	b)	Explain the significance of Maximum Power Point Tracking and explain any one technique in detail.	[7M]				
5.	a)	List the main considerations for selecting a site for wind generator.	[7M]				
	b)	Explain the variation of output of a wind turbine with tip speed ratio of the rotor.	[7M]				
6.	a)	Explain the different types of turbines that are used in Small scale hydroelectric	[7M]				
	b)	power generation. What are the site requirements to construct a Tidal Power Plant?	[7M]				
7.	a) b)	List the advantages, disadvantages and environmental impacts of Biomass. What is meant by geothermal energy? Why it is called renewable energy? What are the deciding factors to use in power generation?	[7M] [7M]				
