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**

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PART –A

1.	a)	Distinguish between the term irradiance and irradiation.	[2M]
	b)	What do you understand by Solar thermal Energy?	[2M]
	c)	Distinguish between a Solar cell, Module, Panel and Array.	[2M]
	d)	Explain the variation of Wind speed with consideration of height from the ground.	[3M]
	e)	Give the classification of small hydro Power stations.	[3M]
	f)	What are the various losses occurring in the fuel cell?	[2M]

PART -B

2.	a)	Explain the following terms used in Solar radiation analysis: i)Hour angle ii) Solar azimuth angle iii) Declination angle	[7M]
	b)	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 Disadvantages.	[7M]
	b)	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 significance.	[7M]
	b)	List the advantages and limitations of Small scale Hydroelectric Units.	[7M]
7.	a)	Explain the current – voltage characteristics of Fuel Cell and give its Significance.	[7M]
	b)	What are the advantages and disadvantages of geothermal energy?	[7M]

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Code No: R1631022 **R16** SET - 2

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**

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PART –A

1.	a)	Distinguish between Conventional resources and Non-conventional sources.	[2M]
	b)	What are Solar thermal Energy applications?	[2M]
	c)	What is the depletion layer in p – n junction?	[2M]
	d)	List the factors responsible for distribution of wind energy on the surface of the earth?	[3M]
	e)	Explain the basic principle of Tidal Power.	[3M]
	f)	List the various Biomass Resources.	[2M]

PART -B

2.	a)	Explain in detail about the Beam radiation and diffuse radiation.	[7M]
	b)	Determine the Local Apparent Time corresponding to 1500 h (IST) Mumbai ($19^0 07'$, 75^0 51 E) on 1 July. In India, IST is based on 82.50^0 E. On 1 July, equation of time correction is equal to – 4.	[7M]
3.	a)	Compare between the concentrating collector over Flat collector.	[7M]
	b)	Explain the working of Solar Water heater with component based diagram.	[7M]
4.	a)	Explain the effect of radiation intensity and temperature on the short circuit current , open circuit voltage and power generated by PV cell.	[7M]
	b)	Explain with a neat algorithm of Hill climbing MPPT Technique and give its merits.	[7M]
5.	a)	Explain Betz model of expanding air stream tube to determine extraction of wind energy by windmill.	[7M]
	b)	Explain the working of Wind Energy Conversion System (WECS) with main components.	[7M]
6.	a)	Explain the basic components of Small hydroelectric scheme with a layout arrangement.	[7M]
	b)	Derive an expression for Power generated by a Tidal System.	[7M]
7.	a)	Explain the principle of working of a $H_2 – O_2$ fuel cell.	[7M]
	b)	Explain about dry, wet and Hot water geo thermal systems?	[7M]

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Code No: R1631022 **R16** SET - 3

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**

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PART –A

1.	a)	List the different forms of Renewable Energy sources.	[2M]
	b)	Enumerate the different types of Concentrating Solar collectors.	[2M]
	c)	Draw and explain briefly about equivalent circuit of a Solar cell.	[2M]
	d)	What are the relative features of drag and lift type machines in Windmills.	[3M]
	e)	List the difficulties in tidal power developments.	[3M]
	f)	Explain the various characteristics of Fuel cell.	[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)	List the advantages and limitations of Tidal power generation.	[7M]
	b)	Explain how the electric power is generated from hydro Power with necessary equations.	[7M]
7.	a)	Explain the process of Single stage gasifier in detail.	[7M]
	b)	Compare between Geothermal Power plant and Conventional thermal Power plant.	[7M]

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Code No: R1631022 **R16** SET - 4

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**

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PART –A

1. a) List the various applications of PV system? [2M]
b) Explain the working of a solar thermal pump. [2M]
c) What do you understand by Valence band, Conduction band and Forbidden band w.r.t. a semiconductor. [2M]
d) How can windmills be classified? [3M]
e) List the advantages of Small hydro power. [3M]
f) Explain the process of Photosynthesis. [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 43^0 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 power generation. [7M]
b) What are the site requirements to construct a Tidal Power Plant? [7M]

7. a) List the advantages, disadvantages and environmental impacts of Biomass. [7M]
b) What is meant by geothermal energy? Why it is called renewable energy? What are the deciding factors to use in power generation? [7M]

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