Reg. No.

B.E. / B.TECH. DEGREE EXAMINATIONS, DEC 2019

Seventh Semester

EE16009 – POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS

(Electrical and Electronics Engineering)

(Regulation 2016)

Time: Three Hours   **Maximum : 100 Marks**

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

		CO	RBT
1.	Write the advantages of renewable energy sources.	1	U
2.	What are fuel cells?	1	U
3.	What are the types of generators used in wind power plant?	2	AP
4.	Write the differences between SCIG and DFIG.	2	U
5.	What is matrix converter?	3	R
6.	What is need of DC-DC converter in solar power system?	3	AP
7.	What is meant by pitch control in wind energy systems?	4	AN
8.	Draw the I-V characteristics of solar cell.	4	AN
9.	Name the various types of hybrid energy systems.	4	AP
10.	Draw the schematic diagram of grid interactive solar PV system.	4	AN

PART B - (5 X16 = 80 Marks)

					CO	RBT
11.	(a)	(i)	Discuss the influence of different renewable energy sources with special reference to the global warming and climate change context.	(8)	1	U
		(ii)	What are the types of ocean thermal energy conversion power plants? Describe in detail the Anderson OTEC cycle.	(8)	1	U

(OR)

	(b)	(i)	Describe the principle of generation of Bio gas and mention the factors affecting its generation.	(8)	1	AP
		(ii)	What is Hydrogen energy? Explain the operation of Hydrogen energy system with neat sketch.	(8)	1	AP

12.	(a)	(i)	Explain the principle of operation the squirrel cage induction generator with neat diagrams.	(12)	2	U
		(ii)	Draw the slip-torque characteristics of induction generator.	(4)	2	AN
			(OR)			
	(b)	(i)	Explain the working principle of permanent magnet synchronous generator with neat diagrams.	(12)	2	AP
		(ii)	State the difference between synchronous generator and PMSG.	(4)	2	U

13.	(a)	(i)	Explain the operation of line commutated converter under inversion mode with the help of a neat circuit diagram and necessary waveforms.	(10)	3	AP
		(ii)	Describe the battery sizing and array sizing in details.	(6)	3	U
			(OR)			
	(b)	(i)	Explain the working principle of buck-boost converter with circuit and waveform diagrams. Also derive the design value of capacitor and inductor.	(12)	3	U
		(ii)	Briefly explain the operation of matrix converter.	(4)	3	U

14.	(a)	(i)	Explain with the help of a neat block diagram the functions of various blocks of a WECS.	(8)	4	U
		(ii)	Describe stand alone operation of solar energy conversion system.	(8)	4	U
			(OR)			
	(b)	(i)	Explain the stand alone operation of fixed speed wind energy conversion system.	(8)	4	AP
		(ii)	Explain about various grid connection issues and its impact on system stability.	(8)	4	AP

15.	(a)	(i)	What is MPPT? Discuss the types of MPPT with its merits and demerits.	(8)	4	AP
		(ii)	With a neat sketch, explain the operation of Wind- PV hybrid system.	(8)	4	AP
			(OR)			
	(b)	(i)	With a neat sketch, explain the operation of Wind-Diesel hybrid system.	(8)	4	AP
		(ii)	Explain MPPT control techniques for WECS.	(8)	4	AP