Q. Code:205101

Reg. No. | | | | | | | | | | | | | |

B. E / B. TECH.DEGREE EXAMINATIONS, MAY 2024

Seventh Semester

ME18029 – RENEWABLE ENERGY RESOURCES

(Common to Mechanical and Marine Engineering)

(Regulation 2018/2018A)

TIME:3 HOURS **MAX. MARKS: 100**

COURSE OUTCOME	STATEMENT	RBT LEVEL
CO 1	The students will have the ability to identify techniques used in direct and indirect usage of solar energy.	**3**
CO 2	Students will be able to present effective methods to harvest and convert wind energy into useful forms	**3**
CO 3	Students will be able to recommend a suitable method for deriving energy from various bio masses	**3**
CO 4	Students will have the ability to explain conversion techniques for effective utilization of hydro and geo-based renewable sources	**3**
CO 5	Students will be able to summarize the techniques involved in utilization of energy from new resources like hydrogen.	**3**

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	What are the functions of Pyranometer?	**1**	**1**
2.	Express the advantages of solar concentrators.	**1**	**1**
3.	Classify WEC Systems.	**2**	**2**
4.	Define Tip speed ratio.	**2**	**2**
5.	Compare the energy from bio mass and bio gas.	**3**	**2**
6.	Give some of the organic materials used in biomass plant.	**3**	**2**
7.	What is Geothermal energy and how is it harnessed?	**4**	**2**
8.	Classify the types of Tidal power plant.	**4**	**1**
9.	How the fuel cells are classified based on temperature of operation?	**5**	**1**
10.	Discuss the applications of fuel cells in aerospace applications.	**5**	**2**

PART- B (5x 14=70Marks)

			Marks	CO	RBT LEVEL
11. (a)	**(i)**	What are the reasons for variation in solar radiation reaching the earth and that received outside the earth atmosphere?	**(7)**	**1**	**2**
	(ii)	Illustrate the different methods of sun tracking applied for concentrated collectors.	**(7)**	**1**	**2**

(OR)

(b)	**(i)**	Discuss the main components of a flat-plate collector and explain its functions.	**(7)**	**1**	**2**
	(ii)	Write the advantages and disadvantages of flat plate collector.	**(7)**	**1**	**2**
12. (a)	**(i)**	Discuss in detail the speed control of wind turbine.	**(7)**	**2**	**3**
	(ii)	Illustrate the function of each components of horizontal shaft wind mill.	**(7)**		
		(OR)			
(b)		Derive the expression for power developed due to wind.	**(14)**	**2**	**3**
13. (a)	**(i)**	Elaborate the factors affecting Bio digestion.	**(7)**	**3**	**2**
	(ii)	Distinguish the updraft, downdraft, and cross draft Gasifiers.	**(7)**	**3**	**2**
		(OR)			
(b)	**(i)**	Differentiate between the following methods of biogas generation Pyrolysis and Combustion.	**(7)**	**3**	**2**
	(ii)	Distinguish woody and non woody biomass Discuss about the bio mass conversion technologies.	**(7)**	**3**	**2**
14. (a)	**(i)**	Discuss about the formation of Tide and generation of Tidal power.	**(7)**	**4**	**3**
	(ii)	Discuss about the open cycle OTEC system and Closed OTEC cycle.	**(7)**	**4**	**3**
		(OR)			
(b)	**(i)**	Discuss in detail about the small and micro hydro power stations.	**(10)**	**4**	**3**
	(ii)	Justify why small hydro power stations are classified as renewable.	**(4)**	**4**	**3**
15. (a)		Discuss about the functioning of any 4 types of Fuel Cell.	**(14)**	**5**	**3**
		(OR)			
(b)	**(i)**	Discuss about the hydrogen Production from electrolysis.	**(7)**	**5**	**3**
	(ii)	Discuss about the hydrogen Production from Fossil Fuels and Biomass.	**(7)**	**5**	**3**

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Show that a wind turbine cannot extract more than 59.3% of wind energy.	**(10)**	**2**	**4**