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GIET UNIVERSITY, GUNUPUR – 765022
 B. Tech (Fifth Semester) Examinations, December – 2022
BPEEL5050 – Renewable Energy Sources
 (EE & EEE)

Time: 3 hrs

Maximum: 70 Marks

Answer ALL Questions**The figures in the right hand margin indicate marks.****PART – A: (Multiple Choice Questions)****(1 x 10 = 10 Marks)****Q.1. Answer ALL questions**

						[CO#]	[PO#]
a.	MPPT means:					1	1
	(i) Maximum Power Point Tracking	(ii) Maximum Power Position Tracking					
	(iii) Maximum Power Point Transfer	(iv) Maximum Power Point Technology					
b.	On September 21, 2022, the declination angle was:					1	1
	(i) 0 degrees	(ii) +23.45 degrees					
	(iii) -23.45 degrees	(iv) +180 degrees					
c.	If no load is connected to solar PV system:					1	1
	(i) it will stop absorbing light	(ii) it will start reflecting the light					
	(iii) its voltage will go on increasing till its breakdown	(iv) it will dissipate energy in the panel and increase its temperature					
d.	Storage of biomass energy is :					2	1
	(i) Very difficult	(ii) Inbuilt feature					
	(iii) Expensive	(iv) Impossible					
e.	Presence of which of the following in the biogas causes corrosive effect :					2	1
	(i) Hydrogen sulphide	(ii) Methane					
	(iii) Nitrogen	(iv) Carbon-di-oxide					
f.	Bio-diesel is :					2	2
	(i) Obtained from fermentation of sugars	(ii) Obtained from pyrolysis process					
	(iii) Exudates of plants	(iv) An upgraded vegetable oil					
g.	The process in which waste material is reduced to ashes is called :					2	2
	(i) Biodegradation	(ii) Composting					
	(iii) Recycling	(iv) Incineration					
h.	A wind turbine extracts maximum power from wind, when the downstream wind speed reduces to:					3	2
	(i) ½ of upstream	(ii) 1/3 of upstream					
	(iii) Double of upstream	(iv) Zero					
i.	Between 30 degrees N(/S) and 70 degrees N(/S), predominantly western wind circulation transferring the cold air southward and hot air northward, such pattern of circulation of wind is known as					3	1
	(i) Hemispheric circulation	(ii) Rossby circulation					
	(iii) Hadley circulation	(iv) Tropical Winds					
j.	The range of wind speed suitable for wind power generator is					3	2
	(i) 0-5 m/s	(ii) 5-25 m/s					
	(iii) 20-50 m/s	(iv) 50-75 m/s					

PART – B: (Short Answer Questions)**(2 x 10 = 20 Marks)**Q.2. Answer ALL questions

	[CO#]	[PO#]
a. Define primary force and Coriolis force	3	1
b. Explain the pitch control mechanism in a wind turbine	3	1
c. Name three plants widely used for energy farming.	2	2
d. Define solidity and tip speed ratio related to wind energy.	3	2
e. Explain the process of photosynthesis?	2	2
f. Differentiate between gasification and pyrolysis	2	2
g. What do you mean by declination angle?	1	1
h. Define semiconductors. What do you mean by intrinsic and extrinsic semiconductors?	1	1
i. Differentiate between open and closed cycle MHD.	4	2
j. Write the equation of current for dark and illuminated solar cell.	1	2

PART – C: (Long Answer Questions)**(10 x 4 = 40 Marks)**Answer ALL questions

	Marks	[CO#]	[PO#]
3. a. What are the ten operational parameters of biogas plant? Briefly explain them.	5	2	1
b. Explain with block diagram the working methodology of MSW incineration.	5	2	2
(OR)			
c. Explain with proper diagram the functioning of fixed dome type biogas plant.	5	2	2
d. Explain with proper diagram the functioning of downdraft gasifier.	5	2	2
4. a. The HAWT wind turbine has found to have 20 m/s wind speed at 1 atm pressure and 27°C having rotor diameter of 80m and speed of rotor is 40 rpm. Calculate (i) the torque produced at the shaft for maximum output of the turbine. (ii) Tip Speed ratio (iii) Power in the wind (iv) Density of air (v) Maximum conceivable torque	10	3	2
(OR)			
c. Explain with neat sketch the working procedure of Central tower receiver power plant	5	1	2
d. Explain with neat sketch the working procedure of distributed collector solar thermal electric power plant	5	1	2
5. a. A two bladed HAWT has a height of tower is 80m. The speed of wind at a height of 10m is 8m/s, air density of 1.226 kg/m ³ , α is 0.13, rotor diameter is 60m. The downstream wind velocity is half of upstream wind. Find (i) Total power available (ii) Power extracted by the turbine (iii) Axial thrust on the turbine (iv) Maximum axial thrust on the turbine	10	3	1
(OR)			
b. Explain the different regions of wind speed with diagram.	5	3	1
c. Mention the advantages of VAWT.	5	3	1
6. a. Explain the working of Claude cycle OTES with neat diagram	5	4	2
b. Mention the impact of OTES on environment	5	4	2
(OR)			
c. What do you mean by Seeding in MHD? Name two seeds.	5	4	1
d. Explain with a block diagram the function of open cycle MHD.	5	4	1

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