UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Programme Name: B. Tech Open Elective **Semester** : V
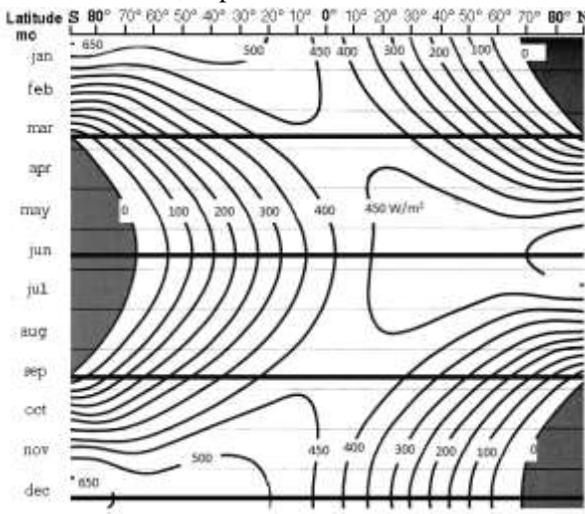**Course Name** : Renewable Energy Technology **Time** : 03 hrs
Course Code : EPEC 3201 **Max. Marks : 100**
Nos. of page(s) : 2
Instructions: All questions are mandatory. Assume parameters wherever required and mention the same.

	SECTION A		
S. No.		**Marks**	**CO**
Q 1	From the figure shown, calculate the difference between the solar radiation intensity received at latitudes $15°N$ and $30°S$ on June. Also, explain what accounts for this difference.	4	CO1
Q 2	Estimate AEP for a horizontal axis wind turbine with a dia of 12 m operating in a wind regime with average wind speed of 8 m/s. Assume ρ as 1.225 kg/m3 and turbine efficiency as 0.4.	4	CO2
Q 3	Explain the difference between pyrolysis and gasification.	4	CO3
Q 4	Explain the principle of operation of Fuel cell with neat diagram.	4	CO4
Q 5	Discuss the limitations of oscillating water column.	4	CO4
	SECTION B		

Q 6	The solar panel specification is shown below:
	  i. Rated maximum power – 40W
	  ii. Open Circuit voltage – 21.9V
	  iii. Short Circuit current – 2.45A
	  iv. Rated Voltage – 17.4V
		10	CO1

	v. Rated current – 2.3A Determine the number of panels required to satisfy a DC load of 1500W operating at 24V. **(OR)** Explain in detail about the Solar PV grid-tied system with neat diagram.		
Q 7	Compare Horizontal Axis Wind Turbine and Vertical Axis Wind Turbine	**10**	**CO2**
Q 8	Does the gasification efficiency depend on moisture in biomass? Explain the mechanistic aspects of the relationship.	**10**	**CO3**
Q 9	Explain in detail about the working principle of SOFC with neat diagram.	**10**	**CO4**
SECTION-C			
Q 10	Explain in detail about Two-way generation scheme for tidal energy generation, and draw all characteristic curves for each scheme.	**20**	**CO4**
Q 11	a. Explain the effect of shading on output power of Solar PV. b. Explain various techniques used to solve the problem of partial shading **(OR)** a. Classify solar thermal system and explain any two in detail with neat diagram. b. Explain the concept of beam radiation, diffuse radiation, and air mass. Calculate the value of air mass when $\theta_z = 60°$	**10+10**	**CO1**