

## Course Name: Non Conventional Energy Resources (BEET 703(B))

### Course Outcomes:

#### At the end of the course the student should be able to:

**CO1** Have a basic knowledge of the principles of Fuel Cells and its components, types of Fuel Cells, performance characteristics, and applications of Fuel Cells.

**CO2** Have a basic knowledge of Hydrogen Energy, Properties of Hydrogen, Production methods and purification, Storage methods, Environmental benefits and its Applications in the Hydrogen Economy.

**CO3** Have a basic knowledge of Ocean energy resources and technologies including Tidal energy, Wave power devices, OTEC, Bio Photolysis, Ocean currents and Salinity gradient devices

**CO4** Have a basic knowledge of the principles of Magneto Hydro Dynamic power generation system, and its applications & technologies.

Q No.	Questions	Marks	C O	B L
1(a)	Discuss the principle of MHD generation.	6	CO4	L1
1(b)	Explain the closed cycle MHD system with suitable diagram. Also explain advantage of MHD generation.	6	CO4	L2
1(c)	Derive equations for the voltage and power output of MHD generator.  An MHD generator has following parameters Plate area = $0.2\text{m}^2$ Distance between plates = $0.4\text{m}$ Flux density = $2\text{wb/m}^2$ Average gas velocity = $800\text{m/s}$ Gaseous conductivity = $\text{mho/m}$ Calculate the open circuit voltage and max. Power output.	8	CO4	L6
2(a)	What is the status of non-conventional energy sources in India and what is their future prospectus?	10	CO2	L1
2(b)	Explain the Hydrogen production methods and Hydrogen storage methods with suitable diagram.	10	CO2	L2
3(a)	What is a fuel cell? Describe the principle of working a $\text{H}_2\text{O}_2$ cell. Give also limitations.	8	CO1	L2
3(b)	Explain the properties of Hydrogen and source of Hydrogen.	6	CO2	L2
3(c)	Explain the difference between the batteries and Fuel cell.	6	CO1	L2
4(a)	Explain the geometries solid oxide fuel and their cell problem.	10	CO1	L2
4(b)	Discuss the overview on research activities on fuel cell in world.	10	CO1	L1
5(a)	Explain briefly with a neat sketch the construction and working of a closed cycle OTEC system its advantage and disadvantage also.	8	CO3	L2
5(b)	Explain the utilization of tidal energy needs a tidal barrage. Also explain the single	6	CO3	L2

	basin and two basin schemes.			
5(c)	Write short notes in the following: 1) Bio Photolysis, 2) wave energy, 3) Origin of tides.	6	CO3	L3
6(a)	Explain the fuel cell power plant with suitable diagram.	10	CO1	L2
6(b)	Explain the working the principle of the fuel cell.	10	CO3	L2
7(a)	Explain the basic theory of wave energy power plant.	10	CO3	L2
7(b)	Distinguish between wave and tidal energy.	4	CO3	L5
7(c)	Explain the advantage and disadvantage of fuel cell power plant.	6	CO1	L2
8(a)	Explain the open OTEC with suitable diagram.	10	CO3	L2
8(b)	Explain the Hydrogen production unit in India and also explain the management of Hydrogen in India.	10	CO3	L2