

GANPAT UNIVERSITY
B. TECH SEM – V (ELECTRICAL ENGINEERING)
REGULAR EXAMINATION– NOV-DEC 2015
2EE506: NON CONVENTIONAL ENERGY SOURCES

TIME: 3 HRS

TOTAL MARKS: 70

- Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION: I

- Q.1 [A]** With the help of a diagram, discuss the power versus wind speed characteristics of a wind turbine. [6]

- [B]** Derive an expression for energy available in the wind. [6]

OR

- Q.1 [A]** Sketch the diagram of a HAWT(Horizontal Axis Wind Turbine) & also explain the function of its main components. [6]

- [B]** Describe the components of Wind Energy Conversion System with the help of block diagram [6]

- Q.2 [A]** Describe the basic principle of operation of an MHD generator & also derive the expressions for maximum power generation per unit volume of a generator. [5]

- [B]** Calculate the open circuit voltage and maximum power output for an MHD generator having following data: [6]

Plate area= 0.25m^2

Distance between the electrodes= 0.50m

Flux density= 2 wb/m^2

Average gas velocity= 1000m/s

Gaseous conductivity= 10 mho/m

OR

- Q.2 [A]** With the help of a schematic diagram, explain the operation of open cycle MHD generating system. [6]

- [B]** Which are the two types of closed loop type MHD systems? Explain any one in detail with neat diagram. [5]

- Q.3 Attempt any Two.** [12]

- [A]** Explain the concept of Tidal phenomenon, describing the Tide & Ebb cycle and Spring & Neap tides.

- [B]** Describe the closed cycle OTEC system with block diagram.

- [C]** What are the essential components of a Tidal Power Station? Discuss the advantages and disadvantages of Tidal Power Generation.

SECTION: II

Q.4 [A] List and describe various types of non conventional energy sources. Give their availability and relative merits. [6]

[B] Explain various method of production of hydrogen for use as energy carrier. [6]

OR

Q.4 [A] What do you understand by energy chain? [2]

[B] What are the properties and use of hydrogen as a fuel cell. [4]

[C] Explain the construction and working of Fuel cell with neat sketch & their application. [6]

Q.5 [A] Distinguish between terrestrial and extraterrestrial radiation with suitable figures. Which radiation is important in solar energy calculations? Why? [5]

[B] Calculate the solar radiation on the top of the atmosphere on 23rd march of this year. [2]

[C] Describe the solar energy photovoltaic water-pumping system giving neat sketch. [4]

OR

Q.5 [A] What is solar concentrating collector? Describe in details its classification giving neat sketches where required. [6]

[B] A PV system feeds a dc motor to produce 2hp power at the shaft. The motor efficiency is 85%. Each module has 60 multicrystalline silicon solar cells arranged in 12*5 matrixes. The cell size is 145mm*145mm and the cell efficiency is 14%. Calculate no. of module required in PC array [5]

Assume global radiation incident normally to the panel as 1 KW/m².

Q.6 Attempt any Two. [12]

[A] Explain the three important ways of obtaining energy from biomass.

[B] Draw and explain the schematic diagrams of Fixed dome and Floating drum types of biogas plant.

[C] What is Photosynthesis? Explain the wet and dry processes of biomass conversion.

-----END OF PAPER-----