| | **ADAMAS UNIVERSITY** | | |
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| | **END-SEMESTER EXAMINATION : MAY 2021** | | |
| | (Academic Session: 2020 – 21) | | |
| **Name of the Program:** | B.Tech | **Semester:** | VIII |
| **Paper Title :** | Elective VII (Renewable Energy Resources) | **Paper Code:** | EEE44116 |
| **Maximum Marks :** | 40 | **Time duration:** | 3 Hrs. |
| **Total No of questions:** | 8 | **Total No of Pages:** | 2 |
| *(Any other information for the student may be mentioned here)* | **1.** At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. **2.** All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. **3.** Assumptions made if any, should be stated clearly at the beginning of your answer. | | |

*Answer all the Groups*
**Group A**
Answer all the questions of the following          $5 \times 1 = 5$

1. **a)** What is the typical open circuit voltage of solar cell?
   **b)** What is the energy payback period of wind generation?
   **c)** What is the range of wind speed suitable for wind power generation?
   **d)** Which turbine is used in a tidal range plant?
   **e)** What is geothermal energy?

**GROUP –B**
(**Short Answer Type Questions**)
Answer *any three* of the following          $3 \times 5 = 15$

2. What are the salient features of vertical axis wind turbine?          [5]

3. Calculate the open circuit voltage and maximum power output of MHD engine with following specifications

    Plate Area = 0.2 m$^2$

    Distance between plates = 0.4 m

    Flux density = 2 Wb/m$^2$

    Average gas velocity = 1000 m/s

    Conductivity of the gas = 10 mho/m          [5]

4. Derive the expression for total useful energy of dry rock. [5]

5. A deep ocean wave of 2m peak to peak appears for a period of 8 s. Find the wavelength, phase velocity and power associated with the wave. At this power rate, what is the average annual wave energy in MWh/m? [5]

### GROUP –C
### (Long Answer Type Questions)
Answer *any two* of the following $2 \times 10 = 20$

6. a) With the help of block diagrams explain the operations of standalone and grid interactive Solar Photovoltaic System.

   b) Describe the principle of MHD generating system.

   [7+3]

7. a) A PV system feeds a dc motor to produce 1 hp power at the shaft. The motor efficiency is 85%. Each module has 36 multi crystalline silicon solar cells arranged in a 9 x 4 matrix. The cell size is 125mm x 125mm and the cell efficiency is 12%. Calculate the number of modules required in the array. Assume global radiation incident normally to the panel as 1 kW/ $m^2$.

   b) What is PV cell? What is fill factor of a PV cell? [5+5]

8. a) Explain heaving float type wave energy technology.

   b) What are the merits of oscillating water-column type wave energy technology?

   c) What are the limitations of tidal energy? [6+2+2]

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