

Code No: **R20DME51****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****M.Tech II Year I Semester Supplementary Examinations, August 2024****Non-Conventional Energy Sources****(TE)**

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Time: 3 hours
70**Max. Marks:****Note:** This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 A How the optical efficiency of a solar collector be estimated? [7M]
B Describe the application of solar energy for the solar refrigeration. [7M]

OR

- 2 A Define solar irradiance, solar constant, extra-terrestrial and terrestrial radiations? What is the standard value of solar constant? [7M]
B Describe the principle and applications of solar ponds. [7M]

SECTION-II

- 3 A How is geothermal energy generated inside the earth crust? [4M]
B Explain with neat sketch, the operation of a geothermal power plant. [10M]

OR

- 4 A Write a short note on geothermal energy? [4M]
B Classify various types of geothermal energy systems. [3M]
C Why does water in geothermal aquifers remain in the liquid state even though its temperature may be much higher than 100 °C? [7M]

SECTION-III

- 5 A What is the need for direct energy conversions? Explain its limitations. [7M]
B Briefly describe the operation of fuel cell with a neat sketch? [7M]

OR

- 6 A Write short notes on
a) Properties and applications of Hydrogen gas [3M]
b) Thermionic and Thermoelectric Generation [4M]
B Discuss and differentiate between “electrical efficiency” and “thermal efficiency” of the fuel cell. [7M]

SECTION-IV

- 7 A Enumerate advantages and disadvantages of bio-mass energy? [7M]
B Classify biogas plants and explain any one type of bio-gas plant with neat sketch. [7M]

OR

- 8 A Discuss briefly the types of bio-gas plant. How bio-energy may be useful for rural application. Justify your answer [7M]

B Explain the process of anaerobic fermentation. List the advantages. [7M]

SECTION-V

9 A Briefly describe cut-in speed and cut-out speed in wind energy conversion system [7M]

B Explain maximum power point tracking procedure in a wind energy conversion system. [7M]

OR

10 Discuss the theory and working principle of ocean thermal energy conversion system. Also mention its limitations and applications. [14M]
