Code No: R203103D **R20** SET - 1

III B. Tech I Semester Regular/Supplementary Examinations, December -2023
RENEWABLE ENERGY SOURCES
(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) List out and elaborate the classification of PV cells? [7M]
   b) Explain in detail about advantages, disadvantages and applications of solar dryers? [7M]

(OR)

2. a) Sketch and explain the efficiency verses temperature curves of solar collectors? [7M]
   b) Compare the differences between declination angle and hour angle of the solar radiation with relevant characteristics? [7M]

UNIT-II

3. a) Write in detail about the justification for generation of substantial amount of power, the wind machines should have large rotors? [7M]
   b) With the help of neat sketch, discuss the operation of propeller and multi blade type wind machines? [7M]

(OR)

4. a) Deduce and analyze the torque speed characteristics of wind energy conversion system? [7M]
   b) A wind energy generator generates 1665 W at rated speed of 8 m/s at atmospheric pressure and temperature of 22 degrees centigrade. Find the power generated and the change in output if the wind generator is operated at an altitude of 1755m, temperature 12 degrees centigrade, wind speed 8.7 m/s and air pressure of 0.7 atmosphere? [7M]

UNIT-III

5. a) Explain in detail about the processes of combustion and incineration in the bio mass conversion? [7M]
   b) Draw the neat diagram and describe the operation of fixed dome type bio gas plant? [7M]

(OR)

6. a) Describe the process of urban waste to energy conversion and write its draw backs? [7M]
   b) Explain in detail about the fluidized bed gasifier with neat sketch? [7M]

UNIT-IV

7. a) Analyze the energy and power in a single basin scheme with relevant equations? [7M]
   b) Memorize and discuss in detail about various components of tidal power plant? [7M]

(OR)

8. a) Derive the expression for the yearly generated power from the tidal power project? [7M]
   b) Find the overall efficiency of an ocean thermal energy conversion plant if the temperature of water in the surface layer is 28 degrees centigrade and the temperature of cold water in the depth of the tropical ocean is 6 degrees centigrade. Assume the relative efficiency factor of the power plant is 0.38? [7M]

UNIT-V

9. a) Develop the connection diagram of flash steam open system and explain its characteristic features? [7M]
   b) Explain the comparison between MHD and conventional turbo generator with gas flow diagram? [7M]

(OR)

10. a) Discuss the limitations and applications of geo thermal energy? [7M]
    b) Describe various financial mechanisms to be applied in the MHD generation? [7M]