

Total No. of Questions : 12]

SEAT No. :

P1170

[4659] - 359

[Total No. of Pages : 3

B.E. (Biotechnology) (Semester - I)
A : BIOENERGY AND RENEWABLE RESOURCES
(2008 Pattern) (Elective - II)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Solve Q-1 or Q-2, Q-3 or Q-4, Q-5 or Q-6, Q-7 or Q-8, Q9 or Q-10, Q-11 or Q-12.*
- 2) *Neat diagrams must be drawn whenever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data if necessary.*
- 5) *Answer to the two sections should be written in separate answer books.*

SECTION - I

Q1) Describe the following.

[18]

- a) Energy intensity and energy - GDP elasticity.
- b) Environmental impacts of the conventional energy sources.
- c) Advantages and disadvantages of geothermal energy.

OR

Q2) Write down the principle, advantages and disadvantages of

[18]

- a) Wind energy
- b) Solar thermal energy
- c) Hydrogen energy system

P.T.O.

Q3) Wind at 1 standard atmospheric pressure and 15°C has velocity of 15m/s calculate: **[16]**

- a) The total power density in the wind stream.
- b) The maximum obtainable power density.
- c) A reasonably obtainable power density.
- d) The total power.
- e) The torque and axial thrust.

Given : turbine diameter = 120 m, and turbine operating speed = 40 r.p.m. at maximum efficiency. Propeller type wind turbine is considered. For air the value of gas constant $R = 0.287\text{kJ/kg K}$.

OR

Q4) What is geo thermal energy? Give the applications of geothermal energy. Enlist the general categories of geothermal resources and describe any two in detail.**[16]**

Q5) Explain the principle of conversion of solar energy into heat? What are the main components of flat-plate solar collector, explain the function of each. **[16]**

OR

Q6) Enumerate the different main applications of solar energy. What is the principle of solar photovoltaic power generation? What are the advantages and disadvantages of photovoltaic solar energy conversion? **[16]**

SECTION - II

Q7) What is microalgae? Describe in detail about microalgae biomass production by . **[18]**

- a) Raceway ponds and
- b) Photobioreactors.

OR

Q8) What is biodiesel? What are the advantages of biodiesel? Enlist the various steps involved in the preparation of biodiesel from *Jatropha* and describe any one in detail. **[18]**

Q9) Describe the process of biobutanol production. What are the different methods for removal of butanol from the broth? **[16]**

OR

Q10) Describe in detail about. **[16]**

- a) Ethanol production from lignocellulosic materials.
- b) Challenges in ethanol production.

Q11) What is biogas? Describe the anaerobic process of biogas production. Illustrate the advantages of anaerobic digestion and the factors affecting generation of gas. **[16]**

OR

Q12) Describe in detail about following biogas plants. **[16]**

- a) Continuous and batch types.
- b) The dome and the drum types.
- c) Different variations in the drum type

