AU – 2852

Seventh Semester B. E. (Mechanical Engineering) Examination

NON-CONVENTIONAL ENERGY SYSTEM

Paper – 7 ME 05

(USC – 10874)

P. Pages : 3

Time : Three Hours] [Max. Marks : 80

Note : (1) Answer **Three** questions from Section A and **Three** questions from Section B.
(2) Due credit will be given to neatness and adequate dimensions.
(3) Assume suitable data wherever necessary.
(4) Diagrams and chemical equations should be given wherever necessary.
(5) Illustrate your answer wherever necessary with the help of neat sketches.
(6) Use pen of Blue / Black ink / refill only for writing the answer book.

SECTION A

1. (a) Define the following :—

(i) Angle of Latitude (ii) Hour Angle (iii) Inclination angle. 3

(b) Explain the construction and principle of operation of a sunshine recorder. 4

(c) Calculate the monthly average of the daily global radiation on the horizontal surface at Gulmarg (34.05^0 N , 74.38^0 E) during the month of October, if the sunshine hour per day is 5 hrs. 7

OR

2. (a) Calculate the number of daylight hours at Banglore on 26^{th} February and 21^{st} December in a leap year. The latitude of Banglore is $12^0 58'$N. 5

(b) Explain Moll Gorczynski Pyrano meter with neat sketch for measurement of global and diffuse radiations. 9

3. (a) Derive an expression for the heat removal efficiency factor for LFPC. 7

(b) State the properties for latent heat storage material. 6

OR

4. (a) Discuss the effect of following on the performance of LFPC.

(i) Intensity of Solar Radiation

(ii) Tilt Angle

(iii) Inlet fluid temperature. 6

(b) Derive an expression for useful heat gain by fluid of LFPC. 7

5. (a) State the desirable properties for latent heat storage material. 4

(b) Explain :—

(i) Space heating with LFPC

(ii) Cabinet Solar Dryer

(iii) Passive method of space heating. 9

OR

6. (a) State the criteria used for judging the suitability of thermochemical heat storage. 4

(b) Discuss the following applications of solar energy with neat figure :—

(i) Convective Solar Dryer

(ii) Box type solar cooker

(iii) Passive method of space heating. 9

SECTION B

7. (a) Explain double basin tidal power plant with neat figure. 6

(b) Draw and explain close cycle OTEC power plant. 7

OR

8. (a) Describe indirect vapour cycle OTEC plant with neat sketch. 6

   (b) Derive an expression for an efficiency of wind mill in terms of inlet and outlet velocities and also show that maximum efficiency is 16/27. 7

9. (a) Explain green plant photo synthesis. 6

   (b) Explain Solar Energy Plantation and economics. 7

OR

10. (a) Explain fixed dome biogas plant with neat sketch. 6

    (b) What is biodiesel ? State the properites of biodiesel. 7

11. (a) Explain working principle of Hot Dry Rock geothermal system with neat sketch. 7

    (b) Explain the concept of energy conversion in photovoltaic solar cell. State its applications. 7

OR

12. (a) Explain working principle of Fuel Cell. State its advantages and disadvantages. 7

    (b) Explain binary fluid liquid dominated geothermal system with neat sketch. 7