

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)

B.TECH (MARINE ENGINEERING)
Semester– VIII- September 2015 Examination

RENEWABLE ENERGY SOURCES AND APPLICATIONS
Subject Code: UG11E1804

Time: 3 Hours

Max Marks: 100

Date: 30.9.2015

Pass Marks: 50

SECTION -A

(3X 10 = 30 Marks)

1.
 - a) What are the advantages of renewable energy?
 - b) Write a short note on solar cooker
 - c) Write short note on solar photovoltaic cells
 - d) Describe how biodiesel is produced?
 - e) list out various wave-energy conversion devices?
 - f) What is nuclear fusion?
 - g) Define beam, diffuse and total radiation
 - h) Explain the principle of operation of acid fuel cell
 - i) Give the details of biomass classification
 - j) Explain the types of solar collectors.

SECTION – B

(5 X 14 = 70 Marks)

2.
 - a) Explain the solar air conditioning and refrigeration system (7 Marks)
 - b) A home in Phoenix (Arizona) requires 62 kWh of heat on a winter day to maintain a constant indoor temperature of 20°C. How much collector surface area does it need for an all-solar heating system that has a 20% efficiency? (Where, at 32°N the average solar radiation in winter is about 6.5 kWh/m²/day) (7 Marks)
3.
 - a) What do you mean by efficiency of solar cells? What are its limitations? (7 Marks)
 - b) Explain the following: (i) Solar pumping system (ii) Solar Furnace (7 Marks)
4.
 - a) Explain the environmental aspects of Renewable energy generation (7 Marks)
 - b) What are the types of turbines that are used in renewable hydro power?
Explain (7 Marks)

5. a) What are the advantages and disadvantages of wind energy system? (7 Marks)
b) Write a note on high velocity wind machines (7 Marks)
6. a) Describe the geothermal resources of energy (4 Marks)
b) A process plant has a back pressure turbine for power generation. The electrical power output from turbine is 1MW. The process data are as under:- (10 Marks)
- The Plant heat rate is 33,000 K.Cal/Kwh
 - Enthalpy of steam at inlet of turbine is 700K.Cal/Kg.
 - Enthalpy of feed water is 70 K.Cal/Kg.
 - Enthalpy of steam at outlet of turbine is 650 K.Cal/Kwh.
 - Evaporation ratio of Boiler is 3.5 Kgs. of steam/Kg of coal

Calculate the following:

- a) Flow rate of steam to turbine
 - b) Power generation efficiency of turbo – alternator
7. (a) How is energy released by nuclear fusion and fission reactions? Why are the Products of fission reactions radioactive? (7 Marks)
- (b) Outline the current status of tidal power world-wide. What are the major Environmental effects of tidal power generation? (7 Marks)
