Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 91091

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Fifth Semester

Aeronautical Engineering

ORO 551 — RENEWABLE ENERGY SOURCES

(Common to: Aerospace Engineering/Agriculture Engineering/Automobile Engineering/Biomedical Engineering/Civil Engineering/Electronics and Communication Engineering/Electronics and Telecommunication Engineering/Environmental Engineering/Industrial Engineering/ Industrial Engineering and Management/Manufacturing Engineering/Marine Engineering/Material Science and Engineering/Mechanical Engineering/Medical Electronics/Petrochemical Engineering/Production Engineering/Safety and Fire Engineering/Bio Technology/Chemical Engineering/Chemical and Electrochemical Engineering/Fashion Technology/Food Technology/Handloom and Textile Technology/Petrochemical Technology/Petroleum Engineering/Pharmaceutical Technology/Textile Chemistry/ Textile Technology)

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the difference between the Zenith angle and the Solar azimuth angle?

2. Define solar constant.

3. Give the types of solar energy collectors.

4. Define collector efficiency.

5. List out the different methods of energy storage.

6. What is solar heating and cooling?

7. List main components of the wind power plant.

8. Point out the factors affecting biogas generation.

9.   Classify the geothermal sources.

10.   Write a note on wave energy.

PART B — (5 × 13 = 65 marks)

11.   (a)   Explain the role and potential of new and renewable source in detail.

Or

      (b)   Tabulate the different types of solar energy measuring instruments.

12.   (a)   Explain the construction and working of solar flat plate collectors.

Or

      (b)   Explain the construction and operation of the central tower receiver power plant with neat sketches

13.   (a)   Explain the construction and working principle of a solar pond with neat sketch.

Or

      (b)   Explain the principle of solar photovoltaic power generation.

14.   (a)   Compare the vertical axis wind turbine and horizontal axis wind turbine.

Or

      (b)   Describe a small biogas plant. Explain the process of Anaerobic Digestion.

15.   (a)   Explain the principle and operation of Magneto-Hydrodynamic Generator(MHD) and its merits.

Or

      (b)   With a suitable diagram, explain the open-cycle OTEC system.

PART C — (1 × 15 = 15 marks)

16.   (a)   Using the Betz model of the wind turbine, derive the expression for power extracted from the wind. What is the maximum theoretical power that can be extracted and under what condition?

Or

      (b)   Discuss briefly about the components of tidal plants with a neat block diagram.

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