

B.E. METALLURGICAL AND MATERIAL ENGINEERING THIRD YEAR

SECOND SEMESTER EXAM 2023

RENEWABLE ENERGY SOURCES

Time: Three hours

Marks: 100

(Answer ALL questions)

Different parts of the same question should be answered together.

- Q1** Answer any **SIX** questions (6 X 5) =30 30
- (CO1)**
- a) Briefly compare between renewable and non-renewable energy sources.
 - b) What are the merits and demerits of wind energy?
 - c) What is tidal energy? Discuss its advantages and limitations.
 - d) What is geothermal energy? Explain briefly about different types of geothermal resources.
 - e) What is fuel cell? How fuel cells are classified?
 - f) What is hydrologic cycle? Briefly explain its different component.
 - g) Discuss the advantages and dis-advantages of solar PV.
 - h) What are the advantages and dis-advantages of small hyro-plant?
- Q2** Answer any **FIVE** questions (5 X 6) =30 30
- (CO2)**
- a) What is anaerobic digestion? Explain the different processes in an anaerobic digester.
 - b) Discuss the different factors affecting anaerobic digestion.
 - c) What is gasification? Discuss the different factors affecting gasification process.
 - d) Explain two systems that can harness power from tides.
 - e) Explain the operation of solar central receiver power plant.
 - f) Explain the working principle of solar PV.
 - g) Explain two systems that can harness power from waves.

[Turn over

Q3 Answer any **FOUR** questions (4 X 5) =20 20

- (CO3)**
- a) Draw a biogas plant and explain the function of different components.
 - b) Explain the function of different components of wind power plant with a schematic.
 - c) Draw a schematic diagram of small hydro plant with its major components.
 - d) Discuss the Power-Velocity characteristics of wind power.
 - e) Briefly discuss about the production methods of Hydrogen.
 - f) Write a short note on Hybrid System.
 - g) Discuss the site selection criteria of small hydro plant.

Q4 Answer any **FOUR** questions (4 X 5) =20 20

- (CO4)**
- a) Explain the storage and safety issues of hydrogen.
 - b) Write a short note on "Pump storage hydro-power plant"
 - c) Discuss the prospect and challenges of solar PV.
 - d) Explain the different materials used in solar cells.
 - e) Discuss the prospect and challenges of gasification technology.
 - f) How biomass can be converted into fuels/power?
 - g) What are the different non-solar applications of solar energy?