Sub Code: SEE301 **ROLL NO……..……..**

III SEMESTER EXAMINATION, 2022 – 23

IInd yr B.Tech. – Mechanical Engineering

RENEWABLE ENERGY SOURCE

Duration: 3:00 hrs **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any four parts of the following. a) Discuss the main features of various types of renewable and non-renewable energy sources. b) Explain the importance of non- conventional energy sources in the context of global warming. c) Give the brief classification of energy resources. Discuss the future of non-conventional resources of India. d) Discuss the wind energy development and policy in India. e) Discuss the economics of renewable energy system. f) What is the current status of wind energy in India and also discuss the roadmap for wind energy by 2030.	5x4=20
Q 2.	Answer any four parts of the following. a) Write a short note on PV arrays and System Charge controllers. b) What are the advantages and disadvantages of photovoltaic solar energy conversion? c) Discuss the operating principle of solar cell with neat diagram d) Write down the properties of polycrystalline silicon cell. e) Define solar constant and solar isolation. f) Discuss the design of a solar power plant and size of solar array in detail.	5x4=20
Q 3.	Answer any two parts of the following. a) Using Betz model of a wind turbine, derive the expression for power extracted from wind. Under what condition does the maximum theoretical power can be extracted from the wind turbine? b) What is the principle of wind energy conversion? What methods are used to overcome the fluctuating power generation of windmills? c) What is the wind farm or wind park? Discuss the types of wind farm and potential of Wind energy in Indian Context.	10x2= 20
Q 4.	Answer any two parts of the following. a) What is hydroelectric power station explain with neat diagram? Also discuss the different types of hydro power plant. b) Explain the working of fuel cells using appropriate diagram and write various chemical reactions involved in fuel cell. c) Discuss the economics of hydrogen and its trend in hydrogen utilization in a global context.	10x2= 20
Q 5.	Answer any two parts of the following. a) Explain the process of gasification of solid biomass. What is the general composition of the gas produced and what is its heating value? What are its applications? b) Explain availability, conversion theory of Biogas plant and Energy conversion from biomass. c) Explain the working of geothermal power plants. Discuss the various technical developments.	10x2= 20

****