PAPER ID-410978

Subject Code: KOE074

Roll No:

B TECH.
(SEM VII) THEORY EXAMINATION 2021-22
RENEWABLE ENERGY RESOURCES

Time: 3 Hours *Total Marks: 100*

Note: **1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.

Qno.	Question	Marks	CO
a.	Describe photovoltaic effect.	2	1
b.	Write down the properties of polycrystalline silicon cell.	2	1
c.	Calculate the angle of declination for 7^{th} may of a leap year.	2	2
d.	Define solar constant and solar isolation.	2	2
e.	What is meant by dry steam, wet steam and hot water in geothermal system?	2	3
f.	Write the chemical reaction takes place in Alkaline Fuel Cell.	2	3
g.	Write short note on HAWT and VAWT.	2	4
h.	State Seebeck Effect and Peltier Effect.	2	4
i.	What do you mean by recycling?	2	5
j.	Write the advantages and disadvantages for floating drum and fixed dome type biogas plant.	2	5

SECTION B

2. Attempt any *three* of the following:

Qno.	Question	Marks	CO
a.	Discuss the main features of various types of renewable and non-renewable energy sources. Also explain the importance of non-conventional energy sources in the context of global warming.	10	1
b.	Describe the Application and classification of hydrothermal resources.	10	2
c.	With the help of a schematic diagram, explain the operation of closed cycle MHD generating system?	10	3
d.	What is the basic difference between thermoelectric and thermionic conversion systems? Also, explain the working of thermoelectric generators?	10	4
e.	Explain availability, conversion theory of Biogas plant and Energy conversion from biomass.	10	5

SECTION C

3. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	Write a short note on PV arrays and System Charge controllers. What are the advantages and disadvantages of photovoltaic solar energy conversion?	10	1

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b.	Describe various direct and indirect application of solar energy.	10	1

4. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	Classify different types of solar thermal collector and show the constructional details of a flat plate collector. What are its main advantages?	10	2
b.	Draw a schematic diagram for solar pond based electric power plant with cooling tower and explain its working.	10	2

5. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	Explain the working of geothermal power plants. Discuss the various technical developments.	10	3
b.	Explain the working of molten carbonate fuel cells using appropriate diagram and write various chemical reactions involved in this type of fuel cell.	10	3

6. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	What is the principle of wind energy conversion? What methods are used to overcome the fluctuating power generation of windmills?	10	4
b.	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?	10	4

7. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
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?	10	5
b.	Explain the principle, working & Efficiency of OTEC power plant. What are the environmental effects of OTEC?	10	5