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R-15

Code: 5G583

IV B.Tech. II Semester Advanced Supplementary Examinations October 2020

Non Conventional Sources of Energy
(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

	Marks	CO	Blooms Level
UNIT-I			
1. a) Explain the importance of non-conventional energy sources in the context of global warming	7M	1	2
b) Mention different types of non-conventional energy sources and write the disadvantages of utilizing solar energy	7M	1	1
OR			
2. a) Define solar irradiance, solar constant, extra terrestrial and terrestrial radiations. What is the standard value of solar constant	7M	2	1
b) Explain the construction and principle of operation of a sunshine recorder.	7M	2	2
UNIT-II			
3. a) Write the advantages and disadvantages of concentrating collectors over flat plate collectors.	7M	2	1
b) Classify concentrating collectors and Explain the working of any one type of concentrating collectors	7M	2	4
OR			
4. a) Explain the effect of various parameters on the performance of flat plate collector	7M	2	2
b) Discuss the working and construction of solar distillation equipment	7M	2	6
UNIT-III			
5. a) What are the most favorable sites for installing wind turbines also explain the major applications of wind power.	5M	3	1
b) Derive the expression for power extracted from wind. What is the maximum theoretical power that can be extracted and under what condition?	9M	3	4
OR			
6. a) What is the origin of biomass energy? What is its global potential	7M	4	1
b) What are the main advantages and disadvantages of biomass energy?	7M	4	1
UNIT-IV			
7. a) Explain various types of geothermal resources	7M	5	2
b) What are the merits and demerits of geothermal energy?	7M	5	1
OR			
8. a) Explain the open cycle technology available for Ocean Technology Energy Conversion	7M	5	2
b) What is the source of tidal energy? What are the main hurdles in the development of tidal energy	7M	5	
UNIT-V			
9. a) Explain Seebeck, Peltier and Joule Thomson effects.	7M	6	2
b) List the limitations of Direct energy conversion (DEC)	7M	6	1
OR			
10. Briefly describe the operation fuel cell. How do you select fuels in the cell based on different operating conditions?	14M		

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Power Plant Engineering

(Mechanical Engineering)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. Draw the general layout of thermal power plant and explain the working of different circuits. 14M

OR

2. Describe the features of coal handling and ash handling systems in detail. 14M

UNIT-II

3. Explain with neat sketch the working principle of a commercial FBC system. 14M

OR

4. Elaborate the different types of dust collectors used in the thermal power plants. 14M

UNIT-III

5. Draw the layout of Diesel power plant and explain the various systems involved in it. 14M

OR

6. a) Explain the features of open and closed cycle gas turbine power plants. 10M
b) Suggest few methods for improving the efficiency of a gas turbine plant. 4M

UNIT-IV

7. Sketch the layout of hydroelectric power plant and explain the functions of each component in it. Discuss the advantages and limitations of this plant. 14M

OR

8. a) Compare pressurized water reactor and boiling water reactor of a Nuclear power plant? 8M
b) Discuss the salient features of the nuclear waste disposal. 6M

UNIT-V

9. Describe with help of neat sketch the working of a solar thermal plant and enumerate the advantages and disadvantages of concentrating collectors over flat plate collectors. 14M

OR

10. A power station has two 60MW units each running for 1500 hours a year. The energy produced per year is 700×10^6 kW-hr. Estimate the plant load factor and plant use factor. 14M
