

Code No: R20DME51

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R20

(Autonomous Institution – UGC, Govt. of India)

M.Tech II Year I Semester Supplementary Examinations, November 2022

Non-Conventional Energy Sources

(TE, VLSI&ES)

Roll No									
----------------	--	--	--	--	--	--	--	--	--

Time: 3 hours

Max. Marks: 70

Answer Any **Five** Questions
All Questions carries equal marks.

- 1 With help of a neat sketch, describe a solar heating system using air heating solar collectors with its advantages and disadvantages of this system. **[14M]**
- 2 Classify the different methods of storing solar energy. Describe thermal energy systems. **[14M]**
- 3 Discuss the operation of any one geothermal plant with neat sketch. **[14M]**
- 4 Explain
 - (i) Hot springs **[4M]**
 - (ii) Hot Rocks **[5M]**
 - (iii) Hot Aquifers. **[5M]**
- 5 Explain the working of Fuel cell with neat sketch. **[14M]**
- 6 Illustrate the working and economic aspects of I.C. engines. **[14M]**
- 7 Sketch and describe any one type of bio gas generation plant. Mention four uses of bio gases produced. **[14M]**
- 8 Describe with a neat sketch the working of a horizontal axis wind energy system indicating clearly all the components. **[14M]**

Code No: R20D2116

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)

R20

M.Tech II Year I Semester Supplementary Examinations, November 2022

Fuels & Combustion

(TE)

Roll No									
---------	--	--	--	--	--	--	--	--	--

Time: 3 hours

Max. Marks: 70

Answer Any **Five** Questions
All Questions carries equal marks.

- 1 a) Describe the properties of coal obtained by ultimate analysis. [7M]
b) What are the various gasification processes of solid fuels? [7M]
- 2 a) Bring out the salient features, merits, demerits and field of application of coal gas and blast furnace gas. [7M]
b) Discuss the problems associated with very low calorific value gaseous fuels. [7M]
- 3 a) Explain cool flame phenomena with respect to hydrocarbon oxidation. [7M]
b) The percentage composition by mass of a sample of coal is found as C=90%, H₂=3.3%, O₂=3%, N₂=0.8%, S=0.9% and ash=2% calculate minimum mass of air required for the complete combustion 1 kg of this fuel. If 50% excess air is supplied, find the total mass of dry flue gases per kg of fuel and the percentage composition of the dry flue gases by volume. [7M]
- 4 What is the importance of chemical kinetics in fuel combustion? Explain the Arrhenius equation of reaction kinetics. [14M]
- 5 Explain in detail the adiabatic flame temperature and its significance. [14M]
- 6 Calculate the adiabatic flame temperature of water vapour after the reaction of gases H₂ and O₂. [14M]
- 7 a) Explain the turbulent flame structure with a neat diagram. [7M]
b) What are the various factors affecting the turbulent burning velocity and briefly explain them. [7M]
- 8 Discuss the emissions, their harmful effects on the environment, tolerance lends as per the legislative measures and the latest methods adopted in pollution control of both automobile industry and thermal power stations. [14M]
