

Code No: R20D2116

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

R20

M.Tech II Year I Semester Supplementary Examinations, August 2023

Fuels & Combustion

(TE)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 A Describe the properties of coal obtained by ultimate analysis. [7M]
B Explain any two tests to determine change in physical properties of fuels [7M]
OR
2 A Explain about treatment of fuels for combustion in IC Engines. [7M]
B What are the higher and the lower heating value of a fuel? How do they differ? How is the heating value of a fuel related to the enthalpy of combustion of that fuel. [7M]

SECTION-II

- 3 A Explain combustion phenomenon of IC Engine. [7M]
B What are the factors affecting reaction rates? Discuss them in detail. [7M]
OR
4 A Write a short note on the following. (i) Chemical kinetics (ii) Reaction rates [7M]
B State first law and second law of thermodynamics. [7M]

SECTION-III

- 5 A Explain enthalpy of combustion. [7M]
B What are the higher and the lower heating value of a fuel? How do they differ? [7M]

OR

- 6 A Air at 5000 kPa and 300 K is flowing through a pipeline. An evacuated and insulated cylinder of volume 0.1 m^3 is connected to the pipeline through a valve. The valve is opened and the cylinder is filled with air till the pressure in the cylinder reaches the line pressure. The valve is then closed. Assuming that the air behaves like an ideal gas with $k = 1.4$, determine the temperature of the air in the cylinder at the end of the filling operation and the mass of air that is filled in the cylinder [7M]
B How is the heating value of a fuel related to the enthalpy of combustion of that fuel. [7M]

SECTION-IV

- 7 A Draw neat sketches of the following (i) laminar flame (ii) turbulent flame. [7M]
B What are the approximate chemical composition of gasoline, LPG, diesel, natural gas & methanol? How presence of moisture in air does affects the outcome of a combustion process. [7M]

OR

- 8 A Explain the structure of turbulent flames with neat sketches. [7M]
B Define droplet combustion. What is evaporation of droplet? [7M]

SECTION-V

- 9 A Discuss about different emissions in combustion of fuels. [7M]
B What are the ways to control emissions in vehicles? [7M]

OR

- 10 A Discuss about effects of pollutants. [7M]
B List out some pollutants of combustion. [7M]

Code No: R20DME51

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

R20

(Autonomous Institution – UGC, Govt. of India)

M.Tech II Year I Semester Supplementary Examinations, August 2023

Non-Conventional Energy Sources

(TE & VLSI&ES)

Roll No									
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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1 A Write the differences between renewable and non renewable energy sources. [7M]
B Explain the different types of renewable energy systems [7M]
OR
2 A Explain briefly about energy for sustainable development [7M]
B Explain the working Solar water heating system with a neat sketch. [7M]

SECTION-II

- 3 A Explain different types of wells used in geo thermal energy. [7M]
B Describe vapour dominated hydrothermal (convective) power plant with neat sketch [7M]
OR
4 A What are the advantages and disadvantages of geothermal energy conversion? [7M]
B Describe the working Principle of Geothermal energy conversion. [7M]

SECTION-III

- 5 A What is the need for Direct Energy Conversion? [7M]
B Write a short notes on carbon cycle [7M]
OR
6 A How would you explain the conversion process of solar energy into electrical energy by photovoltaic cells? [7M]
B What are the main benefits of hydrogen fuel cells? [7M]

SECTION-IV

- 7 A What are the advantages of anaerobic digestion of biomass? [7M]
B Explain the process of production of biogas from biomass. [7M]
OR
8 A Explain briefly about Biomass energy sources [7M]
B Classify the different biomass plants. [7M]

SECTION-V

- 9 A Explain the working of Vertical axis turbines with a neat sketch [7M]
B Explain the technologies available for OTEC. [7M]
OR
10 A List out the major Problems and operational experience of OTEC. [7M]
B What are the drawbacks of wind turbine power plants? [7M]
