


Name:			
Enrolment No:			
<b>UPES</b> <b>End Semester Examination, May 2023</b>			
<b>Course: Fuel and Combustion</b> <b>Program: B. Tech (ADE)</b> <b>Course Code: MEAD3006P</b>		<b>Semester : VI</b> <b>Time : 03 hrs.</b> <b>Max. Marks : 100</b>	
<b>Instructions:</b>			
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
S. No.		Marks	CO
Q 1	Distinguish between Gross and lower calorific value of fuel?	4	CO1
Q 2	What are the causes of knocking in S.I (Petrol) engines?	4	CO2
Q 3	Explain Water gas with reaction.	4	CO3
Q 4	Explain the flash and the fire point of a fuel and its significance.	4	CO3
Q 5	Discuss the proximate analysis and state its significance.	4	CO2
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q 6	What are the desirable properties of a boundary lubricant. Explain the mechanism of boundary lubrication.	10	CO4
Q 7	Discuss the approach of combustion of Diesel fuel. Explain all the phases in detail.	10	CO2
Q 8	Following data is obtained in calorific value determination using Bomb calorimeter: Weight of fuel = 1.084 g Weight of water taken in the calorimeter = 2000 g Water equivalent of the calorimeter = 550 g Rise in temperature = 3.1 °C Cooling correction = 0.051 °C Acid correction = 52.6 cal Fuse wire correction = 2.8 cal Cotton thread correction = 1.5 cal Calculate the gross calorific value of the fuel.	10	CO3

Q 9	<p>Explain the Bergius process used for hydrogenation of coal. Discuss all the sequential steps involved.</p> <p style="text-align: center;">OR</p> <p>How is the metallurgical coke manufactured by Otto-Hoffman's method?</p>	<b>10</b>	<b>CO2</b>
<p><b>SECTION-C</b> <b>(2Qx20M=40 Marks)</b></p>			
Q 10	Classify the lubricants with their respective strength, merits, and applicability.	<b>20</b>	<b>CO1</b>
Q 11	<p>Draw and Explain working of Blast furnace. Also mention the reactions occurring in the furnace with temperature range and the steps involved to control pollution.</p> <p style="text-align: center;">OR</p> <p>Discuss the 'Selective catalytic reduction method' and the 'Selective non-catalytic reduction method', for post combustion treatment of coal.</p>	<b>20</b>	<b>CO4</b>