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UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program: ADE	**Semester – Vth**
Subject (Course): Fuel and Combustion	**Max. Marks : 100**
Course Code : ADEG-333	**Duration : 3 Hrs**
No. of page/s:01	

Instructions:
Attempt all questions. **Section A** (each carrying 5 marks); **Section B** (each carrying 10 marks)**.** **Section C** (each question carrying 20 marks)**.**

Section A (Attempt all)

1	Distinguish between Gross and lower calorific value of fuel?	**[5]**	**CO1**
2	Listed down the objectives for evaluating the crude oil?	**[5]**	**CO2**
3	State, why Wobbe Index is calculated for gaseous fuel?	**[5]**	**CO3**
4	Calculate the enthalpy of the following chemical reaction: $CS_2(\ell) + 3O_2(g) \text{ ---> } CO_2(g) + 2SO_2(g)$; given $C(s) + O_2(g) \text{ ---> } CO_2(g)\ \Delta H = -393.5$ kJ/mol $S(s) + O_2(g) \text{ ---> } SO_2(g)\ \Delta H = -296.8$ kJ/mol $C(s) + 2S(s) \text{ ---> } CS_2(\ell)\ \Delta H = +87.9$ kJ/mol	**[5]**	**CO4**

Section B (Attempt All)

5	With desirable properties of a boundary lubricant, explain mechanism of boundary lubrication.	**[10]**	**CO5**
6	Why additives are needed in lubricants? Explain additives stating different practical problems generally encountered,	**[10]**	**CO5**
7	By writing equations for diameter of oil tube and nozzle, explain Swirl oil burner.	**[10]**	**CO4**
8	Calculate the air fuel ratio for fuel E-45 (Ethanol 45% and Gasoline-55%).	**[10]**	**CO4**

SECTION C (Attempt All)

9	Classify the lubricants with their respective strength, merits and applicability.	**[20]**	**CO5**
10	Draw and Explain working of Blast furnace. Also mention the reactions occurring in the furnace with temperature range.	**[20]**	**CO4**