

Register Number.....

**M.E. DEGREE EXAMINATIONS: JANUARY 2009**

First Semester

**ENERGY ENGINEERING**

P07EN104 Fuels and Combustion

**Time: Three Hours**

**Maximum Marks: 100**

**Answer ALL Questions:-**

**PART A (20 x 1 = 20 Marks)**

1. Which of the following is solid fuel  
a) Methane                      b) Paraffin                      c) Petrol                      d) Peat
2. 2 m<sup>3</sup> of CO require \_\_\_\_\_ m<sup>3</sup> of O<sub>2</sub> and \_\_\_\_\_ m<sup>3</sup> of CO<sub>2</sub>  
a) 2 and 1                      b) 1 and 2                      c) 1 and 1                      d) 2 and 2
3. Which of the following experiment is used to determine HCV  
a) Bomb calorimeter                      b) Dulong's Experiment  
c) Orsat apparatus                      d) Clleve land apparatus
4. A good fuel should have \_\_\_\_\_ ignition point.  
a) Low                      b) High  
c) Medium                      d) Optimum
5. The molecular mass of nitrogen is \_\_\_\_\_ oxygen.  
a) equal to                      b) less than                      c) more than                      d) approximately equal to
6. Liquid fuels are \_\_\_\_\_  
a) Higher cost                      b) Lower cost  
c) Medium cost                      d) Optimum cost
7. Solid fuels consists mainly \_\_\_\_\_  
a) Carbon                      b) Hydrogen  
c) Oxygen                      d) Carbon and Hydrogen
8. A fuel should produce \_\_\_\_\_ smoke  
a) Less                      b) More  
c) Medium                      d) Optimum
9. \_\_\_\_\_ is the final stage of coal formation.  
a) Lignite coal                      b) Bituminous coal                      c) Anthracite coal                      d) Charcoal



**PART B (5 X 16 = 80 Marks)**

21. (a) Explain the types and characteristics of fuels.

**(OR)**

21. (b) Explain briefly the method for flue gas analysis.

22. (a) Explain, briefly Bomb Calorimeter to determine the calorific value of solid fuel.

**(OR)**

22. (b) Explain the following properties liquid fuel. (4 x 4)

- |                            |                      |
|----------------------------|----------------------|
| (i) Octane number          | (ii) Cetane number   |
| (iii) Flash and fire point | (iv) Calorific Value |

23. (a) Explain following Gaseous fuels.

- |         |          |           |                   |         |
|---------|----------|-----------|-------------------|---------|
| (i) LPG | (ii) LNG | (iii) CNG | (iv) Producer Gas | (4 x 4) |
|---------|----------|-----------|-------------------|---------|

**(OR)**

23. (b) Explain, briefly Boy's gas Calorimeter to determine the higher calorific value of gas fuels

24. (a) Explain briefly following combustion processes. (4 x 4)

- |                        |                           |
|------------------------|---------------------------|
| (i) Surface Combustion | (ii) Submerged Combustion |
| (iii) Slow Combustion  | (iv) Explosive Combustion |

**(OR)**

24. (b) Explain the mechanism of Gaseous fuels and write the combustion equations.

25. (a) Explain the following coal burning equipments. (8+8)

- |                       |                             |
|-----------------------|-----------------------------|
| (i) Sprinkler stokers | (ii) Pulverized coal firing |
|-----------------------|-----------------------------|

**(OR)**

25. (b) Classify the burners according to flame structures and what are all factors affecting Burners & Combustion.

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