



**B.E DEGREE EXAMINATIONS: NOV 2015**

(Regulation 2009)

Seventh Semester

**AUTOMOBILE ENGINEERING**

AUE121:Alternate Fuels and Energy System

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

- CNG is stored at a pressure of
  - 150 bar
  - 200 bar
  - 100 bar
  - 250 bar
- LNG is stored at a temperature of
  - 100 °C
  - 50°C
  - 160°C
  - 190°C
- Each mol of oxygen entering combustion chamber is accompanied by \_\_\_\_\_ mol of nitrogen
  - 3.76
  - 2.76
  - 4.76
  - 5
- Which of the following will cause brain damage in children?
  - Crude oil
  - ethanol
  - methanol
  - Lead in gasoline
- \_\_\_\_\_ can be produced from molasses
  - Methanol
  - Ethanol
  - Bio mass
  - Vegetable oil
- Alcohol \_\_\_\_\_ knocking tendency because of high octane number
  - Increases
  - Does not change
  - Decreases
  - Don't play any role
- NO<sub>x</sub> emissions will be high in
  - Petrol engines
  - Diesel engines
  - CNG engines
  - Gas turbine Engines.
- The thick black layer of unburned Hydrocarbon is known as

- a) Smoke
  - b) smog
  - c) hydrocarbons
  - d) Particulate matter
9. Infrared Analyser is used to measure
- a) NO<sub>x</sub> emissions
  - b) CO
  - c) smoke
  - d) CO<sub>2</sub>
10. The Fuel obtained by anaerobic fermentation of wet livestock waste is
- a) Producer gas
  - b) Natural gas
  - c) Bio gas
  - d) LPG

**PART B (10 x 2 = 20 Marks)**

11. List the various methods to produce ethanol?
12. List the products obtained by refining of crude oil?
13. Write advantages of electric vehicles.
14. What is green house effect?
15. What are the problems you will come across if methanol is used as a fuel?
16. Where the CNG reserves are located in India?
17. Compare advantage and disadvantages of CNG?
18. Define esterification?
19. Tell the various methods to produce Hydrogen?
20. What are the limitations of electric vehicle?

**PART C (5 x 14 = 70 Marks)**

21. a) (i) Write in detail about the need, availability, properties of various alternative fuels. (7)
- (ii) Discuss the characteristic of natural gas, Producer gas and Alcohols fuels. (7)
- (OR)**
- b) (i) Draw the chart for briefing about percentage availability of world energy sources and their main uses? (8)
- (ii) List the merits and demerits of various alternate fuels. (6)
22. a) (i) Explain the required properties for engine fuels? (4)
- (ii) Explain the performance characteristics of engine using ethanol as a fuel? (10)
- (OR)**
- b) (i) List the important features of methanol as a fuel. (4)
- (ii) Illustrate the emission characteristics of methanol in engine. (10)

23. a) (i) What is CNG? What are the properties of CNG (7)  
(ii) Illustrate the modification required in engine if LPG gas is used as a fuel (7)
- (OR)**
- b) (i) Briefly explain the various methods to produce hydrogen and how they are stored? (7)  
(ii) Discuss the performance characteristics of engine using hydrogen as a fuel (7)
24. a) (i) List the various vegetable oil fuels and their advantages (4)  
(ii) Discuss the performance and emission characters of sunflower oil with graphs (10)
- (OR)**
- b) (i) What are the desired characters of vegetable oil fuel? List unfavorable properties of Vegetable oil? (6)  
(ii) Write the chemical equation for esterification of vegetable oil and explain the esterification process? (8)
25. a) (i) Explain with a neat sketch the working of solar powered vehicle (7)  
(ii) Describe with a neat sketch working of electric vehicle (7)
- (OR)**
- b) (i) Describe the working of fuel cell vehicles (7)  
(ii) Explain the different types of battery used in electrical vehicle (7)

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