**ME 2041 – ADVANCED IC ENGINES**

**UNIT IV**

**ALTERNATE FUELS**

**1. Write the advantage and disadvantage of alcohol as a fuel.**

The **advantages** of alcohols a fuel are:

1. it is a high octane fuel with antiknock index number (octane number) of over 100.

2. Alcohols have low sulphur content in the fuel.

3. It produces less overall emissions when compared with gasoline

**Disadvantages :**

1. Alcohols have poor ignition characteristics in general.

2. There is a possibility of vapor lock in fuel delivery system.

3. It has poor cold weather starting characteristics due to low vapor pressure and evaporation.

**2. What is the problem with gasoline-alcohol mixture as a fuel**?

Problems with gasoline-alcohol mixture as a fuel are the tendency for alcohol to combine with any water present. When this happens the alcohol separates to locally from the gasoline, resulting in a non-homogenous mixture. This causes the engine to run erratically due to the large air-fuel ratio difference between the two fuels.

**3. Write the sources for methanol.**

Methanol can be obtained from many sources, both fossil and renewable. These include coal, petroleum, natural gas, biomass, wood landfills and even the ocean.

**4. Write the source for ethanol.**

Ethanol can be made from ethylene (or) from fermentation of grains and sugar. Much of it is made from sugarcane, sugarbeets, and even cellulose (wood and paper).

**5. What are the techniques of using alcohol in diesel engine fuel?**

The techniques of using alcohol in diesel engine are:

1. Alcohol diesel emulsions. 2. Dual fuel injection.

3. Alcohol fumigation. 4. Surface ignition of alcohols.

**6. What are the methods are adopted for induction of alcohol into intake manifold?**

The methods are adopted for induction of alcohol into intake manifold micro fog unit, pneumatic spray nozzle, vaporizer, carburetor and fuel injector.

**7. List the advantages of hydrogen as an IC engine.**

1. Low emissions.

2. Fuel availability.

3. Fuel leakage to environment is not a pollutant

4. High energy continent per volume when stored as a liquid.

**8. List the disadvantages of using hydrogen as a fuel.**

 Difficult to re fuel.

 Fuel cost would be high at present day’s technology and availability.

 Poor engine volumetric efficiency.

 High NOx emission because of high flame.

**9. Write the methods for hydrogen can be used in SI engines.**

Hydrogen can be used in SI engines by three methods

 By manifold induction

 By direct introduction of hydrogen into the cylinder.

 By supplementing gasoline.

**10. List the advantages and disadvantages of natural gas.**

**Advantages:**

 Octane number is around 120, which makes it a very good SI engines fuel.

 Low engine emissions

 Fulel is fairly abundant worldwide.

**Disadvantages:**

 Low energy density resulting in low engine performance.

 Low engine volumetric efficiency because it is a gaseous fuel.

 Refueling is a slow process.

**11. Write the two types of LPG used in automobiles engine.**

Two type of LPG used in automobile engines:

One is propane and the other is butane, sometimes in mixture of propane and butane is used as LPG in auto mobile engine.

**12. What are the advantages of LPG?**

 LPG mixes with air at all temperatures.

 LPG has high antiknock characteristics.

 There is no crack case dilution, because the fuel is in the form of vapor.

**13. Write the disadvantages of LPG.**

 A special fuel feed system is required for liquid petroleum gas.

 A good cooling system is quite necessary.

 The vehicle weight is increased due to the use of heavy pressure cylinder for storing LPG.

**14. Write the improvements required for the LPG vehicle in future.**

 Effort must be made to have more LPG filling stations at convenient locations, so that LPG tank can be filled up easily.

 Safety devices are to be introduced to prevent accidents due to explosion of gas cylinders (or) Leakage in the gas pipes.

**15. Compare the petrol and LPG.**

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| **PETROL** | **LIQUIED PETROLEM GAS** |
| Octane rating of petrol is 81 | Octane rating of LPG is 110. |
| Petrol has odours | LPG is odourless. |
| In order to increase octane number | LPG is lead free with high Octane number. |