SNS COLLEGE OF TECHNOLOGY

Vazhiamyampalayam,Coimbatore-35

(An Autonomous institution)

Accredited by **NBA-AICTE** and Re-Accredited by **NAAC-UGC with A+ Grade**

Approved by **AICTE,** New Delhi & Affiliated to **Anna University**, Chennai

DEPARTMENT OF CHEMISTRY

COURSE NAME : 23CHT102- CHEMISTRY OF ENGINNERING MATERIALS

I YEAR / II SEMESTER

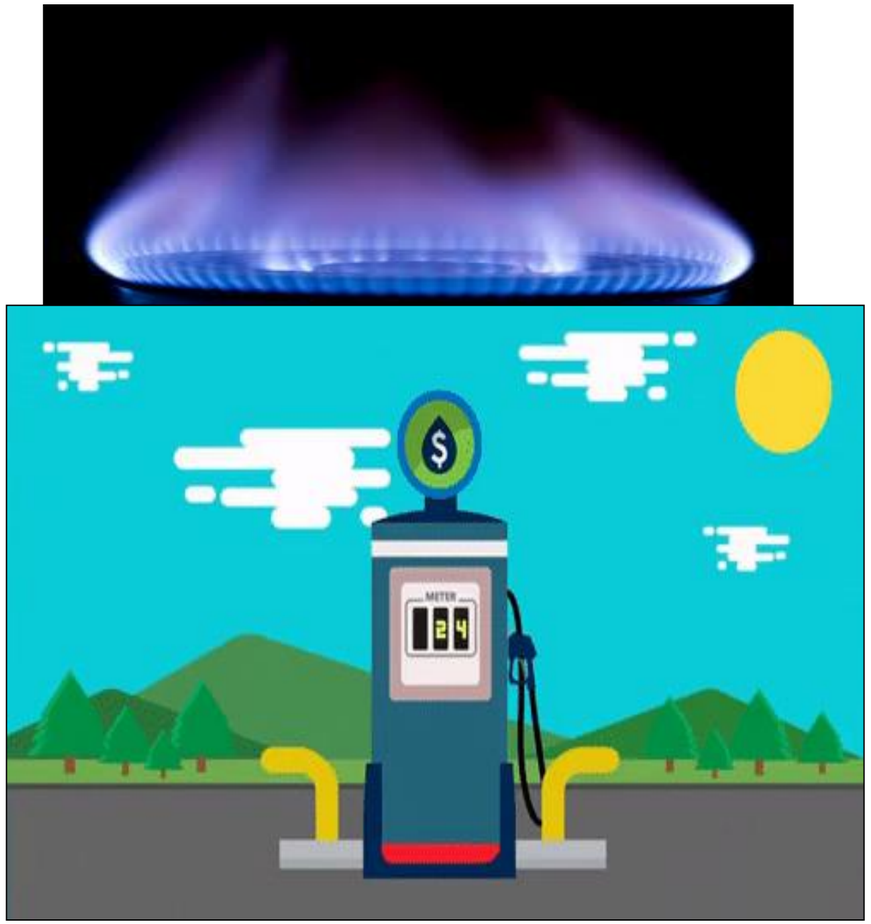
UNIT : 3. FUELS AND COMBUSTION

TOPIC : 6. GASEOUS FUEL,CNG,LPG & BIO GAS

BRAINSTORMING WITH RECAP

GASEOUS FUELS

- Do not leave any residue after burning.
- Burn without any smoke.
- Higher calorific values than the solid fuels.
- Relatively low ignition temperature and hence they burn more easily than solid fuels.
- Free from solid and liquid impurities.
- Often less expensive than solid and liquid fuels.
- Conveyed easily through pipeline to the actual place of need that is the main reason for eliminating the manual labour cost in transportation.
- **Examples: Biogas, CNG and LPG.**



COMPRESSED NATURAL GAS (CNG)

- Natural gas is obtained from well dug in the oil-bearing regions.
- Before use, the natural gas is purified by removing water, dust, grit, H_2S, CO_2, N_2 and heavier liquefiable hydrocarbons (Propane, butane, butene, etc.)
- Compressing the natural gas under pressure of 1000 atm in a steel container is called as compressed natural gas (CNG).
- 15 kg of CNG contains 2 × 104 litre of natural gas.
- It mainly consist of methane. The composition of CNG is given below:
- Methane – 88.5 %,
- Ethane – 5.5 %, Propane – 3.7 %,
- Butane – 1.8 % and Pentane – 0.5 %.

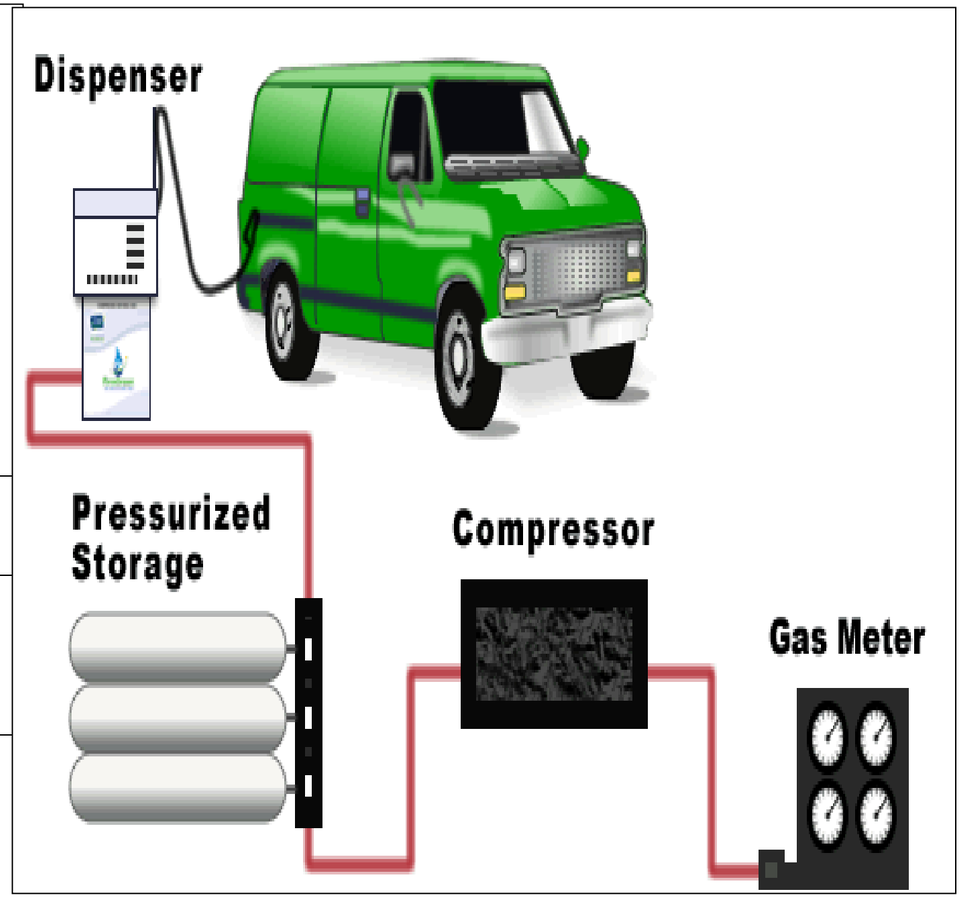
COMPRESSED NATURAL GAS (CNG)

Properties

- The cheapest, cleanest and least environmentally impacting alternative fuel.
- Vehicles powered by CNG produce less CO and hydrocarbon (HC) emission.
- Less expensive than petrol and diesel.
- The ignition temperature of CNG is about 550°C.
- CNG requires more air for ignition.

Uses

It is used as a substitute for petrol and diesel in automobiles



LPG

- LPG is obtained during the fractional distillation of crude oil or heavy oil as by product.
- LPG consists of light hydrocarbon like propane, butane and isobutane.
- This can be readily liquefied under pressure.
- It can be stored and transported easily in cylinders.

The average composition of LPG is given below:

- ✓ Propane - 24.7 %
- ✓ Butane - 38.5 %
- ✓ Isobutane - 36.7
- ✓ Others - 0.1 %

- Its calorific value is 27800 kcal. / m^3.

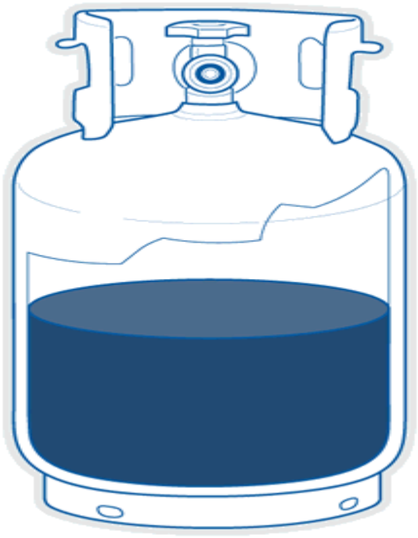
LPG

Properties

- LPG is easily controllable so it helps consumers to cook with desired heat or flame intensity.
- It is readily liquefied under moderate pressure.
- As a liquid, it looks a lot like water.
- It is colourless and odourless in its natural state.
- LPG at atmospheric temperature and pressure is a gas which is 1.5 to 2.0 times heavier than air.

Uses

- It is used as domestic and industrial fuel.
- It is also used as motor fuel.
- LPG is also used as a fuel in internal combustion engine.



Activity

- 206 B in a B?

Ans : 206 Bones in the human body

- Rhythm of eyes' city name in India?
- A. Chennai B. Nainital C. Srinagar D. Karnataka

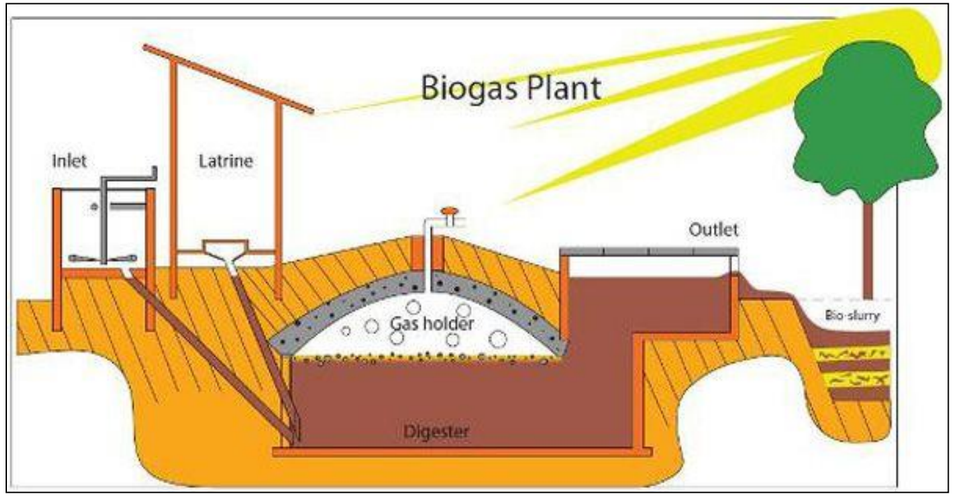
Rhythm of eyes'-**Nainital** in India.
No Zip – Chennai Mr. City - Srinagar
Do Acting - Karnataka.

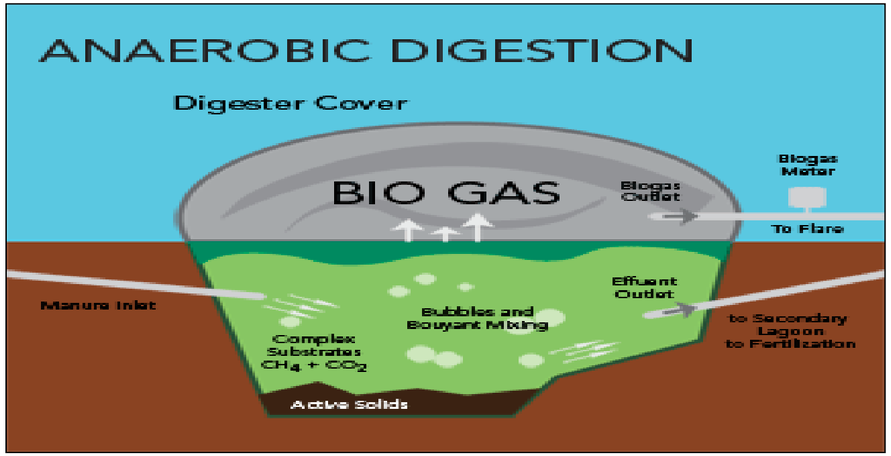
BIO GAS

- Biogas is a type of biofuel that is naturally produced from the decomposition of organic waste in the absence of oxygen.
- When organic matter, such as food scraps and animal waste, break down in an anaerobic environment (an environment absent of oxygen) they release a blend of gases called biogas.
- It is a renewable energy source
- It mainly consists of a varying proportion of CH_4 (methane) and CO_2 (carbon dioxide) and traces of H_2S, N, CO, O, etc

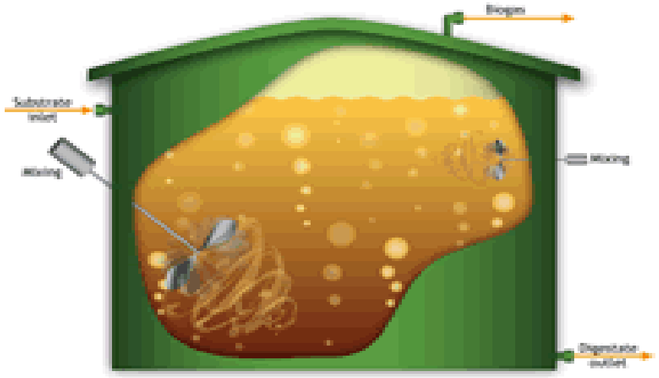
Composition

- Methane - 60-70%
- Carbon dioxide -30-40%
- Traces of H2S,NH4 & Water vapour.





BIO GAS



Properties

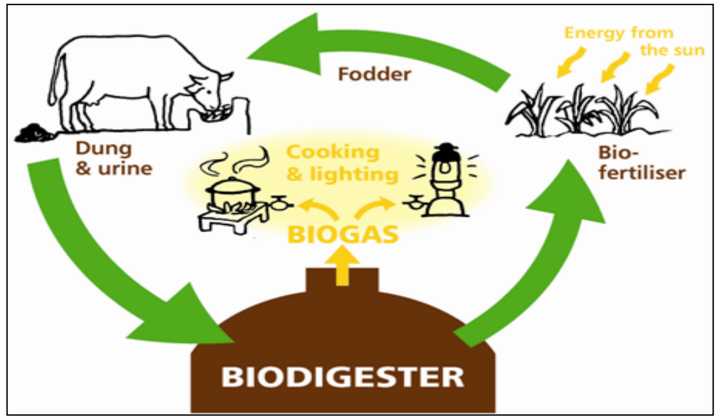
- It is about 20% lighter than air(Density is about 1.2mgs/Liter)
- Ignition Temperature is about 650-750^{o}C
- calorific value is 5000 kcal./m^{3}

Disadvantages

- Expensive
- Steel drum may rust
- Requires regular maintenance

Advantages

- High calorific value
- Clean fuel
- No residue produced
- No smoke produced
- Non polluting
- Economical
- Can be supplied through pipeline
- Burns readily-has a convenient ignition temperature.



Uses

- Domestic fuel
- For street lighting
- For generation of electricity
- If compressed it can replace compressed natural gas for use in vehicles

ASSESSMENT

1. **Mention the various components present in the CNG,LPG & Biogas**

2. **List out the advantages of LPG over CNG & Biogas.**

SUMMARY

REFERENCES

1. O.G. Palanna, “Engineering Chemistry ”Tata McGraw-Hill Pub. Co. Ltd, New Delhi.2017.
2. Wiley, “Engineering Chemistry”, John Wiley & Sons. InC, USA.
3. P.C.Jain & Monicka Jain, “Engineering Chemistry” , Dhanapat Rai Publising Company Pvt. Ltd. 2017.
4. R. Sivakumar and N Sivakumar, “Engineering Chemistry” Tata McGraw-Hill.Pub.Co.Ltd. New Delhi.2009.

THANK YOU