**UNIT-IV CHEMICAL FUELS Part – A**

1. Define the term Fuel. What are the requirements of a good fuel?

**2. What are chemical fuels? Give their classification with example**.

3. Define calorific value of fuel.What are the units of calorific value for gaseous fuels?

4. What are the advantages of gaseous fuels over solid and liquid fuels?

5. Write Dulongs formula for calculation of calorific value of fuel, write its usefulness.

6. **Define calorific value of a fuel. What is HCV & LCV?**

7. Gross calorific value of a fuel is 3500 cal/gm. If it contains 6.5%H2,

Calculate its net calorific value.

10. Calculate the weight of air (23% oxygen by weight) required for complete

combustion of 16Kg of methane.

11. Calculate the minimum weight of air required for complete combustion of 1kg of

fuel containing c=90%, H=3.5%, O=3% and rest is ash.

14. Sulfur is a poison tofuel. Justify the statement.

16. What is meant by knocking? How to improve anti knocking of fuel.

**17. Explain octane and cetane numbers of a fuel. What is their significance.**

18. What is unleaded Petrol? How is its Octane number improved? Discuss its advantages.

19. What is the approximate composition & calorific value of LPG?

20. What is the composition of CNG?

21. Give the uses and composition of diesel and petrol.

**PART-B**

26(a) A sample of coal contains 80% of carbon,15%hydrogen,and rest oxygen.

Calculate the weight and volume of air needed for complete combustion

of 5 Kg of coal. Air contains 21% of oxygen by volume, 23%by weight.

(b) Calculate its HCV and LCV.

27. A Producer Gas has following composition by volume CO2=8%; CO=27.6%; CH4=1.2%;N2= 52.6%; H2 = 10%; O2 = 0.6%. Calculate the gross Calorific Value of the Gas. (CV of H2 = 3100 Kcal/m3 , CO = 2970 Kcal/m3, CH4 = 9260 Kcal/m3)

28.. A sample on analysis by weight, is as follows,-C=90%, H=8%, S=0.5%,

O=1%, ash=0.5%.Calculate a) the minimum quantity of air required for

Complete combustion of 1Kg of fuel. ( Given the% of Oxygen in air = 23 by weight & 21% by volume)

29. Write the principle of fractional distillation of crude oil. What are composition and uses of important fractions obtained ie. Gasoline,diesel and kerosene.

29**. What is cracking? What is its significance**

**30. Explain moving bed catalytic cracking of heavy oil.**

**UNIT –V**

**POLYMER SCIENCE**

1. What do you understand by functionality of the monomer? Explain with examples.
2. **What are the basic requirements of a monomer(s) to take part in Addition polymerization and Condensation polymerization?**
3. What is graft co-polymer?
4. Bakelite is hard and brittle. Explain.
5. Can methane (CH4) undergo polymerization? Explain why?
6. What are natural and synthetic polymers? Give two examples for each.
7. Define Homo, Hetero and Co-polymers with examples.
8. Differentiate between homo polymers and copolymers with suitable examples.
9. Write the name and chemical structure of monomer of natural rubber.
10. How will you distinguish between homochain and hetrochain polymers?
11. Differentiate between Addition and Condensation polymerization.
12. What are the advantageous properties of polymers over metals.
13. What is plasticity and elasticity?
14. What are conducting polymers? Why do they conduct electricity.
15. Write any three important properties of conducting polymers.
16. What are resins?
17. What is the mechanism of addition polymerisation
18. Why is Bakelite used in electrical appliances?
19. PVC is soft and flexible, whereas Bakelite is hard and brittle. Why?
20. Why is Kevlar much less flexible than nylons?
21. What is the repeating unit for natural rubber? Give its molecular structure and name.

**PART B**

1. Explain Addition, Condensation polymerization reactions with examples.
2. Give the important properties of Plastics, Fibers and Elastomers, with examples.
3. Differentiate between thermoplastics and thermosetting resins.
4. Write the formulae of monomers from which the following polymers are formed:
5. Bakelite b) kevlar c) butyl rubber d) Buna S

(Molecular Structure required)

1. Differentiate between Addition and Condensation Polymerization with examples.
2. Short notes on plasticised and unplasticised PVC.
3. Write the properties and applications of Bakelite
4. What are silicone rubber?
5. Give equations for preparation, properties and uses of (i) Buna S, (ii) Butyl rubber
6. Write the preparation,properties and uses of Nylon6,6 and Kevlar.
7. Differentiate between elastomer and plastic.
8. What are intrinsic conducting polymers. Give examples.
9. What is the mechanism of conduction in polymers.
10. Write the structure of polyacetylene ,What are their important applications?
11. Classify the following polymers on the basis of action of heat on them: Bakelite, nylon, polyethelene, nylon, urea formaldehyde and Kevlar.

**UNIT –VI**

**BIODIESEL**

1. What is Biodiesel? What are its advantages over petro diesel?

2. Explain Transesterification in the preparation of Biodiesel?

3. what are advantages of biodiesel over petrodiesel.

**GREEN CHEMISTRY**

1.What is green chemistry?

2. Explain how green chemistry is different from environmental chemistry.

3.What are the principles of green chemistry? Give examples relating to atom economy and catalysis.

4. What is the requirement of Green Chemistry in todays scientific world? Illustrate with examples .

**COMPOSITE MATERIALS**

1 What are composite materials? What are their advantages? Give examples.

2. Write a note on fibre reinforced composites.

3. Describe the constituents of composite materials