**UNIT I**

**SPARK IGNITION ENGINES**

1. What are the stages of combustion in a SI engines?
2. What are the various factors that affect the flame speed?
3. Define normal combustion.
4. Define abnormal combustion and its consequences.
5. What is equivalence ratio?
6. Short note on SI engine equivalence ratio requirements.
7. Write the desirable qualities for SI engine fuel.
8. Explain the type of vibration produced when auto ignition occurs.
9. What is the method to detect the phenomenon of knocking?
10. List out some of the knock limited parameters.
11. Define performance number.
12. List the factors that are involved in either producing (or) preventing

knock.

1. List the parameters which are affecting knock in SI engine.
2. List the parameters in time factors that reduce the knocking.
3. List the composition factors in the knocking.
4. What are the objectives to be kept in mind during design of

combustion chamber?

1. What are the factors to be considered to obtain high thermal efficiency?
2. Write the different types of combustion chambering SI engine?
3. What are the components required in the fuel injection system?
4. What are the advantages of fuel –injection in an SI engine?
5. List the drawbacks of the carburetion.
6. What are the functional requirements of an injection system?
7. List some of the important requirements of automobile carburetors.
8. What are the general types of carburetors?
9. What are the essential parts, compensating device and additional

system (modern) carburetors?

1. Define carburetion.
2. What are the factors effecting carburetion?
3. What are the different types airs –fuel mixtures?
4. What are the different ranges of throttle operation?

**UNIT I**

**LONG QUESTION**

1. Discuses why a modern carburetor is being replaced by an injection

system in SI Engine.

2. Explain the factors that affect the process of carburetion.

3. What are different air –fuel mixture on which an engine can be operated?

4. Explain the following

1. Rich mixture, (2). Stoichiometric mixture (3). Lean mixture.

5. How the power and efficiency of the SI engine vary with air- fuel ratio for different load and speed conditions?

6. By means of suitable graph explain the necessary carburetor

performance to fulfill engine requirements.

7. Explain why a rich mixture is required for the following

1. Idling 2. Maximum power and sudden acceleration.

8. Describe briefly the MPFI system with a neat sketch.

9. Explain port injection and throttle body injection system.

10. Describe D- MPFI and L-MPFI injection system.

11. Briefly explain the stages of combustion in SI engines elaborating the

flame front Propagation.

12. Explain the various factors that influence the phenomena of knock in SI

engines.

13. Explain the effete of various engine variables on SI engine knock.

14. What are the various types of combustion chamber s used in SI engines? Explain them briefly.

**UNIT II**

**COMPRESSION IGNITION ENGINES**

1. What are the stages of combustion in C.I engine?
2. What is ignition delay period?
3. What are two delays occur in ignition delay period?
4. List the factors affecting the delay period?
5. Explain the effect of quality of fuel factor on the delay period?
6. Give a comparative statement various characteristics that reduces knocking in S.I and C.I engine (any four).
7. Write the classification of combustion chamber in C.I engine.
8. What is called direct injection type of combustion chamber?
9. What are the types of open combustion chamber?
10. What are the advantages and disadvantages of open combustion chamber type?
11. What is indirect injection type of combustion?
12. Write the classification of indirect injection chamber (divided

combustion chamber)

1. What are the applications of swirl chamber?
2. List the advantages and drawbacks of indirect injection chamber.
3. Why specific fuel consumption is high in indirect injection type

combustion chamber?

1. What is turbo charging?
2. What are the major parts of a turbocharger?
3. Explain the term turbo lag.
4. Explain the function of waste gate.
5. Why there is a large pressure differences across the injector nozzle are required:
6. What is called break up length?
7. What are the different designs of nozzle used?
8. What are the two types of photographic technique used?
9. Explain photographic techniques method.
10. List the droplet size depends on various factors.
11. Define flame development angle.
12. Define rapid burning angle.

**UNIT II**

**LONG QUESTION**

1. Bring out clearly the process of combustion in CI engines and also explain the various stages of combustion. What is delay period and what are the factors that affect the delay period?

2. Explain with figures various types of combustion chambers used in CI

engines.

3. Explain Turbo charging in CI engines.

4. Explain with heat sketch about the air vision.

5. What are the effects of trubocharging on CI engines?

6. Compare induction swirl with compression swirl with respect to their advantages and disadvantages.

7. What are the main factors affecting the penetration of the fuel spray in CI

engines?

8. Explain about the fuel spray behavior.

**UNIT III**

**ENGINE EXHAUST EMISSION CONTROL**

1. What are the major exhaust emissions?
2. What are the causes for hydrocarbon emission from S.I engine
3. What are the reasons for incomplete combustion in SI engine?
4. What are the reasons for flame quenching?
5. How the oil consumption increases in IC engines and what are the effects
6. Write a short note on carbon monoxide emissions
7. What is photochemical smog?
8. What are soot particles?
9. Which is the most effective after treatment for reducing engine emissions
10. What is a catalyst?
11. List the materials used as catalyst
12. Why catalytic converter called as three way converters
13. What are the types of ceramic structure used in catalytic convertor?
14. List out the drawbacks of catalytic converters
15. What are the methods of catalytic converters preheating?
16. List the invisible and visible emission.
17. What are the methods of measuring the following emission?

**UNIT III**

**LONG QUESTION**

1. Describe in detail the causes of hydrocarbon emissions from SI engines.

2. What are catalytic converters? How are they helpful in reducing HC, CO and NOx emissions?

3. Give a brief account of emissions from CI engines.

4. Explain the internationally accepted methods of measuring the following invisible emission.

5. Explain the terms i) Oxides of nitrogen (ii) Carbon monoxide (iii)

Unburned hydrocarbons

6. What is smoke and classify the measurement of smoke?

**UNIT IV**

**ALTERNATE FUELS**

* 1. Write the advantage and disadvantage of alcohol as a fuel.
  2. What is the problem with gasoline-alcohol mixture as a fuel?
  3. Write the sources for methanol.
  4. Writ e the source for ethanol.
  5. What are the techniques of using alcohol in diesel engine fuel?
  6. What are the methods are adopted for induction of alcohol into

intake manifold?

* 1. List the advantages of hydrogen as an IC engine.
  2. List the disadvantages of using hydrogen as a fuel.
  3. Write the methods for hydrogen can be used in SI engines.
  4. List the advantages and disadvantages of natural gas.
  5. Write the two types of LPG used in automobiles engine.
  6. What are the advantages of LPG?
  7. Write the disadvantages of LPG.
  8. Write the improvements required for the LPG vehicle in future.
  9. Compare the petrol and LPG.

**UNIT IV**

**LONG QUESTION**

1. Explain the reasons for looking for alternate fules for IC engines.

2. Explain alcohols as alternate fuels for IC engines bringing out their merits and demerits.

3. Explain the possibility of using reformulated gasoline and water gasoline mixture as alternate fuel.

4. Can alcohol be used for CI engines? Explain.

5. Explain with a neat sketch the surface-ignition alcohol engine.

6. What are the advantages and disadvantages of using hydrogen in SI

engine?

7. Explain the two methods by which hydrogen can be used in CI engine.

8. What is natural gas? List the advantages and disadvantages of using

natural gas as alternate fuels.

9. Give a brief account of LPG being used as an alternate fuel in SI engine.

10. What are the advantages and disadvantages of using LPG in SI engines?

11. Compare LPG and petrol as fuel for SI engines.

**UNIT V**

**RECENT TRENDS**

1. What is lean burn engine?
2. Why lean mixture is preferred in SI engine?
3. What are the modifications to be made to convert an existing engine as a lean burn engine?
4. How the stratified charge engine can be characterised?
5. List the advantages of the stratified charge engine.
6. What are the main disadvantages of the stratified charge engine?
7. Write short notes on plasma jet ignition system.
8. What are the factors that influence the operation of the plasma jet plug?
9. What are the reasons for automotive engines equipped with gasoline injection system?
10. What are the types of injection systems?
11. What are the objective of the fuel injection system?
12. What are the components of injection system?
13. Write notes on continuous injection system.
14. Explain the functions of the following components.
15. Write the advantages of homogeneous charge compression ignition

engine.

1. What are the fuels used in HCCI engines?
2. List the disadvantages of homogeneous charge compression ignition

engine.

**UNIT V**

**LONG QUESTION**

1. What is the necessity for gasoline injection? Explain with suitable sketch.

2. With neat sketch, explain the exhaust emissions with different air-fuel ratio lean burn spark ignition engines.

3. What do you understand by charge stratification? Explain the method of achieving the same with suitable sketches. Discuss the advantages and disadvantages of charge stratification.

4. Explain briefly plasma – jet ignition system.

5. What is a learn burn engine? What are the advantages of using learn

mixture in SI engine?

6. Explain the characteristics of Homogeneous charge compression ignition

engine.

7. Explain gasoline direct injection engine.