Section A

Unit 1
1) Describe Otto cycle.
2) Describe Diesel cycle.
3) What are “blow down” and “overlap period”.
4) What is the RPM of a slow speed Engine.
5) What do you understand by PV diagram.

Unit 2
1) Name few mountings on a 4 stroke Engine cylinder head.
2) What is the purpose of tell-tail hole in an entablature of an Engine.
3) Why are chocks needed and what are end and side chocks?
4) What are engine frames?
5) What functions do engine frames serve?
6) For what purpose tie-bolts are used?
7) What is the function of a cylinder cover?

Unit 3
1) What is a Supercharged Engine?
2) What is the purpose of Supercharging?
3) What are the methods adapted to supply scavenge air while maneuvering a two stroke engine?
4) What are the advantages of turbo charging?
5) What are the two important effects of charge air-cooling?
6) Why excessive cooling of air should be avoided?

Unit 4
1) What is a pre combustion Chamber?
2) Explain Effects of after burning.
3) Explain The function of a fuel injector.
4) What do you mean by SFC- specific fuel consumption
5) What do you mean by SLOC- specific lub. Oil consumption.

Unit 5
1) Why under piston space scavenge drain is provided.
2) What is the use of stuffing box lube oil drain tank?
3) How are the stuffing box ring segments held?
4) What do you mean by Primary explosion of an Engine crankcase.
5) What do you mean by Secondary explosion of an Engine crankcase.
Section B

UNIT-1
1) Classify IC engines according to a) Speed  b) Bore/ stroke ratio.
2) Explain briefly a) Spark ignition engine b) Compression ignition engine.
3) Draw the PV diagram of a four stroke engine & explain.
4) Draw the PV diagram of a two stroke engine & explain.
5) Name the a) Advantages b) Disadvantages of a cross head engine over trunk type.

UNIT-2
1) Name the forces applied to a bedplate?
2) State the following: a) Clearances to be recorded for piston rings b) Forces acting on it?
3) State what all methods the gudgeon pin is attached to piston.
4) What are the major stresses developed in the crankshaft.
5) Mention the normal defects found in cylinder heads.
6) Explain the purpose of the tie bolts.
7) With respect to cylinder liner state a) Causes of excessive liner wear b) Types of wear.
8) Explain the a) Factors affecting the degree and type of scaling b) The effect of scale deposition in a cooling water circuit.

UNIT-3
1) Explain the term super charging and turbocharging.
2) What is the effect of inefficient scavenging?
3) Why charge air is cooled and what are the benefits on engine performance?
4) Explain various methods of scavenging in a two stroke engine.
5) Explain 1) Under piston scavenging. 2) Pump Scavenging.

UNIT-4
1) Show how the chemical reaction of fuel takes place with oxygen during proper combustion & quantity of heat liberated.
2) Explain the term a) Compression Pressure b) Peak pressure.
3) Explain the term a) Injection delay b) Ignition delay
4) With reference to combustion what is a) atomization b) penetration?

UNIT-5
1) What are the safety devices provided to minimize damage due to crankcase explosion?
2) What are the indications of Scavenge fire?
3) What are different modes of firefighting arrangements provided on board to fight scavenge fire?
4) Describe the means of protection against EACH of the following engine faults in a vessel operating with UMS:
   (a) Crankcase explosion.
   (b) Scavenge fire.

Section C
UNIT-1
1) Compare slow speed, medium speed and high speed engine
2) Draw four stroke engine working principle and explain the cycle.
3) Draw two stroke engine working principle and explain the cycle.
4) Draw valve timing diagram of a four stroke engine and explain the cycle.
5) Draw valve timing diagram of a two stroke engine and explain the cycle.
6) Sketch two most common types of bedplates and name the engine makers who use them.

UNIT-2
1) List out the difference between crosshead and trunk type engine with diagram?
2) With simple sketch discuss what is a) Butt clearance b) Axial clearance c) Back clearance in piston rings. What are the effects of clearances being less or excessive.
3) What are the main causes of liner wear? Explain the term a) Clove Leafing b) Scuffing wear.
4) Sketch and describe hydraulically operated exhaust valve with air spring arrangement.
5) With reference to four stroke engine Cylinder head valves explain what is a) valve floating, b) bouncing c) how can it be reduced d) What is tappet clearance?
6) Sketch a tie bolt in position in a large crosshead engine, define the purpose of fitting tie
Bolt. What are the effects of running with loose tie bolts?

7) Sketch and describe main engine piston with short skirt & name the parts. Show the Direction of coolant. Discuss how it is ensured the crown receives an adequate supply of coolant.

8) Explain the advantages and disadvantages of using water and oil for piston cooling medium.

**Unit 3**

1) With neat sketch explain different type of Scavenging.

2) Explain the advantage and disadvantage of different scavenging system.

3) With reference to turbocharger, what is surging & its causes.

4) With respect to turbocharging sketch and describe what is a) Pulse system b) constant pressure system?

5) Give the merits and demerits of pulse and constant pressure turbocharging system.

6) Sketch and describe a turbocharger suitable for a diesel engine.

**Unit 4**

1) Draw the power and draw card and explain the effect of after burning.

2) Draw the power and draw card and explain the effect of late injection.

3) What liquid fuel (Heavy Oil) consists of & show the chemical reaction with Oxygen during combustion & quantity of heat liberated.

**UNIT 5**

1) What is scavenge fire and what are the causes of scavenge fire. How can it be prevented.

2) Describe the actions to be taken in case of scavenge fire.

3) Sketch and explain the working of a crank case oil mist detector.

4) Discuss how crankcase explosion takes place. Sketch the crank case relief door of a large main engine & name the parts.

5) Sketch & Describe a piston rod stuffing box incorporated in a two stroke crosshead diesel engine which serves to prevent sludge and dirty oil from entering the crankcase.