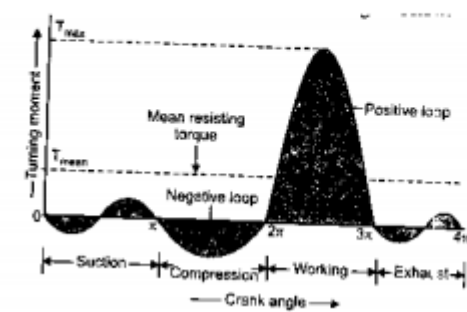


What is supercharging ? State advantages of supercharging.

Superchargers are pressure boosting devices (compressors) which increase the pressure of the air before inletting it get into cylinder of the internal combustion engine, and the process of increasing the pressure OR forcing more air to get into engine is called as supercharging. This gives each intake cycle of the engine more oxygen, letting it burn more fuel and do more work, thus increasing power.

Draw turning moment diagram for four stroke petrol engine and explain it in brief.

Turning moment diagram of four stroke engine:



During suction stroke, negative loop is formed as pressure inside engine cylinder is less than atmospheric pressure. During

compression stroke, work is done on gases therefore higher negative loop is formed. During expansion or power stroke, fuel burn & gases expand therefore large positive loop is formed & during this stroke we get work output. During exhaust stroke, work is done on the gas to expel it out of cylinder, hence negative loop is formed.

Explain with neat sketch working principle of Lobe compressor

Rotary Lobe type Air Compressor has two mating lobe-type rotors mounted in a case. The lobes are gear driven at close clearance, but without metal-to-metal contact. The suction to the unit is located where the cavity made by the lobes is largest. As the lobes rotate, the cavity size is reduced, causing compression of the vapor(air) within. The compression continues until the discharge port is reached, at which point the vapor exits the compressor at a higher pressure.

Give the classification of air-compressors

Classification of Air compressors: 1. According to principle: a. Reciprocating air compressors b. Rotary air compressors

2. According to the capacity a. Low capacity air compressors b. Medium capacity air compressors c. High capacity air compressors

3. According to pressure limits a. Low pressure air compressors b. Medium pressure air compressors c. High pressure air compressors
4. According to method of connection a. Direct drive air compressors b. Belt drive air compressors c. Chain drive air compressors
-

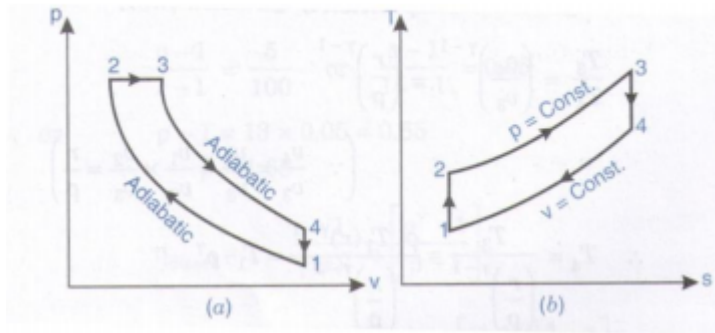
Define :

i) Brake thermal efficiency - It is defined as the ratio of heat equivalent to brake power per unit time to the heat supplied to the engine per unit time $\text{Brake thermal efficiency} = \frac{\text{B.P.}}{\text{mf} \times \text{C.V.}}$

ii) BSFC - It is the mass of fuel required to develop 1 kW brake power for a period of one hour. It is inversely proportional to the brake thermal efficiency. $\text{BSFC} = \frac{\text{Mass of fuel consumed in kg/hr}}{\text{Brake power in kW}}$

Draw P-V and T-S diagram for Diesel cycle. Name the processes involved in it.

Diesel Cycle on P-V and T-S diagram :



Processes :

- 1-2 : Isentropic compression
 - 2-3 : Heat addition at constant pressure
 - 3-4 : Isentropic expansion
 - 4-1 : Heat rejection at constant volume
-

State the applications of gas turbine (any four).

Following are the applications of gas turbine

1. It is used for electric power generation.
 2. It is used for locomotive propulsion.
 3. It is used for ship propulsion.
 4. Gas turbine is used in aircrafts.
 5. It is used for supercharging for heavy duty Diesel engines.
 6. Used in turbo jet and turbo-propeller engine.
 7. It is used for various industrial purpose such as in steel industry, oil and other chemical industry.
-

Enlist different uses of compressed air.

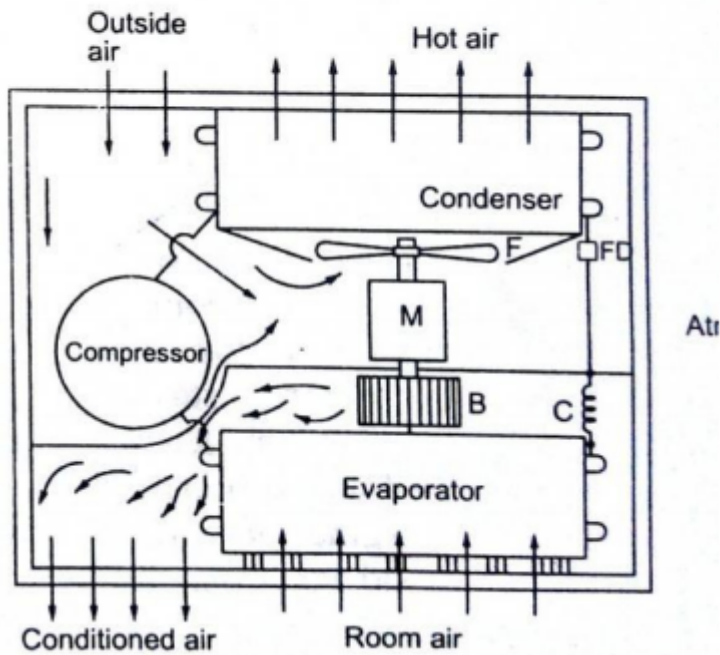
Following are the applications of compressed air

- 1) To drive air motors in coal mines.
 - 2) To inject fuel in air injection diesel engines.
 - 3) To operate pneumatic drills, hammers, hoists, sand blasters.
 - 4) For cleaning purposes.
 - 5) To cool large buildings.
 - 6) In the processing of food and farm maintenance.
 - 7) For spray painting in paint industry.
 - 8) In automobile & railway braking systems.
 - 9) To operate air tools like air guns.
 - 10) To hold & index cutting tools on machines like milling
-

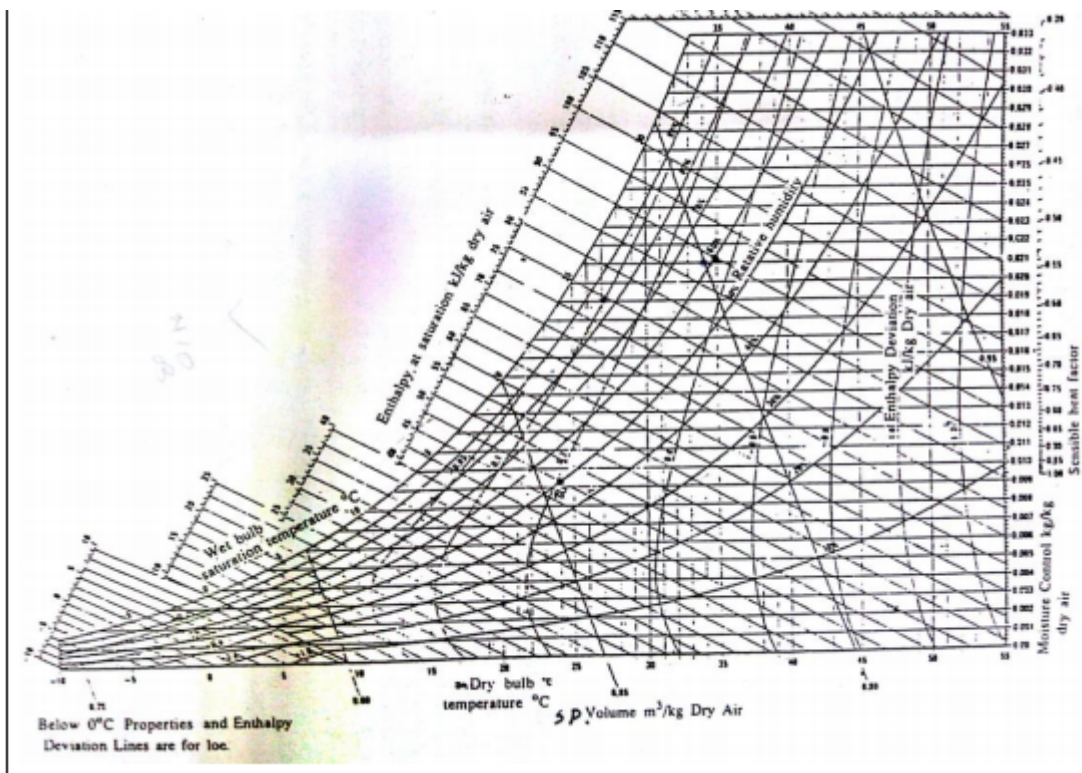
Draw only a neat labelled sketch of window air-conditioner.

Sketch of window air conditioner

B = Blower
C = Capillary tube
FD = Fitter/Dryer
M = Motor



Sketch a psychrometric chart and show the following properties of air on it.....



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