Published on *Mechanical Engg Simple Notes ,Solved problems and Videos* (https://mechdiploma.com)

Classify gas turbine on the basis of

Classification of gas turbine on the basis of

a. Cycle of operation 1. Open cycle 2. Closed cycle

b. Thermodynamic cycle 1. Brayton or Joules cycle 2. Atkinson cycle 3. Erricsson cycle

c. Application 1. For supercharging of IC engine 2. For locomotive propulsion 3. For ship propulsion 4. Industrial application 5. Air craft engines 6. Electric power generation

d. Combustion process 1. Continuous combustion 2. Explosion combustion

---

Classify air compressors

Classification of Air compressors:

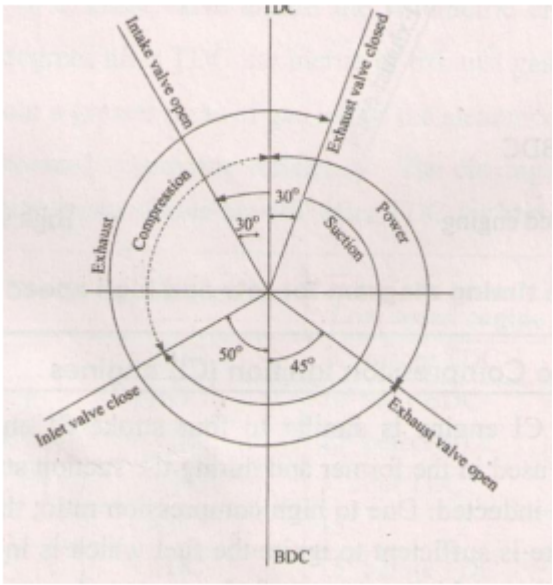
1. According to principle: a) Reciprocating air compressors b) Rotary air compressors 2. According to the capacity a. Low capacity air compressors b. Medium capacity air compressors c. High capacity air compressors 3. According to pressure limits a. Low pressure air compressors b. Medium pressure air 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

---

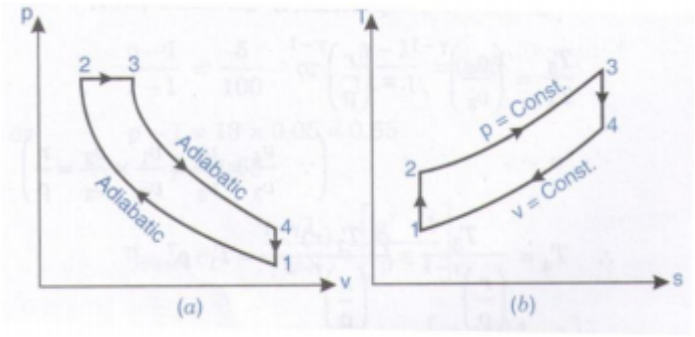
Draw actual valve timing diagram for 4-stroke petrol engine.

Valve timing diagram of four stroke diesel engine



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 :

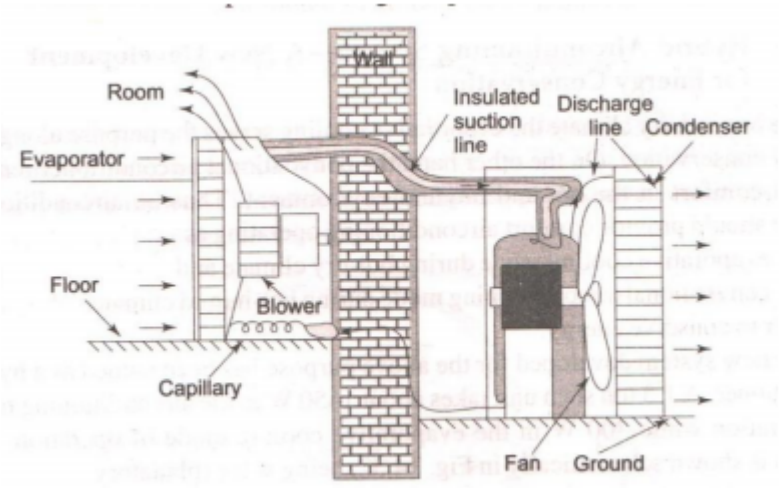


Processes : 1-2 : Isentropic compression 2-3 : Heat addition at constant pressure 3-3 Isentropic expansion 4-1 Heat rejection at constant volume

---

Draw neat sketch of split air conditioner and name the parts.

Split Air-conditioner labeled Diagram 02 for figure 02 for labeling



Explain the principle of Ram jet with neat sketch

Ram jet – (Fig – 2 marks ; explanation –2 marks) - Ram jet is also called as ‘Athodyd or flying stove pipe’. - It is a steady combustion or continuous flow engine & has the simplest construction of any propulsion engine. - Consist of inlet diffuser, combustion chamber & exit nozzle. - Air entering into ram jet with supersonic speed is slowed down to sonic speed in supersonic diffuser, increasing air pressure. - The air pressure is further increased in the subsonic diffuser. - The fuel injected into the combustion chamber is burned with the help of flame stabilizers.

Define (i) Dew point temp. (ii) Wet bulb temp

i) DPT – Dew point temperature tDP - It is the temperature at which air water vapour mixture starts to condense. D.P.T. of mixture is defined as the temperature at which water vapours starts to condense.

Ii) WBT - Wet bulb temperature - tWB - It is the temperature recorded by thermometer when its bulb is covered with wet cloth known as wick and is exposed to air.

A diesel engine has a compression ratio of 14 and cut-off takes place at 6% of stroke....

(b) The air std. efficiency of diesel cycle

$$\eta = 1 - \frac{1}{r_c^{\gamma-1}}\left[\frac{\rho^{\gamma}-1}{\gamma(\rho-1)}\right]$$

Cut off ratio $\rho = 1 + 0.06[r_c - 1]$

$= 1 + 0.06[14-1]$

$= 1.78$

$$\eta = 1 - \frac{1}{14^{1.4-1}}\left[\frac{1.78^{1.4}-1}{1.4(1.6-1)}\right]$$

$= 1 - 0.34(1.478)$

$= 48.68\%$.

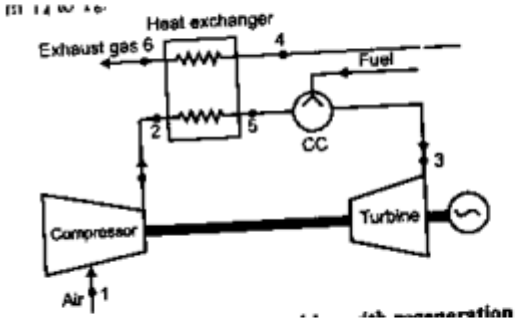
What is the necessity of purification of air in compressor and how it is done ?

Necessity of purification of air in compressor :

State different methods for improving thermal efficiency of gas turbine and explain any one.

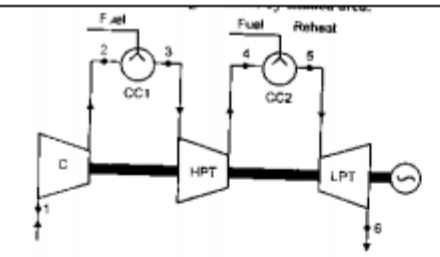
Methods to improve thermal efficiency of gas turbine [illegible]
of any one – 2 marks)

1) Regeneration – This is done by preheating the compressed air before entering to the combustion chamber with the turbine exhaust in a heat exchanger, thus saving fuel consumption.



2) Improving turbine output: this can be done by

(a) Reheating : The whole expansion in the turbine is achieved in two or more stages &reheating is done after each stage.

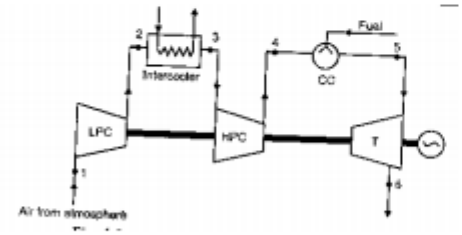


(b) Increasing the value of maximum cycle temp.

(c) Improving turbine efficiency by improving design.

3. Reducing compressor input: By

(a) Intercooling : Compressor work is reduced by intercooling the air between the compressor stages.



(b)By lowering inlet temp to compressor

(c) By increasing compressor efficiency

(d) Water injection at inlet to compressor

Pages

« first
‹ previous
...
2
3
4
5
6
7
8
9
10
...
next ›
last »