

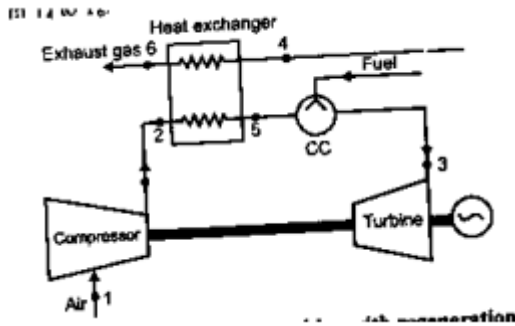
Explain with neat sketch working principle of turbo jet engine.

Working principle of Turbojet: shows the schematic of turbojet engine. It has a diffuser section at inlet for realizing some compression of air passing through this section. Due to this air reaching compressor section has pressure more than ambient pressure. This action of partly compressing air by passing it through diffuser section is called “ramming action” or “ram effect”. Subsequently compressor section compresses air which is fed to combustion chamber and fuel is added to it for causing combustion.

List the methods to improve thermal efficiency of gas turbine and explain any one of them in detail

Methods to improve thermal efficiency of gas turbine

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

State advantages of jet propulsion over other systems.

Advantages of jet propulsion - 1. Higher mechanical efficiency due to absence of reciprocating parts. 2. The weight of gas turbine per kW power developed is low since the working pressures are low requiring lighter construction. 3. Can produce much more power at much higher altitudes where drag is less so higher speeds are possible and they are more efficient. 4. Reliability is one of the elements of success for jet engines. They only have a couple of moving parts and almost no vibration.

Explain with neat sketch working principle of Ram jet engine

Ramjet has no compressor as the entire compression depends upon compression. Function of supersonic & subsonic difference to convert the kinetic called the ram pressure.

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.
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State the advantages of closed cycle gas turbine over open cycle gas turbine

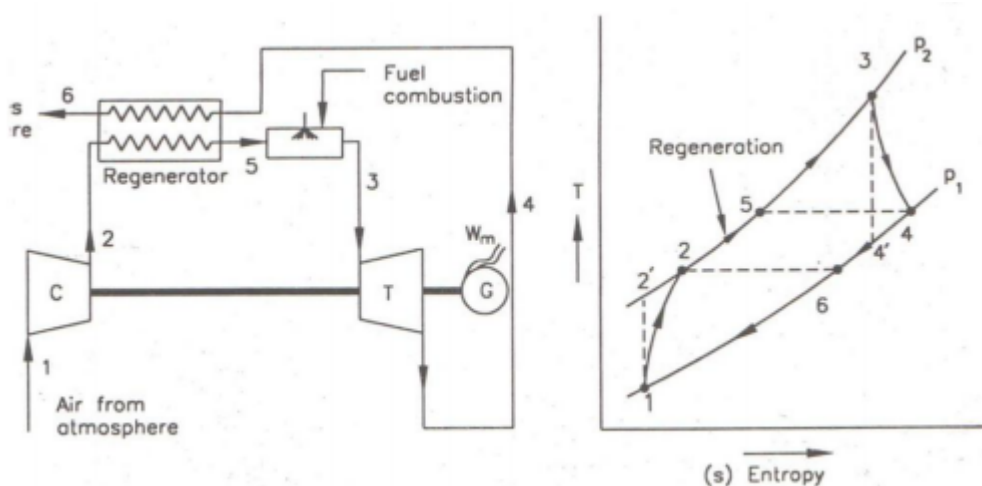
Advantages of closed cycle gas turbine over open cycle gas turbine: (i) It has higher thermal efficiency for the same minimum and maximum temperature limits and for the same pressure ratio. (ii) Since the heating is external, any kind of fuel even solid fuel having low calorific value may be used. (iii) There is no corrosion due to circulation of combustion product. (iv) As the system is a closed one there is no loss of the working fluid. (v) The size of the turbine will be smaller compared to an open cycle gas turbine of the same output.

Turbojet engine working principle

Turbojet engine working principle

Explain regeneration method to improve thermal efficiency of gas turbine with the help...

Regenerative method to improve thermal efficiency in gas turbines : The exhaust gases a lot of heat as their temperature is far above the ambient temperature . The heat of exhaust gases can be used to heat the air coming from the compressor thus reducing the mass of the fuel supplied in the combustion chamber as shown in the figure. This method is called regenerative method.



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
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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.

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