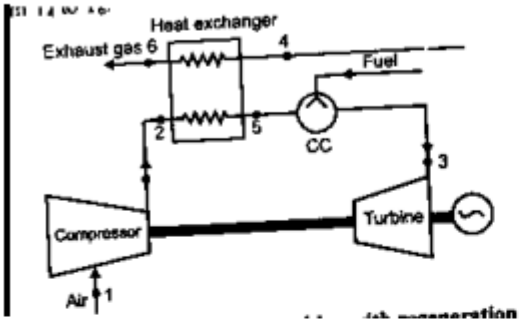

Explain any one method to improve thermal efficiency of gas.....

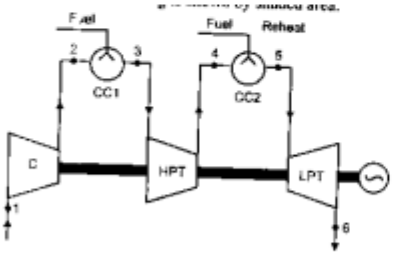
Methods to improve thermal efficiency of gas turbine

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) 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.

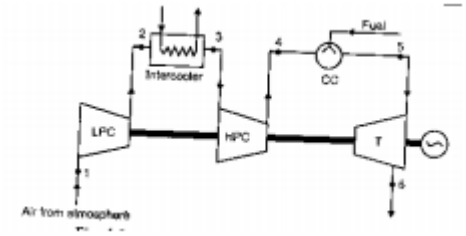


(b) Increasing the value of maximum cycle temp.

(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

Compare between window air conditioner.....

Sr No	Split AC	Window AC
1	It incorporates two units as indoor and outdoor (evaporator indoor and compressor condenser outdoor)	It is a single unit that incorporates all necessary components
2	Noise level to occupants is very less	Higher noise level
3	There is need of copper connector between indoor and outdoor units	No need of copper connector
4	Installation is easy as only a hole for connector is required	It requires more space (window) to install this AC
5	Technician / professional necessary for installation	Not necessary
6	Because cooling unit is separate, it allow the designer to take up more powerful AC	For a fixed space a specific window AC only can be installed
7	Preferable for large cooling space	Preferable for small rooms

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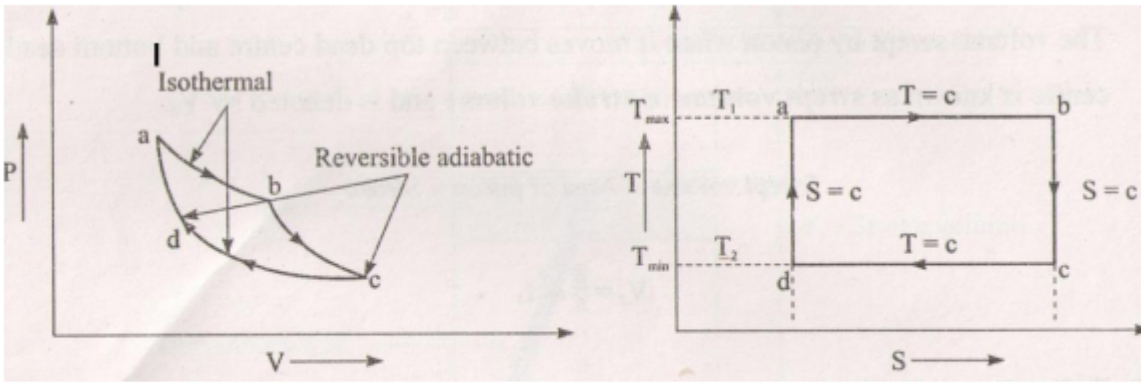
Represent Carnot cycle on P-V and T-S diagram

Representation of Carnot Cycle on P – V and T - S diagram



Process 1-2:- Isentropic or reversible adiabatic Compression process.

Process 2-3:- Reversible Isothermal heat addition process.

Process 3-4:- Isentropic or reversible adiabatic expansion process.

Process 4-1:- Reversible Isothermal heat rejection process.

Why majority of air compressors available in the market are multi.....

Multi-stage air compressors feature many benefits and so, they are mostly used in the market. Some of those features are given below 1. Higher air pressures are achievable by multi-staging (about 175 PSI against 120 PSI in single stage) 2. It requires less power for running 3. Light weight cylinders can are used 4. Leakages are less 5. Overall discharge temperatures are lower 6. Intercooler increases the efficiency of unit 7. It has a greater durability 8. Many multi-stage air compressors have the crankcase cast separate from the pump cylinders, which makes it easier to repair. 9.

State the following term...

(i) Tons of refrigeration – It is the quantity of heat required to remove from one ton of ice within 24 hours when initial condition of water is 0^{0}.

One ton of refrigeration is equivalent to 210 kJ/ min or 3.5 kW

(ii) **C.O.P.** – is the ratio of heat extracted from refrigerator to the work done on the refrigerator.

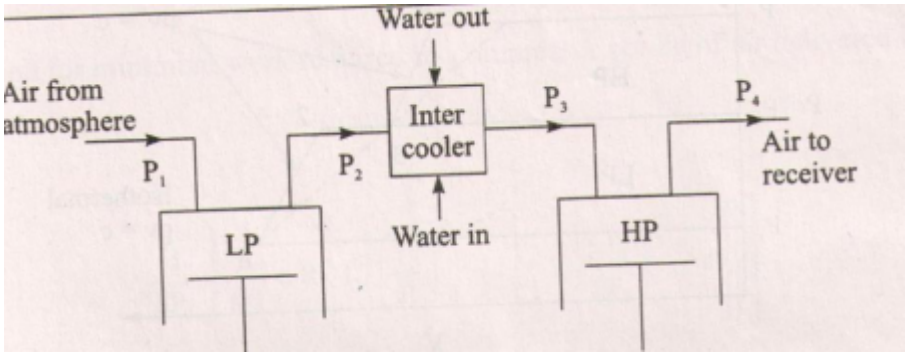
COP of refrigerator = $\frac{Q}{W} = \frac{Amount\ of\ heat\ extracted}{Work\ done}$

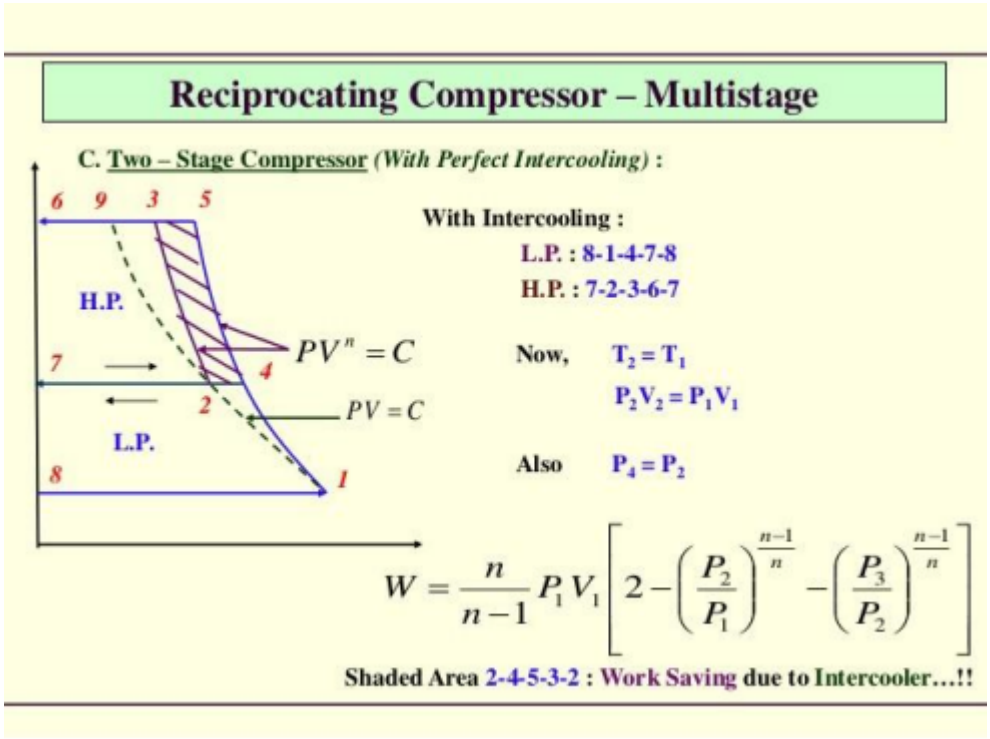
Explain the working of 'Turbo-Prop' engine with neat sketch.....

The main components of turbo-prop engine are a propeller, gear reduction unit, a compressor, a combustor, gas turbine and the nozzles. In this engine 80 to 90% of the total propulsive thrust is generated by the gas turbine and the remainder is developed by the expansion of the gases in nozzles. Due to this the power generated in the gas turbine is used for driving the compressor and the propeller, while in case of turbojet engines the turbine power is only used to drive the compressor and the auxiliaries.

What do you mean by 'Perfect Intercolling' ? Explain with the help of P.V. diagram.

Intercooling : In perfect intercooling the temperature of air after passing out of intercooler is same as that of the temperature of air before compression of LP cylinder.



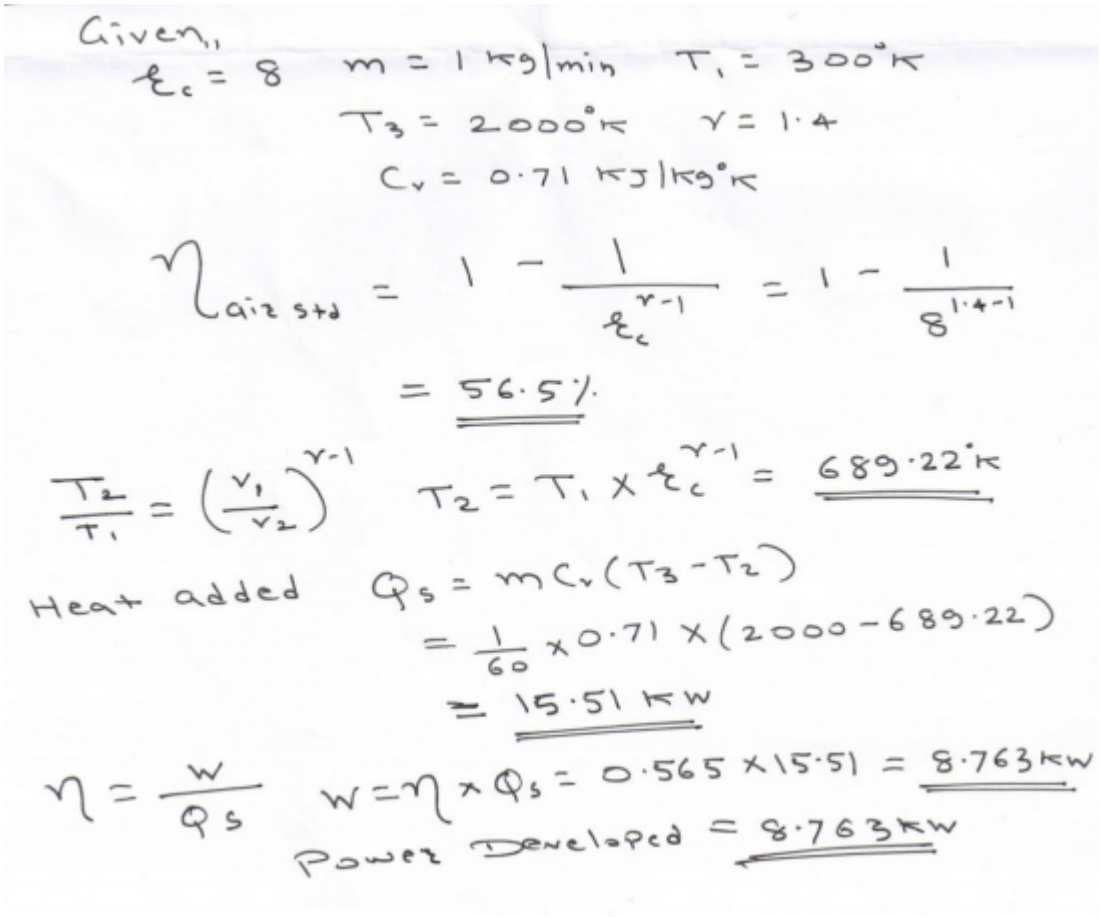


Explain with neat block diagram the working of 'Vapour Absorbtion Cycle'.....

Working of Simple Vapor absorption system: A Simple Vapor absorption system consists of evaporator, absorber, generator, condenser, expansion valve, pump & reducing valve. In this system ammonia is used as refrigerant and solution is used is aqua ammonia. Strong solution of aqua ammonia contains as much as ammonia as it can and weak solution contains less ammonia. The compressor of vapor compressor system is replaced by an absorber, generator,

reducing valve and pump. The heat flow in the system at generator, and work is supplied to pump.

A petrol engine working on constant volume cycle has compression ratio.....



Name any four additives used in lubricants ? State their advantages.....

(1) Detergents – To keep engine parts, such as piston and piston rings, clean & free from deposits. (2) Dispersants – To suspend & disperse material that could form varnishes, sludge etc that clog the engine. (3) Anti – wear – To give added strength & prevent wear of heavily

loaded surfaces such as crank shaft rods & main bearings. (4) Corrosion inhibitors – To fight the rust wear caused by acids moisture. Protect vital steel & iron parts from rust & corrosion.

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