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$C_P \perp (a) r$

Answer :-

(i) Ideal Gas law :-

We have four equations which given below.

$$P \times V = C_b, \quad \frac{V}{n} = C_a, \quad \frac{V}{T} = C_c, \quad \frac{P}{T} = C_g$$

Now for making ideal gas law we will combined these four equations.

Ideal gas $\frac{law}{i}$ Equation :-

$$\frac{PV}{nT} = R$$

We get this equation which is called ideal gas law.

Constant (R):-

The gas constant (R) is a combination of all the individual gas law constants.

Equation :-

The ideal gas law is more commonly written

as

$$PV = nRT.$$

The previous gas laws involved change in either P, V, T or n.

$$\frac{P_1}{T_1} = \frac{P_2}{T_2} \qquad\qquad P_1 V_1 = P_2 V_2$$

$$\frac{V_1}{n_1} = \frac{V_2}{n_2} \qquad\qquad \frac{V_1}{T_1} = \frac{V_2}{T_2}$$

Use of Ideal gas law:-

The ideal gas law is used for any gas system, anytime.

Units:-

The units using for this equation is given below.

(1) Pressure = atm
(2) Volume = liters.
(3) Temperature = K.

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(ii) ## Dalton's law of Partial pressure:-

Statement :-

The total pressure of a mixture of gases is the sum of the partial pressures of it's components.

The partial pressure of a gas in a mixture is the pressure that the gas would exert if the gas alone.

Mathematically :-

The dalton's law of partial pressure mathematically written as :

$$P_T = P_A + P_B + P_C.$$

b) ☞ Carnot cycle :-

Any engine that uses only these two types of processes is called a carnot engine.

Explanation :-

The carnot cycle is an ideal gas cycle that consists of the two adiabatic processes $(Q=0)$ and the two isothermal processes $(\Delta E_{th} = 0)$.

These are the two types of processes allowed in a

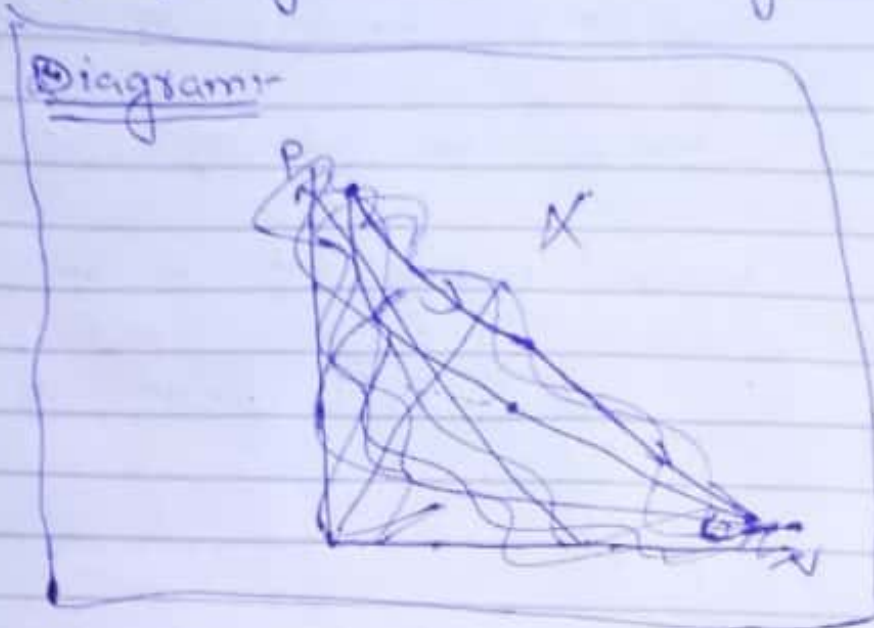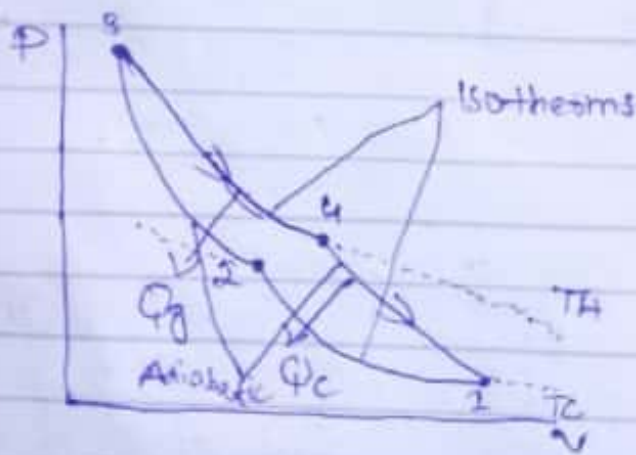4

perfectly reversible gas engine.

Diagram:-

Diagram:-

As a Carnot cycle operates,

1. The gas is isothermally compressed at Tc. Heat energy $Q_c = |Q_2|$ is removed.

2. The gas is adiabatically compressed with $Q = 0$, until the gas temperature reaches TH.

3. After reaching maximum compression, the gas expands

...thermally at temperature T_H. Heat $Q_H = Q_{34}$ is transferred into the gas.

The gas expands adiabatically, with $Q = 0$, until the temperature decreases back to T_c.

Work is done in all four processes of the carnot cycle, but heat transferred only during the two isothermal processes.
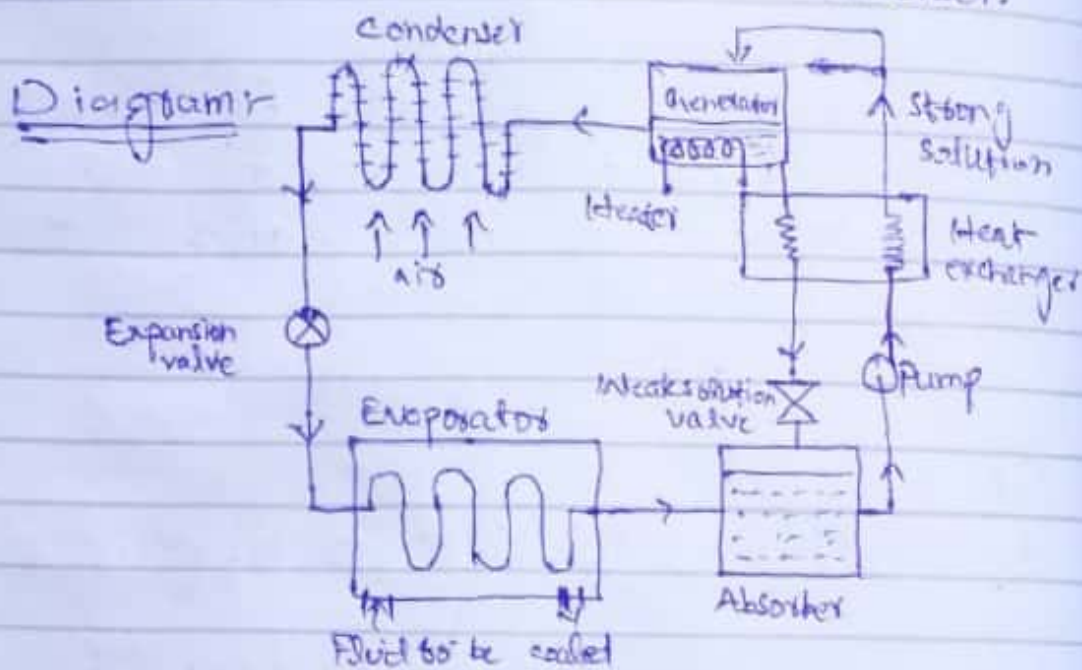

Q2 (b)

Answer:- <u>Vapour absorption refrigeration:-</u>

<u>Principle:-</u> Here the heat energy is utilized to achieve the refrigeration. An electric heater or steam is used to add the heat to the refrigerant for its evaporation. Also an absorber, a pump and a generator are used to complete the cycle.

<u>Construction:</u>

Here a throttle valve is connected between and evaporator and a condenser. One pump is connected between an absorber

and a separator. Water filled in absorber and it is connected to evaporator. The evaporator is kept connected in the storage room. The separator is connected to the condenser.

Diagram:-

Working:-

Dry ammonia vapour from the evaporator enters the absorber containing water where it is absorbed by the water becomes a strong ammonia solution with an increase in temperature. Then the strong ammonia pumped by a pump to the generator where it is heated by coil. so ammonia vaporizes and separate out from water. It is driven through condenser. It is collected in

receiver. Then it is passed through throttle valve where it is expanded. Then it is enter to evaporator kept in storage room.

Q3

Answer:- Difference between Fire tube boiler & Water tube boiler:-

Fire tube boiler:-

These types of boilers consist of a nest of tubes through which the hot gases flow. The tubes being surrounded by water. Since, the contact area of the water hot gases is greater than in the case of shell tube type, hence it has the ability to generate larger quantities of steam. It has efficiency definitely greater than shell tube type. The Merine boilers and locamative boilers are its examples. Velox scotch boiler is a modern fire tube boiler.

Water tube boiler:-

These are the

most   efficient   boilers. Water   runs
in   the   tubes   and   the
hot   gases   surround   it,
hence   the   heat   transfer
area   is   low   value.

_____

Q 4:-

Answer:-

Stroke:-

A   stroke   is   movement of
the   piston   from   top   dead
centre   (T.D.C)   to   bottom   dead
centre   (B.D.C)   or   from   B.DC
to   & T.D.C.

Four Stroke Engine Working:-
                              Four
stroke   cycle   engine   works   on
four   stroke   principle   ie   there
are   four   strokes   in   one   cycle
of   such   engine.   Four   stroke
cycle   engine   is   also   called
otto   cycle   engine.
The   four   strokes   of   otto
cycle   engine   are.

1) **Intake Stroke:-**

On the intake stroke, the piston is moving down due to which a partial vaccum is produced inside the cylinder. The intake valve is open, therefore, atmospheric pressure pushes the fresh air fuel mixture in the cylinder through the intake valve.

2) **Compression Stroke:-**

When the piston reaches the B.D.C on the intake stroke, the intake valve closes. Then the piston moves up on the compression stroke. During this stroke the both valves are closed, therefore, no air-fuel mixture can enter or goes out of cylinder. When the piston move up the mixture inside the cylinder is compressed.

3) **Power Strokes Engine:-**

During the compression stroke, the piston

moved up when it gets near T.D.C., the air-fuel spark plug produces a spark which ignite the compressed air-fuel mixture. Due to which the temperature and the pressure of gas rises. The pressure becomes about 600 psi which push the piston down. As during this stroke, we obtain power therefore it is called power stroke.

The piston transmit this power through the connecting rod to the crank due to which the crankshaft rotates. This rotary motion is carried through shafts and gears to the car wheels due to which wheel turns and car moves.

(4) Exhaust Stroke:-

During this power stroke as the piston reaches B.D.C, the exhaust valve opens. Then the piston moves up on exhaust stroke, when the piston moves up, is pushed

out the the burnt gases from
... cylinder. through exhaust
..lve closes and intake valve
..ens for the second cycle.

Q5:-(a)

Answer:-

Difference b/w petrol engine & a
diesel engine :-

Petrol Engine:-

Petrol engines are the
spark ignition engines back
the compressed air-fuel is
ignited by a powerful spark
at the exact time is
spark is produced by the
ignition system. There are
spark plug filled on the
combustion chamber. The transistor
is used to distribute the
voltage spark to the every
cylinder according to engine
firing order at exact time
in petrol engine, the compression

Diesel Engine:-

The diesel engines are called the compression compressed in the combustion chamber. On the compressed heated air, fuel is sprayed on the heated air by an injector, at the exact time, so the ignition is accomplished by compression. Injectors are filled on the top of the combustion chamber. High pressure fuel is distributed by the injection pump so every cylinder according to the engine fuiseng order at the exact time.

In diesel engines, the compression ratio is higher.

(b)

Answer:-

The two stroke engines rickshaws are banned in several provinces of Pakistan because it is more pollutants than the four stroke engines. This rickshaws were banned in

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punjab in 200x to free
the environment from pollution.

2 2 (a):-

Answer:-

When we buying the
refrigerator is to keep our
food cool. Because in hot
days the bacteria attack
the food and it become
dirty. Therefore, we use
refrigerator to decrease the
bacteria attack. That it stay
fresh longer. The other purpose
is that we bake ice
from its in summer to
keep our water cool by
using ice. The ice is very
important in hot season.
That's the key factors of
buying refrigerator.