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Q.1)

a)

i) Ideal gas law:-

It is also called the general gas equation, is of the equation of state of a hypothetical ideal gas. It is a good approximation of the behaviour of many gases under many conditions although it has several limitations. It was first stated by "Emile Clapeyron" in 1834.

If we combine all these equations, we get the ideal gas law.

Mathematical form:-

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

$$\frac{PV}{nT} = R \rightarrow \text{Gas Constant}$$

The gas constant "R" is a mathematical combination of all the individual gas law constants (C_b, C_c, C_g, C_a)

$$PV = nRT$$

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P = pressure = atm
V = volume = liters
T = Temperature = K

ii) Dalton's Law :-

This law states that in a mixture of non reacting gases, the total pressure exerted is equal to the sum of the partial pressures of the individual gases.

"John Dalton" in "1802".

Mathematically :-

The pressure of a mixture of non reactive gases can be defined as the summation.

$$P_{\text{total}} = \sum_{i=1}^n P_i$$

OR

$$P = P_1 + P_2 + P_3 + \dots + P_n$$

where P_1 , P_2 and P_3 are represent the partial pressures of each component.

P_1 = partial pressure of gas A

P_2 = partial pressure of gas B

P = Total pressure.

Q1

(b)

Carnot Cycle:-

This is a theoretical ideal thermodynamic cycle proposed by French physicist "Sadi Carnot" in 1824 and expanded upon by others in the 1830s and 1840s. It provides an upper limit on the efficiency that any classical thermodynamic engine can achieve during the conversion of heat into work or conversely the efficiency of a refrigeration system in creating a temperature difference by the application of work to the system.

When a system is taken through a series of different states and finally returned to its initial state. In the process of going through this cycle the system may perform work on its surroundings.

A system by moving a piston acting as a heat engine and the system undergoing Carnot cycle is called a Carnot heat engine.

Four processes of Carnot Cycle

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are isothermal heat addition
(happens in a boiler)

Isentropic expansion (happens in a turbine)

Isenthalpic heat rejection (happens in
a condenser)

Isentropic compression (happens in a
compressor)

Q2:-

a)

The following are key factors
while buying a refrigerator.

i) Style :-

Modern fridges come in
a variety of layouts.

The most common style are
side-by-side, freezer on top
or freezer on bottom models.
each one has benefits and
drawbacks.

ii) Refrigerator features:-

New refrigerator
features add value and
convenience. They also tend
to come at a high price
tag. You'll want to consider
adjustable shelves allow you

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to customize your space and door-water and ice dispensers and popular with many people.

iii) Energy Efficiency:

Newer refrigerators use less energy, which translate into savings for you and less environmental impact. Look for refrigerators that are Energy Star certified.

iv) Dimensions:

most refrigerators fit between two counters. So make sure you measure the width. You'll also want to look at the depth of the appliance and its door swing. Keep in mind that your new fridge also will have to get through all doorways on the way to its new home.

v) Warranty Card:

warranty is most important and essential for buying a refrigerator. your refrigerator must have more the 1 year warranty and you must check the warranty card.

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vi) Finish:-

Option for finishes seem to grow every year. stainless steel is most popular, include black stainless and bronze, are growing in appeal, in addition to these new finishes, lower priced classic white and black finishes are attractive in some kitchens.

Q 2:→

b→

Answer → Absorption of vapour in refrigerator system:-

The vapour absorption refrigeration system comprise of all the processes in the vapor compression refrigeration system like compression, condensation, and expansion and evaporation.

i) Condenser:-

Just like in the traditional condenser of the vapor compression cycle, the refrigeration enters and the condenser in high pressure and temperature and get condensed. it is just like water cool type.

1) Expansion:-

when the refrigerant passes through the expansion valve, its pressure and temp. reduces suddenly.

2) Evaporation:-

The refrigerant at very low pressure and temp. enters the evaporator and produces the cooling effect. in the vapour compressor, but in the vapor absorption cycle, this refrigerant flows to the absorber that acts as the suction part of the refrigeration cycle.

3) Absorber:-

The absorber is an a sort of vessel consisting of water that acts as the absorber refrigerant thus the absorber consist of the weak solution of the refrigerant and absorbent when ammonia from the evaporation enters and absorber, it is absorb by the absorbent due to which the pressure inside the absorbent reduce further leading to more flow of the refrigerant.

1) Pump:-

when the absorbent absorbs the refrigerant strong solution of refrigerant absorbent is foamed. This solution is pumped by the pump at high pressure to the generator. Thus pump increases the pressure to 10 bar.

2) Generator:-

The refrigerant ammonia solution in the generator is heated by the external source of heat. This is can be steam, hot water or any other suitable source due to heat the temp of solution increase.

The pressure of the refrigerant increased in the generator. Hence it is considered to be equivalent to the compression part of compressor.

Q3 :-

Answer :-

Water tube:-

water tube is a type of boiler in which water circulates in tubes heated externally by the fire

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Fuel is burned inside the furnace creating hot gas which heats water in the system generating tubes. In smaller boilers, additional generating tubes are operated in the furnace, while larger utility boilers rely on the water filled tubes that make up the walls of the furnace to generate steam.

A water tube boiler was presented by Blakely of England in 1766 and was made by Dallery of France in 1780.

The heated water rise into then rises into the steam drum. Here, saturated steam is drawn off the top of the drum. In same service the steam will reenter the furnace through a superheater to become super heated.

super heated steam is define as steam that is heated above the boiling point at the given pressure.

Cool water remain in the bottom of the steam drum.

Fire tube boiler:-

A fire tube boiler is a type of boiler in which hot gases pass from a fire through one or more tubes running through a sealed container of water. The heat of the gases is transferred through the walls of the tubes by thermal conduction, heating the water and ultimately creating steam.

Difference b/w water and fire boilers:-

The boilers are divided into two main parts water boiler and fire boilers. The main difference b/w these two boilers are in fire tube boiler the flue gases flow and in water tube boiler water flows from the shell and in water tube boiler water flows from the tubes and the flue gases from the shell or passes over the tube.

State the meaning of the word "Stroke"
& describe the working of a D4 stroke
again?

Stroke:-

A Stroke is movement of the piston from top dead Centre (T.D.C) to the bottom dead Center (B.D.C) or from (BDC) to T.D.C.

Four Stroke Engine

Four Stroke cycle engine work on four stroke principle. There are four strokes in one cycle of such engine. Four stroke cycle engine is also called four cycle engine.

Four Stroke engine.

(i) Intake
(ii) Compression

(iii) Power
(iv) Exhaust.

1) Intake:-

It is also known as induction or suction. This stroke of the piston begins at top dead center (T.D.C) and ends at bottom dead center (B.D.C). In this stroke the intake valve must be in the open position while the piston pulls in a fuel mixture into the cylinder by producing a vacuum through its downward motion. The piston is moving down as air is being sucked in by the downward motion against the piston.

2) Compression:-

The stroke begins at B.D.C or just at the end of the suction stroke and ends at T.D.C.

In this stroke the piston compresses the air fuel mixture in preparation for ignition during the power stroke.

(below). Both the intake and exhaust valves are closed during this stage.

Exhaust:-

Also known as outlet. During the exhaust stroke, the piston, once again, returns from B.D.C to T.D.C. While the exhaust valve is open. This action the spent air fuel mixture through the exhaust valve.

Q5

(a)

Answer:

Petrol Engine:-

gasoline engine
is an internal combustion engine with spark-ignition, designed to run on petrol and similar fuels.

In most petrol engine the gas and fuel is mixed after compression. The pre-mixing was formerly done in a carburetor but now it is done by electronically control fuel injection except in small engines where the cost of electronics does not justify the added engine efficiency.

The spark ignites it, causing combustion the expansion of the heat combustion gases pushes the piston during the power stroke.

Diesel Engine:-

The diesel engine also known as (compression ignition) it is an internal combustion engine in which ignition of the fuel is

Caused by the elevated temp. of the air in the cylinder due to the mechanical compression. This contrasts with spark-ignition engines such as petrol engine.

Diesel engine work by compression only the air. This increase the air temp inside the cylinder to such a high degree that atomised diesel fuel injected into the combustion chamber with the fuel being injected into the air just before combustion the dispersion of the fuel is uneven. This is called homogeneous air fuel mixture.

Difference b/w petrol / diesel engine:

The difference lies in the spark plug. Diesel engines don't have ~~any~~ the main difference between diesel and petrol engine is that petrol engine use spark plug to ignite the air fuel mixture while diesel engine rely ~~on~~ solely on heavily compressed diesel engine is more powerful than petrol engine.

Q5 :-

b) :-

Answer: Two ⁰² stroke engine :-

As the name implies, the two stroke engine only requires two piston movements (one cycle) in order to generate power. The engine is able to produce power after one cycle because the exhaust ~~and~~ intake of the gas occurs simultaneously.

• 02 stroke engine are banned :-

vehicles are pollution in common in growing metro-pollutant areas through out the world to eliminate their impact in air quality the government of Pakistan promulgated an order all 02 stroke engines from the roads.

2 stroke engines are not fuel efficient and emit more pollution than the four stroke engine.

2 stroke motorcycle are banned in Pakistan and

are not available new only
more these motorcycles and
rickshaws require auto lube
for burning and they
end up polluting the
environment.

The only reason is pollution
2 stroke engines make
more pollution
motorcycles and rickshaws are
banned in pakistan due
to pollution. and no new
2 stroke engine will
make in pakistan.

not only in pakistan but
all over the world 2
stroke engines are banned.