QUESTION:- 1

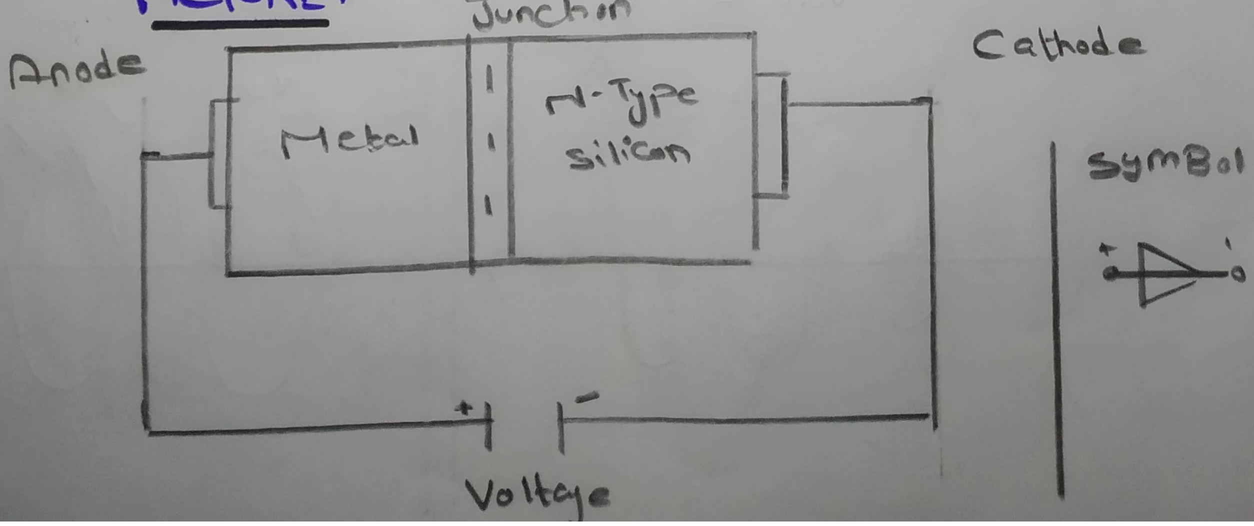
Answer:-

DIODE:- A device two terminals, typying allowing the flow of current in one direction.

FUNCTION: is to allow an electric current to pass in one direction called diode forward direction while blocking it in opposite direction is reverse direction

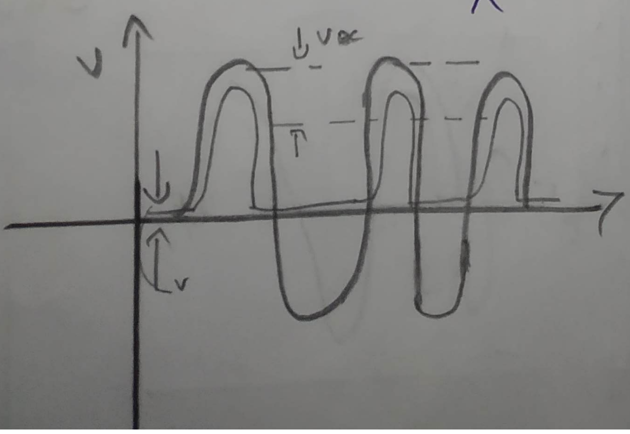
FORMATION:- A diode is formed by joining two equivalently Joped P-Type and N-Type semi-Conductor.

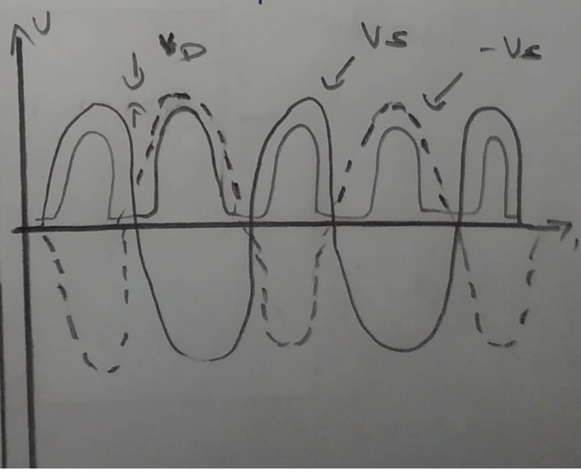
FIGURE:



DIFFERENCE:-

HALF WAVE RECTIFICATION	FULL WAVE RECTIFICATION
=> One diode is used	=> Two diode or two Junction diode used
=> Ordinary transformer is used	=> Centre trap transformer is used
=> Efficiency 40.6%	=> Efficiency 81.2%
=> The value $I = \frac{I_o}{2}$	=> $I = \frac{I_o}{\sqrt{2}}$
=> It convert half cycle of applied AC signal into dc.	=> It convert whole cycle.
=> $V_{dc} = \frac{V_m}{\pi}$	=> $\frac{2V_m}{\pi}$





QUESTION:: 1 B

ANSWER:-

GIVEN:- 323g of water

$T_1 = 15.0C^\circ$

REQUIRED:- specific heat = 0.129 J/g°C

$T_F = ?$

Solution:-

- lose heat = Gain heat

$-[(C_{(AU)})(mass)(\Delta T)] = (C_{H_2O})(mass)(\Delta T)$

$-[(0.129 J/g^\circ C)(97g)(T_F - 78.5C)] = (4.18 J/g^\circ C)(387)(T_F - 15$

$-125 T_F + 9.82 \times 10^3 = 1.35 \times 10^3 T_F - 2.02x$

$3 \times 10^4 = 1.36 \times 10^3 T_F$

$T_F = 22.1C^\circ$

QUESTION: 2

ISOMETRIC PROCESS:

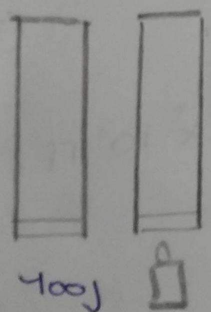
It is also called Constant - Volume process.
=> It also called isochoric process.
Constant Volume $V = 0$

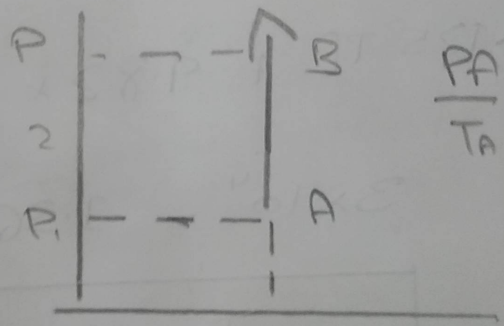
$W = 0$

$Q = U + W^0$ so that $Q = U$

Heat in = increase in internal energy
Heat out = Decrease in internal energy

EXAMPLE:





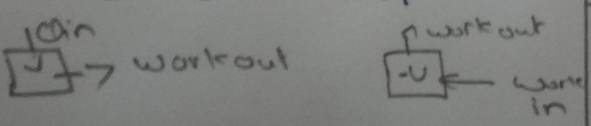
$\frac{P_A}{T_A} = \frac{P_B}{T_B}$

Heat input increase P with Con V

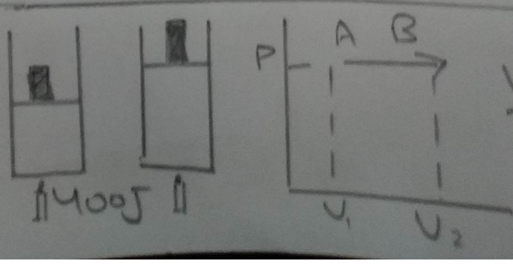
400J input increase internal energy by 400J and zero work done

Constant Pressure = 0

$Q = U + W$ But $W = PV$



Heat in = W_{out} + increase in internal energy + decrease in internal energy

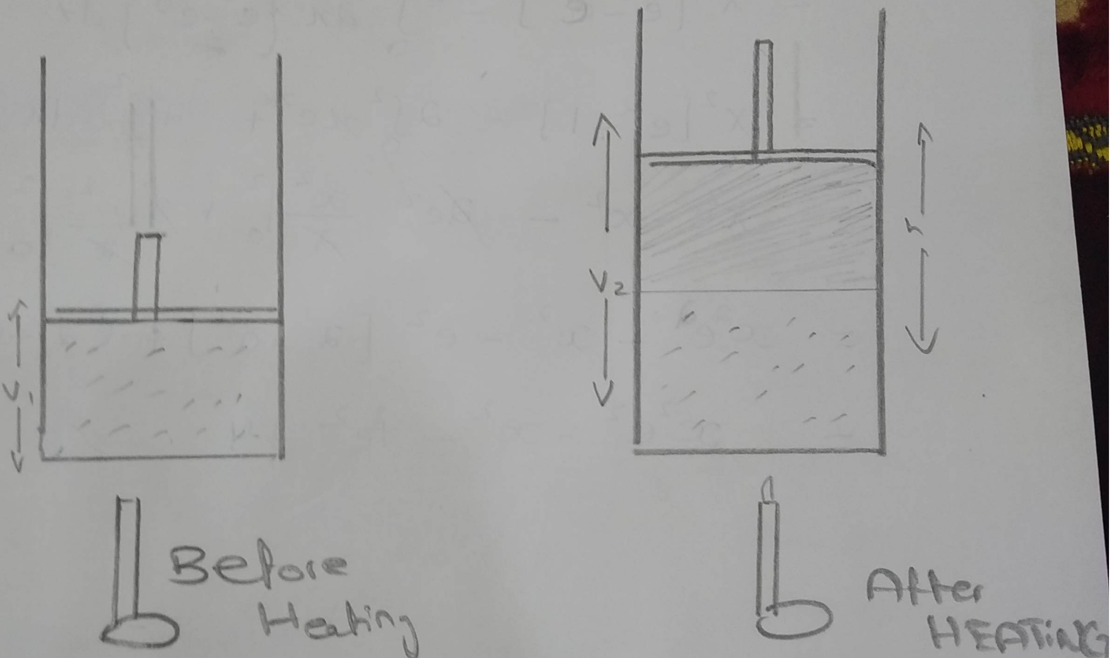


$\frac{V_A}{T_A} =$

ISOBORIC PROCESS:-

He supplied at constant pressure is known isobaric process.

=> No Pressure changes takes place during supply of heat of system.



According To First law of thermodynamics:-

P= Pressure	$q_P = \Delta E + \text{work}$
E= Energy	$q_P = \Delta E + P\Delta V$
T= Temperature	$q_P = E_2 - E_1 + P(V_2 - V_1)$
V= Volume	$q_P = E_2 + PV_2 - E_1 - PV_2$
H= heat	$q_P = (E_2 + PV_2) - (E_1 + PV_1)$
	$q_P = \Delta H$

$(E + PV = H)$

OR

$$q_P = \Delta E + P\Delta V = \Delta H$$

ISOTHERMAL PROCESS:

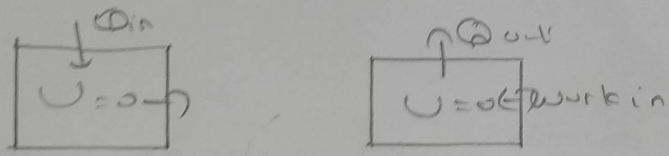
Constant temperature $T = 0$

$U = 0$

$Q = U + W$

and

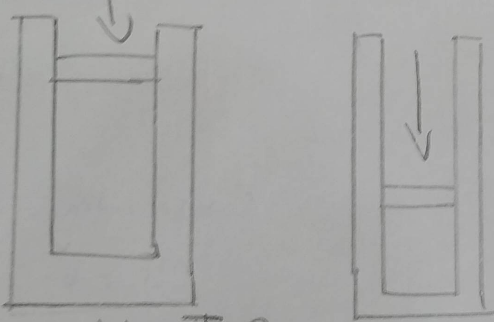
$Q = W$



Net heat input = work output

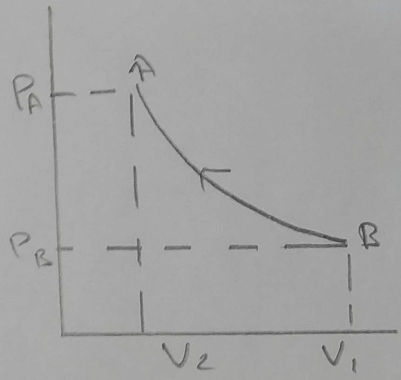
EXAMPLE:-

work input = Net Heat out



$U = T = 0$

$P_A V_A = P_B V_B$

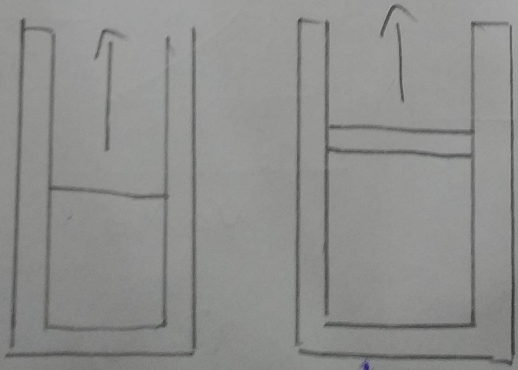


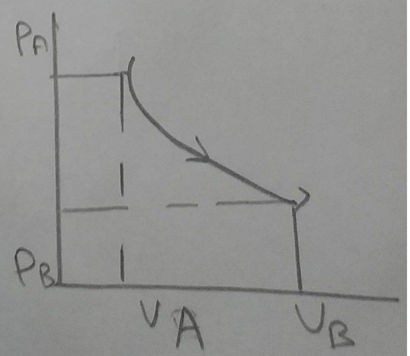
Slow temperature

Constant temper

No change in U

EXPANSION:-





$U = T = 0$

$W = nRT\, V$

$P_A V_A = P_B V_B$

QUESTION:- 2(B)

ANSWER:-

GIVEN:-

$w = 600J$

$T_c = 300k$

$T_H = 500k$

REQ:

actual efficieny = ?

work done = ?

Sol:

To find efficieny :-

$$e = 1 - \frac{T_c}{T_H}$$

$$e = 1 - \frac{300k}{500k}$$

$$e = 40\%$$

$$\text{Actual } e = 0.5e$$
$$= 20\%$$

$$e = \frac{W}{Q_H}$$

$$W = eQ_H = 0.20(600J)$$

$$\text{work} = 120J$$

QUESTION :- 3

ANSWER :- DIFFERENCE

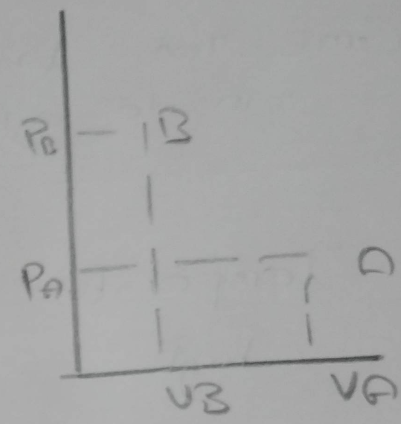
INTERNAL COMBUSTION ·E	EXTERNAL COMBUSTION ·E
=> Combustion took place inside cylinder	=> Combustion take place outside glinder
=> Temperature is high	=> Temperature is lower
=> Pressure is very higher.	=> Pressure is lower
=> It is lighter in weight	=> Heavy in the weight
=> Efficieny is higher	=> Efficiency is lower
=> less time required to start	=> more time required to start.
=> Pressure generated inside the engine is due to combustion	=> Pressure generated inside the engine is due to stre of water.

QUESTION: 3(B)

ANSWER:

Solution:-

$AB = 0$



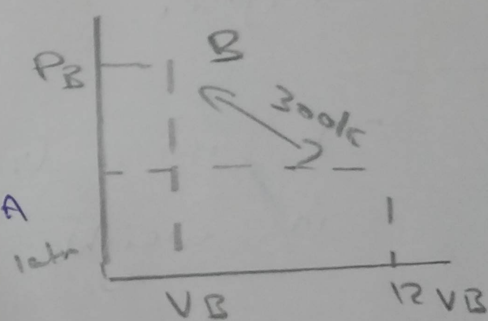
To find PB

$P_A V_A = P_B V_B$

$$P_B = P_A \left(\frac{V_A}{V_B} \right)^{\gamma}$$

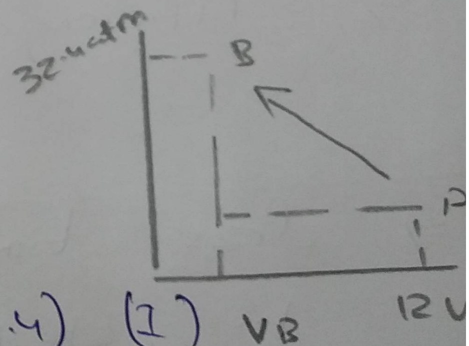
$P_B = 32.4$ atm

OR $P_B = 324$ kPA



To find TB

$$\frac{P_A V_A}{T_B} = \frac{P_B V_B}{T_B}$$



$$\Rightarrow \frac{1 \times 12}{300\,K} = \frac{(32.4)\,(1)}{T_B}$$

$T_B = 810\,K$

QUESTION :- 4

ANSWER:-

CONDUCTION	CONVECTION
In Conduction the heat transfer take place between objects by direct Contact	In convection the heat transfer takes within fluid.
The heat transfer takes place due to the difference in temperature	The heat transfer occurs due to defference in density
Heat transfer Conduction is slow	Heat transfer Convection is faster
The heat transfer occurs through a heated solid object	The heat transfer occurs through intermidate object
It does not follow the law of reflection refraction	It also doesnot follow both laws.

QUESTION:- 4

ANSWER:-

Solution:-

$$Q_{water} = -Q_{pb}$$

$$m_{water} C_{water} \Delta T_{water} = -(m_{pb} C_{pb} \Delta T_{pb})$$

$$125(4.18)(T_F - 23) = -75(0.13)(T_F - 435)$$

$$522.5\,T_F - 12017.5 = -9.75\,T_F + 424.25$$

$$+9.75\,T_F + 12017.5 = +9.75\,T_F + 12017.5$$

$$532.25\,T_F = 12441.75$$

$$\boxed{T_F = 30.5C}$$

QUESTION:- 5

Answer:-

Given:-

$T_1 = 15\,C$
$T_2 = 4\,C$
$L = 0.25\,m$

Required:-

Solution:-

The inner and outer surface of flat concrete roof electricticaly heated home are maintaind at speeified temperature during night.

Accumption:- 1. Steady operating conditions exists during the entire night since the roofs temperature remain constant.

2. Constant properties can use for roof.

Analysis: Nothing that heat transfer through the roof is

condition ... ... of

$$A = 6m \times 8m$$
$$= 48m^2$$

The steady rate of heat transfer through the roof is determined by

$$Q = \frac{kA(T_2 - T_2)}{L}$$

$$= \frac{(0.8)(48)(25.0)}{0.25}$$

$$= 3840 kw$$

$$\boxed{= 3.84 kw}$$

=> The amount of heat lost through the roof during at 10 hours period its cost determined from

$$Q = Q \Delta T$$
$$= (3.84 kw)(10h)$$
$$\boxed{= 38.4 kwh}$$

So Cost per day = (Amount of energy) (unit cost o

$$= (38.4 kwh)(\$0.2 / kwh) \boxed{= \$7.68}$$

Cost/month = Cost/dy × 30 days
$$= 7.68 \times 30 \quad \boxed{= \$230.4}$$