Q No# 01@

DIODE

- Has Two Terminals,
- Limits Current to one direction.
- diode have an anode and a Cathode
- Positive Current normally flow to anode to the cathode.

- Diodes are useful for protecting circuitry from harmful voltage or currents.

- Diodes are a basic building block of the charge-collection element in many detectors.

03

Q No 10 (b)

Solution

$= T = 785^\circ C$

$= mass = 97.0\ g$

$T = 15.0^\circ C$

$mass = 323\ g$

Loss heat = Gain heat.

$= -[(CAU)(mass)(\Delta T)] = [(CH_2O)(mass)(\Delta T)]$

$= [(0.129\ J/g^\circ C)(97g)(T_1 - 785^\circ C) =$

$(4.184\ J/g^\circ C)(323g)(T_f - 150^\circ C)]$

$$= -[(12.5)(T_f - 785^\circ C)] = (1.35 \times 10^3)(T_f - 15^\circ C)$$

$$= -12.5 T_f + 9.82 \times 10^3 = 1.35 \times 10^3 T_f - \frac{2.02 \times 10^4}{10^4}$$

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

$$\boxed{T_f = 22.1^\circ C}$$

Q#2b Steam engine 600 J
head 500 K
Temp 300 K.

Sol

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

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

$$e = 40\%$$

Actual $e = 0.5e_i = 20\%$

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

(6)

$W = eQ_H = 0.20(600)$

$W_{work} = 120\,J$

Q #36 A diametic 300 KJ

Sol

$\Delta Q = 0$ Find P_B

$$P_a V_a^{\gamma} = P_B V_B^{\gamma}$$

Solve P_B:

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

$P_B = 32.4$ atm

or

3284 KPa

Find T_B: $\frac{P_A V_a}{T_A} = \frac{P_B V_B}{T_B}$

(8)

$$\frac{(1\,atm)(12\,V_B)}{(300\,K)} = \frac{(32.4\,atm)\,1\,V_B}{T_B}$$

$$T_B = 810\,K$$

Q(a)(b) a 75-piece of lead.

S.h = 0.130 J/g °C

Initialy 455 °C

Set int 125.0 g

Sol

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

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

$= 125(4.18)(T_f - 23) = -75(0.13)(T_f - 455)$

$= 522.5 T_f - 12017.5 = -9.75 T_f + 4241.25$

10

$+ 9.75T_f + 12017.5 + 9.75T_f + 12017.5$

$32.25T_f = 16258.75$

$$\boxed{T_f = 30.5^\circ C}$$

(11)

Q.No# Q.No# 5a

Sol

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

$$Q = KA(T_1 - T_2)/L = (0.8)(48)(25-0)/0.25$$

$$= 3840W$$

$$W = 3.84 KW$$

$$Q = Q \cdot \Delta t = (3.84 KW)(10h)$$

$$= 38.4 KWh$$

(12)

Cost/day = (amount of energy)(unit cost of energy)

$= (38.4\ kWh)(\$0.2/kWh)$

$= \$7.68$

$Cost/m = (cost/day) \times (30\ day/month)$

$= \$7.68 \times 30$

$= \$230.4$

#02 @ (1) Isobaric process.
(2) Isometric process.
(3) Isothermal process.

→ (1) An Isobaric process is a thermodynamic process

∴ $\Delta P = 0$. The heat transfered to the system does work but also changes the internal energy of the system using the convention. by the first law Thermodynamic where w is work, U is internal energy & Q is heat.

2) ISOBARIC Process

An I.P is a Thermodynamic process in which the Temp. of a system remains Constant. The Transfer of heat in to or out of the system happens so slowly that Thermal Equilibrium is maintain.

3) Isothermal process is a thermodynamic process in which the temperature of a system remains constant The Transfer of heat into or out of the system happens so slowly that Thermal Equilibrium is maintained.

Q#3a Internal & External Combustion.

External engines have a working fluid that is heated by the fuel. Internal combustion engines relay on the explosive power of the fuel with in the engines to produce work. In Internal Engine to produce work. Internal Combustion engines. The explosion pushes piston or expels hot high pressure gas out of the engine at great speeds.

3)

a)