**Q/ Define the followings?**

1. Energy Balance 2- Convective Heat Transferring 3- Units

4- Cp 5- Heat Exchanger 6- Force

**Q/ Answer the following questions.**

1. What is Enthalpy? What is the relation between it and environment Temperature?

Write the equation by which Enthalpy can be calculated.

1. When fat is present in a solid or liquid material, the specific heat above freezing point can be estimated by: ………….................................., ………………………,

………………………., and ……………………

**Q/ Enumerate for the following:**

1. Design of Heat Exchanger.
2. Kinds of Energy.
3. Types of Heat Exchangers.

**Q/ Solve the following problems:**

1. A heat exchanger system used to cool down a fluid from 425o Kelvin to 320o Kelvin, using another fluid which enters the system with a temperature of 180o Kelvin and leaves with a temperature of 230o Kelvin. Calculate the transferred thermal energy when you know that the heat transfer surface area is 2.50 m2. Assume the heat transfer coefficient is 4000 $\frac{W}{m2.K}$ .
2. Calculate the specific heat of mutton roast containing 13% protein, 22% fat, and 65% water.
3. In a kitchen of 28 oC, a chef uses a rectangle pan (w: 25cm, l: 30cm) to make an omelet, the stove is 450o kelvin, and temperature of the pan and the contents is 275o kelvin. The pan’s thickness is 4mm. Determine the heat transfer. (thermal conductivity= 200 $\frac{W}{m.k}$).