Quantity of heat rejected from the system in evaporater $Q_2 = m * C_{pw} * \Delta T$

= 2.38 * 10 -3* 1.005 * 13

= 0.1297 KW

Coefficient of performance C O P = 0.1297 / 0.1035 = 1.25

Capacity of air conditioner :

Volume of water inside the vessel $V_w = L* b * h$

= 0.35 * 0.35 * 0.2
= 0.0245 m^3

Mass of water $M_w = \rho_w * v_w$

= 1000 * 0.0225
= 24.5 Kg.

Mass flow rate of water = 24.5 / 3600

= 0.0068 Kg/sec

Quantity of heat removed
$Q_{r1} = M_w * C_{pw} * (T_{w\,1} – T_{w\,2})$

$T_{w1} = 28\ ^0C$; $T_{w2} = 12\ ^0C$

= .0068 * 4.186 * (28 – 12)
= .45543 KJ / Sec.

Capacity of water cooling unit

= .45543 / 3.5
= .13012 T O R

Cooling capacity of room Cooler: Mass of air = $\delta_a * A_d * V_a$

$A_d = \pi / 4 (d^2) * h$

$V_a = (\pi * d * N) / 60$

= $1.2*\pi / 4 * 0.21^2 * (\pi * 0.21* 1360) / 60$

= 0.6209 Kg / Sec.

Assume that fan efficiency = 80 %

Therefore Ma = 0.6209 * 0.8

= 0.49692 Kg / Sec.

From the psychrometric chart;

DBT 1 = 37 ^0C

WBT 1 = 22 ^0C

DBT 2 = 26 ^0C

WBT 2 = 16 ^0C

From table;

h 1 = 65 KJ / Kg; h 2 = 45 KJ / Kg

Heat rejection $Q_r = M_a * (h1 – h2)$

= 0.49692 * (65 – 45) Q_r = 9.9344 KJ / Sec.

Cooling capacity of room cooler 9.9344 / 3.5

= 2.8384 T O R

4. Air Conditioning

Air conditioning means conditioning of air for maintaining specific conditions of temperature, relative humidity and low dust levels inside an enclosed space.

Generally air-conditioning is subdivided into industrial air-conditioning and comfort air-conditioning. The controlled atmosphere which gives maximum comfort to the human being is known as comfort air-conditioning. The controlled atmosphere which is required for the manufacturing process for engineering goods is known as industrial air-conditioning.

The comfort air-conditioning is further subdivided into summer air-conditioning and winter air-conditioning. The air cooling and dehumidification used in summer is known as summer air-conditioning and the heating and humidifying used in winter is known as winter air-conditioning.

Need for air-conditioning

Human beings give off heat around an average of 100 kcal per hour per person, due to what is known as „metabolism". The temperature of around 56.9 degree C (98.4 degree F). But the skin temperature varies according to the surrounding temperature and relative humidity. To dissipate the heat generated by metabolism in order to maintain the body temperature at the normal level, there must be a flow of heat from the skin to the surrounding temperature is very low, as on a cold winter day the rater of heat flow from the body, and so there cannot be flow of heat from the skin to the surrounding, thus the person feels hot. In such a situation water from the body temperature. But if the surrounding air is not only hot but highly humid as well, very little evaporation of water can take place from the skin surface and so the person feels hot and uncomfortable.

(i) No loss of energy
(ii) Higher efficiency when compared to normal Air Conditioner
(iii) Power consumption can be minimized
(iv) Low economic cost
(v) Very effective in all applications

5. Photography

6. Results and Conclusions

From the above prototype the three in one Air Conditioner is one of the reusable and an eco friendly project which can be implemented in our day to day life for the effective management of power consumption factor. Hence it plays a major role for the people who are living in the desert regions. This is one maiden venture in the field of refrigeration system from the stream of mechanical engineering as term leads to change in the recent trends to the favour of ecological systems. The main advantage in this system depicted as,

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