Experiment (2)

Objective : To find COP of water cooler.

Apparatus used: Water cooler trainer.

Name of device: Water cooler trainer.

Theory: Temperature–entropy diagram

That results in a mixture of liquid and vapour at a lower temperature and pressure as shown at point 4. The cold liquid-vapour mixture then travels through the evaporator coil or tubes and is completely vaporized by cooling the warm air (from the space being refrigerated) being blown by a fan across the evaporator coil or tubes. The resulting refrigerant vapour returns to the compressor inlet at point 1 to complete the thermodynamic cycle. The above discussion is based on the ideal vapour - compression refrigeration cycle, and does not take into account real-world effects like frictional pressure drop in the system, slight thermodynamic irreversiblity during the compression of the refrigerant vapour, or non-ideal gas behavior (if any).

Where
P_1=suction pressure
P_2=discharge pressure
T1= temperature before entering to compressor
T2=temperature after exit from compressor
T3=temperature after condensor
T4=temperature after expansion valve
M_R =rotameter reading (kg/min.)

OBSERVATION TABLE:

S.NO.	P_1	P_2	T_1	T_2	T_3	T_4	M_r
1							
2							
3							

Coefficient of performance: - The coefficient of performance is defined as the ratio of heat
extracted in the evaporator to the work done on the refrigerant

$$COP = \frac{Q}{W}$$

Using points (P1,T1) ; (P2,T2) ;T3 and T4 locate points 1,2,3,4 on the p-h chart for R-22 and
obtain the enthalpy values H1, H2, H3, H4

THEORETICAL

$$COP = \frac{h_1 - h_4}{h_2 - h_1}$$

Result: The C.O.P. of the system is……..