Advantages of dry compression over wet compression :-

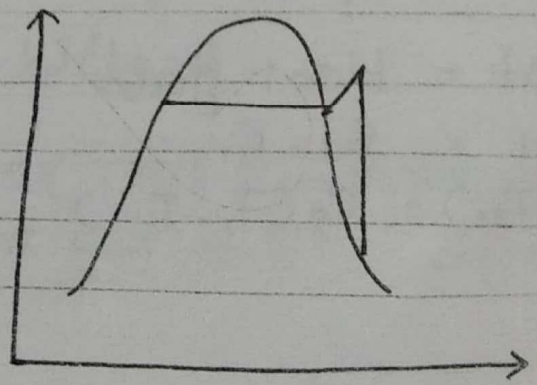
i) Wet compression represents incomplete vaporisation of refrigerant & hence there is a loss of refrigeration effect.

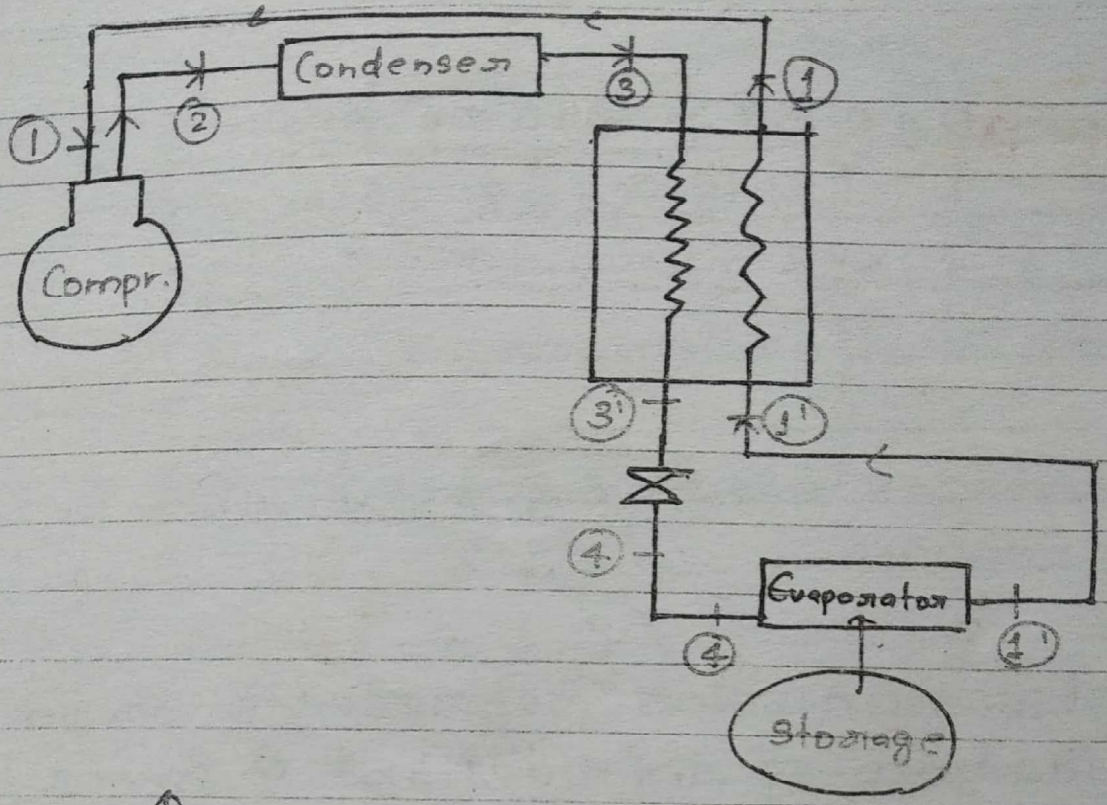
ii) The liquid refrigerant may wash away lubricating oil thus increasing wear & tear

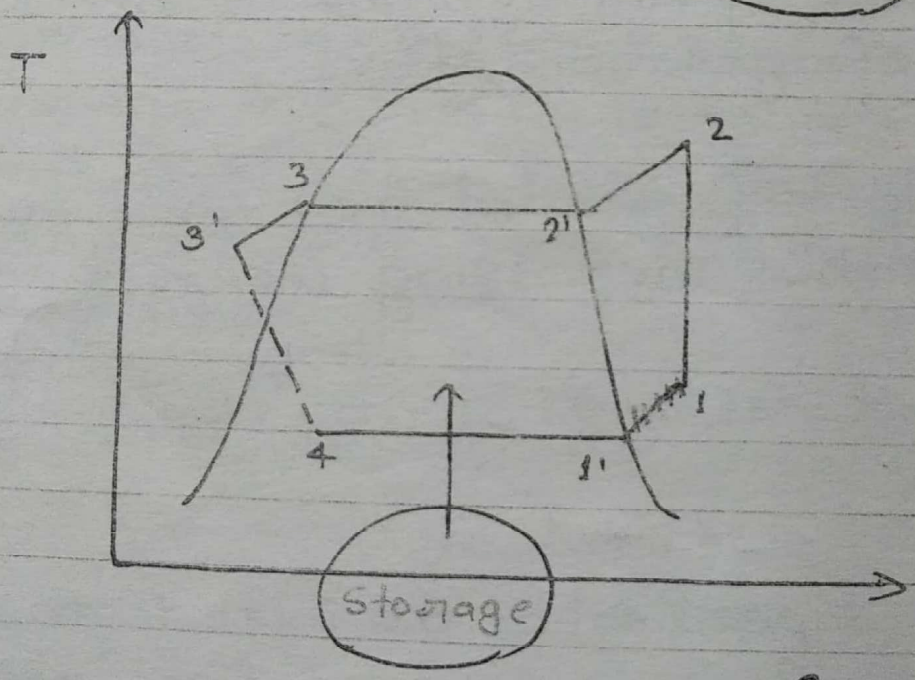
iii) The liquid refrigerant may damage compressor valves.

Nt - Slight superheat at the inlet to the compressor is desirable (too much superheat results in increase in work input to the compressor).

Imp:-
Use of Heat exchanger in (V-C) cycle -







$$\left\{ COP = \frac{h_1' - h_4}{h_2 - h_1} \right\}$$

$$\left\{ COP = \frac{h_1' - h_{3'}}{h_2 - h_1} \right\}$$

Heat lost = Heat gain

$$h_3 - h_{3'} = h_1 - h_1'$$

$$C_e(T_3 - T_{3'}) = C_g(T_1 - T_1')$$

$T_3 - T_{3'}$ → degree of subcooling
$T_1 - T_{1'}$ → degree of superheating

Nt- Though heat loss is equal to heat gain, deg of subcooling is not equal to degree of super heating, because liquid & vapour's specific hea are different.

Problm- A heat exchanger is used in a refrige ration cycle. The enthalpies at condenser outle & evaporator outlet are 78 kJ/kg & 182 kJ/kg r The enthalpy at the outlet of compressor is kJ/kg & enthalpy of subcooled liquid is 68 kJ/k then find COP.

Soln- $h_3 = 78$ kJ/kg, $h_{1'} = 182$ kJ/kg
$h_2 = 230$ kJ/kg, $h_{3'} = 68$ kJ/kg
COP = ?

$$COP = \frac{h_{1'} - h_{3'}}{h_2 - h_1} = \frac{182 - 68}{230 - h_1}$$

$h_1 = h_{1'} + C_p(T_1 - T_{1'})$

$h_3 - h_{3'} = h_1 - h_{1'}$
$78 - 68 = h_1 - 182$
$h_1 = 192$

$$COP = \frac{182 - 68}{230 - 192} = 3 \text{ Ans.}$$