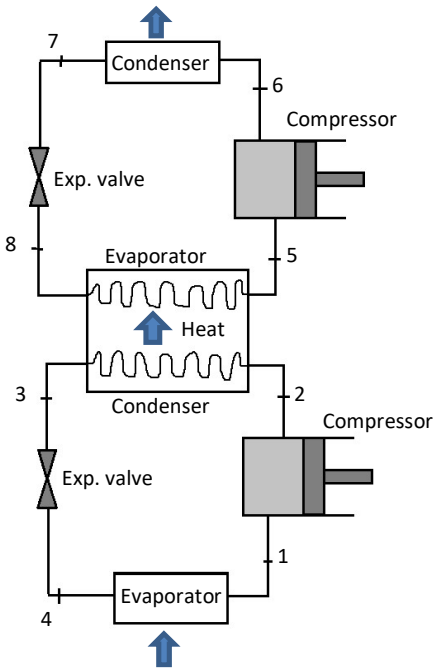
QUIZ 3A – APPLIED THERMODYNAMICS

NAME: ……..
ID. NO.: …….....

Two-stage ideal cascade refrigeration system operating between 1.2 MPa and 200 kPa with R134a as the working fluid. There are lower and upper cycle. The lower cycle rejects heat to the upper cycle in an adiabatic counter flow heat exchanger. Pressure in the upper and lower cycles are 0.4 and 0.5 MPa, respectively. In both cycles, the refrigerant is a saturated liquid at the condenser exit and a saturated vapor at the compressor inlet. Mass flow rate of the working fluid through the lower cycle regulated at 0.15 kg/s, determine (a) the sketch of *T-s* diagram, (b) the mass flow rate of the refrigerant through the upper cycle, (c) the rate of heat removal from the refrigerated space, and (d) the COP of this refrigerator



QUIZ 3B – APPLIED THERMODYNAMICS

NAME: ……..
ID. NO.: …….....

A company plans to implement two-stage ideal cascade refrigeration system in a food processing plant. The system operates between 1.4 MPa and 240 kPa with R134a as the working fluid. Heat rejection occurred in an adiabatic counter flow heat exchanger from the lower cycle to the upper cycle. Pressure in the upper and lower cycles are 0.4 and 0.5 MPa, respectively. In both cycles, the refrigerant is a saturated liquid at the condenser exit and a saturated vapor at the compressor inlet. If the mass flow rate of the refrigerant through the lower cycle is 0.18 kg/s, determine (a) the sketch of *T-s* diagram, (b) the mass flow rate of the refrigerant through the upper cycle, (c) the rate of heat removal from the refrigerated space, and (d) the COP of this refrigerator