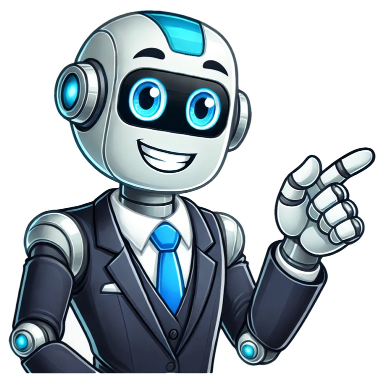

Post any question and get expert help quickly.Post any question and get expert help quickly.Transcribed image text: The adiabatic compressor of a refrigeration system compresses saturated R-134a vapor at 0 C to 600 kPa and 50C. What is the isentropic efficiency of this compressor? Use the tables for R-134a. 600 kPa 50C R-134a compressor 0C sal. vapor %. The Isentropic efficiency of the compressor is Transcribed image text: 1. Is the isentropic process a sutable model for compressors that are cooled intentionally? Explain. 2. Steam at 4MPa and 350C is expanded in an adiabatie turbise to 120kPa. What is the isentrepic efficiency of this turbine if the stearn is txhausted as a saturated vapor? (60.33) 3. Combustion cases enter an adiabatic zas turbine at 827C and 250kPa and leave at 425kPa with a low velocity. Treating the combustion gases as air and assuming an isentropic efficiency of azk, determine the work output of the turbine. (16sk/kg) 4. Steam enters an adiabatic turbine at 8MPa and 500C with a mass flow rate of 3kg/5 and leaves at 30kPa. The isentropic efficiency of the turbine is 0.9. Negiecting the kinetic enerig tharge of the steam, determine fal the temperature at the turbine exit (b) the power output of the turbine (69.1C,3054kW) 5. A refrigerant unit compresses saturated R-134a vapor at 10C to 1000kPa. How much power is recuired to compress 6.9kg /'s of R134a with a compresior efficiency of $5% (19.3W) 6. Aedrigerant-134a enters an adiabatic compresior as sturated vapor at 100kPa at a rate of a.7 m2/m in and exits at 1 MPa pressure. If the isentropic ethiciency of the compressor in 87%, determine (a) the temperature of the refrigerant at the exit of the compresser and b] the power input in KW. Ase shew the process on T-s diagram with respect to saturation line (S6.5'6, 3.3sk 7. Air is compressed by an adiabatic compressor from 95kPa and 27 " C to 600kPa and 277C. Assuming variable yecific heats and neglecting the changes in kinetic and potential energies, determine (a) isentropic efficiency of the compressor and (b) the exat temperature of air if the peocess were reversible (81.9%,506K) 8. Argon gas enters an aslabatic compressar at 98kPa and 25NC with a velocity of 20m/s and in exits at 1400kPa and 75mv/k. If the isentropic efficiency of the compresser is 87%, determine (a) the exit temperature of the argon (b) the work input to the compressor (94t .4x.340ki//kg) 9. hir enters an adiabatic nozzle at 400kPa and 54.7C with low velocity and exit at 240m/s. If the isentropic efficiency of the noctie is 99%, detemine the exit temperature and pressure of the air (793.8x, 348kPa) 10. The exhaust nozzle of a jet eneine expands air at 300 bia and 180C adiabatically to 100ba. Determine the air velocity at the exit when the iniet velocity is low and the nazzle isentropic efficiency is 963s(485m/s) 11. Het combuntion gawes enter the nozze of a turbojet engine at 260kPa.747C and 80m/s. and they ext at a pressure of 35kPa. Assuming an isentropic efficiency of 92% and treating the combustion gasesias air, determine (a) the exit velociay (b) the exit temperature. (72sm/s, 786K) 12. Redrigerant-134a at 100kPa and 20C is tempressed by an adiabatic 1.3kW cermpresser to an eait stage of boo kPa and 60C. Neglecting the cthanges in kinetic and potential energes, detemine (a) the isentropic efficiency of the compressor (b) the volume flow rate of the refrigerant at the comprewor inlet (L/min) and (c) the maximum volume flow rate at the inlet. conditions that this adiabatic 0.7kW compressor can handle without violating the second law. (77. Ax, 270 L/min, 347 L/mins)Post any question and get expert help quickly.Steam at 3 MPa and 400C is expanded to 30 kPa in an adiabaticturbine with an isentropic efficiency of 92 percent. Determine thepower produced by this turbine, in kilowatts, when the mass flowrate is 2.4 kg/s. Use steam tables. The power produced by the turbine is ??? kW. Transcribed image text: Steam at 100 psia and 650'F is expanded adiabatically in a closed system to 10 psla. Determine the work produced, in Bbm and the final temperature of steam for an isentropic expansion efficiency of 80 percent. Use steam tables The work produced is Btu/bm The final temperature of steam is "F Post any question and get expert help quickly.Transcribed image text: 1. Air is used as the working fluid in a simple ideal Brayton cycle that has a pressure ratio of 12 , a compressor inlet temperature of 300K, and a turbine inlet temperature of 1000K. Determine the required mass flow rate of air for a net power output of 70MW, assuming both the compressor and the turbine have an isentropic efficiency of 100 percent. Assume constant specific heats at room temperature. Answers: (a) 352kg/s. 2. A simple Brayton cycle using air as the working fluid has a pressure ratio of 10 . The minimum and maximum temperatures in the cycle are 295K and 1240K. Determine (a) the air temperature at the turbine exit, (b) the net work output, and (c) the thermal efficiency. 3. Consider a 210-MW steam power plant that operates on a simple ideal Rankine cycle. Steam enters the turbine at 10MPa and 500C and is cooled in the condenser at a pressure of 10kPa. Show the cycle on a T-s diagram with respect to saturation lines, and determine (a) the quality of the steam at the turbine exit, (b) the thermal efficiency of the cycle, and (c) the mass flow rate of the steam. Answers: (a) 0.793, (b) 40.2 percent, (c) 165kg/s Page 1 of 2 4. A refrigerator uses refrigerant-134a as the working fluid and operates on the ideal vaporcompression refrigeration cycle except for the compression process. The refrigerant enters the evaporator at 120kPa with a quality of 34 percent. If the compressor consumes 450W of power, determine (a) the mass flow rate of the refrigerant, (b) the condenser pressure, and (c) the COP of the refrigerator. Answers: (a)0.012kg/s, (b) 800kPa, (c) 3.58Transcribed image text: gapore 24: A) Why is the throttling valve not replaced by an isentropic turbine in the ideal vapor- compression refrigeration cycle?

Why reversible adiabatic is isentropic. Isentropic process explained. Isentropic process. Is adiabatic isentropic. What is reversible adiabatic and isentropic process. Difference between reversible adiabatic and isentropic process. Why adiabatic process is isentropic. What is difference between reversible adiabatic process and isentropic process. Isentropic relations derivation. Isentropic process thermodynamics.