EGEN324 Exam 4 – FALL 2020 (EXAM HAS 30 POINTS TOTAL)

1) Take Home Exam- **EXAM MUST BE UNDERTAKEN INDIVIDUALLY AND WITHOUT ASSISTANCE FROM OTHERS**.

2) Open book and notes – Calculators required. Tables required.

3) The exam will be provided as a PDF document. You can choose to add your answers in this document and UPLOAD IT AS A PDF or

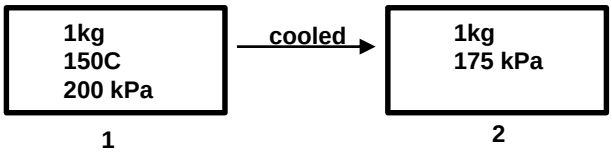
You may write your answers on a separate sheet to be UPLOADED AS A PDF

4) PLEASE DOUBLE CHECK THAT THE UPLOAD WAS SUCCESSFUL

5) WHEN USING TABLES, PLEASE USE NEAR TABLE VALUE AND STATE THIS AS “NTV”

6) **SHOW ALL WORKING AND SET WORKING OUT CLEARLY**

QUESTION 1 (10 POINTS TOTAL): A rigid container has 1kg of water at 150C and 200kPa. The tank is cooled until the pressure is 175kPa.



a. At state 1, find **the phase** _____

ν_1 _____

u_1. _____

b. At state 2, find **the phase** _____

ν_2 _____

u_2. _____

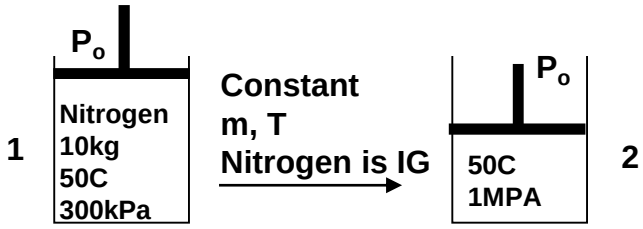
c. Find the total heat transfer for the process in kJ.

_____

d. What is the temperature at state 2 (degrees C)?

_____

QUESTION 3 (6 POINTS): 10 kg nitrogen in a piston/cylinder at 50C, 300kPa is compressed at constant temperature to 1Mpa.



1. **What is the initial Volume (State 1) (m^3)?**

2. What is the final Volume (State 2) in m^3?

3. Find the total work for the process (kJ)? Explain sign.

4. Find the total heat transfer for the process in kJ. Explain sign.

QUESTION 4 (2 POINTS): A 250 kg piece of copper is heated from 25 C to 300 C. How much total heat is required (kJ)?

QUESTION 5 (6 POINTS): Water in a rigid tank is heated from 25 C, 250 kPa to 200 C, 1000 kPa. How much specific heat (q) must be provided (kJ/kg)? Explain sign.

QUESTION 6 (6 POINTS): 5 kg of water in a piston-cylinder is heated at constant pressure from 25 C, 200 kPa to 200 C. How much total heat (Q) must be provided (kJ). Explain sign.