

Name: _____

Instructor: _____

ENGR 222 - Quiz 3

Section: _____

Allowed Materials: pencils and/or pens.

ExamForm := 33

Honor Statement: On my honor, I promise that I have not received any unauthorized assistance on this exam (I didn't look at another student's paper, I didn't view any unauthorized written materials, I didn't talk or listen to another student, I didn't use an unauthorized calculator, I didn't use any electronic device, any visual or auditory signals, or any other techniques of exchanging information with others.) I have maintained the highest standards of academic integrity while completing this exam.

Signed: _____



1. (2 point deduction for failure to complete this problem!)

- Write in all of the indicated information in the boxes of your response form.
- Darken the appropriate circles to encode the corresponding information.
- Write your name on this exam and sign the Honor Statement.

Notes:

- If your last name is too long, just write the first 10 letters.
- "F.I." and "M.I." are your first and middle initials, respectively
- Your "Username" is the first part of your LATech email address
- For "Section" use the guide provided to the right
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Exam Form		Program	
<input type="radio"/>	01	<input type="radio"/>	BIEN
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Last Name										F.I.	M.I.	LA Tech Username										Course #					Section (last 2 digits)	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		

Choices = $\left(\begin{array}{l} \text{"A"} \quad \text{"I properly completed all required items in problem 1, so I will not lose these points"} \\ \text{"B"} \quad \text{"I did not properly complete problem 1 because I am fine with losing these points."} \end{array} \right)$

Please put your final answers on the answer sheet that was given to you. You must show your work to receive full credit.

The words "steam" and "water" may be used interchangeably. Check the tables to determine the phase of the system.

Unless the problem states otherwise, assume that the atmospheric pressure is 101.325 kPa or 14.7 psia.

Read the questions carefully and CHECK YOUR UNITS.

You may write on the exam. There is additional space on the back if you need it.

If you made any marks in your steam table, please erase them before turning in your packet.

Good luck!



2. (10 points) Solids and liquids are different from gases in that solids and liquids are considered _____.

Choices = $\left(\begin{array}{ll} \text{"A"} & \text{"adiabatic"} \\ \text{"B"} & \text{"isothermal"} \\ \text{"C"} & \text{"lighter"} \\ \text{"D"} & \text{"incompressible"} \\ \text{"E"} & \text{"isobaric"} \\ \text{"F"} & \text{"isentropic"} \end{array} \right)$



3. (10 points) The boundary work done during a process depends on _____.

Choices = $\left(\begin{array}{ll} \text{"A"} & \text{"the path followed"} \\ \text{"B"} & \text{"nothing"} \\ \text{"C"} & \text{"the end states"} \\ \text{"D"} & \text{"the path followed and the end states"} \\ \text{"E"} & \text{"the slope of the path function"} \end{array} \right)$

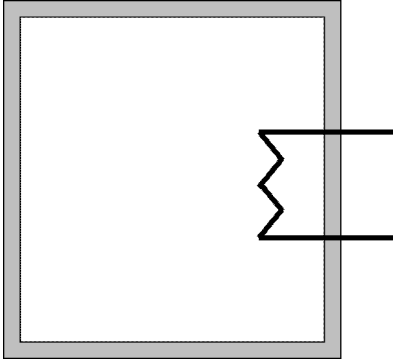


4. (10 points) The specific enthalpy of an ideal gas is dependent on :
(bubble in all answers that apply)

Choices = $\left(\begin{array}{ll} \text{"A"} & \text{"temperature"} \\ \text{"B"} & \text{"mass"} \\ \text{"C"} & \text{"volume"} \\ \text{"D"} & \text{"pressure"} \end{array} \right)$



5. (10 points) A rigid, insulated tank contains mass = 7·kg of air initially at 300 K. It is heated using a resistance heater that uses 120 V and draws a current = 4.2·A. The time it would take to heat the air to 800 K is closes to:
(HINT: Use the most exact method for this problem.)



$$\text{Choices} = \begin{pmatrix} \text{"A"} & 78.70 \\ \text{"B"} & 83.09 \\ \text{"C"} & 87.55 \\ \text{"D"} & 92.00 \\ \text{"E"} & 96.42 \\ \text{"F"} & 100.93 \\ \text{"G"} & 105.26 \\ \text{"H"} & 109.73 \end{pmatrix} \cdot \text{min}$$

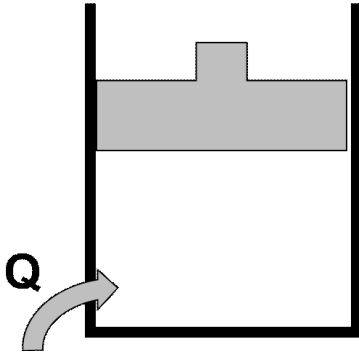


6. (10 points) A 2 ft³ rigid tank contains nitrogen initially at 500 R and pressure = 27·psia. The boundary work done by the system if the pressure increases to = 40.5·psia is closest to:

$$\text{Choices} = \begin{pmatrix} \text{"A"} & 0.000 \\ \text{"B"} & 4.237 \\ \text{"C"} & 4.487 \\ \text{"D"} & 4.743 \\ \text{"E"} & 4.996 \\ \text{"F"} & 5.250 \\ \text{"G"} & 5.502 \\ \text{"H"} & \text{"not enough information"} \end{pmatrix} \cdot \text{Btu}$$



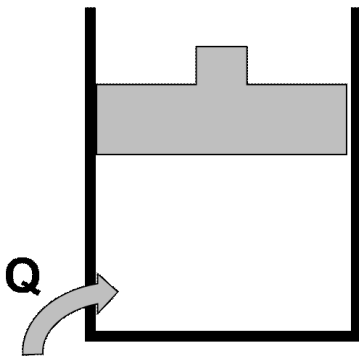
7. (10 points) A piston cylinder contains 2 kg of saturated liquid R-134a at temperature = 4°C . It is heated until half the mass vaporizes. The boundary work done by the system is closest to:



Choices =	"A"	0.00) · kJ
	"B"	7.98	
	"C"	11.01	
	"D"	14.06	
	"E"	17.09	
	"F"	20.12	
	"G"	23.16	
	"H"	"not enough information"	



8. (10 points) A piston cylinder contains 1 kg steam initially at 200 kPa with a quality of $x = 0.6$. Heat is added to the system until the temperature of the steam is temperature = 700°C . The amount of heat added to the system is closest to



Choices =	"A"	0.0) · kJ
	"B"	835.9	
	"C"	1151.1	
	"D"	1469.7	
	"E"	1786.0	
	"F"	2103.1	
	"G"	2420.5	
	"H"	"not enough information"	



9. (10 points) A metal worker is cooling a piece of silver with a mass = 2.1·kg from an initial temperature of 500°C by submerging it in a 10-L pail filled with water initially at temperature = 32·°C. During the process, 50kJ of heat is lost to the environment. The final temperature of the water in the pail and the silver is closest to:

Assumptions:

- No water is vaporized.

$$- \rho_w = 1000 \frac{\text{kg}}{\text{m}^3}$$

$$\text{Choices} = \left(\begin{array}{ll} \text{"A"} & 28.93 \\ \text{"B"} & 30.73 \\ \text{"C"} & 32.59 \\ \text{"D"} & 34.44 \\ \text{"E"} & 36.28 \\ \text{"F"} & 38.12 \\ \text{"G"} & 39.96 \\ \text{"H"} & \text{"not enough information"} \end{array} \right) \cdot ^\circ\text{C}$$



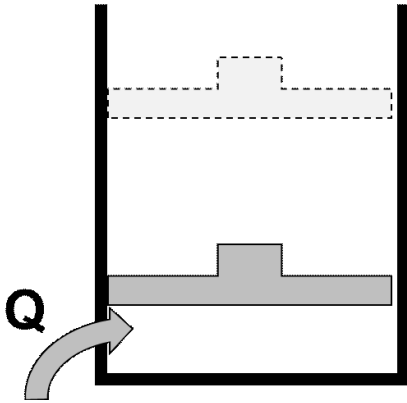
10. (10 points) An insulated rigid tank is divided into two parts by a partition. One part of the tank contains = 4.4·kg of water at = 300·kPa and = 110·°C while the other part is evacuated. The partition is now removed, and the water expands to fill the entire tank. If the final pressure is = 15·kPa, the volume of the entire tank is closest to:
(Hint: The tank is NOT necessarily divided into two equal parts.)

Choices = $\left(\begin{array}{ll} \text{"A"} & 4.200 \\ \text{"B"} & 4.436 \\ \text{"C"} & 4.673 \\ \text{"D"} & 4.910 \\ \text{"E"} & 5.148 \\ \text{"F"} & 5.382 \\ \text{"G"} & 5.624 \\ \text{"H"} & \text{"not enough information"} \end{array} \right) \cdot \text{m}^3$



11. (10 points) A piston cylinder-like device contains mass = 0.33·kg of air. Initially the air has a pressure = 100·kPa and 300K. The air is then heated until the volume triples (i.e. $\times 3$); during this time the piston can freely move. After the volume is tripled, the piston is locked in place and no longer moves. The air is heated once more until it reaches a temperature of 1100 K. The TOTAL amount of heat added for this two-step process is closest to:

(Hint: you should use an exact analysis for this problem.)



Choices =	"A"	208.88) ·kJ
	"B"	227.73	
	"C"	246.34	
	"D"	265.14	
	"E"	283.86	
	"F"	302.54	
	"G"	"not enough information"	

END OF EXAM

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ExamForm = 35

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Read the questions carefully and CHECK YOUR UNITS.

If a question does not contain enough information to solve, please select the appropriate answer "not enough information".

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If you made any marks in your steam table, please erase them before turning in your packet.

Good luck!



ExamForm = 35

	1
1	"A"
2	"D"
3	"D"
4	"A"
5	"C"
6	"A"
7	"F"
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10	"C"
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Key =

