Name:____________________________ Section:__________ ENGR 222 - Quiz 1

Allowed Materials: *pencils and/or pens.*

THIS IS YOUR EXAM FORM # --> ExamForm := 15

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:*____

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

wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww

Bubble:	For Course Section:
01	001 Hollins
02	002 Reeves
03	003 Reis

- 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:

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- **"F.I."** and **"M.I."** are your first and middle initials, respectively
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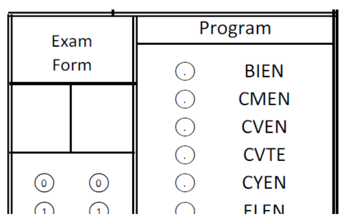
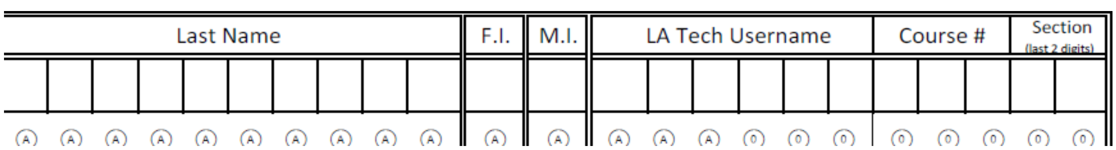




$$\text{Choices} = \begin{pmatrix} \text{"A"} & \text{"I properly completed all required items in problem 1, so I will not lose these points"} \\ \text{"B"} & \text{"I did not properly complete problem 1 because I am fine with losing these points."} \end{pmatrix}$$

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

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.

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

Good luck!

3. (10 points) A process that is insulated and does not involve heat transfer is called:

$$\text{Choices} = \begin{pmatrix} \text{"A"} & \text{"saturated"} \\ \text{"B"} & \text{"adiabatic"} \\ \text{"C"} & \text{"isometric"} \\ \text{"D"} & \text{"superheated"} \\ \text{"E"} & \text{"isothermal"} \\ \text{"F"} & \text{"isochoric"} \\ \text{"G"} & \text{"isobaric"} \end{pmatrix}$$

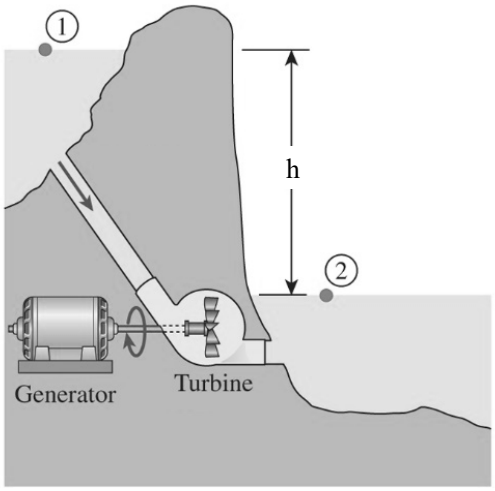
5. (10 points) The air inside a balloon has $\text{initially} = 16 \cdot \text{kJ}$ of internal energy. A child squeezes the balloon while holding it over a hot stove for a few seconds. $\text{Heat} = 559\ \text{J}$ is transferred into the balloon air from the stove. If the air's internal energy is $\text{then} = 17 \cdot \text{kJ}$, how much work was done on the air by the squeezing?

$$\text{Choices} = \begin{pmatrix} \text{"A"} & 441 \\ \text{"B"} & 472 \\ \text{"C"} & 503 \\ \text{"D"} & 535 \\ \text{"E"} & 566 \\ \text{"F"} & 597 \\ \text{"G"} & 629 \\ \text{"H"} & 659 \end{pmatrix} \text{J}$$

7. (10 points) An elevator is operated by a motor and pulley system that is 54% efficient overall. The elevator with its passengers has known weight ($W = 880 \cdot lbf$). After rising $h = 44 \cdot ft$ from the ground, the elevator is traveling $v = 5.1 \cdot \frac{ft}{s}$ (having started from rest). How much electric energy did the motor consume?

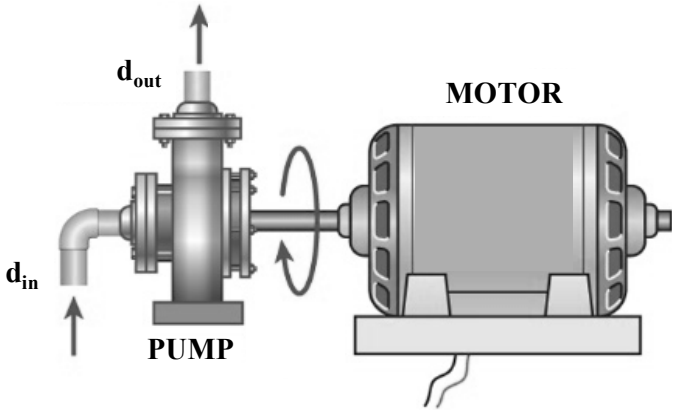
$$Choices = \begin{pmatrix} "A" & 6.723 \times 10^4 \\ "B" & 7.236 \times 10^4 \\ "C" & 7.749 \times 10^4 \\ "D" & 8.261 \times 10^4 \\ "E" & 8.768 \times 10^4 \\ "F" & 9.284 \times 10^4 \\ "G" & 9.794 \times 10^4 \\ "H" & 1.031 \times 10^5 \end{pmatrix} \cdot ft \cdot lbf$$

9. (10 points) A hydroelectric dam is used to supply electric power to a small town. The height difference between the water levels of the reservior and the river is $h = 184 \cdot m$. Water runs through the turbine with an $\text{efficiency} = 82 \cdot \%$ at a $\text{rate} = 4700 \cdot \frac{kg}{s}$. If the dam must supply the town with at least 5 MW (MW = 10^6 W) of power, the minimum effiency of the generator is closest to:



$$\text{Choices} = \begin{pmatrix} \text{"A"} & 67.48 \\ \text{"B"} & 69.68 \\ \text{"C"} & 71.87 \\ \text{"D"} & 74.09 \\ \text{"E"} & 76.30 \\ \text{"F"} & 78.46 \\ \text{"G"} & 80.67 \\ \text{"H"} & 82.85 \end{pmatrix} \cdot \%$$

11. (10 points) A pump is controlled by a motor with $\text{efficiency} = 77 \cdot \%$ drawing 3A at 120V. The inlet diameter is 8 cm and the outlet diameter is 10 cm. The pump has an efficiency of 90%. If water flows through the pump at a $\text{rate} = 51 \cdot \frac{\text{kg}}{\text{s}}$, the change in pressure across the pump is closest to: (Ignore any height differences across the pump.)



$$\text{Choices} = \begin{pmatrix} \text{"A"} & 22.76 \\ \text{"B"} & 25.28 \\ \text{"C"} & 27.80 \\ \text{"D"} & 30.27 \\ \text{"E"} & 32.79 \\ \text{"F"} & 35.28 \\ \text{"G"} & 37.79 \\ \text{"H"} & 40.26 \end{pmatrix} \cdot \text{kPa}$$

END OF EXAM

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01	001 Hollins
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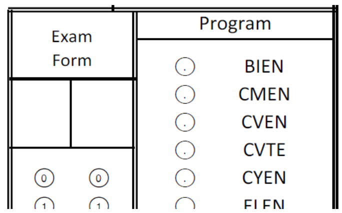

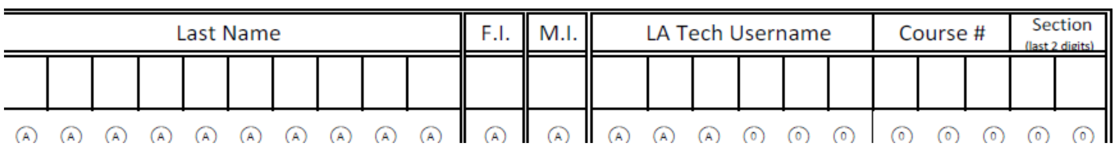

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Key =

	1
1	"A"
3	"B"
5	"A"
7	"B"
9	"C"
11	"F"