HW 2_after adiabatic flame temp and vent flows

Due Sep 16 at 12:59pm   **Points** 4   **Questions** 4   **Time Limit** None
Allowed Attempts 3

Take the Quiz Again ⇒ (https://canvas.okstate.edu/courses/137119/quizzes/349070/take?
user_id=220308)

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1 ⇒ (https://canvas.okstate.edu/courses/137119/quizzes/349070/history?version=1)	312 minutes	4 out of 4

Correct answers are hidden.

Score for this attempt: **4** out of 4
Submitted Sep 15 at 4:26pm
This attempt took 312 minutes.

Question 1	1 / 1 pts

Calculate the mass flow rate [kg/s] in a circular duct with a 12" diameter with the shown conditions:

20°C
1.2 kg/m³   250°C, 7 m/s

0.34

Question 2

1 / 1 pts

Calculate the average velocity of the outflow from the compartment with the following conditions in m/s.

- Single room with one door opening
- Temp: 25°C, Amb. Density: 1.2 kg/m³
- Opening height: 2.1 m, opening width: 0.9 m
- Neutral plane height: 40 % of the opening height
- Compartment upper layer temperature is 269 °C

- ◉ 3 m/s

- ○ 4 m/s

- ○ 5 m/s

- ○ 6 m/s

Question 3

1 / 1 pts

What would be the room upper temperature in Celsius to generate 4.8 m/s average velocity of

outgoing flow in a room fire? Write your answer rounded to the nearest tens without units.

Assumption:

- Single room with one door opening
- temp.: 20 °C, Amb. density: 1.2 kg/m3
- Opening height: 2.1 m, opening width: 0.9 m
- Neutral plane height: 0.92 m

677.6

Question 4   1 / 1 pts

Calculate adiabatic flame temperature (K) of Butane(C_4H_{10}) burning in the air with the initial temperature of 298K and 1 atm. Write down your answer to the nearest ones without units.

- Specific heat: CO_2 = 54.3 J/mole-K, H_2O = 41.3 J/mole-K, N_2 = 32.7 J/mole-K.
- Heat of formation: fuel = -124.7 kJ/mole, CO_2 = -393.5 kJ/mole, H_2O = -241.8 kJ/mole

2,472