

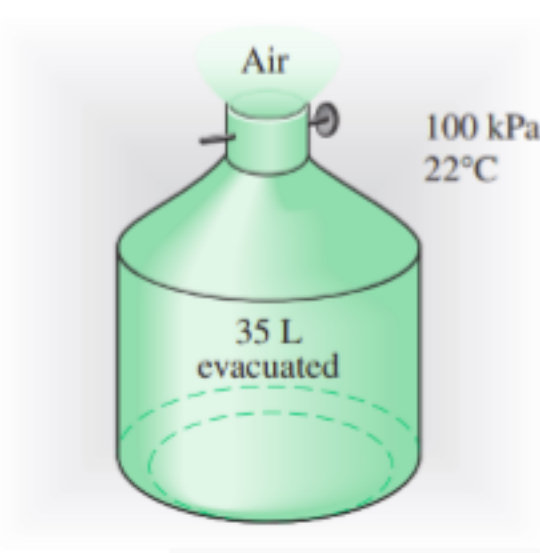
# Unit 9 - Week 6 :

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## Assignment 6

The due date for submitting this assignment has passed. **Due on 2019-09-11, 23:59 IST.**  
 As per our records you have not submitted this assignment.

1) 1 point  
**Common Data for Questions 1 and 2:**  
 Consider a 35-L evacuated rigid bottle that is surrounded by the atmosphere at 100 kPa and 22°C. A valve at the neck of the bottle is now opened and the atmospheric air is allowed to flow into the bottle. The air trapped in the bottle eventually reaches thermal equilibrium with the atmosphere as a result of heat transfer through the wall of the bottle. The valve remains open during the process so that the trapped air also reaches mechanical equilibrium with the atmosphere.



Determine the final mass inside the bottle.

- (a) 0.5543 kg
- (b) 0.127 kg
- (c) 0.041 kg
- (d) 0.011 kg

- a
- b
- c
- d

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: c

2) Determine the net heat transfer through the wall of the bottle to the surroundings during this filling process. 1 point

- (a) 2.5 kJ
- (b) 3.5 kJ
- (c) 6 kJ
- (d) 7 kJ

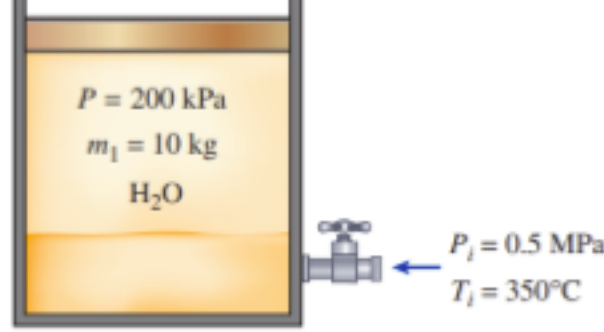
- a
- b
- c
- d

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: b

3) 1 point

**Common Data for Questions 3 and 4:**

An insulated, vertical piston-cylinder device initially contains 10 kg of water, 6 kg of which is in the vapor phase. The mass of the piston is such that it maintains a constant pressure of 200 kPa inside the cylinder. Now steam at 0.5 MPa and 350°C is allowed to enter the cylinder from a supply line until all the liquid in the cylinder has vaporized.



Determine the final temperature inside the cylinder.

- (a) 60.12°C
- (b) 80.23°C
- (c) 100.23°C
- (d) 120.23°C

- a
- b
- c
- d

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: d

4) Determine the mass of the steam that has entered. 1 point

- (a) 19.10 kg
- (b) 15.42 kg
- (c) 12.69 kg
- (d) 9.67 kg

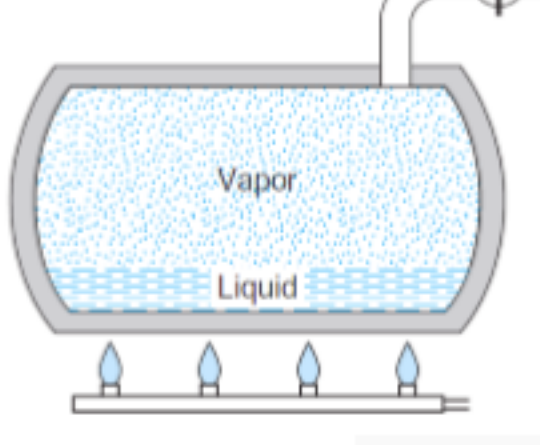
- a
- b
- c
- d

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: a

5) 1 point

**Common Data for Questions 5 and 6:**

A 200-L tank (see the figure below) initially contains water at 100 kPa and a quality of 1%. Heat is transferred to the water, thereby raising its pressure and temperature. At a pressure of 2 MPa, a safety valve opens and saturated vapor at 2 MPa flows out. The process continues, maintaining 2 MPa inside until the quality in the tank is 90%, then stops.



Determine the total mass of water that flowed out.

- (a) 2.22 kg
- (b) 4.45 kg
- (c) 8.90 kg
- (d) 17.80 kg

- a
- b
- c
- d

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: c

6) Determine the total heat transfer to the tank. 1 point

- (a) 10.48 MJ
- (b) 13.54 MJ
- (c) 17.52 MJ
- (d) 25.45 MJ

- a
- b
- c
- d

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: d

7) An insulated 1.7 m<sup>3</sup> rigid tank contains air at 500 kPa and 50°C. A valve connected to the tank is now opened, and air is allowed to escape until the pressure inside drops to 200 kPa. The air temperature during this process is maintained constant by an electric resistance heater placed in the tank. Determine the electrical work done during this process. 1 point

- (a) 340 kJ
- (b) 510 kJ
- (c) 595 kJ
- (d) 850 kJ

- a
- b
- c
- d

No, the answer is incorrect.  
 Score: 0  
 Accepted Answers: b