Unit 12 - Week 10: Gas Mixtures

Assignment 10

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-10-09, 23:59 IST.

1) The concept of partial volume is given by *1 point*

- Dalton's law
- Amagat's law
- Kay's rule
- Gibbs' rule

No, the answer is incorrect.
Score: 0
Accepted Answers:
Amagat's law

2) In a mixture comprising of two ideal gases A and B, the mole fraction of A is twice of the same for B. Among the following properties, which one then will always be equal for both the gases within the mixture? *1 point*

- partial pressure
- partial volume
- temperature
- mass fraction

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

3) Two ideal gases having molecular weight of M_1 and M_2 respectively are mixed in equal molar proportion to form a mixture. Then the apparent molecular weight of the mixture is *1 point*

- M_1
- M_2
- arithmetic mean of M_1 and M_2
- geometric mean of M_1 and M_2

No, the answer is incorrect.
Score: 0
Accepted Answers:
arithmetic mean of M_1 and M_2

4) In a mixture of real gases, the characteristic gas constant for each individual component *1 point*

- depends on its partial pressure
- depends on the pressure and temperature of the mixture
- depends only on its partial volume
- is constant

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

5) A room of 60 m^3 volume, and maintained at 300 K, 100 kPa, is completely occupied by air, which involves 21% oxygen by volume. If can be viewed as a mixture of ideal gases, then the specific volume of oxygen available within the room air (correct to 2 decimal places) is _____ m^3/kg.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 3.6,3.8

1 point

6) If air is assumed to be a mixture of two ideal gases, namely nitrogen and oxygen, in a volume ratio of 4:1, then the apparent molecular weight of air (correct to 1 decimal place) is _____ kg/kmol.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 28.6,29

1 point

7) A mixture of 60% nitrogen, 30% argon and 10% oxygen on a mass basis is inside a cylinder at 250 kPa, 310 K. If each of the component can be viewed as ideal gases, and the total volume of the cylinder is 0.5 m^3, then the mole fraction of oxygen in the mixture (correct to 1 decimal place) is _____.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.09,0.11

1 point

8) A 100 m^3 storage tank with fuel gases is at 20°C, 100 kPa, containing a mixture of C_2H_2, C_3H_8 and C_4H_{10}. A test shows the partial pressure of C_2H_2 is 15 kPa and that of C_3H_8 is 65 kPa. If all three components can be considered as ideal gas, then the mass of C_4H_{10} in the mixture (correct to 1 decimal place) is _____ kg.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 47.1,48.3

1 point

9) A rigid insulated tank contains 12 kg of oxygen at 200 kPa, 280 K, which is kept separated by a membrane from 26 kg of carbon dioxide at 400 kPa, 360 K. The membrane is removed, allowing the gases to mix and attain a final uniform state. If both the gases can be considered to be ideal, then the final temperature of the mixture (correct to 1 decimal place) is _____ K.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 330,340

1 point

10) A mixture of 0.5 kg nitrogen and 0.5 kg oxygen is kept inside a piston-cylinder arrangement at 100 kPa, 300 K. Now 800 kJ of heat is added at constant pressure. If both nitrogen and oxygen can be assumed to be perfect gas with C_p of 0.922 kJ/kg.K and 1.042 kJ/kg.K, then the increase in the entropy of the mixture during the process (correct to 2 decimal places) is _____ kJ/K.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 1.2,1.4

1 point