

Course outline

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● Week 6 Lecture Material

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Week 6 : Assignment 6

The due date for submitting this assignment has passed.

Due on 2021-09-08, 23:59 IST.

As per our records you have not submitted this assignment.

- 1) In a combustion reaction, the product gas consists of 62.0 mol% N₂, 17.0 mol% CO₂, 11.0 mol% O₂ and the rest is H₂O. Calculate molar composition of the product gas on a dry basis. 2 points

- (a) 0.7 mol of N₂, 0.2 mol of CO₂ and 0.1 mol of O₂
 (b) 0.7 mol of N₂, 0.15 mol of CO₂ and 0.15 mol of O₂
 (c) 0.7 mol of N₂, 0.1 mol of CO₂ and 0.2 mol of O₂
 (d) 0.6 mol of N₂, 0.2 mol of CO₂ and 0.2 mol of O₂

- a)
 b)
 c)
 d)

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 a)

- 2) For a combustion reaction, Orsat analysis reports the product composition as 60 mol% N₂, 15% CO₂, 15% CO and 10% O₂. Mole fraction of H₂O is 0.0500. Calculate the molar composition of the product on a wet basis. 2 points

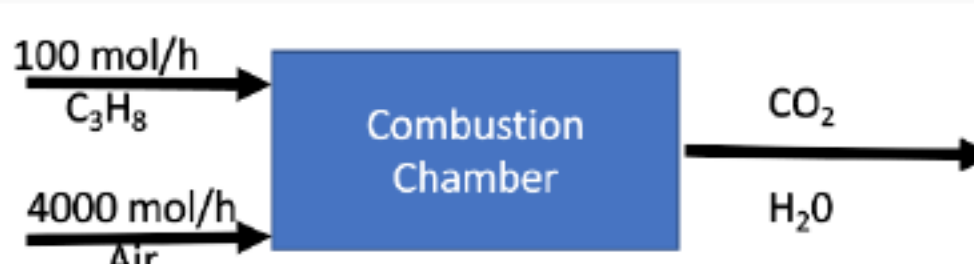
- (a) 57% N₂, 11% CO₂, 11% CO, 15% O₂, and rest H₂O
 (b) 47% N₂, 10% CO₂, 10% CO, 10% O₂ and rest H₂O
 (c) 47% N₂, 12% CO₂, 12% CO, 9% O₂ and rest H₂O
 (d) 57% N₂, 14% CO₂, 14% CO, 10% O₂ and rest H₂O

- a)
 b)
 c)
 d)

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 d)

- 3) 2 points



From the process flow chart, write a balanced equation for complete combustion of propane and calculate the % excess air fed to the combustion chamber.

- (a) 60%
 (b) 64%
 (c) 68%
 (d) 72%

- a)
 b)
 c)
 d)

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 c)

- 4) Calculate the density of a mixture obtained by mixing 2.0 L of n-pentane and 4.0 L of n-heptane at 293.15 K and 1 atm. (Consider densities of n-pentane and n-heptane as 0.626 g/cm³ and 0.680 g/cm³, respectively.) 2 points

- (a) 0.442 g/cm³
 (b) 0.653 g/cm³
 (c) 0.662 g/cm³
 (d) 0.772 g/cm³

- a)
 b)
 c)
 d)

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 c)

- 5) 100 grams of oxygen is stored in a container at 300 K and 5.00 psig. Assuming ideal gas behavior, calculate the volume of container in liters. 2 points

- (a) 47.5 liters
 (b) 22.4 liters
 (c) 57.4 liters
 (d) 50.2 liters

- a)
 b)
 c)
 d)

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 c)

- 6) A container with a volume of 5 L consists of 112 g of N₂ and 64 g of O₂ at 300 K. Calculate the total pressure inside the container in atm. 2 points

- (a) 39.6 atm
 (b) 9.9 atm
 (c) 19.8 atm
 (d) 29.5 atm

- a)
 b)
 c)
 d)

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 d)

- 7) Orsat analysis of a flue gas gives the following composition by volume: CO₂: 13.4%, O₂: 6.2% and rest N₂. Calculate the % excess air involved in the combustion reaction. 2 points

- (a) 23.3 %
 (b) 35.0 %
 (c) 40.8 %
 (d) 45.3 %

- a)
 b)
 c)
 d)

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 c)

- 8) From the above data of Q7, calculate the C:H (w/w) ratio in the fuel. 2 points

- (a) 17.4
 (b) 22.3
 (c) 10.3
 (d) 15.2

- a)
 b)
 c)
 d)

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 b)

- 9) Given below is the composition of dry air by volume at 1 atm: 2 points

N₂: 77.741; O₂: 20.946; Ar: 0.934; CO₂: 0.379

What is the partial pressure of O₂ and CO₂?

- (a) 0.41892 atm for O₂ and 0.0379 atm for CO₂
 (b) 0.20946 atm for O₂ and 0.0189 atm for CO₂
 (c) 0.10423 atm for O₂ and 0.0758 atm for CO₂
 (d) 0.20946 atm for O₂ and 0.00379 atm for CO₂

- a)
 b)
 c)
 d)

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 d)

- 10) Using phase rule, determine the degrees of freedom for each of the following system at equilibrium? 2 points

- (i) Pure liquid water
 (ii) Pure water at 273.15 K and 4.58 mm Hg
 (iii) A vapour–liquid mixture of four hydrocarbons

- (a) (i) 0, (ii) 1 and (iii) 4
 (b) (i) 2, (ii) 2 and (iii) 5
 (c) (i) 0, (ii) 0 and (iii) 5
 (d) (i) 2, (ii) 0 and (iii) 4

- a)
 b)
 c)
 d)

No, the answer is incorrect.
 Score: 0

Accepted Answers:
 d)