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Courses » Fundamentals of Combustion (Part 2)

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Unit 9 - Week 8: Combustion and Environment

Course outline

How to access the portal

Week 1: Introduction to Flame and One dimensional Combustion Wave Analysis

Week 2: Laminar Premixed Flames and Burning Velocity

Week 3: Effects of Physical and Chemical Variables on Burning Velocity, Flame Extinction, Ignition and Stabilization

Week 4: Introduction to Turbulent Premixed Flames and Diffusion Flames

Week 5: Diffusion Flame and Introduction to Droplet Combustion

Week 8: Assignment

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-10-03, 23:59 IST.**

1) Respiratory ailments like acute and chronic bronchitis are mainly caused due to **1 point** SO₂, NO_x and particulate matter. Following statement is:

- True
 False

No, the answer is incorrect.

Score: 0

Accepted Answers:

True

2) consider the following factors regarding vegetation: **1 point**

- I) Phytotoxicants
II) SO₂
III) Peroxyacetylene nitrate

The responsible factor/s for the damage of vegetation is/are:

- I only
 I and II
 II and III
 I, II, and III

No, the answer is incorrect.

Score: 0

Accepted Answers:

I, II, and III

3) Acid rain is caused by secondary pollutants. Given statement is: **1 point**

- True

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**Week 8:
Combustion and
Environment**

● Lecture 36:
Carbon Sphere
in Convective
Environment

● Lecture 37:
Combustion
and Effects on
Environment

● Lecture 38:
Chemicals from
Combustion

● Lecture 39:
Emission
Control
Methods

● Lecture 40:
Combustion
Modification
Methods

○ Quiz : Week 8:
Assignment

○ WEEK 8 -
FEEDBACK -
Fundamentals
of Combustion
(Part 2)

4) Which of the following is primary consumer of oxidant OH, the “cleaning agent” 1 point

CO₂

CO

NO

NO₂

No, the answer is incorrect.

Score: 0

Accepted Answers:

CO

5) Which of the following is the largest source of NO_x 1 point

Biomass

Bio-alcohols

Non-fossil natural gas

Fossil fuel

No, the answer is incorrect.

Score: 0

Accepted Answers:

Fossil fuel

6) CO is formed at fuel lean condition due to insufficient quantity of oxygen. Given statement is: 1 point

True

False

No, the answer is incorrect.

Score: 0

Accepted Answers:

False

7) Which of the following is used to absorb CO₂ in absorber section of CO₂ capture pilot plant: 1 point

Silica gel

Mono-ethanol amine

Potassium carbonate

Calcium oxide

No, the answer is incorrect.

Score: 0

Accepted Answers:

Mono-ethanol amine

8) Sulphur oxides are corrosive in nature. Given statement is: 1 point

True

False

No, the answer is incorrect.

Score: 0

Accepted Answers:

*True*9) NO is more harmful to health as compared to NO₂. Given statement is: 1 point

- True
- False

No, the answer is incorrect.**Score: 0****Accepted Answers:***False*10) Identify the correct statement regarding removal the particulate matters: 1 point

- Electrostatic precipitator can be used but cyclone separator cannot be used to remove particulate matters.
- Electrostatic precipitator cannot be used but cyclone separator can be used to remove particulate matters.
- Electrostatic precipitator and cyclone separator both can be used to remove particulate matters.
- Electrostatic precipitator and cyclone separator both cannot be used to remove particulate matters.

No, the answer is incorrect.**Score: 0****Accepted Answers:***Electrostatic precipitator and cyclone separator both can be used to remove particulate matters.*11) Following mole fractions of the exhaust products are measured during combustion of C₂H₆ with air: 2 points $X_{CO_2}=0.15; X_{O_2}=0.01; X_{H_2O}=0.18; X_{NO}=190 \times 10^{-6}$

Assume that the CO and unburnt hydrocarbon concentrations are negligible. Then the calculated NO emission index is:

- 2.53 g/kg
- 4.83 g/kg
- 6.64 g/kg
- 13.38 g/kg

No, the answer is incorrect.**Score: 0****Accepted Answers:***2.53 g/kg*12) The emission index of the unburnt hydrocarbons expressed as equivalent hexane is measured to be 15 g/kg during combustion of a hydrocarbon fuel and these following mole fractions of the exhaust products are measured during combustion process: 3 points $X_{CO_2}=0.1188; X_{CO}=0.0012; X_{O_2}=0.21; X_{C_6H_{14}}=300 \text{ ppm} \ \& \ X_{NO}=78 \text{ ppm}$

Then the hydrocarbon fuel used for combustion is:

- C₆H₁₄
- C₈H₁₈
- C₁₀H₁₈
- C₉H₁₆

No, the answer is incorrect.

Score: 0

Accepted Answers:

C_8H_{18}

13 Following mole fractions of the exhaust products are measured during combustion of C_8H_{18} with air: 3 points
 $X_{CO_2}=0.1188$; $X_{CO}=0.0012$; $X_{O_2}=0.02$; $X_{C_6H_{14}}=300\text{ ppm}$ & $X_{NO}=80\text{ ppm}$
Then the converted NO concentration to a wet basis is:

- 56.8 ppm
- 69.7 ppm
- 78.2 ppm
- 90 ppm

No, the answer is incorrect.

Score: 0

Accepted Answers:

69.7 ppm

14 A hydrocarbon fuel $C_{10}H_{22}$ is combusted with air where oxygen mass fraction is measured to be .023 of dry basis. If the unburnt hydrocarbon concentration in the exhaust stream is 140 ppm (wet basis), then the unburnt hydrocarbon concentration of a dry basis is calculated to be: 3 points

- 147.6 ppm
- 152.5 ppm
- 160.1 ppm
- 172.2 ppm

No, the answer is incorrect.

Score: 0

Accepted Answers:

160.1 ppm

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