Unit 9 - Week 8: Combustion and Environment

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 SO\(_2\), 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:
I) Phytotoxicants
II) SO\(_2\)
III) Paroxyacetyle 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:

- [ ] True

No, the answer is incorrect.
Score: 0
Accepted Answers: True
4) Which of the following is primary consumer of oxidant OH, the “cleaning agent”

- CO₂
- CO
- NO
- NO₂

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

5) Which of the following is the largest source of NOₓ

- 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:

- 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:

- 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:

- True
- False

No, the answer is incorrect.
Score: 0
Accepted Answers:
9) NO is more harmful to health as compared to NO\textsubscript{2}. Given statement is:  
- True
- False

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

10) Identify the correct statement regarding removal the particulate matters:  
- 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 C\textsubscript{2}H\textsubscript{6} with air:  
\[X_{CO_2} = 0.15; \quad X_{O_2} = 0.01; \quad X_{H_2O} = 0.18; \quad X_{NO} = 190 \times 10^{-6}\]
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:  
\[X_{CO_2} = 0.1188; \quad X_{CO} = 0.0012; \quad X_{O_2} = 0.21; \quad X_{C_6H_{14}} = 300 \text{ ppm} \quad \text{&} \quad X_{NO} = 78 \text{ ppm}\]
Then the hydrocarbon fuel used for combustion is:  
- C\textsubscript{6}H\textsubscript{14}
- C\textsubscript{8}H\textsubscript{18}
- C\textsubscript{10}H\textsubscript{18}
- C\textsubscript{9}H\textsubscript{16}
13. Following mole fractions of the exhaust products are measured during combustion of \( \text{C}_8\text{H}_{18} \) with air:
\[ X_{\text{CO}_2} = 0.1188; \ X_{\text{CO}} = 0.0012; \ X_{\text{O}_2} = 0.02; \ X_{\text{C}_6\text{H}_{14}} = 300 \text{ ppm} \text{ and } X_{\text{NO}} = 80 \text{ ppm} \]
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:
- \( \text{C}_8\text{H}_{18} \)

14. A hydrocarbon fuel \( \text{C}_{10}\text{H}_{22} \) is combusted with air where oxygen mass fraction is measured to be 0.023 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:
- 147.6 ppm
- 152.5 ppm
- 160.1 ppm
- 172.2 ppm

No, the answer is incorrect.
Score: 0
Accepted Answers:
- \( \text{C}_{10}\text{H}_{22} \)
