

Unit 8 - Week 6 : Energy and Its Forms

Course outline

How does an NPTEL online course work?

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Week 3: Fundamentals of Material Balance

Week 4: Basic Principles of Compressible System

Week 5 : Basic principles of multiphase system

Week 6 : Energy and Its Forms

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Lecture 6.2: Laws and properties of thermodynamics

Lecture 6.3: Standard Heat of Formation

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Week 8 : Energy Balances on Reactive Systems

Week 9 : Balances on Transient Process

Week 10 : Computational Techniques

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Assignment 6

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

Due on 2020-03-11, 23:59 IST.

1) The first law of thermodynamics deals with 1 point

- conservation of momentum
 conservation of mass
 conservation of pressure
 conservation of energy

No, the answer is incorrect.
Score: 0

Accepted Answers:
conservation of energy

2) A liquid is pumped from a storage tank through a tube of 2.5 cm inner diameter at the rate of 0.005 m³/s. What is the specific kinetic energy of the water? Assume the density of water 1000 kg/m³. 1 point

- 67.32 J/kg
 51.92 J/kg
 49.56 J/kg
 36.45 J/kg

No, the answer is incorrect.
Score: 0

Accepted Answers:
51.92 J/kg

3) The change in enthalpy can occur because of 1 point

- change in temperature
 change in moles
 change in specific heat
 All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

4) The entropy of the universe always 1 point

- increases
 decreases
 constant
 maximum

No, the answer is incorrect.
Score: 0

Accepted Answers:
increases

5) Enthalpy of the system is expressed as 1 point

- $H = U - PV$
 $H = U + PV$
 $H = PV - U$
 $H = U - TV$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $H = U + PV$

6) Enthalpy of ideal gas depends on 1 point

- pressure
 temperature
 volume
 density

No, the answer is incorrect.
Score: 0

Accepted Answers:
temperature

7) What is the heat required to raise the temperature of 5 mole gas from 50 °C to 80 °C. Specific heat depends on temperature and is defined as $C_p = a + bT$ where T is in °C. The value of parameters $a = 0.04$ and $b = 0.2 \times 10^{-5}$ 1 point

- 5.21 kJ
 6.01 kJ
 4.65 kJ
 5.31 kJ

No, the answer is incorrect.
Score: 0

Accepted Answers:
6.01 kJ

8) For ideal gases the values of $C_p - C_v$ is where C_p and C_v are the specific heat capacity at constant pressure and constant volume 1 point

- 0
 R/3
 R
 5

No, the answer is incorrect.
Score: 0

Accepted Answers:
R

9) A brine solution having $C_p = 3.12$ kJ/kg K flowing at 50 g/s is heated from 40 °C to 90 °C. What is the change in enthalpy of the brine solution? 1 point

- 8.9 kJ/s
 6.5 kJ/s
 7.8 kJ/s
 4.6 kJ/s

No, the answer is incorrect.
Score: 0

Accepted Answers:
7.8 kJ/s

10) Latent heat of vaporization is defined as 1 point

- the heat required to raise the temperature by 1 °C
 the heat required to change the phase from solid to liquid at constant volume
 the heat required to change the phase (liquid-vapour) at a constant temperature
 the heat required to change the phase at variable temperature

No, the answer is incorrect.
Score: 0

Accepted Answers:
the heat required to change the phase (liquid-vapour) at a constant temperature

11) Internal energy is a function of 1 point

- $f(T,P)$
 $f(P,V)$
 $f(T,V)$
 $f(V,C_v)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $f(T,V)$

12) C_p is the specific heat at constant 1 point

- temperature
 pressure
 volume
 entropy

No, the answer is incorrect.
Score: 0

Accepted Answers:
pressure

13) Latent heat of vaporization is the 1 point

- the heat required to melt solid
 heat required to vaporize solid
 heat required to vaporize liquid
 both (b) and (c)

No, the answer is incorrect.
Score: 0

Accepted Answers:
heat required to vaporize liquid

14) The heat of formation is expressed as where, $\Delta \hat{H}_i$ is the enthalpies of the mixture components. C_p is the specific heat capacity 1 point

- $\Delta H_{f,i}^s = \Delta \hat{H}_i - \int_{T_1}^{T_2} C_p dT$
 $\Delta H_{f,i}^s = \Delta \hat{H}_i + \int_{T_1}^{T_2} C_p dT$
 $\Delta H_{f,i}^s = \Delta \hat{H}_i + \int_{T_{ref}}^T C_p dT$
 $\Delta H_{f,i}^s = \Delta \hat{H}_i - \int_{T_{ref}}^T C_p dT$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\Delta H_{f,i}^s = \Delta \hat{H}_i - \int_{T_{ref}}^T C_p dT$

15) Zeroth law of thermodynamics states that 1 point

- the energy of a universe is always constant
 the entropy of the system at absolute zero temperature is zero
 the energy always transfer from high to low temperature
 if two systems are in equilibrium with the third system than they are in thermal equilibrium with each other

No, the answer is incorrect.
Score: 0

Accepted Answers:
if two systems are in equilibrium with the third system than they are in thermal equilibrium with each other