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Unit 6 - Week 4

Register for Certification exam

Course outline

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Assignment 4

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. **Due on 2019-02-27, 23:59 IST.**

1) A Carnot engine, working between 600 K and 300 K and using 5 mole of oxygen (C_v = 5 $CalK^{-1}mol^{-1}$) as the working substance, absorbs 1,000 k Cal heat from the hot reservoir. The work done during the adiabatic reversible expansion is (in Cal): ***1 point***

- -1,500
- +4,500
- -7,500
- +10,500

No, the answer is incorrect.
Score: 0

Accepted Answers:
-7,500

2) Calculate the change in the entropies of the system and the surroundings, and the total change in entropy, when a gas of mass 21.5 g at 300 K and 1.30 bar doubles its volume in an adiabatic reversible expansion ***1 point***

- 0, 0, 0
- 10 $J K^{-1}$, -10 $J K^{-1}$, 0
- 1 $J K^{-1}$, -1 $J K^{-1}$, 0
- 100 $J K^{-1}$, -100 $J K^{-1}$, 0

No, the answer is incorrect.
Score: 0

Accepted Answers:
0, 0, 0

3) Calculate the change in the entropies of the system and the surroundings, and the total change in entropy, when a sample of oxygen gas of mass 49.33 g at 298 K and 1.00 bar doubles its volume in an isothermal reversible expansion ***1 point***

Week 12

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No, the answer is incorrect.
Score: 0

Accepted Answers:
8.88 J K^{-1}, - 8.88 J K^{-1}, 0

4) A Carnot engine, working between 600 K and 300 K and using 5 mole of oxygen (C_v = 5 CalK^{-1}mol^{-1}) as the working substance, absorbs 1,000 Cal heat from the hot reservoir. The quantity of heat released to the cold reservoir is (in Cal): ***1 point***

- 2,000
- 500
- 1,500
- 1,000

No, the answer is incorrect.
Score: 0

Accepted Answers:
500

5) The entropy change when two moles of ideal monoatomic gas is heated from 100^{O}C to 200^{O}C reversibly and isochorically is given by ***1 point***

- 4.78 J K^{-1}
- 5.92 J K^{-1}
- 11.56 J K^{-1}
- 15.25 J K^{-1}

No, the answer is incorrect.
Score: 0

Accepted Answers:
5.92 J K^{-1}

6) When one mole of an ideal gas is expanded to twice of its initial volume and simultaneously cooled to half of its initial temperature, the change in entropy is ***1 point***

- (Cv,m –R) ln2
- Cp,m ln2
- (R – Cv,m) ln2
- R ln2

No, the answer is incorrect.
Score: 0

Accepted Answers:
(R – Cv,m) ln2

7) Calculate the standard reaction entropy at 298 K of ***1 point***

$$2\ AgCl(s) + Br_2(l) \rightarrow 2AgBr(s) + Cl_2(g)$$

Use the following values
S_m^o (AgBr, s) = 107.1 J K^{-1} mol^{-1}, S_m^o (Cl_2, g) = 223.07 J K^{-1} mol^{-1}, S_m^o (AgCl, s) = 96.2 J K^{-1} mol^{-1} , S_m^o (Br_2, l) = 152.23 J K^{-1} mol^{-1}

- 92.6 J K^{-1} mol^{-1}
- 22.6 J K^{-1} mol^{-1}
- 52.6 J K^{-1} mol^{-1}

- 72.6 J K^{-1} mol^{-1}

No, the answer is incorrect.
Score: 0

Accepted Answers:
92.6 J K^{-1} mol^{-1}

8) Calculate the minimum work needed to prepare 1 kg ice from water at 25^0C in a refrigerator working between 5^0C and 25^0C. **1 point**

- 11754.17 calories
- 11.17 calories
- 154.17 calories
- 117.17 calories

No, the answer is incorrect.
Score: 0

Accepted Answers:
11754.17 calories

9) A 1000 Watt electric heater attaining 800 K temperature instantaneously is kept on for 10 mins in a room of temperature 27^0C. Calculate change in entropy of universe **1 point**

- 1250 J K^{-1}
- 2 J K^{-1}
- 10 J K^{-1}
- 25 J K^{-1}

No, the answer is incorrect.
Score: 0

Accepted Answers:
1250 J K^{-1}

10) An engine working between 600 K and 300 K extracts 10^5 kJ of heat. The inventor claims that the engine is a 1kW engine. So how long the engine will work with the supplied heat. **1 point**

- 50000 seconds
- 2 seconds
- 5 seconds
- 10 seconds

No, the answer is incorrect.
Score: 0

Accepted Answers:
50000 seconds

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