Quiz 6

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This Quiz will be evaluated for 5 points.
Time: 5:35 to 5:50.
No Extra time is Given. Form automatically closes at 5:45 PM.
Any submissions beyond 5:45 will be given Zero
All the best

* Required

A household refrigerator that has a power input of 450 W and a COP of 2.5 is to cool five large watermelons, 10 kg each, to 8 °C. If the watermelons are initially at 20 °C, determine how long it will take for the refrigerator to cool them. The watermelons can be treated as water whose specific heat is 4.2 kJ/kg °C. * 1 point

- ○ 10.2 min
- ○ 66.1 min
- ○ 26.2 min
- ○ 13.3 min
- ○ 21.2 min
- ○ 55.12 min
- ◉ 37.3 min

Entropy change for an irreversible process taking system and surrounding together is * 1 point

- (●) >0
- ( ) <0
- ( ) =0
- ( ) None of these
- ( ) All of these
- ( ) -2
- ( ) -1
- ( ) -8

Assertion (A): Water is pure substance Reason (R): The term pure substance designates a substance which is heterogeneous and has the different chemical composition in all phases. Identify the correct statement below. * 1 point

- (●) A is true but R is false
- ( ) R is True but A is not True
- ( ) Both A and R are true and R is not a correct explanation for A
- ( ) A is false but R is true
- ( ) Both A and R are true and R is the correct explanation for A
- ( ) A is False but R is True

The second law of thermodynamics states that * 1 point

- [ ] It is possible to transfer heat from a lower temperature to a higher temperature
- [ ] All of these
- [ ] The total energy of system and surrounding remains the same.
- [ ] The energy change of a system undergoing any Irreversible process is zero.
- [ ] The total energy of surrounding remains the same.
- [ ] None of these
- [ ] The energy change of a system undergoing any reversible process is zero.
- [x] It is not possible to transfer heat from a lower temperature to a higher temperature

Keeping the limitations imposed by the second-law of thermodynamics in mind, choose the wrong statement below * 1 point

- [ ] A heat engine cannot have a thermal efficiency of 100%.
- [ ] For all Irreversible processes, the second-law efficiency is 100%.
- [ ] A heat engine can have a thermal efficiency of 100%.
- [ ] For all reversible processes, the second-law efficiency is 100%.
- [ ] The second-law efficiency of a process is 100% if no entropy is generated during that process
- [x] The second-law efficiency of a heat engine cannot be greater than its thermal efficiency.

A heat pump is absorbing heat from the cold out¬doors at 5°C and supplying heat to a house at 25°C at a rate of 18,000 kJ/h. If the power consumed by the heat pump is 1.9 kW, the coefficient of performance of the heat pump is: * 1 point

- [ ] 1.3
- [x] 2.6
- [ ] 3.0
- [ ] 3.8
- [ ] -1.8
- [ ] -3.2
- [ ] 10.2
- [ ] -18.1

A heat engine receives heat from a source at 1500 K at a rate of 600 kJ/s and rejects the waste head to a sink at 300 K. If the power output of the engine is 400 kW. The efficiency of real heat engine is : * 1 point

- [ ] 62 %
- [ ] 22 %
- [ ] 67 %
- [ ] 42 %
- [x] 83 %
- [ ] 73 %
- [ ] 53 %

Irreversibility of thermodynamic process occurs only by : (a) heat transfer across the boundary (b) Frictional effects (c) Unrestrained expansion (d) Mixing of two dissimilar pure substances * 1 point

- ○ a, b and c
- ○ a and b
- ○ c only
- ○ a only
- ○ b only
- ○ c and b
- ◉ a, b, c and d

The work done in isothermal compression compared to the adiabatic compression will be * 1 point

- ○ Very high and independent of the extent of work done
- ○ More or less depending upon the extent of work done
- ○ Slightly lower
- ○ More
- ◉ Less
- ○ Same
- ○ Slightly higher

Entropy of a substance remains constant during the _____ process. * 1 point

- ○ Revesrible adiabtic
- ○ Irreversible isochoric
- ○ Reversible isobaric
- ○ All of these
- ○ Irreversible isothermal
- ○ Reversible isothermal
- ○ None of these
- ◉ Reversible adiabatic

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