

Quiz 6

Total points 8/10

Quiz 6

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

The respondent's email (**choudhary.21@iitj.ac.in**) was recorded on submission of this form.

✓ A household refrigerator that has a power input of 450 W and a COP of 1/1 1/1 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. *

- ☐ 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 *

1/1

- ☒ >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. *

1/1

- ☒ 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 *

1/1

- ☐ 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.
- ☒ 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 1/1
in mind, choose the wrong statement below *

- ☐ 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
- ☒ 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 $18,000 \text{ kJ/h}$. If the power consumed by the heat pump is 1.9 kW , the coefficient of performance of the heat pump is: *

1/1

- ☐ 1.3
- ☒ 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 0/1 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 : *

- ☐ 62 %
- ☐ 22 %
- ☐ 67 %
- ☐ 42 %
- ☒ 83 %
- ☐ 73 %
- ☐ 53 %

✗

Correct answer

- ☒ 67 %

✓ 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 *

1/1

- ☐ 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 * 0/1

- ☐ 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

✗

Correct answer

- ☒ More or less depending upon the extent of work done

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

- ☐ Reversible adiabatic
- ☐ Irreversible isochoric
- ☐ Reversible isobaric
- ☐ All of these
- ☐ Irreversible isothermal
- ☐ Reversible isothermal
- ☐ None of these
- ☒ Reversible adiabatic

✓



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