



Standardized Test Prep

MULTIPLE CHOICE

- If there is no change in the internal energy of a gas, even though energy is transferred to the gas as heat and work, what is the thermodynamic process that the gas undergoes called?
 - adiabatic
 - isothermal
 - isovolumetric
 - isobaric
- To calculate the efficiency of a heat engine, which thermodynamic property does *not* need to be known?
 - the energy transferred as heat to the engine
 - the energy transferred as heat from the engine
 - the change in the internal energy of the engine
 - the work done by the engine
- In which of the following processes is no work done?
 - Water is boiled in a pressure cooker.
 - A refrigerator is used to freeze water.
 - An automobile engine operates for several minutes.
 - A tire is inflated with an air pump.
- A thermodynamic process occurs in which the entropy of a system decreases. From the second law of thermodynamics, what can you conclude about the entropy change of the environment?
 - The entropy of the environment decreases.
 - The entropy of the environment increases.
 - The entropy of the environment remains unchanged.
 - There is not enough information to state what happens to the environment's entropy.

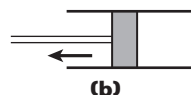
Use the passage and diagrams below to answer questions 5–8.

A system consists of steam within the confines of a steam engine, whose cylinder and piston are shown in the figures below.

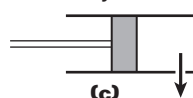
Steam from boiler added to empty cylinder



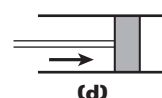
Steam expands rapidly within cylinder, moving piston outward



Steam condenses to hot water and is removed from cylinder



Piston moves inward



- Which of the figures describes a situation in which $\Delta U < 0$, $Q < 0$, and $W = 0$?
 - (a)
 - (b)
 - (c)
 - (d)
- Which of the figures describes a situation in which $\Delta U > 0$, $Q = 0$, and $W < 0$?
 - (a)
 - (b)
 - (c)
 - (d)
- Which of the figures describes a situation in which $\Delta U < 0$, $Q = 0$, and $W > 0$?
 - (a)
 - (b)
 - (c)
 - (d)