
MEWB - Steam Plants

1. Energy existing in a system as a result of the relative velocities of the objects is defined as _____.

- potential energy
- pressure energy
- **kinetic energy**
- relative energy

Note:
Kinetic energy is the energy possessed by an object due to its motion; therefore, it accurately describes energy resulting from the relative velocities of objects within a system. Potential energy relates to position, pressure energy to fluid mechanics, and 'relative energy' is not a recognized physics term.

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2. Which of the following statements is NOT one of Newton's laws?

- A body at rest tends to remain rest and a body in motion tends to remain in motion.
- For every action there is an equal and opposite reaction.
- **If the pressure is constant, the volume of an enclosed dry gas varies directly with the absolute temperature.**
- An imbalance of force on a body tends to produce an acceleration in the direction of that force which is directly proportional to the applied force and inversely proportional to the mass of the body.

Note:
The correct answer is choice C because it describes Charles’s Law, a gas law relating volume and temperature, rather than a principle of motion or force as defined by Newton’s laws.

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3. A theoretical engine cycle is a process that _____.

- takes place in the combustor of the engine
- **begins with certain conditions, progresses through a series of additional conditions and returns to the original conditions**
- begins with certain conditions, progresses to a steady state and stays there
- None of the above.

Note:
A theoretical engine cycle is defined as a sequence of processes that begins at a specific state and returns to that state, allowing for repetition.

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4. Boyle's law can best be defined as _____.

- **the volume of an enclosed gas varies inversely with the applied pressure, provided the temperature remains constant**
- if the pressure is constant, the volume of an enclosed gas varies indirectly with absolute temperature
- a body at rest tends to remain at rest
- none of the above

Note:
Boyle's law defines the inverse relationship between pressure and volume of a gas at constant temperature.

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5. Which of the following best describes the adiabatic pressure/volume relationship with regards to a fixed amount of a saturated gas?

- **As pressure decreases, volume increases**
- As pressure increases, volume increases
- As pressure decreases, volume decreases
- As volume increases, pressure increases exponentially

Note:
In an adiabatic process involving a fixed amount of saturated gas, pressure and volume are inversely related; therefore, as pressure decreases, volume increases.

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6. Which of the statements listed concerning heat transfer is correct?

- Heat is always transferred at a constant rate.
- **Heat transfer rate increases as temperature difference increases.**
- The rate of heat transfer is not affected by temperature difference.
- The high temperature region is known as a heat sink.

Note:
Heat transfer rate increases proportionally with temperature difference, as this difference drives heat flow. Heat transfer equations for conduction and convection demonstrate this relationship, while a heat sink is the lower temperature region, and heat transfer rates are rarely constant.

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7. A turbine exhaust pressure of 14.7 psia is equal to _____.

- **00.000 psig**
- 01.470 psig
- 07.350 psig
- 29.400 psig

Note:
14.7 psia represents atmospheric pressure, which is equivalent to 0 psig because psig measures pressure relative to atmospheric pressure.

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8. What is the gain in potential energy of an object weighing 10 pounds when it is raised to a height of 10 feet?

- 10 ft-lb
- 20 ft-lb
- **100 ft-lb**
- 1000 ft-lb

Note:
Potential energy gain is calculated by multiplying weight by height, resulting in 100 ft-lb (10 lb × 10 ft).

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9. How much work would be accomplished if a 15 pound box were raised to the top of a 25 foot platform?

- 15 ft-lb
- 25 ft-lb
- 40 ft-lb
- **375 ft-lb**

Note:
Work is calculated as force multiplied by distance; therefore, 15 pounds of force applied over 25 feet results in 375 ft-lb of work.

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10. What is the potential energy of an object weighing 10 pounds (4.54 kg) at a height of 10 feet (3.05 m)?

- 10 ft-lb (1.38 kg-m)
- 20 ft-lb (2.76 kg-m)
- **100 ft-lb (13.83 kg-m)**
- 1000 ft-lb (138.25 kg-m)

Note:
Potential energy is calculated by multiplying weight by height, resulting in 100 ft-lb (approximately 13.83 kg-m).
