

1. Which law of thermodynamics governs the energy conversion process in turbo machines?

- a) First law
- b) Second law
- c) Third law
- d) Zeroth law

Answer: a) First law

Explanation: The first law of thermodynamics, also known as the law of energy conservation, governs the energy conversion process in turbo machines by accounting for the conservation of energy, stating that energy cannot be created or destroyed, only transformed from one form to another.

2. What equation represents the conservation of angular momentum in fluid flow through a turbo machine?

- a) Bernoulli's equation
- b) Euler turbine equation
- c) Energy equation
- d) Moment of momentum equation

Answer: d) Moment of momentum equation

Explanation: The moment of momentum equation is derived from the conservation of angular momentum in fluid flow and is applicable to turbo machines. It describes the relationship between the torque exerted on a fluid and its angular momentum.

3. Which principle distinguishes between impulse and reaction turbo machines?

- a) Newton's third law
- b) Conservation of mass

- c) Conservation of energy
- d) Principle of action and reaction

Answer: d) Principle of action and reaction

Explanation: Impulse and reaction turbo machines operate based on different principles of fluid flow. The principle of action and reaction distinguishes between them, where impulse turbines change the fluid's momentum entirely through the action of the blades, while reaction turbines partially rely on pressure change.

4. The degree of reaction in a turbo machine refers to the ratio of:
- a) Static pressure change to total pressure change
 - b) Absolute velocity to relative velocity
 - c) Work done by the rotor to work done by the stator
 - d) Flow rate at the outlet to flow rate at the inlet

Answer: c) Work done by the rotor to work done by the stator

Explanation: The degree of reaction indicates the proportion of work done by the rotor to that done by the stator in a turbo machine. It helps in characterizing the machine's design and performance.

5. In the context of turbo machines, the Euler turbine equation is used to determine:
- a) Pressure drop across the rotor
 - b) Efficiency of the stator
 - c) Velocity of the fluid leaving the rotor
 - d) Total energy change in the system

Answer: c) Velocity of the fluid leaving the rotor

Explanation: The Euler turbine equation relates the fluid velocity leaving the rotor to the changes in angular momentum and energy, aiding in analyzing and designing turbine stages.

6. The energy equation for relative velocities in turbo machines is based on the principle of:

- a) Conservation of momentum
- b) Conservation of energy
- c) Conservation of angular momentum
- d) Conservation of mass

Answer: b) Conservation of energy

Explanation: The energy equation for relative velocities in turbo machines is derived from the conservation of energy principle, accounting for changes in kinetic energy and potential energy as the fluid flows through the machine.

7. What aspect does the first law of thermodynamics primarily address in turbo machines?

- a) Entropy generation
- b) Energy conversion
- c) Heat transfer
- d) Irreversibility

Answer: b) Energy conversion

Explanation: The first law of thermodynamics primarily addresses energy conversion processes in turbo machines, ensuring that energy input is accounted for and properly utilized in performing work or changing the fluid's energy state.

8. In one-dimensional analysis of turbo machines, what assumption is made regarding fluid flow?

- a) Flow is steady and incompressible
- b) Flow is turbulent and viscous
- c) Flow is unsteady and compressible
- d) Flow is laminar and inviscid

Answer: a) Flow is steady and incompressible

Explanation: One-dimensional analysis of turbo machines typically assumes steady and incompressible fluid flow, simplifying the analysis while still providing valuable insights into performance and behavior.

9. Which law of thermodynamics restricts the efficiency of turbo machines?

- a) Zeroth law
- b) First law
- c) Second law
- d) Third law

Answer: c) Second law

Explanation: The second law of thermodynamics imposes limitations on the efficiency of turbo machines, stating that no engine can be 100% efficient in converting heat into work due to the inevitable increase in entropy.

10. What does the degree of reaction indicate about a turbo machine?

- a) Efficiency of the turbine
- b) Balance of work between rotor and stator
- c) Total pressure change across the machine
- d) Relative velocity of the fluid leaving the rotor

Answer: b) Balance of work between rotor and stator

Explanation: The degree of reaction reflects how the work is distributed between the rotor and stator of a turbo machine, providing insights into the machine's design and performance characteristics.

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