1. Which of the following turbines is best suited for high head, low flow applications?
a) Pelton turbine
b) Francis turbine
c) Kaplan turbine
d) None of the above

Answer: c) Kaplan turbine
Explanation: Kaplan turbines are specifically designed for sites with low head and high flow rates, making them ideal for such applications.

2. What is the purpose of a draft tube in a water turbine?
a) To increase the efficiency of the turbine
b) To regulate the flow of water to the turbine
c) To decrease the velocity of water leaving the turbine
d) To increase the rotational speed of the turbine

Answer: c) To decrease the velocity of water leaving the turbine
Explanation: The draft tube helps to reduce the velocity of water leaving the turbine, thereby increasing the efficiency of the turbine.

3. What is the main advantage of a centrifugal pump over a reciprocating type pump?
a) Higher efficiency
b) Lower initial cost
c) Better suited for high-pressure applications
d) Easier maintenance

Answer: b) Lower initial cost

Explanation: Centrifugal pumps generally have a lower initial cost compared to reciprocating pumps due to their simpler construction.

4. Which term refers to the total head developed by a pump when no flow is taking place?
a) Manometric head
b) Gross head
c) Static head
d) Dynamic head

Answer: c) Static head
Explanation: Static head refers to the total head developed by a pump when no flow is taking place, usually due to the difference in elevation between the pump inlet and outlet.

5. What does the term “cavitation” refer to in the context of water turbines and centrifugal pumps?
a) Excessive vibration of the machinery
b) Formation of air bubbles in the fluid
c) Loss of efficiency due to friction
d) Increase in temperature of the working fluid

Answer: b) Formation of air bubbles in the fluid
Explanation: Cavitation occurs when the pressure of the fluid drops below its vapor pressure, causing the formation of vapor bubbles, which collapse with significant force, leading to damage to turbine or pump components.

6. Which efficiency represents the ratio of actual work done by the machine to the work done ideally?

a) Hydraulic efficiency
b) Volumetric efficiency
c) Mechanical efficiency
d) Overall efficiency

Answer: d) Overall efficiency
Explanation: Overall efficiency represents the ratio of actual work done by the machine to the work done ideally, considering all losses in the system.

7. In a vector diagram of a turbine, which vector represents the velocity of water entering the turbine?
a) Tangential velocity
b) Axial velocity
c) Radial velocity
d) Resultant velocity

Answer: b) Axial velocity
Explanation: Axial velocity represents the velocity of water entering the turbine parallel to the axis of rotation.

8. What is the governing mechanism used to control the speed of water turbines?
a) Nozzle control
b) Blade adjustment
c) Governor valve
d) Flow rate regulation

Answer: c) Governor valve

Explanation: Governor valves are used to control the flow of water to the turbine, thereby regulating its speed.

9. Which of the following quantities remains constant in a dimensionally homogeneous equation?
a) Mass
b) Length
c) Time
d) All of the above

Answer: d) All of the above
Explanation: In a dimensionally homogeneous equation, all quantities must have the same dimensions, so all the mentioned quantities (mass, length, and time) remain constant.

10. Which type of pump is typically used for applications requiring a continuous, steady flow?
a) Reciprocating pump
b) Centrifugal pump
c) Diaphragm pump
d) Gear pump

Answer: b) Centrifugal pump
Explanation: Centrifugal pumps are well-suited for applications requiring a continuous, steady flow due to their smooth operation.

11. What is the purpose of dimensional analysis in the performance analysis of machines?
a) To simplify complex equations
b) To determine the scale effects

c) To predict the behavior of machines at different scales
d) All of the above

Answer: d) All of the above
Explanation: Dimensional analysis helps simplify equations, determine scale effects, and predict machine behavior at different scales by analyzing the relationships between various physical quantities.

12. What type of efficiency represents the ratio of power output to power input in a machine?
a) Hydraulic efficiency
b) Volumetric efficiency
c) Mechanical efficiency
d) Overall efficiency

Answer: c) Mechanical efficiency
Explanation: Mechanical efficiency represents the ratio of power output to power input in a machine, accounting for losses due to mechanical friction and inefficiencies.

13. Which of the following is a unit quantity in the performance analysis of water turbines?
a) Flow rate
b) Head
c) Power
d) Efficiency

Answer: c) Power
Explanation: Power is a unit quantity in the performance analysis of water turbines, typically measured in watts or horsepower.

14. How does cavitation affect the performance of water turbines and centrifugal pumps?
a) It increases efficiency
b) It decreases efficiency
c) It has no effect on efficiency
d) It improves durability

Answer: b) It decreases efficiency
Explanation: Cavitation decreases the efficiency of water turbines and centrifugal pumps by causing damage to components and reducing the effectiveness of the machinery.

15. Which characteristic of a pump is represented by the difference in pressure between the inlet and outlet?
a) Manometric head
b) Gross head
c) Static head
d) Dynamic head

Answer: a) Manometric head
Explanation: Manometric head represents the difference in pressure between the inlet and outlet of a pump, indicating the pressure developed by the pump.

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