1. Which of the following is NOT a common application of nano tribology?
a) Automobile engines
b) Machine tools
c) Computer hard drives
d) Agricultural machinery

Answer: d) Agricultural machinery
Explanation: Nano tribology, dealing with friction, wear, and lubrication at the nanoscale, finds applications in various fields such as automotive, electronics (like computer hard drives), and industrial machinery (like machine tools). While it's possible for nano tribology to have applications in agricultural machinery, it's not as prevalent as the other options listed.

2. What instrumental test is commonly used to analyze friction and wear at the nanoscale?
a) Scanning Electron Microscopy (SEM)
b) Atomic Force Microscopy (AFM)
c) Transmission Electron Microscopy (TEM)
d) X-ray Diffraction (XRD)

Answer: b) Atomic Force Microscopy (AFM)
Explanation: AFM is a powerful tool for imaging, measuring, and manipulating matter at the nanoscale. It's commonly used in nano tribology to investigate surface morphology, friction, and wear characteristics with high resolution.

3. Bearings are commonly used in machinery to:
a) Reduce friction between moving parts
b) Increase friction between moving parts
c) Enhance wear on moving parts

d) Reduce wear on stationary parts

Answer: a) Reduce friction between moving parts
Explanation: Bearings are mechanical components used to reduce friction between moving parts by providing smooth rolling or sliding motion. They help in minimizing wear and facilitating efficient operation in various applications such as automotive, aerospace, and industrial machinery.

4. Clutches and brakes are essential components in vehicles for:
a) Increasing speed
b) Decreasing speed
c) Stopping the engine
d) Increasing fuel consumption

Answer: b) Decreasing speed
Explanation: Clutches and brakes are crucial for controlling the speed of vehicles by engaging or disengaging power transmission and applying friction to slow down or stop the vehicle. They play a vital role in ensuring safety and efficient operation on roads.

5. Slide units are commonly employed in machine tools for:
a) Reducing precision
b) Increasing vibration
c) Enhancing accuracy
d) Decreasing productivity

Answer: c) Enhancing accuracy
Explanation: Slide units, also known as linear slides, are used in machine tools to facilitate

precise and controlled movement of components along a linear axis. They contribute to enhancing the accuracy and precision of machining operations in various industries such as manufacturing and automotive.

6. Dynamic seals are utilized in machinery to:
a) Prevent fluid leakage
b) Increase fluid flow
c) Enhance friction
d) Reduce temperature

Answer: a) Prevent fluid leakage
Explanation: Dynamic seals, such as O-rings and lip seals, are designed to prevent the leakage of fluids (liquids or gases) between moving or stationary components in machinery. They help maintain the integrity of enclosed systems and prevent contamination or loss of fluid.

7. In automobile applications, turbochargers are commonly used to:
a) Increase fuel efficiency
b) Enhance engine power output
c) Decrease engine emissions
d) Reduce engine temperature

Answer: b) Enhance engine power output
Explanation: Turbochargers are devices used in automobile engines to increase the power output by compressing air before it enters the combustion chamber. This compressed air allows more fuel to be burned, resulting in increased engine power output without significantly increasing engine size.

8. Which of the following is NOT a typical application of machine tools/press machines?
a) Metal cutting
b) Woodworking
c) Plastic molding
d) Crop harvesting

Answer: d) Crop harvesting
Explanation: Machine tools and press machines are commonly used in various manufacturing processes such as metal cutting, woodworking, and plastic molding. However, they are not typically associated with crop harvesting, which involves specialized agricultural equipment.

9. An example of another application of nano tribology is:
a) Smartphone manufacturing
b) Solar panel installation
c) Bicycle maintenance
d) House painting

Answer: a) Smartphone manufacturing
Explanation: Nano tribology plays a significant role in the manufacturing of smartphones, particularly in ensuring the smooth operation of touchscreens, reducing friction between moving parts (such as buttons or sliders), and improving the durability of components subjected to repetitive use.

10. Which of the following is a case study involving the application of nano tribology?
a) Building construction
b) Bridge maintenance
c) Spacecraft propulsion

d) Micro-electromechanical systems (MEMS)

Answer: d) Micro-electromechanical systems (MEMS)
Explanation: MEMS are miniature devices or systems that integrate mechanical and electrical components on a microscopic scale. Nano tribology is crucial in ensuring the reliability and functionality of MEMS devices by addressing friction, wear, and lubrication issues at the nanoscale.

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