AST 406

Links, Guiding Controls, Motion, Friction and Adhesion

Part 1: Linking

1) Identify the characteristic of the links described in the statements below.

   a) characteristic of a link when the linking component or the surfaces of the linked parts are rigid

   _____

   b) characteristic of a link when at least one part can move independently of the other parts

   _____

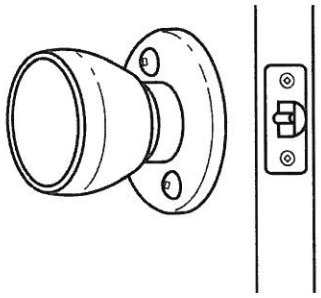
   c) characteristic of a link in which the separation of the linked parts damages their surfaces or the linking component

   _____

   d) characteristic of a link that requires a linking component

   _____

2) Consider the link below between the doorknob plate and the door.



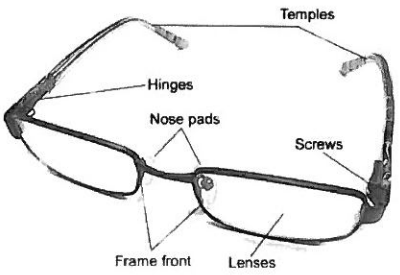
   a) Identify the characteristics of this link by checking the correct boxes.

direct	□	indirect	□
rigid	□	flexible	□
removable	□	non-removable	□
complete	□	partial	□

   b) On the figure, draw an arrow that points to a linking component, if there are any.

   c) If the doorknob has any degrees of freedom in relation to the door, how many does it have?

3) Consider the pair of glasses illustrated below.



a) Give the characteristics of the link between the temples and the front frame.

direct	□	indirect	□
rigid	□	flexible	□
removable	□	non-removable	□
complete	□	partial	□

b) Give the characteristics of the link between the lenses and the front frame.

direct	□	indirect	□
rigid	□	flexible	□
removable	□	non-removable	□
complete	□	partial	□

Part 2: Guiding and types of motion

4) Identify the form of guiding described in the following statements.

a) form of guiding that allows a moving part to turn on itself

_____

b) form of guiding that allows a moving part to move in a straight line

_____

c) form of guiding that allows a moving part to rotate while moving sideways along its rotational axis

_____

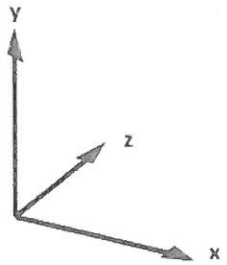
5) Which form of guiding control is usually found in an object when the guiding component . . .

a) has threads? _____

b) has grooves? _____

c) is cylindrical? _____

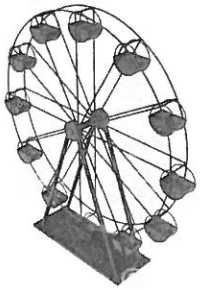
6) For each object below, indicate the type and direction of the motion.



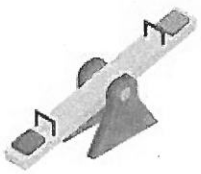
a) The minutes and hours hands (same motion for both)

b) The gate

c) The ferris wheel



d) The see saw

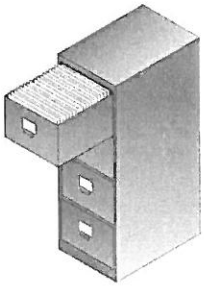


e) For the laptop

i) The "screen/cover"

ii) The keys

f) The drawers in the filing cabinet



g) The ceiling fan

7) Which form of guiding makes the following actions possible?

a) exposing the blade of a retractable utility knife _____

b) using a paint roller _____

c) pressing the keys of a computer keyboard _____

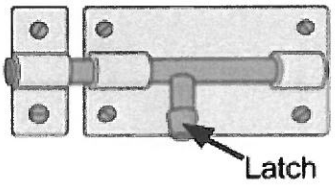
d) opening and closing a tap _____

e) opening a classroom door _____

f) opening a patio door _____

g) opening a compact disk case _____

8) Consider the door lock illustrated below.



a) How many degrees of freedom does the latch have? _____

b) On the diagram, circle the parts that limit the translational motion of the latch.

Part 3: Friction and adhesion

9) For each of the following situations, determine whether the strength of adhesion between the surfaces described will increase or decrease, and identify the factor affecting the strength of adhesion.

a) between the soles of a worker's boots and the shingles on a roof as the temperature rises over the course of the day

increase ☐ decrease ☐

Factor involved: _____

b) between a hockey puck and the ice as the period advances and the ice becomes rougher

increase ☐ decrease ☐

Factor involved: _____

c) between the wheel of a wheelbarrow and the road after the wheelbarrow has been emptied

increase ☐ decrease ☐

Factor involved: _____

d) between a bicycle chain and the derailleur after oil has been applied

increase ☐ decrease ☐

Factor involved: _____

e) Between a ping pong ball and the racket if the rubber coating is removed to reveal the wood underneath

increase ☐ decrease ☐

Factor involved: _____

10) What force resists the slipping of a piece of sandpaper on a wooden surface?

_____