

CONCEPT REVIEW 56

Complete this concept review handout and keep it as a record of what you have learned.

Guiding controls

Definitions

- Guiding is the mechanical function performed by any component that controls the motion of one or more moving parts.
- A guiding component or control is a component whose mechanical function is to guide the motion of moving parts.
- Adhesion is the phenomenon by which two surfaces tend to remain in contact with each other without slipping.
- In mechanics, friction is a force that resists the slipping of one moving part over another.
- Lubrication is the mechanical function performed by any component that reduces friction between two parts.

Main types of guiding

Type of guiding	Description
Translational guiding	Ensures the straight translational motion of a moving part.
Rotational guiding	Ensures the rotational motion of a moving part.
Helicoidal guiding	Ensures the translational motion of a moving part while it rotates about the same axis.

Five factors that vary the strength of adhesion between two surfaces

Factor	Description
<i>Nature of the materials in contact</i>	<i>Certain materials adhere to each other better than others.</i>
<i>Presence of a lubricant</i>	<i>Adhesion is usually reduced by the presence of a lubricant.</i>
<i>Temperature</i>	<i>Adhesion between two surfaces tends to diminish with colder temperatures.</i>
<i>State of the surfaces in contact</i>	<i>Usually, the rougher a surface, the better its adhesion to another surface</i>
<i>Perpendicular force exerted by one surface on another</i>	<i>Adhesion increases as this force increases.</i>

Means of reducing friction

- *Applying a lubricant.*
- *Polishing the surface of parts.*



Name: _____ Class: _____ Date: _____

INTEGRATION QUESTIONS

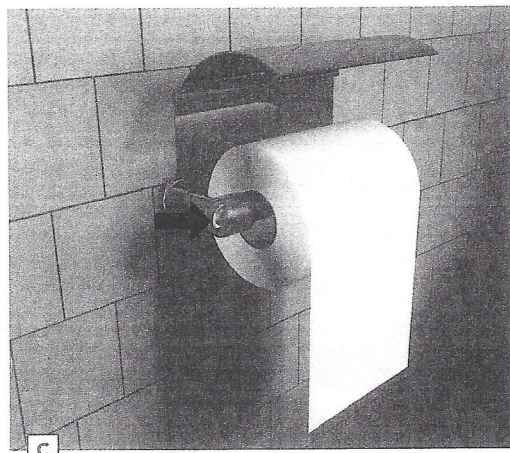
Guiding control

1. Name the type of guiding used in the following systems and identify the guiding components with arrows.



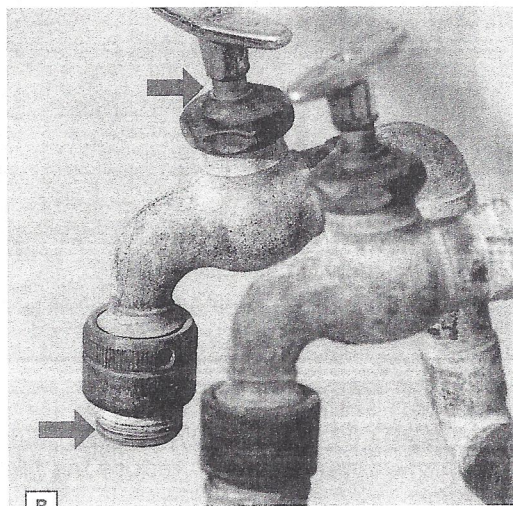
A

Translational guiding.



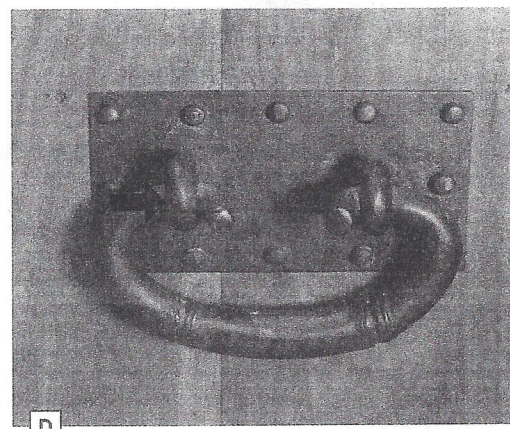
C

Rotational guiding.



B

Helicoidal guiding.



D

Rotational guiding.

2. What type of guiding is most suitable in each of the following situations?

- a) The object can slide without a linking component, but a front-to-back motion must be maintained. *Translational guiding.*
- b) The object to guide is round and must pivot on its axis. *Rotational guiding.*

3. Identify a type of guiding that can be found between parts of the human body. Give two examples.

Answers will vary. Examples. Rotational guiding in the knee, shoulder, wrist, etc.



4. What factor is varying the strength of adhesion in each of these situations?

- a) A stuffed animal is stuck with a suction cup to a greasy window.

The presence of a lubricant.

- b) The soles of Joel's boots are worn.

The state of the surfaces in contact.

- c) The car was so overloaded on our camping trip that it clung to the road.

The perpendicular force exerted by one surface on another.

- d) In summer, the hotter it is outside, the better the adhesion.

Temperature.

- e) It is easier to slide on a varnished wooden floor than a ceramic one.

The nature of the materials in contact.

5. True or false?

- a) The greater the adhesion between two parts, the greater the friction.

True.

- b) Polishing increases adhesion.

False.

- c) Friction always occurs between the moving part and the linking component.

False.

- d) A lubricant can be a solid.

True.

6. What can you do to increase the adhesion of your automobile tires in winter when it is icy?

Answers will vary. Example. Use tires with a rougher surface or weight the car to increase the perpendicular force exerted on the surface.

7. You have made a wooden toy for your little sister, but the parts do not slide against each other well because they are too rough, What solution would be most appropriate to reduce the friction in this case?

The most appropriate solution in this case would be to polish the wooden parts. Applying a wax can also make the surfaces slip better.

8. The basement door opens with an ear-piercing creak. What is the problem and what can you do to solve it?

The door creaks because there is friction between the parts of the guiding component.

The solution would be to apply a lubricant.

