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Name.			

Linking in technical objects

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CONCEPT REVIEW 55

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

Definitions

- Mechanical engineering is a branch of engineering that focuses on the design, production, analysis, working and improvement of technical objects with moving parts.
- A link allows the keeping together of two or more pieces in the same object.
- ✓ In mechanics, a component is a part or fluid that performs a mechanical function.
- Linking is the mechanical function performed by any component that connects different parts of a technical object.
- The degrees of freedom are the set of independent movements that are possible for a given part in a technical object.

Possibilities of independent motion

Possibilities	Notation	
Translational motion		
 Translation from left to right or from right to left 	T _x	
• Translation from top to bottom or from bottom	Ty	
to top		R _y
Translation from front to back or from back	Tz	Ty
to front		T _x ×
Rotational motion	·	T _z f
Rotation about the x axis	R _×	
		Z Rz
Rotation about the y axis	R _y	
Rotation about the z axis	R_{z}	
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Characteristics of links

Characteristics	Description
Direct	Two parts hold together without a linking component.
Indirect	Parts require a linking component to hold them together.
Rigid	The linking component or the surfaces of linked parts are rigid.
Flexible	The linking component or the surfaces of linked parts can be deformed.
Removable	 Linked parts can be separated without damaging either their surfaces or the linking component (if present).
Non-removable	 Separating the linked parts damages their surfaces or the linking component.
Complete	Linked parts are prevented from moving independently of one another.
Partial	At least one part can move independently of the other parts.

A cabinetmaker builds a table using a saw, hammer, wood, glue and nails. The mechanic removes the damaged wheel by lifting the car with a jack and removing the screw and nut. A worker installs a ceramic floor by spreading glue with a trowel and then laying tiles. Marvin broke his scissors while cutting a piece of cloth: both blades and the rivet fell on the workshop floor. Give the four characteristics of each link illustrated opposite. Direct. Non-removable. Rigid. Complete. Complete. Partial. You have invented an object made of two pieces of rubber. One of the stays immobile. The object is very practical because it can be carried in characteristics of the links in this object? Direct link.		Date:	Class:	
Name the linking component(s) used in the following situations. A cabinetmaker builds a table using a saw, hammer, wood, glue and nails. The mechanic removes the damaged wheel by lifting the car with a jack and removing the screw and nut. A worker installs a ceramic floor by spreading glue with a trowel and then laying tiles. Marvin broke his scissors while cutting a piece of cloth: both blades and the rivet fell on the workshop floor. Give the four characteristics of each link illustrated opposite. Direct. Non-removable. Rigid. Complete. Complete. Complete. Partial. You have invented an object made of two pieces of rubber. One of the stays immobile. The object is very practical because it can be carried in characteristics of the links in this object? Direct link.		*		
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D. wind link	e parts turns and the c in two bags. What are	it can be carried in	very practical because his object?	ays immobile. The object is naracteristics of the links in
		Partial link.		
Removable link.				Removable link.
When a house is being built, asphalt shingles are often nailed to the roal) What components are used to cover the roof? Nails.	roof.	ften nailed to the ro Nails.	asphalt shingles are c	When a house is being built,



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For each of the following technical objects, specify the possible motions and the notation for the motions.

Possible motions

Notation

a)



Rotation about the x axis.



6)



Translation from top to bottom or from

 T_{y}

bottom to top.



Rotation about the z axis.

 R_{z}

ldentify the independent motions performed in this series of actions. Marianne turns the door handle, opens the door, then enters the room. She opens a drawer, takes out a jar and unscrews the lid.

Turns the door handle, rotation about the z axis.

Opens the door: rotation about the y axis.

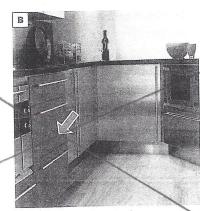
Opens a drawer: translation from back to front along the z axis.

Unscrews the Kd: rotation and translation about the y axis.

Ta How many degrees of freedom do the following parts have?



6 degrees of freedom. (rotation and translation)



1 degree of freedom. (translation)



1 degree of freedom. (rotation)

