

✔ Congratulations! You passed!  
Grade received 100% To pass 80% or higher

Go to next item

1. Which of the following are possible elements of robots in this specialization? Select all that apply.

1 / 1 point

☒ Rigid bodies.

✔ Correct

This specialization focuses on robots that consist of rigid bodies and joints.

☐ Soft, flexible bodies.

☒ Joints.

✔ Correct

This specialization focuses on robots that consist of rigid bodies and joints.

2. The number of degrees of freedom of a robot is (select all that apply):

1 / 1 point

☒ the dimension of its configuration space.

✔ Correct

☒ the number of real numbers needed to specify its configuration.

✔ Correct

☐ the number of points on the robot.

☐ the number of joints of the robot.

☐ the number of bodies comprising the robot.

☒ the number of freedoms of the bodies minus the number of independent constraints between the bodies.

✔ Correct

3. The number of degrees of freedom of a planar rigid body is

1 / 1 point

3

3

✔ Correct

Two linear (translational) degrees of freedom and an angular degree of freedom.

4. The number of degrees of freedom of a spatial rigid body is

1 / 1 point

6

6

✔ Correct

Three linear (translational) degrees of freedom and three angular degrees of freedom.

5. A rigid body in  $n$ -dimensional space has  $m$  total degrees of freedom. How many of these  $m$  degrees of freedom are angular (not linear)? Select all that apply. (This is consistently one of the most incorrectly answered questions in this course, so think about it carefully!)

1 / 1 point

☒  $m - n$

✔ Correct

$n$  linear coordinates specify the location of one point of the rigid body, and the remaining  $m - n$  coordinates are subject to radius constraints (as described in the video), and hence can be thought of as angular coordinates.

☒  $n(n - 1)/2$

✔ Correct

This is equivalent to  $m - n$ .

☐ Neither of the above.