

## Unit 9 - Week 7

## Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Classical Mechanics: Rigid Body, Transformation matrix

Classical Mechanics: Rigid Body, Euler Angles

Classical Mechanics: Parameterization using Euler Angles

Classical Mechanics: Rigid Body, Euler's Theorem

Classical Mechanics: General motion of a rigid body

Classical Mechanics: Moment of Inertia Tensor

Quiz : Assignment 7

Week 7 Feedback Form : Introduction to Classical Mechanics

Week 8

Week 9

Week 10

Week 11

Week 12

Live session

Video Download

## Assignment 7

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2020-11-04, 23:59 IST.**

1) How many degrees of freedom a free symmetric top has

1 point

- 6  
 5  
 4  
 3

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
6

2) How many degrees of freedom a free symmetric top has whose one point is fixed

1 point

- 6  
 5  
 4  
 3

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
3

3) Consider a symmetric top. If two points along its axis are fixed, then, the top has how many degrees of freedom?

1 point

- 3  
 2  
 1  
 0

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
1

4) Consider a symmetric top. If three non collinear points are fixed, then, the top has how many degrees of freedom?

1 point

- 3  
 2  
 1  
 0

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
0

5) Think of a copper block as a true rigid body, that is, assume the distances between its (point like) atoms to be fixed. Can this block absorb heat ?

1 point

- Yes  
 No

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
No

6) Consider the set of orthogonal transformations. Is the following statement correct? Identity matrix is continuously connected to

2 points

$$\begin{pmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{pmatrix}$$

- Correct  
 Wrong

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Wrong

7) Consider a top that is pivoted at one point. Suppose its orientation at time  $t$  can be reached by a transformation matrix  $A$  starting at time  $t_0$ . If one of the eigenvalues of  $A$  is known to be  $(1+i)/\sqrt{2}$ , then the other eigenvalues are

3 points

- $1, (1-i)/\sqrt{2}$   
  
  $1, (1+i)/\sqrt{2}$   
  
  $i/\sqrt{2}, -i/\sqrt{2}$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $1, (1-i)/\sqrt{2}$