

X

NPTEL

reviewer3@nptel.iitm.ac.in ▼

Courses » Theory of groups for physics applications

Announcements **Course** Ask a Question Progress Mentor FAQ

Unit 11 - Week 10

Course outline

[How to access the portal](#)[Week 1](#)[Week 2](#)[Week 3](#)[Week 4](#)[Week 5](#)[Week 6](#)[Week 7](#)[Week 8](#)[Week 9](#)**Week 10**[Lecture 37: SO\(3\), SU\(2\) Representations-I](#)[Lecture 38: SO\(3\), SU\(2\) Representations-II](#)[Lecture 39: Representation On Function Spaces-I](#)[Lecture 40: Representation](#)

Week 10-Assignment 10-MCQ

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-10-10, 23:59 IST.**

1) We can state that there is _____ from $SU(2)$ to $SO(3)$ (Fill in the blank) **1 point**

- 2-to-1 mapping, ie, an isomorphism
- 1-to-1 mapping, ie, an isomorphism
- 2-to-1 mapping, ie, a homomorphism
- 1-to-1 mapping, ie, a homomorphism

No, the answer is incorrect.

Score: 0

Accepted Answers:

2-to-1 mapping, ie, a homomorphism

2) The covering space of abelian group $\{e^{i\theta}\}$ with $\theta \in [0, 2\pi)$ and addition as group operation is **1 point**

- \mathbb{R}
- $\mathbb{R}P^3$
- S^2
- S^1

No, the answer is incorrect.

Score: 0

Accepted Answers:

\mathbb{R}

© 2014 NPTEL - Privacy & Terms - Honor Code - FAQs -



A project of



NPTEL

National Programme on
Technology Enhanced Learning

In association with

NASSCOM

Funded by

Lecture Slides

Week10-
Assignment10-
Solutions

Week 11

Week 12

$\pm J_{\pm}$
 0

No, the answer is incorrect.

Score: 0

Accepted Answers:

0

4) For a $2p$ electron (with spin $\frac{1}{2}$), what are the possible values m_j can take? **1 point**

$-\frac{3}{2}, \frac{3}{2}$
 $-\frac{3}{2}, -\frac{1}{2}, \frac{1}{2}, \frac{3}{2}$
 $-\frac{1}{2}, \frac{1}{2}$
 None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

$-\frac{3}{2}, -\frac{1}{2}, \frac{1}{2}, \frac{3}{2}$

5) The Special Orthogonal group of rotations in 3 dimensions is **1 point**

Neither connected nor simply connected
 Simply connected but not connected
 Both connected and simply connected
 Connected but not simply connected

No, the answer is incorrect.

Score: 0

Accepted Answers:

Connected but not simply connected

6) In some specific representation where J_z is diagonal, we can represent J^2 by a matrix with **1 point** dimension of (where $J^2|j, m\rangle = j(j+1)\hbar^2|j, m\rangle$)

$(2j+1) \times (2j+1)$
 $(2j-1) \times (2j-1)$
 $2j \times 2j$
 $j \times j$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$(2j+1) \times (2j+1)$

7) The infinitesimal generator of the Lorentz boost along z axis in 4 dimensional spacetime can be represented by, **1 point**

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

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

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

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

No, the answer is incorrect.

Score: 0

Accepted Answers:

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

8) The dimension of the Lorentz group in 4 dimensional spacetime is

1 point

- 15
- 6
- 4
- 10

No, the answer is incorrect.

Score: 0

Accepted Answers:

6

9) Algebra of Lorentz group in 4 dimension can be written as

1 point

- $SO(2)_A \otimes SO(2)_B$
- $SU(2)_A \otimes U(1)_B$
- $SU(2)_A \otimes SU(2)_B$
- $SU(3)_A \otimes SU(3)_B$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$SU(2)_A \otimes SU(2)_B$$

10) Evaluate the following commutator, $[K_{0x}, J_{yz}]$ where K_{0i} and J_{jk} are the boosts along **1 point** and the rotation about the i^{th} axis respectively.

0

iK_{0y}

iK_{0x}

iK_{0z}

No, the answer is incorrect.

Score: 0

Accepted Answers:

0

Previous Page

End