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Courses » Theory of groups for physics applications

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Unit 6 - Week 5

Course outline

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Week 5

● Lecture 17: Representation Theory-III

● Lecture 18: Representation Theory-IV

● Lecture 19: Schur's Lemma & Orthogonality Theorem-I

● Lecture 20: Schur's Lemma & Orthogonality Theorem-II

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Week 5-Assignment 5-MCQ

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-09-12, 23:59 IST.**

1) If $\{D^{(\alpha)}(g)\}$ is a representation then the Adjoint representation of it is **1 point**

$$\{D^{(\alpha)*}(g)^T\}$$

$$\{D^{(\alpha)*}(g)\}$$

$$\{D^{(\alpha)}(g)^T\}$$

$$\{(D^{(\alpha)}(g)^T)^{-1}\}$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\{(D^{(\alpha)}(g)^T)^{-1}\}$$

2) The subgroup $SL(n, \mathbb{C})$ of the set of complex $n \times n$ matrices is characterised by additional requirements **1 point**

The matrices should be invertible.

The matrices should be self-adjoint.

The matrices should have determinant + 1.

The matrices should obey associative multiplication.

No, the answer is incorrect.

Score: 0

Accepted Answers:

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 all of the above.

No, the answer is incorrect.

Score: 0

Accepted Answers:

all of the above.

4) All the possible irreducible representations of the group \mathbb{Z}_8 have to be

1 point

- 1-dimensional
- 2-dimensional
- 4-dimensional
- 8-dimensional

No, the answer is incorrect.

Score: 0

Accepted Answers:

1-dimensional

5) The possible dimension(s) of the irreducible representations of A_4 is/are

1 point

- 1
- 3
- 1,3
- 1,3,4

No, the answer is incorrect.

Score: 0

Accepted Answers:

1,3

6) Consider the set of 3×3 matrices $M(a)$ with $a \in \mathbb{R}$

1 point

$$M(a) = \frac{1}{3} \begin{pmatrix} 1 & 0 & 0 \\ a & 1 & 0 \\ a^2 & 2a & 1 \end{pmatrix}$$

The character of this representation is

- 3
- $(a+1)^2$
- $(a+1)$
- 1

No, the answer is incorrect.

Score: 0

Accepted Answers:

1

7) If a and b are conjugate elements within a group and $\chi(a)$ and $\chi(b)$ are the characters of the representations of a and b , then it can be stated that

1 point

- $\chi(a) = \chi(b)$
- $\chi(a) > \chi(b)$

$\chi(a) < \chi(b)$

$\chi(a) \leq \chi(b)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\chi(a) = \chi(b)$

8) Number of irreducible representations of a group G

1 point

= Number of conjugacy classes of G

\leq Number of left cosets of G with respect to an element h

\geq Number of invariant subgroups of G

None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

= Number of conjugacy classes of G

9) If $D[g_1] = D[g_2]$ for any arbitrary pair of $g_1 \neq g_2$ then it is

1 point

Trivial Representation

Faithful Representation

Unfaithful Representation

Equivalent Representation

No, the answer is incorrect.

Score: 0

Accepted Answers:

Unfaithful Representation

10) All the possible irreducible representations of the symmetry group C_{10} of planar rotations of a ten sided regular polygon have to be

1 point

10-dimensional

5-dimensional

2-dimensional

1-dimensional

No, the answer is incorrect.

Score: 0

Accepted Answers:

1-dimensional

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