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NPTEL

Unit 5 - Week 4

Week 4-Assignment 4-MCQ

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. **Due on 2018-09-05, 23:59 IST.**

1) The operation of reflection in the plane $x - y$ denoted by σ_{xy} can be written as matrix representation in the form (when the basis is considered as $\begin{pmatrix} x \\ y \\ z \end{pmatrix}$) ***1 point***

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{pmatrix}$

2) Starting with a given representation $D[a]$ of any element $a \in G$, we can construct the ***1 point***

unitary

No, the answer is incorrect.
Score: 0

Accepted Answers:
non-singular

3) Consider a group $G = \{e, a, a^2, a^3, a^4\}$. What is the generator of G ? **1 point**

e

a^2

a^3

a

No, the answer is incorrect.
Score: 0

Accepted Answers:
a

4) If $g \in G$ is represented by a matrix $D[g]$, then in this representation, g^{-1} can be represented by **1 point**

$D[g^{-1}]/(\det D[g])$

$D[g]/(detD[g])$

$D[g]$

$D[g]^{-1}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$D[g]^{-1}$

5) The Coset Space G/N formed using a normal subgroup N **1 point**

can be endowed with a group structure and is called the factor group.

is the trivial subgroup of G.

is a permutation Group.

is a Symmetric Group.

No, the answer is incorrect.
Score: 0

Accepted Answers:
can be endowed with a group structure and is called the factor group.

6) Representation matrices can always be chosen to be **1 point**

- Orthogonal.
- Unitary.
- Orthogonal with determinant 1.
- Unitary with determinant 1.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Unitary.

7) For a group element represented as $\sigma_v = \frac{1}{2}\begin{pmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$, the character is **1 point**

- 1/2
- 1
- -1/2
- 0

No, the answer is incorrect.
Score: 0

Accepted Answers:
1/2

8) The 1s orbital of Hydrogen atom has the symmetry axis **1 point**

- C_6
- C_3
- C_2
- C_∞

No, the answer is incorrect.
Score: 0

Accepted Answers:
C_∞

9) For an Abelian Group, which of the following statements is true? (where $D[a]$ is a representation of element a) **1 point**

- $D[a]D[b] = D[a-b]$
- $D[a]D[b] = D[a+b]$
- $D[a]D[b] = D[b]D[a]$
- $D[a^{-1}]D[b^{-1}] = D[b]D[a]$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$D[a]D[b] = D[b]D[a]$

10) If $D_1[a] = S^{-1}D_2[a]S$ for a nonsingular Unitary matrix S and for any $a \in G$, then D_1 and D_2 are said to be **1 point**

- Trivial Representation
- Equivalent Representation
- Faithful Representation
- Inequivalent Representation

No, the answer is incorrect.
Score: 0

Accepted Answers:
Equivalent Representation

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