

# Unit 4 - Week 2- Generation of Symmetry Operations from Symmetry Elements; Point Group analysis; Relation between molecular symmetry and physical properties(polarity and chirality).

## Course outline

How does an NPTEL online course work?

Week-1: Introduction to Symmetry elements, Symmetry operations and Group Theory

Week 2- Generation of Symmetry Operations from Symmetry Elements; Point Group analysis; Relation between molecular symmetry and physical properties(polarity and chirality).

Lecture 6

Lecture 7

Lecture 8

Lecture 9

Lecture 10

Quiz : Assignment 2

Feedback form 2

Assignment 2 Solution

Week 3 - Introduction to Group Multiplication Tables; Stereographic Projections and Matrix Representations of Symmetry Operations

Week 4- Matrix Representation of Point Group, Introduction to Reducible and Irreducible Representation, Description of Character Table , Great Orthogonality Theorem and its consequences

Week 5 - Constructing Character table using the consequences of GOT, Relation between group theory and quantum mechanics, Introduction to Symmetry Adapted Linear Combinations: Projection operator.

Week 6 - Projection operator, concept of Symmetry Adapted Linear Combination(SALC), concept of Linear Combination of Atomic Orbitals(LCAO),LCAO-MO, Hückle Approximations and Introduction to Normal Mode of Vibration.

Week 7 - Molecular Vibrations: Normal modes and their symmetry aspects, Selection rules of fundamental vibrational transitions.

Text Transcripts

Week - 8 - Electronic Transitions

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## Assignment 2

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

Due on 2020-02-12, 23:59 IST.

1) What is the point group for para-dichlorobenzene?

1 point

- $D_{6d}$
- $D_{6h}$
- $D_{2h}$
- $C_{2v}$

No, the answer is incorrect. Score: 0

Accepted Answers:  $D_{2h}$

2) What is the point group for Phosphorouspentafluoride ( $PF_5$ )?

1 point

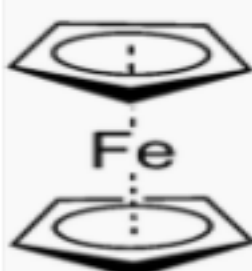
- $C_{3v}$
- $D_{3h}$
- $C_3$
- $C_{3h}$

No, the answer is incorrect. Score: 0

Accepted Answers:  $D_{3h}$

3) What is the point group for eclipsed Ferrocene? (structure is given)

1 point



- $C_{5h}$
- $D_{5h}$
- $D_{5d}$
- $C_5$

No, the answer is incorrect. Score: 0

Accepted Answers:  $D_{5h}$

4) What is the point group for staggered dibenzene chromium?

1 point

- $C_{6h}$
- $C_6$
- $D_{6d}$
- $D_{6h}$

No, the answer is incorrect. Score: 0

Accepted Answers:  $D_{6d}$

5) What is the point group for ethene?

1 point

- $C_{2v}$
- $D_{2h}$
- $C_s$
- $D_{2d}$

No, the answer is incorrect. Score: 0

Accepted Answers:  $D_{2h}$

6) Which one of the following is equivalent to the symmetry operation  $S_4^2$ ?

1 point

- E
- $C_2$
- $C_5\sigma$
- $\sigma$

No, the answer is incorrect. Score: 0

Accepted Answers:  $C_2$

7) What is the point group for acetylene?

1 point

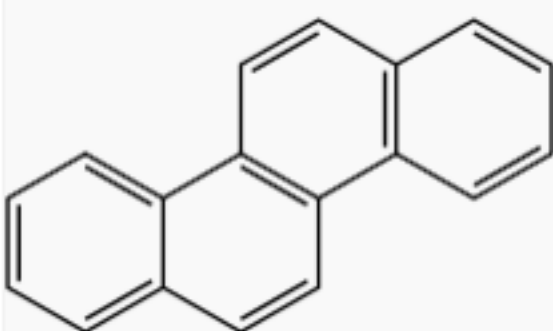
- $D_{\infty h}$
- $C_{\infty h}$
- $C_{\infty}$
- $C_s$

No, the answer is incorrect. Score: 0

Accepted Answers:  $D_{\infty h}$

8) What is the point group for Chrysene (structure is given)?

1 point



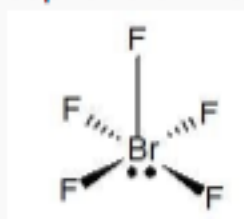
- $C_{2v}$
- $C_{2h}$
- $C_s$
- $D_{2h}$

No, the answer is incorrect. Score: 0

Accepted Answers:  $C_{2h}$

9) What is the point group for bromine pentafluoride? (Structure is given)

1 point



- $C_{4h}$
- $C_s$
- $C_{4v}$
- $D_{4d}$

No, the answer is incorrect. Score: 0

Accepted Answers:  $C_{4v}$

10) What is the point group for ethane in eclipsed conformation?

1 point

- $C_{2v}$
- $C_s$
- $D_{3h}$
- $D_{3d}$

No, the answer is incorrect. Score: 0

Accepted Answers:  $D_{3h}$