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Courses » Theory of groups for physics applications

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

Unit 4 - Week 3

Course outline

How to access the portal

Week 1

Week 2

Week 3

● Lecture 9:
Cycle Structures & Molecular Notation-I

● Lecture 10:
Cycle Structures & Molecular Notation-II

● Lecture 11:
Cycle Structures & Classification-I

● Lecture 12:
Cycle Structures & Classification-II

● Week-3 Lecture Slides and Reading Materials

○ Download Videos

○ Weekly

Week 3-Assignment 3-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) Two conjugacy classes of a group **1 point**

- must be disjoint and isomorphic.
- must be disjoint.
- can not be either disjoint or isomorphic.
- none of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

must be disjoint.

2) Consider the symmetric group S_8 . Choose the false statement from below. **1 point**

- The subset consisting of permutations of six of the original eight objects is a subgroup.
- The subset consisting of odd permutations of the eight objects is a subgroup.
- The subset consisting of even permutations of seven of the original eight objects is a subgroup.
- We can find cyclic groups as subgroups of S_8 .

No, the answer is incorrect.

Score: 0

Accepted Answers:

The subset consisting of odd permutations of the eight objects is a subgroup.

3) Consider the dihedral group $D_{5h} = \{e, a, a^2, a^3, a^4, \sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5\}$ where, a is **1 point** the rotation by $2\pi/5$ and σ_h is a π rotation about an axis in the plane perpendicular to the axis of the above rotations. Find the only invariant non-trivial subarou of the followina group.

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Week 4	<input type="radio"/>	$\{e, \sigma_1, \sigma_2, \sigma_3\}$	
Week 5	<input type="radio"/>	$\{e, a, a^2, a^3, a^4, \sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5\}$	
Week 6		No, the answer is incorrect.	
Week 7		Score: 0	
Week 8		Accepted Answers: $\{e, a, a^2, a^3, a^4\}$	
Week 9		4) The order of Alternating group of degree $2n$ is	1 point
Week 10	<input type="radio"/>	${}^{2n}C_2$	
Week 11	<input type="radio"/>	nC_2	
Week 12	<input type="radio"/>	$n!/2$	
	<input type="radio"/>	$(2n)!/2$	
		No, the answer is incorrect.	
		Score: 0	
		Accepted Answers: $(2n)!/2$	
		5) Which of the following is a possible order for a group so that more than one group structures can be found corresponding to it ?	1 point
	<input type="radio"/>	2	
	<input type="radio"/>	3	
	<input type="radio"/>	4	
	<input type="radio"/>	5	
		No, the answer is incorrect.	
		Score: 0	
		Accepted Answers: 4	
		6) Which one of the following options is not a Point group operation?	1 point
	<input type="radio"/>	Translation	
	<input type="radio"/>	Rotation	
	<input type="radio"/>	Reflection	
	<input type="radio"/>	Inversion	
		No, the answer is incorrect.	
		Score: 0	
		Accepted Answers: Translation	
		7) The group consisting of n^{th} roots of unity is	1 point
	<input type="radio"/>	C_n	
	<input type="radio"/>	A_n	

 S_n 

None of the above

No, the answer is incorrect.**Score: 0****Accepted Answers:** C_n 8) The number of possible cycle structures of the symmetric group S_8 is**1 point**

24



20



23



22

No, the answer is incorrect.**Score: 0****Accepted Answers:**

22

9) The multiplication table of a group is given in table 1.

1 point

	E	A	B	C	K	L	M	N
E	E	A	B	C	K	L	M	N
A	A	K	N	B	L	E	C	M
B	B	C	K	L	M	N	E	A
C	C	M	L	K	N	B	A	E
K	K	L	M	N	E	A	B	C
L	L	E	C	M	A	K	N	B
M	M	N	E	A	B	C	K	L
N	N	B	L	E	C	M	A	K

Table 1.Find the π_K .

$$\begin{pmatrix} E & A & B & C & K & L & M & N \\ L & E & C & M & A & K & N & B \end{pmatrix}$$



$$\begin{pmatrix} E & A & B & C & K & L & M & N \\ K & L & M & N & E & A & B & C \end{pmatrix}$$



$$\begin{pmatrix} E & A & B & C & K & L & M & N \\ M & N & E & A & B & C & K & L \end{pmatrix}$$



$$\begin{pmatrix} E & A & B & C & K & L & M & N \\ C & M & L & K & N & B & A & E \end{pmatrix}$$

No, the answer is incorrect.**Score: 0****Accepted Answers:**

$$\begin{pmatrix} E & A & B & C & K & L & M & N \\ K & L & M & N & E & A & B & C \end{pmatrix}$$

10 Suppose that the cycle structure of a particular element of a group, consists of cycles ν_k as, $\nu_1 = 2, \nu_2 = 1, \nu_3 = 0, \nu_4 = 3, \nu_5 = 2$. The order of the conjugacy class to which the element belongs is, **1 point**



5×10^{21}



7×10^{21}



3×10^{21}



10^{21}

No, the answer is incorrect.

Score: 0

Accepted Answers:

5×10^{21}

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