Unit 6 - Week 4 : Unit 4

Assignment 4

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

Due on 2019-09-25, 23:59 IST.

1) The orders of $\sigma_1 = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \end{pmatrix} \in S_3$ and $\sigma_2 = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 1 \end{pmatrix} \in S_4$ are _____ and _____ respectively. (Here S_n denotes the symmetric group on the set $\{1, 2, \ldots, n\}$) **1 point**

A. 4, 3
B. 2, 4
C. 3, 4
D. 4, 2

A
B
C
D

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

2) Let us consider the following two statements: **1 point**

(i) $(\mathbb{Q}, +)$ is a cyclic group.
(ii) $(\mathbb{Z}, +)$ is a cyclic group.

Select the correct option from below.

A. Only (i) is true.
B. Only (ii) is true.
C. both (i), (ii) are false.
D. both (i), (ii) are true.

A
B
C
D

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

3) Let H be a subgroup of a group G. Let g be an element of G such that the order of g is n and $g^m \in H$ where $n, m > 2$ are co-prime integers. What is the minimum value of the positive integer a such that $g^a \in H$? **1 point**

A. m
B. $m - 1$
C. 2
D. 1

A
b
c
D

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

4) Let us consider the following two statements: **1 point**

(i) If G be a group of odd order, then the equation $x^2 = a$ has a unique solution for all a in G.
(ii) If G be a group of order p^n where p is a prime, then the center of G cannot have order p^{n-1}.

Then which of the following is true?

A. only (i)
B. only (ii)
C. neither (i) nor (ii)
D. both (i), (ii)

A
B
C
D

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

5) Let $G = S_n$ and $H = A_n$. Then $[G : H]$ is equal to _____. **1 point**

A. $n!$
B. $\frac{n!}{2}$
C. 2
D. n

A
B
C
D

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

6) In $\mathbb{Z}_{24}$ the number of generators of the subgroup $\langle 21 \rangle \bigcap \langle 10 \rangle$ is _____. **1 point**

A. 3
B. 4
C. 2
D. 5

A
B
C
D

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

7) Let $\mathbb{E}$ be the set of all even integers. Then the number of elements in the factor group $\mathbb{Z}/\mathbb{E}$ is _____. **1 point**

A. 0
B. 1
C. 2
D. ∞

A
B
C
D

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

8) Let $G = S_3$ and $H = \{(1), (1\ 3)\}$. Then the left coset $(2\ 3)H$ is the same as the left coset (Note that the notation $(a_1\ a_2\ a_3)$ denotes a cycle in S_3) **1 point**

A. $(1\ 2)H$
B. $(1\ 3)H$
C. $(1\ 2\ 3)H$
D. $(1\ 3\ 2)H$

A
B
C
D

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

9) Let G be any group under multiplication. Which of the followings is(are) homomorphism(s)? **1 point**

(i) $\phi_1 : \mathbb{Z} \to G$ defined by $\phi_1(n) = g^n$ for a fixed $g \in G$.
(ii) $\phi_2 : G \to G$ defined by $\phi_1(g) = g^2$ for $g \in G$.

A. only (i)
B. only (ii)
C. both (i), (ii)
D. neither (i) nor (ii)

A
B
C
D

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

10) Let $\mathbb{Z}_{17}[i] = \{a + ib : a, b \in \mathbb{Z}_{17}, i = \sqrt{-1}\}$. Then $(\mathbb{Z}_{17}[i], +, .)$ is _____. **1 point**

A. not a ring
B. not an integral domain
C. a field
D. a ring without identity

A
B
C
D

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