Summary in Graph

Exam Summary (GO Classes Test Series 2024 | Discrete Mathematics | Test 3)

Qs. Attempted:	**9** (1 + 8)	**Correct Marks:**	**9** (1 + 8)
Correct Attempts:	**5** (1 + 4)	**Penalty Marks:**	**1.33** (0 + 1.33)
Incorrect Attempts:	**4** (0 + 4)	**Resultant Marks:**	**7.66** (1 + 6.66)

Total Questions:	**15** (5 + 10)
Total Marks:	**25** (5 + 20)
Exam Duration:	**45 Minutes**
Time Taken:	**45 Minutes**

EXAM RESPONSE | EXAM STATS | FEEDBACK

Technical

Q #1 Numerical Type | Award: 1 | Penalty: 0 | Set Theory & Algebra

What is the order of smallest non-cyclic group?

Your Answer: | Correct Answer: 4 | Not Attempted | Discuss

Q #2 Numerical Type | Award: 1 | Penalty: 0 | Set Theory & Algebra

Let G be a cyclic group with generator 'a'. Order of 'a' is 29. The number of subgroups G has _____

Your Answer: | Correct Answer: 2 | Not Attempted | Discuss

Q #3 Multiple Choice Type | Award: 1 | Penalty: 0.33 | Set Theory & Algebra

In a group G, every element other than the identity element has order 2 then G is?

A. Abelian group
B. Cyclic group
C. Non-abelian group

D. Non-cyclic group

Your Answer: | Correct Answer: A | Not Attempted | Discuss

Q #4 | Numerical Type | Award: 1 | Penalty: 0 | Set Theory & Algebra

What is the smallest positive integer n such that there is a group of order n which is not abelian?

Your Answer: | Correct Answer: 6 | Not Attempted | Discuss

Q #5 | Multiple Select Type | Award: 1 | Penalty: 0 | Set Theory & Algebra

Let $\mathbf{Z}$ be the group of all integers under the operation of addition. Which of the following subsets of $\mathbf{Z}$ is/are NOT a subgroup of $\mathbf{Z}$?

A. $\{0\}$
B. $\{n \in \mathbf{Z} : n > 0\}$
C. $\{n \in \mathbf{Z} : n \text{ is an even integer}\}$
D. $\{n \in \mathbf{Z} : n \text{ is divisible by both } 6 \text{ and } 9\}$

Your Answer: B | Correct Answer: B | Correct | Discuss

Q #6 | Multiple Select Type | Award: 2 | Penalty: 0 | Set Theory & Algebra

The multiplication table $(*)$ for a group $\mathrm{G} = \{\mathrm{a}, \mathrm{b}, \mathrm{c}, \mathrm{d}\}$ is given below.

$*$	a	b	c	d
a	a	b	c	d
b	b	a		
c	c		a	
d				a

Fill in the rest of the table.

Which of the following is/are false?

A. $d * b = d$
B. $b * c = d$
C. $(c * d) * c = d$
D. G is a cyclic group.

Your Answer: A;D | Correct Answer: A;D | Correct | Discuss

Q #7 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Set Theory & Algebra

Let R be the set of all real numbers.

Let $\mathrm{S} = \mathrm{R} \backslash \{-1\}$ and define a binary operation on S by $a * b = a + b + ab$.

Which of the following is true?

A. $(S, *)$ is a not a group.
B. $(S, *)$ is a group but not abelian.
C. $(S, *)$ is a cyclic group.
D. $(S, *)$ is an abelian group but not cyclic.

Your Answer: D **Correct Answer: D** Correct Discuss

Q #8 Multiple Select Type Award: 2 Penalty: 0 Set Theory & Algebra

Which of the following multiplication tables defined on the set $G = \{a, b, c, d\}$ form a group?

(a)

∘	a	b	c	d
a	a	c	d	a
b	b	b	c	d
c	c	d	a	b
d	d	a	b	c

(b)

∘	a	b	c	d
a	a	b	c	d
b	b	a	d	c
c	c	d	a	b
d	d	c	b	a

(c)

∘	a	b	c	d
a	a	b	c	d
b	b	c	d	a
c	c	d	a	b
d	d	a	b	c

(d)

∘	a	b	c	d
a	a	b	c	d
b	b	a	c	d
c	c	b	a	d
d	d	d	b	c

Your Answer: B;C;D **Correct Answer: B;C** Incorrect Discuss

Q #9 Multiple Select Type Award: 2 Penalty: 0 Set Theory & Algebra

Let G be a group under binary operation $*$. Let $g \in G$.

We define $\langle g \rangle$ as follows :

$$\langle g \rangle = \{g^n \mid n \in \mathbb{Z}\}$$

Which of the following is /are true about $\langle g \rangle$ under binary operation $*$?

A. $\langle g \rangle$ is also a group.
B. $\langle g \rangle$ is a cyclic subgroup of G.
C. $\langle g \rangle$ is abelian.
D. If $H \leq G$ and $g \in H$, then $\langle g \rangle \leq H$.

Your Answer: **Correct Answer: A;B;C;D** Not Attempted Discuss

Q #10 Multiple Choice Type Award: 2 Penalty: 0.67 Set Theory & Algebra

Let G be a group and let $\mathrm{H} = \{x^{-1} | x \in \mathrm{G}\}$ then which of the following is true?

A. $\mathrm{G} \subseteq \mathrm{H}$ but G may not be same as H
B. $\mathrm{H} \subseteq \mathrm{G}$ but H may not be same as G
C. $\mathrm{H} = \mathrm{G}$
D. H may not be a group.

Your Answer: C | Correct Answer: C | Correct | Discuss

Q #11 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Set Theory & Algebra

Let G_1 and G_2 be two groups as following:

1. G_1 is a group such that $\forall x, y, z \in \mathrm{G}_1$

   $xy = zx$ implies $y = z$

2. G_2 is a group such that $\forall x, y, z \in \mathrm{G}_2$

   $xyz = ayc$ implies $xz = ac$

where $x, y, z, a, c \in \mathrm{G}_2$

Then which of the following is True ?

A. G_1 is abelian, G_2 is not abelian.
B. Both G_1 and G_2 are abelian.
C. G_2 is abelian, not G_1.
D. Neither of G_1 and G_2 is abelian.

Your Answer: A | Correct Answer: B | Incorrect | Discuss

Q #12 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Set Theory & Algebra

Let $\mathbf{Z}$ be set of integers, and "$+$" be an integer addition operation.

Let p, q be distinct primes. If J is a proper subgroup of $(\mathbf{Z}, +)$ containing exactly three of $\{p, p+q, pq, p^q, q^p\}$,

(Note : J may contain other elements of $\mathbf{Z}$ which are not in this set), which three elements does J include?

A. $\{p, p+q, pq\}$
B. $\{pq, p^q, q^p\}$
C. $\{p, pq, p^q\}$
D. $\{p, pq, q^p\}$

Your Answer: | Correct Answer: C | Not Attempted | Discuss

Q #13 | Numerical Type | Award: 2 | Penalty: 0 | Set Theory & Algebra

A binary operation "$*$" on a set A is a function from $\mathrm{A} \times \mathrm{A}$ to A, which maps pair (a, b) to $a * b$. Binary operation "$*$" on a set A is commutative if $a * b = b * a, \forall a, b \in \mathrm{A}$. The total number of different commutative binary operations on a set of four elements is?

Your Answer: 6 | Correct Answer: 1048576 | Incorrect | Discuss

Q #14 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Set Theory & Algebra

Consider the following statements :

1. Suppose G is a group and $a, x \in \mathrm{G}$. If order of $x = 2$, Then (axa^{-1}) has order 2.

2. A finite group is never the union of two of its proper subgroups.

Which of the above statements is/are true?

A. Only 1
B. Only 2
C. Both
D. None

Your Answer: A **Correct Answer: C** Incorrect Discuss

Q #15 Multiple Choice Type Award: 2 Penalty: 0.67 Set Theory & Algebra

Let S be the set of all functions $f : \mathrm{R} \to \mathrm{R}$. Consider the two binary operations $+$ and $*$ on S defined as pointwise addition and composition of functions, as follows.

- $(f + g)(x) = f(x) + g(x)$
- $(f * g)(x) = f(g(x))$

Which of the following statements are true?

I. $*$ is commutative.
II. $+$ and $*$ satisfy the left distributive law i.e. $f * (g + h) = (f * g) + (f * h)$.
III. $+$ and $*$ satisfy the right distributive law i.e. $(g + h) * f = (g * f) + (h * f)$.

A. All
B. II only
C. III only
D. II and III only

Your Answer: C **Correct Answer: C** Correct Discuss

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