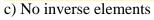
1.	A set with one operation is called a: a) Group b) Monoid c) Semigroup d) Algebraic structure
2.	A binary operation on a set is a function that: a) Maps one element to another b) Combines two elements to produce a third element in the set c) Maps a set to an external element d) Only works for finite sets
3.	Which of the following properties is NOT necessary for a set with one operation to be a semigroup ? a) Closure b) Associativity c) Commutativity d) At least one binary operation
4.	A set with one operation must always satisfy which of the following properties? a) Closure b) Inverse c) Commutativity d) Identity
5.	A semigroup is a set equipped with a binary operation that is: a) Associative b) Commutative c) Invertible d) Distributive

6.	A monoid is a semigroup that also has:
	a) An inverse for every element
	b) A unique identity element
	c) Commutativity
	d) No closure property
7.	If a semigroup contains an identity element , it is called a:
	a) Monoid
	b) Group
	c) Field
	d) Lattice
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8.	, · · · · · · · · · · · · · · · · · · ·
	a) Semigroupb) Monoid
	c) Group
	d) Ring
	u) King
9.	A commutative semigroup is called:
	a) Abelian semigroup
	b) Monoid
	c) Ring
	d) Group
10.	. Which of the following is an example of a binary operation?
	a) Addition of real numbers
	b) Taking the square root of a number
	c) Finding the absolute value of a number
	d) Mapping an integer to its opposite

11. The identity element of multiplication in real numbers is: a) 0 b) 1 c) -1 d) 2
12. A binary operation * is said to be associative if: a) (a*b)*c=a*(b*c) for all a,b,c in the set b) a*b=b*a for all a,b in the set c) a*e=a for all a in the set d) Every element has an inverse
 13. Which of the following binary operations is NOT associative? a) Addition of integers b) Multiplication of real numbers c) Subtraction of integers d) Function composition
14. In modular arithmetic , what is 7+5 mod 4? a) 0 b) 1 c) 2 d) 3
 15. Which of the following modular arithmetic properties is always true for any modulus mmm? a) (a+b) mod m = (a mod m+b mod m) mod m b) (a-b) mod m = (a mod m-b mod m) mod m c) (a×b) mod m = (a mod m×b mod m) mod m d) All of the above

16. A Galois field GF(p) is a field v	with:
a) An infinite number of elemer	nts
b) A finite number of elements	



d) No closure property

17.	The	number	of	elements	in a	Galois	field	GF(n ⁿ)	is:
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- a) p
- b) pⁿ
- c) n^p
- d) p+n

18. In **modular arithmetic**, the multiplicative inverse of **3 modulo 7** is:

- a) 2
- b) 3
- c) 5
- d) 6

19. The **basis vectors** of a graph are associated with:

- a) The fundamental cycles of the graph
- b) The adjacency matrix of the graph
- c) The spanning tree of the graph
- d) The number of isolated vertices in the graph

20. If a **graph has n vertices and mmm edges**, the number of basis vectors in the cycle space is:

- a) m-n+1
- b) m+n-1
- c) n-m+1
- d) m-2n+1