Chapter 1. SETS

Summary of the Lesson

- A Set is a well defined collection of distinct object. Each object is called elements of the set. Sets are usually denoted by capital letters and elements are denoted by small letters.
- A Set may be represented in two methods.
 a) Roster/Tabular form Eg : { 1,2,3,4,5,6 }
 b) Set-builder form Eg : { x/ x is natural number < 7 }
- A set which does not contain any element is called empty set or Null set or Void set.
- A set which consists of a definite number of elements is called a finite set, otherwise, the set is called infinite set.
- A set which has only one element is called a singleton set.
- Two sets A and B are said to be equal if they have exactly the same elements.
- A set A is said to be a subset of a set B, if every element of A is also an element of B. The symbol '⊂' stands for ' is a subset of '.
- The collection of all subsets of a set A is called the power set of A and is denoted by P(A). If A is a set with n(A)=m, then n(P(A)) = 2^m.
- The union of two sets A and B is the set of all those elements which are either in A or in B.
- The intersection of two sets A and B is the set of all elements which are common.
- The difference of two sets A and B in this order is the set of elements which belongs to A but not to B.
- The complemement of a subset A of a Universal set U is the set of all elements of U which are not the elements of A.
- For any two sets A and B, $(A \cup B)' = A' \cap B'$ and $(A \cap B)' = A' \cup B'$
- If A and B are finite sets such that $A \cap B = \phi$, then $n(A \cup B) = n(A) + n(B)$ If $A \cap B \neq \phi$, then $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

Objective Type Questions:

- 1. In a city 25 percent of the population travels by car, 45% travels by bus and 10% travels by both car and bus. Then persons travelling by car or bus is.
 - a) 80% b) 40% c) 60% d) 70%
- 2. If A and B are two sets, then $A \cap (A \cup B)'$ is equal to

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	a)	А	b)	В	c)	Ø	d)	None	of these
3.	. If A and B are two sets. Then								
	a) C)	A∩B¢ A∩B	⊂A∪B ⊇A∪B		b) d)	A∩B A∪B	=A∪B ⊆A∪B		
4.	If A is	any se	t , then						
	a) c)	A∩A′ A∩A′	=U =U′		b) d)	ΑυΑ΄ ΑυΑ΄	i=φ =υ		
5.	lf A a	and B	are ar	iy two	sets ,	then	(A∪B)′	is equ	ial to
	а) с)	A∩B A′∩B	/		b) d)	A∪B A´∪B	7		
6.	lf A a	and B	be any	y two s	sets ,	then ($A \cap B$)´ is e	qual to
	а) с)	A´∪B A´∩B	,		b) d)	A∩B None	e of the	ese	
7.	lf A a	and B	are tw	o sets	, thei	n A∪(A	A∩B) is	equa	l to
	а) с)	B A´			b) d)	A None	e of the	ese	
8.	3. If $A \subseteq B$, then $A \cup B$ is equal to								
	а) с)	B A′			b) d)	A None	e of the	ese	
9.	lf A ⊆	≡B,th	nen Ar	nB is e	qual t	0			
	а) с)	B A´			b) d)	A B´			
10).	Whic	h of t	he follo	owing	is a n	ull set	?	
	а) с)	{	$x^2 = 4$ $x > 0$	or x = or x <	= 1 } < 0 }′			b) d)	{ 0 } { x : x ² +1=0,x∈R }
11	<u>!</u> .	Two	sets A	and E	8 are d	disjoin	t iff :		
	а) с)	A – B A ∩B	B = A $\phi \neq \phi$			b) d)	A ∩B A ∪B	$= \phi$ $= \phi$	

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12. Let $A = \{ 1, 2, 3, 4, 5 \}$, $B = \{ 2, 3, 4, 5, 6, 7 \}$, then $A \cap B$ is equal to { 1 } { 1,2,3 } { 5,6 } b) a) { 2,3,4,5 } d) C) 13. Let $U = \{ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 \}$, $A = \{ 1, 2, 3, 4, 5 \}$, $B = \{ 6, 7 \}$. Then A $\cap B'$ is : a) В b) B d) A C) Α 14. Let $A = \{a, b, c, d\}$, $B = \{b, c, d\}$, $C = \{a, b, d, e\}$, then $A \cap (B \cup C)$ is a) { a,b,d,e } b) { e } { b,c,d } { a,b,c,d } *c*) d) 15. If A and B are two sets , then $A \cup B = A \cap B$ if a) $B \subseteq A$ b) $A \subseteq B$ A = BNone of these *c*) d) 16. Let A and B be two sets in the universal set . Then A - B is equal to $A' \cap B$ b) none of these a) *c*) A n B' d) $A \cap B$ 17. If A and B are two sets, then $A \cap (A \cup B)$ is equal to a) В b) none of these Α d) C) A' 18. If $A = \{1, 2, 3, 4, 8, 10\}$, $B = \{3, 4, 5, 10, 12\}$ and $C = \{4, 5, 6, 12, 14\}$, then $(A \cup B) \cap (A \cup C)$ is equal to { 3,8,10,12 } { 2,4,5,10,12 } a) b) *c*) { 4,5,8,10,12 } d) $\{1, 2, 3, 4, 5, 8, 10, 12\}$ 19. If $A = \{1, 2, 3, 4, 8, 10\}$, $B = \{3, 4, 5, 10, 12\}$ and $C = \{4, 5, 6, 12, 14\}$, then $(A \cap B) \cup (A \cap C)$ is { 2, 8, 10 } {3,4,10} a) b) { 4, 5, 6 } d) None of these *c*) 20. If A and B are disjoint, then $n (A \cup B)$ is equal to n(A)n(B) a) b)

c) n(A) + n(B) d) None of these

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21. If A and B are not disjoint , then n (A \cup B) is equal to

a)	$n(A) + n(B) + n(A \cap B)$	b)	n(B)
<i>c)</i>	$n(A) + n(B) - n(A \cap B)$	d)	n (A)

22. The set of intelligent students in a class is

a)	a null set	b)	a singleton set
с)	not a well defined collection	d)	a finite set

23. Let $A = \{1, 2, 3, 4\}$, then total number of subsets of A are given by

a)	16	b)	12
<i>c)</i>	8	d)	0

24. If A and B be two sets such that n(A) = 70, n(B) = 60, and $n(A \cup B) = 110$. Then $n(A \cap B)$ is equal to

a)	20	b)	130
c)	180	d)	170

25. Which set is the subset of all given sets ?

a)	{	b)	{ a,b }
c)	{a}	d)	{ }

Answers:

1. C	2. с	З. а	4. d	5. с	6. a	7. b
8. a	9. b	10. d	11. b	12. с	13. с	14. d
15. с	16. c	17. с	18. d	19. b	20. с	21. с
22. с	23. а	24. а	25. d			