

Student Name: .....

Date: .....

## SETS AND OPERATIONS ON SETS

I. Multiple Choice Questions

Select and write one most appropriate option out of the four options given for each of the questions 1 – 5.

**Directions:** In a class of 20 pupils, 8 read Mathematics, 13 read Biology and 3 read both Mathematics and Biology.

On the basis of this information answer the following questions (Q. 1–2):

- How many pupils read Biology only?  
(a) 10                      (b) 5                      (c) 3                      (d) 4
- How many pupils do not read either Mathematics or Biology?  
(a) 7                      (b) 5                      (c) 4                      (d) 2
- Given that  $X = \{a, e, i, o, u\}$  and  $Y = \{a, e, f, i\}$ , find  $X \cap Y$ .  
(a)  $\{a, e, i\}$               (b)  $\{a, e, o\}$               (c)  $\{a, e, i, f\}$               (d)  $\{a, e, f\}$
- $P = \{\text{even integers between 15 and 30}\}$  and  $Q = \{22, 28\}$ . Which of the following is true?  
(a)  $P \subset Q$               (b)  $Q \subset P$               (c)  $P = Q$               (d)  $P \cap Q = Q$
- If  $A =$  set of whole numbers upto 6 and  $U =$  set of whole numbers upto 10, then  $A'$  is  
(a)  $\{6, 7, 8, 9, 10\}$                       (b)  $\{7, 8, 9, 10\}$   
(c)  $\{8, 9, 10\}$                       (d)  $\{5, 7, 8, 9, 10\}$

## II. Fill in the Blank Type Questions

Fill in the blanks with a suitable word for each of the questions 6–10.

6. The cardinality of set  $A = \{\text{all factors of } 45\}$  is \_\_\_\_\_.
7. If a set has 7 elements, then the cardinality of the set is \_\_\_\_\_.
8. 22 \_\_\_\_\_  $\{20, 21, \dots, 50\}$ .
9. 17 \_\_\_\_\_  $\{\text{factors of } 54\}$ .
10. A year with fifteen months is \_\_\_\_\_.

## III. True or False

State whether the following statements are true or false for each of the questions 11–15.

11. Sets having equal number of members or elements are equal sets.
12. A set with limited number of members is called a finite set.
13. Two sets A and B are said to be disjoint, if they have only one common element.
14. If every member of set Y is also a member of set X, then set Y is a subset of set X.
15. A well defined collection of objects is called a set.

## IV. Very Short Answer Type Questions

Answer each of the questions 16–20.

16. Given universal set  $U = \{1, 2, 3, 4, \dots, 30\}$ .

Write the following sets and represent them using Venn diagrams.

A set of numbers less than 10

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17. If  $A = \{1, 3, 4, 5, 7\}$  and  $B = \{3, 4, 8, 9\}$ , find  $A \cap B$ .

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- \_\_\_\_\_
- \_\_\_\_\_
- 18.** If the universal set is  $U = \{1, 2, 3, \dots, 10\}$ , find  $A'$  where  $A = \{9\}$ .

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- 19.** Let  $A = \{x : x \text{ is a letter of the word PERMANENT}\}$   
and  $B = \{x : x \text{ is a letter of the word TEMPORARY}\}$   
Find  $A \cap B$

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- 20.** List the members of each of the sets  $B = \{\text{natural numbers from 20 to 30}\}$  and  $D = \{15, 16, 20, 21, 25, 26, 28\}$  and find  $B \cup D$ .

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### V. Short Answer Type Questions

*Answer each of the questions 21–25.*

- 21.** Given universal set  $U = \{1, 2, 3, 4, 5, a, b, c, d, e\}$ , find the complements of the following sets. Represent them using Venn diagrams.

$$Q = \{4, 5, d, e\}$$

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- 22.** If the universal set is  $U = \{1, 2, 3, \dots, 10\}$ , find  $A'$  where  $A = \{\text{odd numbers up to } 9\}$

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- 23.** Let  $A = \{1, 2, 3, 4\}$ ,  $B = \{2, 3, 5, 7\}$ ,  $C = \{3, 6, 7, 8\}$  and  $D = \{3, 5, 7, 9\}$ ; find  $(A \cup B) \cap (B \cap D)$

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- 24.** If  $X = \{0, 2, 4, 6\}$ ,  $Y = \{2, 4, 8, 16\}$  and universal set  $U = \{0, 2, 4, 6, 8, 10, 12, 14, 16\}$ , then find  $(X \cup Y)'$

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- 25.** Which of the following is the universal set of the other two?  
 $A = \{1, 3, 5, 7, 9\}$ ,  $B = \{2, 4, 6, 8\}$ ,  $C = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

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*Teacher's Signature* .....