

**MATHEMATICS****Sets**

No. of Questions

**30**

Maximum Marks

**120**

Time

**1 Hour***Speed***TEST****60**

Chapter-wise

**GENERAL INSTRUCTIONS**

- This test contains 30 MCQ's. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.
- You have to evaluate your Response Grids yourself with the help of solutions provided at the end of this book.
- Each correct answer will get you 4 marks and 1 mark shall be deducted for each incorrect answer. No mark will be given/ deducted if no bubble is filled. Keep a timer in front of you and stop immediately at the end of 60 min.
- The sheet follows a particular syllabus. Do not attempt the sheet before you have completed your preparation for that syllabus.
- After completing the sheet check your answers with the solution booklet and complete the Result Grid. Finally spend time to analyse your performance and revise the areas which emerge out as weak in your evaluation.

- Let  $A = \{(1, 2), (3, 4), 5\}$ , then which of the following is incorrect?
  - $\{3, 4\} \notin A$  as  $(3, 4)$  is an element of  $A$
  - $\{5\}, \{(3, 4)\}$  are subsets of  $A$  but not elements of  $A$
  - $\{1, 2\}, \{5\}$  are subsets of  $A$
  - $\{(1, 2), (3, 4), 5\}$  is subset of  $A$
- A market research group conducted a survey of 1000 consumers and reported that 720 consumers liked product A and 450 consumers liked product B. What is the least number that must have liked both products?
  - 170
  - 280
  - 220
  - None of these
- One of the partitions of the set  $\{1, 2, 5, x, y, \sqrt{2}, \sqrt{3}\}$  is
  - $\{\{1, 2, x\}, \{x, 5, y\}, \{\sqrt{2}, \sqrt{3}\}\}$
  - $\{\{1, 2, \sqrt{2}\}, \{x, y, \sqrt{2}\}, \{5, \sqrt{2}, \sqrt{3}\}\}$
  - $\{\{1, 2\}, \{5, x\}, \{\sqrt{2}, \sqrt{3}\}\}$
  - $\{\{1, 2, 5\}, \{x, y\}, \{\sqrt{2}, \sqrt{3}\}\}$
- Let A and B be two sets then  $(A \cup B)' \cup (A' \cap B)$  is equal to
  - $A'$
  - $A$
  - $B'$
  - None of these

**RESPONSE GRID**

1. (a)(b)(c)(d) 2. (a)(b)(c)(d) 3. (a)(b)(c)(d) 4. (a)(b)(c)(d)

*Space for Rough Work*

5. Let  $A = \{(n, 2n) : n \in \mathbf{N}\}$  and  $B = \{(2n, 3n) : n \in \mathbf{N}\}$ . What is  $A \cap B$  equal to ?  
 (a)  $\{(n, 6n) : n \in \mathbf{N}\}$  (b)  $\{(2n, 6n) : n \in \mathbf{N}\}$   
 (c)  $\{(n, 3n) : n \in \mathbf{N}\}$  (d)  $\phi$
6. If  $a\mathbf{N} = \{ax : x \in \mathbf{N}\}$  and  $b\mathbf{N} \cap c\mathbf{N} = d\mathbf{N}$ , where  $b, c \in \mathbf{N}$  are relatively prime, then  
 (a)  $d = bc$  (b)  $c = bd$   
 (c)  $b = cd$  (d) None of these
7. In a class of 55 students, the number of students studying different subjects are 23 in Mathematics, 24 in Physics, 19 in Chemistry, 12 in Mathematics and Physics, 9 in Mathematics and Chemistry, 7 in Physics and Chemistry and 4 in all the three subjects. The number of students who have taken exactly one subject is  
 (a) 6 (b) 9  
 (c) 7 (d) All of these
8. A set  $A$  has 3 elements and another set  $B$  has 6 elements. Then  
 (a)  $3 \leq n(A \cup B) \leq 6$  (b)  $3 \leq n(A \cap B) \leq 9$   
 (c)  $6 \leq n(A \cup B) \leq 9$  (d)  $0 \leq n(A \cup B) \leq 9$
9. If  $A = \{1, 2, 5\}$  and  $B = \{3, 4, 5, 9\}$ , then  $A \Delta B$  is equal to  
 (a)  $\{1, 2, 5, 9\}$  (b)  $\{1, 2, 3, 4, 9\}$   
 (c)  $\{1, 2, 3, 4, 5, 9\}$  (d) None of these
10. At a certain conference of 100 people, there are 29 Indian women and 23 Indian men. Of these Indian people 4 are doctors and 24 are either men or doctors. There are no foreign doctors. How many foreigners and women doctors are attending the conference?  
 (a) 48, 1 (b) 34, 3  
 (c) 46, 4 (d) 42, 2
11. Let  $X$  and  $Y$  be two non-empty sets such that  $X \cap A = Y \cap A = \phi$  and  $X \cup A = Y \cup A$  for some non-empty set  $A$ . Then  
 (a)  $X$  is a proper subset of  $Y$   
 (b)  $Y$  is a proper subset of  $X$   
 (c)  $X = Y$   
 (d)  $X$  and  $Y$  are disjoint sets
12. Let  $A$  and  $B$  are two sets in a universal set  $U$ . Then which of these is/are correct ?  
 (a)  $A - B = A' - B'$   
 (b)  $A - (A - B) = A \cap B$   
 (c)  $A - B = A' \cap B'$   
 (d)  $A \cup B = (A - B) \cup (B - A) \cup (A \cap B)$
13. If  $A$  and  $B$  are non-empty sets such that  $A \supset B$ , then  
 (a)  $B' - A' = A - B$  (b)  $B' - A' = B - A$   
 (c)  $A' - B' = A - B$  (d)  $A' \cap B' = B - A$
14. In a town of 10,000 families, it was found that 40% families buy newspaper  $A$ , 20% families buy newspaper  $B$  and 10% families buy newspaper  $C$ . 5% families buy  $A$  and  $B$ , 3% buy  $B$  and  $C$  and 4% buy  $A$  and  $C$ . If 2% families buy all the newspapers, then  
 (a) 3,300 families buy  $A$  only  
 (b) 1,400 families buy  $B$  only.  
 (c) 4000 families buy none of  $A$ ,  $B$  and  $C$   
 (d) All are correct

RESPONSE  
GRID

5. (a)(b)(c)(d) 6. (a)(b)(c)(d) 7. (a)(b)(c)(d) 8. (a)(b)(c)(d) 9. (a)(b)(c)(d)  
 10. (a)(b)(c)(d) 11. (a)(b)(c)(d) 12. (a)(b)(c)(d) 13. (a)(b)(c)(d) 14. (a)(b)(c)(d)

Space for Rough Work

15. In a battle 70% of the combatants lost one eye, 80% an ear, 75% an arm, 85% a leg,  $x$  % lost all the four limbs. The minimum value of  $x$  is  
 (a) 10 (b) 12  
 (c) 15 (d) None of these
16. Let  $n(U) = 700, n(A) = 200, n(B) = 300, n(A \cap B) = 100$ , then  $n(A' \cap B')$  is equal to  
 (a) 400 (b) 600  
 (c) 300 (d) None of these
17. **Statement-1** : If  $B = U - A$ , then  $n(B) = n(U) - n(A)$  where  $U$  is universal set.  
**Statement-2** : For any three arbitrary set  $A, B, C$  we have if  $C = A - B$ , then  $n(C) = n(A) - n(B)$ .  
 (a) Statement -1 is true, Statement-2 is true; Statement -2 is a correct explanation for Statement-1.  
 (b) Statement -1 is true, Statement-2 is true; Statement -2 is not a correct explanation for Statement-1.  
 (c) Statement -1 is false, Statement-2 is true.  
 (d) Statement -1 is true, Statement-2 is false.
18. Each student in a class of 40, studies at least one of the subjects English, Mathematics and Economics. 16 study English, 22 Economics and 26 Mathematics, 5 study English and Economics, 14 Mathematics and Economics and 2 study all the three subjects. The number of students who study English and Mathematics but not Economics is  
 (a) 7 (b) 5  
 (c) 10 (d) 4
19. In a class of 80 students numbered a to 80, all odd numbered students opt of Cricket, students whose numbers are divisible by 5 opt for Football and those whose numbers are divisible by 7 opt for Hockey. The number of students who do not opt any of the three games, is  
 (a) 13 (b) 24  
 (c) 28 (d) 52
20. In a class of 60 students, 23 play Hockey 15 Play Basket-ball and 20 play cricket. 7 play Hockey and Basket-ball, 5 play cricket and Basket-ball, 4 play Hockey and Cricket and 15 students do not play any of these games. Then  
 (a) 4 play Hockey, Basket-ball and Cricket  
 (b) 20 play Hockey but not Cricket  
 (c) 1 plays Hockey and Cricket but not Basket-ball  
 (d) All above are correct
21. The set  $(A \setminus B) \cup (B \setminus A)$  is equal to  
 (a)  $[A \setminus (A \cap B)] \cap [B \setminus (A \cap B)]$   
 (b)  $(A \cup B) \setminus (A \cap B)$   
 (c)  $A \setminus (A \cap B)$   
 (d)  $\overline{A \cap B} \setminus A \cup B$
22. If  $A$  is the set of the divisors of the number 15,  $B$  is the set of prime numbers smaller than 10 and  $C$  is the set of even numbers smaller than 9, then  $(A \cup C) \cap B$  is the set  
 (a)  $\{1, 3, 5\}$  (b)  $\{1, 2, 3\}$   
 (c)  $\{2, 3, 5\}$  (d)  $\{2, 5\}$
23. Two finite sets have  $m$  and  $n$  elements. The number of subsets of the first set is 112 more than that of the second set. The values of  $m$  and  $n$  are, respectively,  
 (a) 4, 7 (b) 7, 4  
 (c) 4, 4 (d) 7, 7
24. The number of students who take both the subjects mathematics and chemistry is 30. This represents 10% of the enrolment in mathematics and 12% of the enrolment in chemistry. How many students take at least one of these two subjects?  
 (a) 520 (b) 490  
 (c) 560 (d) 480

<b>RESPONSE GRID</b>	<b>15.</b> (a) (b) (c) (d)	<b>16.</b> (a) (b) (c) (d)	<b>17.</b> (a) (b) (c) (d)	<b>18.</b> (a) (b) (c) (d)	<b>19.</b> (a) (b) (c) (d)
	<b>20.</b> (a) (b) (c) (d)	<b>21.</b> (a) (b) (c) (d)	<b>22.</b> (a) (b) (c) (d)	<b>23.</b> (a) (b) (c) (d)	<b>24.</b> (a) (b) (c) (d)

25. If  $n(A) = 1000$ ,  $n(B) = 500$  and if  $n(A \cap B) \geq 1$  and  $n(A \cup B) = p$ , then  
 (a)  $500 \leq p \leq 1000$  (b)  $1001 \leq p \leq 1498$   
 (c)  $1000 \leq p \leq 1498$  (d)  $1000 \leq p \leq 1499$
26. The number of elements in the set  $\{(a, b) : 2a^2 + 3b^2 = 35, a, b \in Z\}$ , where  $Z$  is the set of all integers, is  
 (a) 2 (b) 4  
 (c) 8 (d) 12
27. Let  $A, B, C$  be finite sets. Suppose that  $n(A) = 10$ ,  $n(B) = 15$ ,  $n(C) = 20$ ,  $n(A \cap B) = 8$  and  $n(B \cap C) = 9$ . Then the possible value of  $n(A \cup B \cup C)$  is  
 (a) 26  
 (b) 27  
 (c) 28  
 (d) Any of the three values 26, 27, 28 is possible
28. The value of  $(A \cup B \cup C) \cap (A \cap B^c \cap C^c)^c \cap C^c$ , is  
 (a)  $B \cap C^c$  (b)  $B^c \cap C^c$   
 (c)  $B \cap C$  (d)  $A \cap B \cap C$
29. In a town of 10,000 families it was found that 40% family buy newspaper A, 20% buy newspaper B and 10% families buy newspaper C, 5% families buy A and B, 3% buy B and C and 4% buy A and C. If 2% families buy all the three newspapers, then number of families which buy A only is  
 (a) 3100 (b) 3300  
 (c) 2900 (d) 1400
30. **Statement-1** : If  $A \cup B = A \cup C$  and  $A \cap B = A \cap C$ , then  $B = C$ .  
**Statement-2** :  $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ .  
 (a) Statement -1 is true, Statement-2 is true; Statement -2 is a correct explanation for Statement-1.  
 (b) Statement -1 is true, Statement-2 is true; Statement -2 is not a correct explanation for Statement-1.  
 (c) Statement -1 is false, Statement-2 is true.  
 (d) Statement -1 is true, Statement-2 is false.

RESPONSE  
GRID

25. (a)(b)(c)(d) 26. (a)(b)(c)(d) 27. (a)(b)(c)(d) 28. (a)(b)(c)(d) 29. (a)(b)(c)(d)  
 30. (a)(b)(c)(d)

### MATHEMATICS CHAPTERWISE SPEED TEST-60

Total Questions	30	Total Marks	120
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	40	Qualifying Score	55
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct $\times$ 4) – (Incorrect $\times$ 1)			

Space for Rough Work