



**Set theory**

1. The set of intelligent students in a class is [AMU 1998]
  - (a) A null set
  - (b) A singleton set
  - (c) A finite set
  - (d) Not a well defined collection
2. Which of the following is the empty set [Karnataka CET 1990]
  - (a) is a real number and
  - (b)  $\{x : x \text{ is a real number and}$
  - (c)  $\{x : x \text{ is a real number and}$
  - (d)  $\{x : x \text{ is a real number and}$
3. The set and equals [Karnataka CET 1995]
  - (a) (b)  $\{14, 3, 4\}$
  - (c)  $\{3\}$  (d)  $\{4\}$
4. If a set  $A$  has  $n$  elements, then the total number of subsets of  $A$  is [Roorkee 1991; Karnataka CET 1992, 2000]
  - (a)  $n$  (b)
  - (c) (d)
5. The number of proper subsets of the set  $\{1, 2, 3\}$  is [JMIEE 2000]
  - (a) 8 (b) 7
  - (c) 6 (d) 5
6. Given the sets ,  $C = \{4, 5, 6\}$ , then is [MNR 1988; Kurukshetra CEE 1996]
  - (a)  $\{3\}$  (b)  $\{1, 2, 3, 4\}$
  - (c)  $\{1, 2, 4, 5\}$  (d)  $\{1, 2, 3, 4, 5, 6\}$
7. If  $A$  and  $B$  are any two sets, then is equal to [Karnataka CET 1996]
  - (a)  $A$  (b)  $B$
  - (c) (d)
8. If  $A$  and  $B$  are two given sets, then is equal to [AMU 1998; Kurukshetra CEE 1999]
  - (a)  $A$  (b)  $B$
  - (c) (d)
9. If the sets  $A$  and  $B$  are defined as
  - (a) (b)
  - (c) (d) None of these
10. Let and then the set  $D$  is
  - (a) (b)
  - (c) (d) None of these
11. If the sets  $A$  and  $B$  are defined as ; then [UPSEAT 1994, 99, 2002]
  - (a) (b)
  - (c) (d)
12. If and then is equal to [Karnataka CET 1997]
  - (a)  $X$  (b)  $Y$
  - (c)  $N$  (d) None of these
13. Let and then [Kurukshetra CEE 1999]
  - (a) 400 (b) 600
  - (c) 300 (d) 200
14. 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 [Roorkee 1997]
  - (a) 3100 (b) 3300
  - (c) 2900 (d) 1400
15. In a city 20 percent of the population travels by car, 50 percent travels by bus and 10 percent travels by both car and bus. Then persons travelling by car or bus is [Kerala (Engg.) 2002]
  - (a) 80 percent (b) 40 percent
  - (c) 60 percent (d) 70 percent
16. 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 [UPSEAT 1990]
  - (a) 6 (b) 9
  - (c) 7 (d) All of these
17. If  $A, B$  and  $C$  are any three sets, then  $A \times (B \cup C)$  is equal to [Pb. CET 2001]
  - (a)  $(A \times B) \cup (A \times C)$  (b)  $(A \cup B) \times (A \cup C)$
  - (c)  $(A \times B) \cap (A \times C)$  (d) None of these
18. If  $A, B$  and  $C$  are any three sets, then  $A - (B \cup C)$  is equal to



- (a)  $(A - B) \cup (A - C)$       (b)  $(A - B) \cap (A - C)$   
 (c)  $(A - B) \cup C$       (d)  $(A - B) \cap C$
19. If  $A, B$  and  $C$  are non-empty sets, then  $(A - B) \cup (B - A)$  equals  
 [AMU 1992, 1998; DCE 1998]  
 (a)  $(A \cup B) - B$       (b)  $A - (A \cap B)$   
 (c)  $(A \cup B) - (A \cap B)$       (d)  $(A \cap B) \cup (A \cup B)$
20. If \_\_\_\_\_ then \_\_\_\_\_ is equal to  
 (a) 6      (b) 9  
 (c) 3      (d) 0
21. If the set  $A$  has  $p$  elements,  $B$  has  $q$  elements, then the number of elements in  $A \times B$  is  
 [Karnataka CET 1999]  
 (a) \_\_\_\_\_      (b) \_\_\_\_\_  
 (c) \_\_\_\_\_      (d) \_\_\_\_\_
22. If \_\_\_\_\_ then \_\_\_\_\_ is equal to  
 [AMU 1999; Him. CET 2002]  
 (a)  $A \cap (B \cup C)$       (b)  $A \cup (B \cap C)$   
 (c)  $A \times (B \cup C)$       (d)  $A \times (B \cap C)$
23. If  $P, Q$  and  $R$  are subsets of a set  $A$ , then  $R \times (P^c \cup Q^c)^c =$   
 [Karnataka CET 1993]  
 (a)  $(R \times P) \cap (R \times Q)$       (b) \_\_\_\_\_  
 (c) \_\_\_\_\_      (d) None of these
24. In rule method the null set is represented by  
 [Karnataka CET 1998]  
 (a)  $\{\}$       (b) \_\_\_\_\_  
 (c) \_\_\_\_\_      (d) \_\_\_\_\_
25. \_\_\_\_\_ represents \_\_\_\_\_  
 [Kurukshetra CEE 1998]  
 (a)  $\{0\}$       (b)  $\{\}$   
 (c)  $\{1\}$       (d)  $\{x\}$
26. If \_\_\_\_\_, then \_\_\_\_\_  
 (a) \_\_\_\_\_      (b) \_\_\_\_\_  
 (c) \_\_\_\_\_      (d) \_\_\_\_\_
27. Which set is the subset of all given sets  
 (a)  $\{1, 2, 3, 4, \dots\}$       (b)  $\{1\}$   
 (c)  $\{0\}$       (d)  $\{\}$
28. Let \_\_\_\_\_ . Then the total number of subsets of  $S$  is  
 (a) 64      (b) 32  
 (c) 40      (d) 20
29. The number of non-empty subsets of the set  $\{1, 2, 3, 4\}$  is  
 [Karnataka CET 1997; AMU 1998]  
 (a) 15      (b) 14  
 (c) 16      (d) 17
30. The smallest set  $A$  such that  $A \cup \{1, 2\} = \{1, 2, 3, 5, 9\}$  is  
 (a)  $\{2, 3, 5\}$       (b)  $\{3, 5, 9\}$   
 (c)  $\{1, 2, 5, 9\}$       (d) None of these
31. If  $A \cap B = B$ , then \_\_\_\_\_ [JMIEE 2000]  
 (a) \_\_\_\_\_      (b) \_\_\_\_\_  
 (c) \_\_\_\_\_      (d) \_\_\_\_\_
- (a) \_\_\_\_\_      (b) \_\_\_\_\_  
 (c) \_\_\_\_\_      (d) \_\_\_\_\_
32. If  $A$  and  $B$  are two sets, then \_\_\_\_\_ iff  
 (a) \_\_\_\_\_      (b) \_\_\_\_\_  
 (c) \_\_\_\_\_      (d) None of these
33. Let  $A$  and  $B$  be two sets. Then  
 (a)  $A \cup B = A \cap B$       (b)  $A \cap B = A \cup B$   
 (c)  $A \cap B = A \cup B$       (d) None of these
34. Let \_\_\_\_\_ ,  
 Then \_\_\_\_\_  
 (a) \_\_\_\_\_      (b) \_\_\_\_\_  
 (c) \_\_\_\_\_      (d) None of these
35. If  $A = \{2, 3, 4, 8, 10\}$ ,  $B = \{3, 4, 5, 10, 12\}$ ,  
 $C = \{4, 5, 6, 12, 14\}$  then  $(A \cap B) \cup (A \cap C)$  is equal to  
 (a)  $\{3, 4, 10\}$       (b)  $\{2, 8, 10\}$   
 (c)  $\{4, 5, 6\}$       (d)  $\{3, 5, 14\}$
36. If  $A$  and  $B$  are any two sets, then  $A \cap (A \cup B)$  is equal to  
 (a)  $A$       (b)  $B$   
 (c) \_\_\_\_\_      (d) \_\_\_\_\_
37. If  $A, B, C$  be three sets such that  $A \cup B = A \cup C$  and  $A \cap B = A \cap C$ , then  
 [Roorkee 1991]  
 (a)  $A = B$       (b)  $B = C$   
 (c)  $A = C$       (d)  $A = B = C$
38. Let  $A = \{a, b, c\}$ ,  $B = \{b, c, d\}$ ,  $C = \{a, b, d, e\}$ , then  $A \cap (B \cup C)$  is  
 [Kurukshetra CEE 1997]  
 (a)  $\{a, b, c\}$       (b)  $\{b, c, d\}$   
 (c)  $\{a, b, d, e\}$       (d)  $\{e\}$
39. If  $A$  and  $B$  are sets, then  $A \cap (B - A)$  is  
 (a) \_\_\_\_\_      (b)  $A$   
 (c)  $B$       (d) None of these
40. If  $A$  and  $B$  are two sets, then \_\_\_\_\_ is equal to  
 (a)  $A$       (b)  $B$   
 (c) \_\_\_\_\_      (d) None of these
41. Let \_\_\_\_\_ ,  
 then \_\_\_\_\_ is \_\_\_\_\_  
 (a) \_\_\_\_\_      (b)  $A$   
 (c) \_\_\_\_\_      (d)  $B$
42. If  $A$  is any set, then \_\_\_\_\_  
 (a) \_\_\_\_\_      (b) \_\_\_\_\_  
 (c) \_\_\_\_\_      (d) None of these
43. If \_\_\_\_\_ then \_\_\_\_\_  
 [Kerala (Engg.) 2005]  
 (a) \_\_\_\_\_      (b)  $N$   
 (c) \_\_\_\_\_      (d) \_\_\_\_\_
44. If \_\_\_\_\_ then the set \_\_\_\_\_ is \_\_\_\_\_



- (a)  $21N$  (b)  $10N$   
 (c)  $4N$  (d) None of these
45. The shaded region in the given figure is [NDA 2000]  
 (a)  $A \cap (B \cup C)$  (b)  $A \cup (B \cap C)$   
 (c)  $A \cap (B - C)$  (d)  $A - (B \cup C)$
46. If  $A$  and  $B$  are two sets then  $(A - B) \cup (B - A) \cup (A \cap B)$  is equal to  
 (a)  $A \cup B$  (b)  $A \cap B$   
 (c)  $A$  (d)  $B$
47. Let  $A$  and  $B$  be two sets then is equal to  
 (a)  $A \cup B$  (b)  $A$   
 (c)  $B$  (d) None of these
48. Let  $U$  be the universal set and  $A, B$  be two sets. Then  $(A \cup B) \cap U$  is equal to  
 (a)  $A \cup B$  (b)  $A \cap B$   
 (c)  $A$  (d)  $B$
49. If  $A = \{1, 2, 3, 4, 5\}$ ,  $B = \{2, 3, 4, 5, 6\}$  and  $C = \{3, 4, 5, 6, 7\}$ . Then the number of elements in  $A \cap B \cap C$  is equal to  
 (a) 3 (b) 9  
 (c) 6 (d) None of these
50. Let  $A$  and  $B$  be two sets such that  $A \cap B = \{1, 2, 3\}$ . Then  $(A \cap B) \cap (A \cap B)$  is equal to [JMIEE 2001]  
 (a) 0.3 (b) 0.5  
 (c) 0.05 (d) None of these
51. If  $A$  and  $B$  are disjoint, then  $(A \cup B) \cap (A \cap B)$  is equal to  
 (a)  $A \cup B$  (b)  $A \cap B$   
 (c)  $A$  (d)  $B$
52. If  $A$  and  $B$  are not disjoint sets, then  $(A \cup B) \cap (A \cap B)$  is equal to [Kerala (Engg.) 2001]  
 (a)  $A \cup B$  (b)  $A \cap B$   
 (c)  $A$  (d)  $B$   
 (e)  $A \cup B \cap A \cap B$
53. 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
54. Out of 800 boys in a school, 224 played cricket, 240 played hockey and 336 played basketball. Of the total, 64 played both basketball and hockey; 80 played cricket and basketball and 40 played cricket and hockey; 24 played all the three games. The number of boys who did not play any game is [DCE 1995; MP PET 1996]  
 (a) 128 (b) 216  
 (c) 240 (d) 160
55. A survey shows that 63% of the Americans like cheese whereas 76% like apples. If  $x\%$  of the Americans like both cheese and apples, then  
 (a) 12 (b) 8  
 (c) 16 (d) None of these
56. 20 teachers of a school either teach mathematics or physics. 12 of them teach mathematics while 4 teach both the subjects. Then the number of teachers teaching physics only is  
 (a) 12 (b) 8  
 (c) 16 (d) None of these
57. Of the members of three athletic teams in a school 21 are in the cricket team, 26 are in the hockey team and 29 are in the football team. Among them, 14 play hockey and cricket, 15 play hockey and football, and 12 play football and cricket. Eight play all the three games. The total number of members in the three athletic teams is  
 (a) 43 (b) 76  
 (c) 49 (d) None of these
58. In a class of 100 students, 55 students have passed in Mathematics and 67 students have passed in Physics. Then the number of students who have passed in Physics only is [DCE 1993; ISM Dhanbad 1994]  
 (a) 22 (b) 33  
 (c) 10 (d) 45
59. If  $A$  and  $B$  are two sets, then  $A \times B = B \times A$  iff  
 (a)  $A = B$  (b)  $A \cap B = \emptyset$   
 (c)  $A \cup B = \emptyset$  (d) None of these
60. If  $A$  and  $B$  be any two sets, then  $(A \cup B) \cap (A \cap B)$  is equal to  
 (a)  $A \cup B$  (b)  $A \cap B$   
 (c)  $A$  (d)  $B$
61. Let  $A$  and  $B$  be subsets of a set  $X$ . Then  $(A \cup B) \cap (A \cap B)$  is equal to  
 (a)  $A \cup B$  (b)  $A \cap B$   
 (c)  $A$  (d)  $B$
62. Let  $A$  and  $B$  be two sets in the universal set. Then  $(A \cup B) \cap (A \cap B)$  equals  
 (a)  $A \cup B$  (b)  $A \cap B$   
 (c)  $A$  (d) None of these
63. If  $A, B$  and  $C$  are any three sets, then  $(A \cup B) \cap (A \cap B) \cap C$  is equal to  
 (a)  $A \cup B$  (b)  $A \cap B$   
 (c)  $A$  (d)  $B$
64. If  $A, B, C$  are three sets, then  $A \cap (B \cup C)$  is equal to  
 (a)  $(A \cap B) \cap (A \cap C)$  (b)  $(A \cap B) \cup (A \cap C)$   
 (c)  $(A \cup B) \cap (A \cup C)$  (d) None of these
65. If  $A = \{1, 2, 4\}$ ,  $B = \{2, 4, 5\}$ ,  $C = \{2, 5\}$ , then  $(A - B) \times (B - C)$  is



- (a)  $\{(1, 2), (1, 5), (2, 5)\}$  (b)  $\{(1, 4)\}$   
 (c)  $\{(1, 4)\}$  (d) None of these
66. If  $(1, 3), (2, 5)$  and  $(3, 3)$  are three elements of  $A \times B$  and the total number of elements in is 6, then the remaining elements of are  
 (a)  $(1, 5); (2, 3); (3, 5)$  (b)  $(5, 1); (3, 2); (5, 3)$   
 (c)  $(1, 5); (2, 3); (5, 3)$  (d) None of these
67.  $A = \{1, 2, 3\}$  and  $B = \{3, 8\}$ , then  $(A \cup B) \times (A \cap B)$  is  
 (a)  $\{(3, 1), (3, 2), (3, 3), (3, 8)\}$   
 (b)  $\{(1, 3), (2, 3), (3, 3), (8, 3)\}$   
 (c)  $\{(1, 2), (2, 2), (3, 3), (8, 8)\}$   
 (d)  $\{(8, 3), (8, 2), (8, 1), (8, 8)\}$
68. If  $A = \{2, 3, 5\}, B = \{2, 5, 6\}$ , then  $(A - B) \times (A \cap B)$  is  
 (a)  $\{(3, 2), (3, 3), (3, 5)\}$  (b)  $\{(3, 2), (3, 5), (3, 6)\}$   
 (c)  $\{(3, 2), (3, 5)\}$  (d) None of these
69. In a class of 30 pupils, 12 take needle work, 16 take physics and 18 take history. If all the 30 students take at least one subject and no one takes all three then the number of pupils taking 2 subjects is [J & K 2005]  
 (a) 16 (b) 6  
 (c) 8 (d) 20
70. If , , , then [Kerala (Engg.) 2005]  
 (a) 288 (b) 1  
 (c) 12 (d) 17  
 (e) 2
71. The number of elements in the set , where  $Z$  is the set of all integers, is [Kerala (Engg.) 2005]  
 (a) 2 (b) 4  
 (c) 8 (d) 12  
 (e) 16
72. If ; and  $f$  is a mapping such that , then is [DCE 2005]  
 (a)  $\{(a, 1), (3, b)\}$   
 (b)  $\{(a, 2), (4, b)\}$   
 (c)  $\{(1, a), (1, b), (2, a), (2, b), (3, a), (3, b), (4, a), (4, b)\}$   
 (d) None of these
73. If  $A = \{1, 2, 3, 4, 5\}, B = \{2, 4, 6\}, C = \{3, 4, 6\}$ , then is [Orissa JEE 2004]  
 (a)  $\{3, 4, 6\}$  (b)  $\{1, 2, 3\}$   
 (c)  $\{1, 4, 3\}$  (d) None of these
74. If  $A = \{x, y\}$  then the power set of  $A$  is [Pb. CET 2004, UPSEAT 2000]  
 (a)  $\{\emptyset, x, y\}$   
 (b)  $\{\emptyset, x, y\}$   
 (c)  $\{\emptyset, \{x\}, \{2y\}\}$   
 (d)  $\{\emptyset, \{x\}, \{y\}, \{x, y\}\}$
75. A set contains elements. The number of subsets of this set containing more than  $n$  elements is equal to [UPSEAT 2001, 04]  
 (a) (b)  
 (c) (d)
76. Which of the following is a true statement [UPSEAT 2005]  
 (a)  $\{a\} \in \{a, b, c\}$  (b)  $\{a\} \subseteq \{a, b, c\}$   
 (c)  $\emptyset \in \{a, b, c\}$  (d) None of these
77. If  $A = \{x : x \text{ is a multiple of } 4\}$  and  $B = \{x : x \text{ is a multiple of } 6\}$  then  $A \subset B$  consists of all multiples of [UPSEAT 2000]  
 (a) 16 (b) 12  
 (c) 8 (d) 4
78. A class has 175 students. The following data shows the number of students obtaining one or more subjects. Mathematics 100, Physics 70, Chemistry 40; Mathematics and Physics 30, Mathematics and Chemistry 28, Physics and Chemistry 23; Mathematics, Physics and Chemistry 18. How many students have offered Mathematics alone [Kerala (Engg.) 2003]  
 (a) 35 (b) 48  
 (c) 60 (d) 22  
 (e) 30
79. Consider the following relations :  
 (1)  
 (2)  
 (3)  
 which of these is/are correct [NDA 2003]  
 (a) 1 and 3 (b) 2 only  
 (c) 2 and 3 (d) 1 and 2
80. If two sets  $A$  and  $B$  are having 99 elements in common, then the number of elements common to each of the sets and are [Kerala (Engg.) 2004]  
 (a) (b)  
 (c) 100 (d) 18  
 (e) 9
81. Given , , , where  $U$  is the universal set,  $A$  and  $B$  are subsets of  $U$ , then [Kerala (Engg.) 2004]  
 (a) 17 (b) 9  
 (c) 11 (d) 3  
 (e) 16



Relations

1. Let  $A = \{1, 2, 3\}$ . The total number of distinct relations that can be defined over  $A$  is
  - (a) 8
  - (b) 6
  - (c) 8
  - (d) None of these
2. Let  $R_1$  and  $R_2$  be relations from  $X$  to  $Y$ . Which of the following is/are relations from  $X$  to  $Y$ 
  - (a)  $R_1 \cup R_2$
  - (b)  $R_1 \cap R_2$
  - (c)  $R_1 - R_2$
  - (d)  $R_1 \oplus R_2$
3. Given two finite sets  $A$  and  $B$  such that  $n(A) = 2, n(B) = 3$ . Then total number of relations from  $A$  to  $B$  is
  - (a) 4
  - (b) 8
  - (c) 64
  - (d) None of these
4. The relation  $R$  defined on the set of natural numbers as  $\{(a, b) : a \text{ differs from } b \text{ by } 3\}$ , is given by
  - (a)  $\{(1, 4), (2, 5), (3, 6), \dots\}$
  - (b)  $\{(4, 1), (5, 2), (6, 3), \dots\}$
  - (c)  $\{(1, 3), (2, 6), (3, 9), \dots\}$
  - (d) None of these
5. The relation  $R$  is defined on the set of natural numbers as  $\{(a, b) : a = 2b\}$ . Then  $R$  is given by
  - (a)  $\{(2, 1), (4, 2), (6, 3), \dots\}$
  - (b)  $\{(1, 2), (2, 4), (3, 6), \dots\}$
  - (c)  $R$  is not defined
  - (d) None of these
6. The relation  $R = \{(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3)\}$  on set  $A = \{1, 2, 3\}$  is
  - (a) Reflexive but not symmetric
  - (b) Reflexive but not transitive
  - (c) Symmetric and Transitive
  - (d) Neither symmetric nor transitive
7. The relation "less than" in the set of natural numbers is
 

**[UPSEAT 1994, 98, 99; AMU 1999]**

  - (a) Only symmetric
  - (b) Only transitive
  - (c) Only reflexive
  - (d) Equivalence relation
8. Let  $R$  be a relation on a set  $A$ . Then  $P$  is
  - (a) Reflexive
  - (b) Symmetric
  - (c) Transitive
  - (d) Anti-symmetric
9. Let  $R$  be an equivalence relation on a finite set  $A$  having  $n$  elements. Then the number of ordered pairs in  $R$  is
  - (a) Less than  $n$
  - (b) Greater than or equal to  $n$
  - (c) Less than or equal to  $n$
  - (d) None of these
10. For real numbers  $x$  and  $y$ , we write  $xRy \Leftrightarrow x - y$  is an irrational number. Then the relation  $R$  is
  - (a) Reflexive
  - (b) Symmetric
  - (c) Transitive
  - (d) None of these
11. Let  $X$  be a family of sets and  $R$  be a relation on  $X$  defined by ' $A$  is disjoint from  $B$ '. Then  $R$  is
  - (a) Reflexive
  - (b) Symmetric
  - (c) Anti-symmetric
  - (d) Transitive
12. If  $R$  is a relation from a set  $A$  to a set  $B$  and  $S$  is a relation from  $B$  to a set  $C$ , then the relation  $S \circ R$ 
  - (a) Is from  $A$  to  $C$
  - (b) Is from  $C$  to  $A$
  - (c) Does not exist
  - (d) None of these
13. If  $R_1$  and  $R_2$  be two relations, then
  - (a)  $R_1 \cup R_2$  is reflexive
  - (b)  $R_1 \cap R_2$  is reflexive
  - (c)  $R_1 - R_2$  is reflexive
  - (d)  $R_1 \oplus R_2$  is reflexive
14. If  $R$  be a relation  $<$  from  $A = \{1, 2, 3, 4\}$  to  $B = \{1, 3, 5\}$  i.e.,  $(a, b) \in R \Leftrightarrow a < b$  then  $R \circ R$  is
  - (a)  $\{(1, 3), (1, 5), (2, 3), (2, 5), (3, 5), (4, 5)\}$
  - (b)  $\{(3, 1), (5, 1), (3, 2), (5, 2), (5, 3), (5, 4)\}$
  - (c)  $\{(3, 3), (3, 5), (5, 3), (5, 5)\}$
  - (d)  $\{(3, 3), (3, 4), (4, 5)\}$
15. A relation from  $P$  to  $Q$  is
  - (a) A universal set of  $P \times Q$
  - (b)  $P \times Q$
  - (c) An equivalent set of  $P \times Q$
  - (d) A subset of  $P \times Q$
16. Let  $A = \{a, b, c\}$  and  $B = \{1, 2\}$ . Consider a relation  $R$  defined from set  $A$  to set  $B$ . Then  $R$  is equal to set
 

**[Kurukshetra CEE 1995]**

  - (a)  $A$
  - (b)  $B$
  - (c)  $A \times B$
  - (d)  $B \times A$
17. Let  $n(A) = n$ . Then the number of all relations on  $A$  is
  - (a)  $2^n$
  - (b)  $2^{2^n}$
  - (c)  $2^{n^2}$
  - (d) None of these
18. If  $R$  is a relation from a finite set  $A$  having  $m$  elements to a finite set  $B$  having  $n$  elements, then the number of relations from  $A$  to  $B$  is
  - (a)  $m^n$
  - (b)  $n^m$
  - (c)  $m \times n$
  - (d)  $m + n$
19. Let  $R$  be a reflexive relation on a finite set  $A$  having  $n$ -elements, and let there be  $m$  ordered pairs in  $R$ . Then
  - (a)  $m \geq n$
  - (b)  $m \geq n^2$
  - (c)  $m \geq n + 1$
  - (d) None of these
20. The relation  $R$  defined on the set  $A = \{1, 2, 3, 4, 5\}$  by  $R = \{(x, y) : x + y = 6\}$  is given by
  - (a)  $\{(1, 1), (2, 1), (3, 1), (4, 1), (2, 3)\}$
  - (b)  $\{(2, 2), (3, 2), (4, 2), (2, 4)\}$
  - (c)  $\{(3, 3), (3, 4), (5, 4), (4, 3), (3, 1)\}$
  - (d) None of these
21. A relation  $R$  is defined from  $\{2, 3, 4, 5\}$  to  $\{3, 6, 7, 10\}$  by  $(x, y) \in R \Leftrightarrow x$  is relatively prime to  $y$ . Then domain of  $R$  is
  - (a)  $\{2, 3, 4, 5\}$
  - (b)  $\{3, 6, 7, 10\}$
  - (c)  $\{2, 3, 4, 5, 6, 7, 10\}$
  - (d)  $\{2, 3, 4, 5, 6, 7, 10, 15\}$

- (a) {2, 3, 5} (b) {3, 5}  
 (c) {2, 3, 4} (d) {2, 3, 4, 5}
22. Let  $R$  be a relation on  $N$  defined by . The domain of  $R$  is  
 (a) {2, 4, 8} (b) {2, 4, 6, 8}  
 (c) {2, 4, 6} (d) {1, 2, 3, 4}
23. If is a relation in  $Z$ , then domain of  $R$  is  
 (a) {0, 1, 2} (b) {0, -1, -2}  
 (c) {-2, -1, 0, 1, 2} (d) None of these
24.  $R$  is a relation from {11, 12, 13} to {8, 10, 12} defined by . Then is  
 (a) {(8, 11), (10, 13)} (b) {(11, 18), (13, 10)}  
 (c) {(10, 13), (8, 11)} (d) None of these
25. Let  $A = \{1, 2, 3\}$ ,  $B = \{1, 3, 5\}$ . If relation  $R$  from  $A$  to  $B$  is given by  $R = \{(1, 3), (2, 5), (3, 3)\}$ . Then is  
 (a) {(3, 3), (3, 1), (5, 2)} (b) {(1, 3), (2, 5), (3, 3)}  
 (c) {(1, 3), (5, 2)} (d) None of these
26. Let  $R$  be a reflexive relation on a set  $A$  and  $I$  be the identity relation on  $A$ . Then  
 (a) (b)  
 (c) (d) None of these
27. Let  $A = \{1, 2, 3, 4\}$  and  $R$  be a relation in  $A$  given by  $R = \{(1, 1), (2, 2), (3, 3), (4, 4), (1, 2), (2, 1), (3, 1), (1, 3)\}$ . Then  $R$  is  
 (a) Reflexive (b) Symmetric  
 (c) Transitive (d) An equivalence relation
28. An integer  $m$  is said to be related to another integer  $n$  if  $m$  is a multiple of  $n$ . Then the relation is  
 (a) Reflexive and symmetric (b) Reflexive and transitive  
 (c) Symmetric and transitive (d) Equivalence relation
29. The relation  $R$  defined in  $N$  as is divisible by  $a$  is  
 (a) Reflexive but not symmetric  
 (b) Symmetric but not transitive  
 (c) Symmetric and transitive  
 (d) None of these
30. Let  $R$  be a relation on a set  $A$  such that , then  $R$  is  
 (a) Reflexive (b) Symmetric  
 (c) Transitive (d) None of these
31. Let  $R = \{(a, a)\}$  be a relation on a set  $A$ . Then  $R$  is  
 (a) Symmetric  
 (b) Antisymmetric  
 (c) Symmetric and antisymmetric  
 (d) Neither symmetric nor anti-symmetric
32. The relation "is subset of" on the power set  $P(A)$  of a set  $A$  is  
 (a) Symmetric (b) Anti-symmetric  
 (c) Equivalency relation (d) None of these
33. The relation  $R$  defined on a set  $A$  is antisymmetric if for  
 (a) Every  $(a, b)$  (b) No
- (c) No (d) None of these
34. In the set  $A = \{1, 2, 3, 4, 5\}$ , a relation  $R$  is defined by  $R = \{(x, y) | x, y \in A \text{ and } x < y\}$ . Then  $R$  is  
 (a) Reflexive (b) Symmetric  
 (c) Transitive (d) None of these
35. Let  $A$  be the non-void set of the children in a family. The relation 'x is a brother of' on  $A$  is  
 (a) Reflexive (b) Symmetric  
 (c) Transitive (d) None of these
36. Let  $A = \{1, 2, 3, 4\}$  and let  $R = \{(2, 2), (3, 3), (4, 4), (1, 2)\}$  be a relation on  $A$ . Then  $R$  is  
 (a) Reflexive (b) Symmetric  
 (c) Transitive (d) None of these
37. The void relation on a set  $A$  is  
 (a) Reflexive (b) Symmetric and transitive  
 (c) Reflexive and symmetric (d) Reflexive and transitive
38. Let be a relation defined by . Then is [UPSEAT 1999]  
 (a) An equivalence relation on  $R$   
 (b) Reflexive, transitive but not symmetric  
 (c) Symmetric, Transitive but not reflexive  
 (d) Neither transitive nor reflexive but symmetric
39. Which one of the following relations on  $R$  is an equivalence relation  
 (a) (b)  
 (c) (d)
40. If  $R$  is an equivalence relation on a set  $A$ , then is  
 (a) Reflexive only  
 (b) Symmetric but not transitive  
 (c) Equivalence  
 (d) None of these
41.  $R$  is a relation over the set of real numbers and it is given by . Then  $R$  is  
 (a) Symmetric and transitive (b) Reflexive and symmetric  
 (c) A partial order relation (d) An equivalence relation
42. In order that a relation  $R$  defined on a non-empty set  $A$  is an equivalence relation, it is sufficient, if  $R$  [Karnataka CET 1990]  
 (a) Is reflexive  
 (b) Is symmetric  
 (c) Is transitive  
 (d) Possesses all the above three properties
43. The relation "congruence modulo  $m$ " is  
 (a) Reflexive only (b) Transitive only  
 (c) Symmetric only (d) An equivalence relation
44. Solution set of  $(\text{mod } 7)$ , is given by  
 (a) {3} (b)



- (c) (d) None of these
45. Let  $R$  and  $S$  be two equivalence relations on a set  $A$ . Then  
 (a)  $R \cup S$  is an equivalence relation on  $A$   
 (b)  $R \cap S$  is an equivalence relation on  $A$   
 (c) is an equivalence relation on  $A$   
 (d) None of these
46. Let  $R$  and  $S$  be two relations on a set  $A$ . Then  
 (a)  $R$  and  $S$  are transitive, then  $R \cup S$  is also transitive  
 (b)  $R$  and  $S$  are transitive, then  $R \cap S$  is also transitive  
 (c)  $R$  and  $S$  are reflexive, then  $R \cap S$  is also reflexive  
 (d)  $R$  and  $S$  are symmetric then  $R \cup S$  is also symmetric
47. Let  $R = \{(1, 3), (2, 2), (3, 2)\}$  and  $S = \{(2, 1), (3, 2), (2, 3)\}$  be two relations on set  $A = \{1, 2, 3\}$ . Then  $R \circ S =$   
 (a)  $\{(1, 3), (2, 2), (3, 2), (2, 1), (2, 3)\}$   
 (b)  $\{(3, 2), (1, 3)\}$   
 (c)  $\{(2, 3), (3, 2), (2, 2)\}$   
 (d)  $\{(2, 3), (3, 2)\}$
48. Let  $L$  denote the set of all straight lines in a plane. Let a relation  $R$  be defined by . Then  $R$  is  
 (a) Reflexive (b) Symmetric  
 (c) Transitive (d) None of these
49. Let  $R$  be a relation over the set  $N \times N$  and it is defined by . Then  $R$  is  
 (a) Reflexive only (b) Symmetric only  
 (c) Transitive only (d) An equivalence relation
50. Let  $n$  be a fixed positive integer. Define a relation  $R$  on the set  $Z$  of integers by, . Then  $R$  is  
 (a) Reflexive (b) Symmetric  
 (c) Transitive (d) Equivalence
51. Let be a relation on the set . The relation is [AIIEE 2005]  
 (a) An equivalence relation  
 (b) Reflexive and symmetric only  
 (c) Reflexive and transitive only  
 (d) Reflexive only
52. is a relation which is [Orissa JEE 2005]  
 (a) Symmetric (b) Reflexive  
 (c) Transitive (d) None of these
53. Let  $R = \{(1, 3), (4, 2), (2, 4), (2, 3), (3, 1)\}$  be a relation on the set  $A = \{1, 2, 3, 4\}$ . The relation  $R$  is [AIIEE 2004]  
 (a) Reflexive (b) Transitive  
 (c) Not symmetric (d) A function
54. The number of reflexive relations of a set with four elements is equal to [UPSEAT 2004]  
 (a) (b)
- (c) (d)
55. Let  $S$  be the set of all real numbers. Then the relation  $R = \{(a, b) : 1 + ab > 0\}$  on  $S$  is [NDA 2003]  
 (a) Reflexive and symmetric but not transitive  
 (b) Reflexive and transitive but not symmetric  
 (c) Symmetric, transitive but not reflexive  
 (d) Reflexive, transitive and symmetric  
 (e) None of the above is true
56. If  $A$  is the set of even natural numbers less than 8 and  $B$  is the set of prime numbers less than 7, then the number of relations from  $A$  to  $B$  is [NDA 2003]  
 (a) (b)  
 (c) (d)
1. If and then (a) (b)  
 (c) (d) None of these
2. If then (a) (b)  
 (c) (d)
3. Sets  $A$  and  $B$  have 3 and 6 elements respectively. What can be the minimum number of elements in  $A \cup B$  [MNR 1987; Karnataka CET 1996]  
 (a) 3 (b) 6  
 (c) 9 (d) 18
4. If and  $B =$  , then contains [AMU 1996; Pb. CET 2002]  
 (a) One point (b) Three points  
 (c) Two points (d) Four points
5. If is a multiple of 3] and is a multiple of 5], then  $A - B$  is ( means complement of  $A$ ) [AMU 1998]  
 (a) (b)  
 (c) (d)
6. If is then [Kerala (Engg.) 2002]  
 (a)  $\{(2, 4), (3, 4)\}$  (b)  $\{(4, 2), (4, 3)\}$   
 (c)  $\{(2, 4), (3, 4), (4, 4)\}$  (d)  $\{(2, 2), (3, 3), (4, 4), (5, 5)\}$

7. In a college of 300 students, every student reads 5 newspaper and every newspaper is read by 60 students. The no. of newspaper is **[IIT 1998]**
- (a) At least 30 (b) At most 20  
(c) Exactly 25 (d) None of these
8. Let  $A = \{1, 2, 3, 4, 5\}$ ;  $B = \{2, 3, 6, 7\}$ . Then the number of elements in  $(A \times B) \cap (B \times A)$  is
- (a) 18 (b) 6  
(c) 4 (d) 0
9. Let  $A = \{1, 2, 3\}$ ,  $B = \{1, 3, 5\}$ . A relation is defined by  $R = \{(1, 3), (1, 5), (2, 1)\}$ . Then is defined by
- (a)  $\{(1,2), (3,1), (1,3), (1,5)\}$  (b)  $\{(1, 2), (3, 1), (2, 1)\}$   
(c)  $\{(1, 2), (5, 1), (3, 1)\}$  (d) None of these
10. Let  $R$  be the relation on the set  $R$  of all real numbers defined by  $a R b$  iff . Then  $R$  is **[Roorkee 1998]**
- (a) Reflexive and Symmetric (b) Symmetric only  
(c) Transitive only (d) Anti-symmetric only
11. With reference to a universal set, the inclusion of a subset in another, is relation, which is **[Karnataka CET 1995]**
- (a) Symmetric only (b) Equivalence relation  
(c) Reflexive only (d) None of these
12. Let  $R$  be a relation on the set  $N$  of natural numbers defined by  $n R m \Leftrightarrow n$  is a factor of  $m$  (i.e.,  $n|m$ ). Then  $R$  is
- (a) Reflexive and symmetric  
(b) Transitive and symmetric  
(c) Equivalence  
(d) Reflexive, transitive but not symmetric
13. Let  $R$  and  $S$  be two non-void relations on a set  $A$ . Which of the following statements is false
- (a)  $R$  and  $S$  are transitive  $\Rightarrow R \cup S$  is transitive  
(b)  $R$  and  $S$  are transitive  $\Rightarrow R \cap S$  is transitive  
(c)  $R$  and  $S$  are symmetric  $\Rightarrow R \cup S$  is symmetric  
(d)  $R$  and  $S$  are reflexive  $\Rightarrow R \cap S$  is reflexive
14. Let a relation  $R$  be defined by  $R = \{(4, 5); (1, 4); (4, 6); (7, 6); (3, 7)\}$  then is
- (a)  $\{(1, 1), (4, 4), (4, 7), (7, 4), (7, 7), (3, 3)\}$   
(b)  $\{(1, 1), (4, 4), (7, 7), (3, 3)\}$   
(c)  $\{(1, 5), (1, 6), (3, 6)\}$   
(d) None of these
15. Let  $R$  be a relation on the set  $N$  be defined by  $\{(x, y) | x, y \in N, 2x + y = 41\}$ . Then  $R$  is
- (a) Reflexive (b) Symmetric  
(c) Transitive (d) None of these