SET 1 – Multiple Choice Questions (Relations and Functions)

1–50 MCQs

1. If A={1,2}A = \{1,2\}A={1,2} and B={x,y,z}B = \{x,y,z\}B={x,y,z}, then the number of elements in A×BA \times BA×B is:
(a) 2
(b) 3
(c) 5
(d) 6

2. If P={m,n}P = \{m,n\}P={m,n} and Q={p}Q = \{p\}Q={p}, then P×QP \times QP×Q is:
(a) {(p,m),(p,n)}\{(p,m),(p,n)\}{(p,m),(p,n)}
(b) {(m,p),(n,p)}\{(m,p),(n,p)\}{(m,p),(n,p)}
(c) {(m,n),(p,q)}\{(m,n),(p,q)\}{(m,n),(p,q)}
(d) {(p,p)}\{(p,p)\}{(p,p)}

3. If n(A)=4,n(B)=3n(A) = 4, n(B) = 3n(A)=4,n(B)=3, then number of elements in A×BA \times BA×B is:
(a) 7
(b) 12
(c) 9
(d) 6

4. The ordered pairs (x+1,y−2)=(3,1)(x+1, y-2) = (3,1)(x+1,y−2)=(3,1) give values of (x,y)(x,y)(x,y) as:
(a) (1,1)
(b) (2,3)
(c) (3,2)
(d) (2,2)

5. If A={a,b,c},B={r}A = \{a, b, c\}, B = \{r\}A={a,b,c},B={r}, then Q×PQ \times PQ×P will have:
(a) 1 element
(b) 3 elements
(c) 6 elements
(d) 0 element

6. The Cartesian product R×RR \times RR×R represents:
(a) Set of real numbers
(b) All ordered pairs (x,y)(x,y)(x,y) with x,y∈Rx,y \in Rx,y∈R
(c) Set of integers
(d) Set of natural numbers

7. If A={1,2},B={3,4}A = \{1,2\}, B = \{3,4\}A={1,2},B={3,4}, then number of subsets of A×BA \times BA×B is:
(a) 4
(b) 8
(c) 16
(d) 32

8. If A={−1,1}A = \{-1,1\}A={−1,1}, then A×A×AA \times A \times AA×A×A has:
(a) 4 elements
(b) 6 elements
(c) 8 elements
(d) 2 elements

9. A relation from a set AAA to a set BBB is defined as:
(a) Subset of AAA
(b) Subset of BBB
(c) Subset of A×BA \times BA×B
(d) Cartesian product A×BA \times BA×B

10. The domain of relation R={(1,2),(2,3),(3,4)}R = \{(1,2),(2,3),(3,4)\}R={(1,2),(2,3),(3,4)} is:
(a) {1,2,3}

(b) {2,3,4}
(c) {1,3,4}
(d) {2,4}

11. The range of relation R={(x,y):y=x+1,x∈{1,2,3,4}}R = \{(x,y) : y = x+1, x \in \{1,2,3,4\}\}R={(x,y):y=x+1,x∈{1,2,3,4}} is:
(a) {1,2,3,4}
(b) {2,3,4,5}
(c) {1,3,5}
(d) {2,4}

12. If A={1,2,3},B={4,5}A = \{1,2,3\}, B = \{4,5\}A={1,2,3},B={4,5}, then number of relations from A to B is:
(a) 6
(b) 12
(c) 64
(d) 32

13. A function is a special type of relation in which:
(a) Every element of domain has exactly one image in codomain
(b) An element may have two images
(c) Every element of codomain must be mapped
(d) Range = Codomain always

14. Which of the following is a function?
(a) {(1,2),(1,3)}
(b) {(2,1),(3,1),(4,2)}
(c) {(2,2),(2,4)}
(d) {(1,2),(2,3),(3,4)}

15. The function f(x)=2x+1f(x) = 2x+1f(x)=2x+1 defined on natural numbers has range:
(a) Odd natural numbers
(b) Even natural numbers
(c) Whole numbers
(d) Prime numbers

16. Graph of f(x)=xf(x) = xf(x)=x is:
(a) Parabola
(b) Line parallel to x-axis
(c) Line parallel to y-axis
(d) Straight line through origin

17. Range of f(x)=∣x∣f(x) = |x|f(x)=∣x∣ is:
(a) R
(b) R+
(c) R–
(d) Non-negative real numbers

18. Domain of f(x)=1/xf(x) = 1/xf(x)=1/x is:
(a) R – {0}
(b) R
(c) N
(d) Z

19. The function f(x)=[x]f(x) = [x]f(x)=[x] denotes:
(a) Least integer greater than x
(b) Greatest integer less than or equal to x
(c) Fractional part of x
(d) Reciprocal of x

20. Range of signum function is:
(a) {0,1}
(b) {0,1,2}
(c) {–1,0,1}
(d) {–1,1}

21. A polynomial function must have powers of x:
(a) Negative integers
(b) Non-negative integers
(c) Rational numbers
(d) Real numbers

22. If f(x)=2xf(x) = 2xf(x)=2x, then f is:
(a) Identity function
(b) Polynomial function
(c) Constant function
(d) Rational function

23. The function f(x)=1/xf(x) = 1/xf(x)=1/x is a:
(a) Rational function
(b) Polynomial function
(c) Constant function
(d) Signum function

24. If f(x)=x2f(x) = x^2f(x)=x2, domain is R, then range is:
(a) R
(b) R+
(c) $\{x^2 : x \in R\}$
(d) Z

25. The graph of modulus function is:
(a) V-shaped
(b) U-shaped
(c) Straight line
(d) Step function

26. The function f(x)=mx+cf(x) = mx+cf(x)=mx+c is called:
(a) Polynomial of degree 2
(b) Polynomial of degree 0
(c) Linear function
(d) Constant function

27. Number of relations from set with 2 elements to set with 3 elements is:
(a) 6
(b) 12
(c) 64
(d) 8

28. If f(x)=x3f(x) = x^3f(x)=x3, its graph is:
(a) Line
(b) Parabola
(c) Cubic curve
(d) Hyperbola

29. Range of f(x)=x2+2f(x) = x^2+2f(x)=x2+2 is:
(a) {2,3,4, …}
(b) R
(c) R+
(d) $\{x^2+2 : x \in R\}$

30. Function f(x)=[x]f(x) = [x]f(x)=[x] has discontinuities at:
(a) All integers
(b) Non-integers
(c) 0 only
(d) Rational numbers

31. Identity function is represented by:
(a) f(x) = 0
(b) f(x) = x
(c) f(x) = c
(d) f(x) = 1/x

32. The codomain of a relation is:
(a) Set A
(b) Set B
(c) Subset of A
(d) Subset of B

33. Range $\subset$ Codomain means:
(a) Always true
(b) Always false
(c) Sometimes true
(d) Never true

34. The number of elements in P×PP \times PP×P, where P = {1,2,3,4} is:

(a) 8
(b) 12
(c) 16
(d) 20

35. Which of the following is not a real function?

(a) $f(x) = x^2$
(b) $f(x) = 1/x$
(c) $f(x) = \sqrt{x}$, $x \geq 0$
(d) $f(x) = \sqrt{x}$, $x < 0$

36. For f(x)=–xf(x) = –xf(x)=–x, domain is R and range is:

(a) R+
(b) R–
(c) R
(d) 0

37. The graph of constant function is:

(a) Horizontal line
(b) Vertical line
(c) Parabola
(d) Diagonal line

38. If f(x)=sinxf(x) = \sin xf(x)=sinx, then range is:

(a) {–1,1}
(b) [–1,1]
(c) R
(d) R+

39. If f(x)=[x]f(x) = [x]f(x)=[x], then f(–2.3) =:

(a) –3
(b) –2
(c) –1
(d) 0

40. Range of function f(x)=1xf(x) = \frac{1}{x}f(x)=x1 is:

(a) R
(b) R – {0}
(c) R+
(d) Z

41. For f(x) = sign(x), f(0) =:

(a) –1
(b) 0
(c) 1
(d) Not defined

42. The function f(x)=ax+bf(x) = ax+bf(x)=ax+b is linear if:

(a) a ≠ 0
(b) b ≠ 0
(c) a = 0
(d) a,b both zero

43. The relation R = {(a,b): a–b is integer} on Q is:

(a) Reflexive only
(b) Reflexive, Symmetric, Transitive
(c) Symmetric only
(d) None

44. The number of functions from a set of m elements to set of n elements is:

(a) mnm^nmn
(b) nmn^mnm
(c) 2mn2^{mn}2mn
(d) mnmnmn

45. Which of the following is onto function?

(a) $f(x) = x^2, x \in R \rightarrow R+$
(b) $f(x) = |x|, x \in R \rightarrow R+$
(c) $f(x) = 2x, x \in R \rightarrow R$
(d) $f(x) = x^3, x \in R \rightarrow R$

46. The function $f(x) = \sqrt{x}$ is defined for:
(a) $x < 0$
(b) $x \geq 0$
(c) all real numbers
(d) $x \neq 0$

47. The graph of greatest integer function is:
(a) Smooth curve
(b) Straight line
(c) Step function
(d) Hyperbola

48. If A = {1,2}, B = {a,b}, number of functions from A to B is:
(a) 2
(b) 4
(c) 8
(d) 16

49. Range of $f(x) = \cos x$ is:
(a) $[-1,1]$
(b) $(-\infty,\infty)$
(c) $[0,1]$
(d) $\{-1,0,1\}$

50. If $f(x) = 2x - 5$, then $f(0)$ =:
(a) –5
(b) 0
(c) 5
(d) 2

Answers – Set 1

1(d), 2(b), 3(b), 4(b), 5(b), 6(b), 7(c), 8(c), 9(c), 10(a),
11(b), 12(c), 13(a), 14(b), 15(a), 16(d), 17(d), 18(a), 19(b), 20(c),

21(b), 22(b), 23(a), 24(c), 25(a), 26(c), 27(c), 28(c), 29(d), 30(a),
31(b), 32(b), 33(a), 34(c), 35(d), 36(c), 37(a), 38(b), 39(a), 40(b),
41(b), 42(a), 43(b), 44(b), 45(d), 46(b), 47(c), 48(b), 49(a), 50(a).