Digital Logic Design: Unit 1 MCQs

Number Systems & Base

1. What is the base of the decimal number system?
A) 2
B) 8
C) 10
D) 16
Answer: C) 10
2. What is the base of the binary number system?
A) 2
B) 10
C) 8
D) 1
Answer: A) 2
3. What is the base of the octal number system?
A) 16
B) 10
C) 8
D) 2
Answer: C) 8
4. What is the base of the hexadecimal number system?
A) 8
B) 16
C) 10
D) 32
Answer: B) 16
5. Which number system uses only the digits 0 and 1?
A) Decimal
B) Octal
C) Hexadecimal
D) Binary
Answer: D) Binary
6. The term 'radix' is also known as?
A) Digit
B) Base
C) Bit
D) Power
Answer: B) Base
7. How many unique digits are there in the octal number system?
A) 7
B) 8

C) 9
D) 10
Answer: B) 8 (0, 1, 2, 3, 4, 5, 6, 7)
8. What does the digit 'B' represent in the hexadecimal system?
A) 10
B) 11
C) 12
D) 13
Answer: B) 11
9. What is the weight of the digit '5' in the number 257?
A) 10^0
B) 10^1
C) 10^2
D) 10^3
Answer: B) 10^1 or 10
10. What is the weight of the LSB (Least Significant Bit) in a binary number?
A) 2^1
B) 2^2
C) 2^0
D) 2^-1
Answer: C) 2^0 or 1
11. What is the weight of the MSB (Most Significant Bit) in the binary number 1011?
A) 2^0
B) 2^1
C) 2^2
D) 2^3
Answer: D) 2^3 or 8
12. What character represents the value 15 in hexadecimal?
A) E
B) F
C) 15
D) G
Answer: B) F
13. A group of 4 bits is called a _____.
A) Byte
B) Word
C) Nibble
D) Bit
Answer: C) Nibble
14. A group of 8 bits is called a _____.
A) Nibble
B) Byte

C) Word
D) Group
Answer: B) Byte
15. Which number system is most commonly used in digital electronics?
A) Decimal
B) Binary
C) Octal
D) Roman
Answer: B) Binary
16. What is the positional value of 'A' in the hexadecimal number 3A1F?
A) 16^0
B) 16^1
C) 16^2
D) 16^3
Answer: C) 16^2 or 256
17. In the number $(734)_8$, what is the significance of the subscript 8?
A) It's the largest digit.
B) It's the total number of digits.
C) It indicates the base is Octal.
D) It is a calculation hint.
Answer: C) It indicates the base is Octal.
18. What is the largest single digit in the hexadecimal system?
A) 9
B) 16
C) G
D) F
Answer: D) F (which is 15 in decimal)
19. What is the largest single digit in the octal system?
A) 7
B) 8
C) 9
D) F
Answer: A) 7
20. Is '8' a valid digit in the octal system?
A) Yes
B) No
C) Only at the end
D) Only at the beginning
Answer: B) No

Number System Conversions

21. What is the decimal equivalent of the binary number 101?
A) 4

B) 5
C) 6
D) 7
Answer: B) 5 ($12^2 + 02^1 + 1*2^0 = 4 + 0 + 1$)
22. How is the decimal number 10 represented in binary?
A) 1000
B) 1010
C) 1100
D) 1001
Answer: B) 1010
23. What is the binary equivalent of the octal number 7?
A) 111
B) 101
C) 110
D) 001
Answer: A) 111
24. Convert the hexadecimal number 'A' to binary.
A) 1001
B) 1100
C) 1010
D) 1110
Answer: C) 1010
25. What is the octal equivalent of the binary number 110101?
A) 55
B) 65
C) 66
D) 56
Answer: B) 65 (Grouped as 110 101 -> 6 5)
26. What is the hexadecimal equivalent of the binary number 11011010?
A) CA
B) DA
C) DB
D) CB
Answer: B) DA (Grouped as 1101 1010 -> D A)
27. Convert the decimal number 25 to hexadecimal.
A) 19
B) 1A
C) F1
D) 91
Answer: A) 19 (25 / 16 = 1 remainder 9)
28. What is the decimal value of the octal number 23?
A) 19
B) 20

C) 18
D) 23
Answer: A) 19 ($28^1 + 38^0 = 16 + 3$)
29. What is the decimal value of the hexadecimal number 1A?
A) 25
B) 26
C) 27
D) 36
Answer: B) 26 ($116^1 + 1016^0 = 16 + 10$)
30. To convert a binary number to octal, you group the bits in sets of _____.
A) 2
B) 3
C) 4
D) 8
Answer: B) 3
31. To convert a binary number to hexadecimal, you group the bits in sets of _____.
A) 2
B) 3
C) 4
D) 8
Answer: C) 4
32. Convert $(52)_8$ to decimal.
A) 42
B) 52
C) 40
D) 25
Answer: A) 42 ($58^1 + 28^0 = 40 + 2$)
33. Convert $(10110)_2$ to decimal.
A) 20
B) 22
C) 24
D) 16
Answer: B) 22 (16 + 0 + 4 + 2 + 0)
34. What is the octal equivalent of the hexadecimal number 1F?
A) 37
B) 40
C) 3F
D) 73
Answer: A) 37 (1F -> 0001 1111 -> 011 111 -> 3 7)
35. Convert the decimal number 8 to binary.
A) 100
B) 10000

C) 1000
D) 1110
Answer: C) 1000
36. What is the binary representation of the decimal number 15?
A) 1111
B) 1001
C) 1110
D) 1011
Answer: A) 1111
37. Convert the octal number 62 to binary.
A) 110010
B) 101011
C) 010110
D) 111001
Answer: A) 110010 (6 -> 110, 2 -> 010)
38. Convert the hexadecimal number B4 to binary.
A) 10110100
B) 10110010
C) 11000100
D) 10100100
Answer: A) 10110100 (B -> 1011, 4 -> 0100)
39. What is the main method for converting decimal to another base?
A) Successive Multiplication
B) Successive Division
C) Grouping
D) Sum of weights
Answer: B) Successive Division
40. What is the hexadecimal equivalent of $(75)_{10}$?
A) 4A
B) 4B
C) 5B
D) 75
Answer: B) 4B (75 / 16 = 4 remainder 11 (B))