

# CPE 301 - Assembly Language Programming

## Chapter 1: Basic Concepts - MCQ Question Bank

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### SECTION 1: INTRODUCTION TO ASSEMBLY LANGUAGE (Questions 1-25)

**1. Assembly language is considered to be:**

- a. A high-level language
- b. A machine-independent language
- c. The oldest programming language
- d. A portable language

**Answer: c) The oldest programming language**

---

**2. What is the relationship between assembly language and machine language?**

- a. Many-to-one
- b. One-to-many
- c. One-to-one
- d. Many-to-many

**Answer: c) One-to-one**

---

**3. Which of the following is NOT a well-known assembler for x86 systems?**

- a. MASM
- b. TASM
- c. NASM
- d. JAVA

**Answer: d) JAVA**

---

**4. What does MASM stand for?**

- a. Microsoft Assembly Module
- b. Microsoft Macro Assembler
- c. Machine Assembly System Manager
- d. Micro Architecture System Module

**Answer: b) Microsoft Macro Assembler**

---

**5. A utility program that converts source code programs from assembly language into machine language is called:**

- a. Compiler
- b. Interpreter
- c. Assembler
- d. Debugger

**Answer: c) Assembler**

---

**6. A utility program that combines individual files created by an assembler into a single executable program is called:**

- a. Compiler
- b. Linker
- c. Loader
- d. Debugger

**Answer: b) Linker**

---

**7. Which utility lets you step through a program while it's running and examine registers and memory?**

- a. Assembler
- b. Linker
- c. Debugger
- d. Compiler

**Answer: c) Debugger**

---

**8. What type of relationship exists between high-level languages like C++ and machine language?**

- a. One-to-one
- b. One-to-many
- c. Many-to-one
- d. No relationship

**Answer: b) One-to-many**

---

**9. Which of the following is TRUE about assembly language portability?**

- a. Assembly language is highly portable
- b. Assembly language is designed for a specific processor family
- c. Assembly language programs can run on any computer
- d. Assembly language is as portable as Java

**Answer: b) Assembly language is designed for a specific processor family**

---

**10. Registers are:**

- a. External storage devices
- b. Named storage locations in the CPU
- c. Types of memory chips
- d. Input/output devices

**Answer: b) Named storage locations in the CPU**

---

**11. Programs stored in a small amount of memory in single-purpose devices are called:**

- a. System programs
- b. Application programs
- c. Embedded programs
- d. Utility programs

**Answer: c) Embedded programs**

---

**12. Which of the following is an example of an embedded system?**

- a. Microsoft Word
- b. Automobile fuel and ignition systems
- c. Web browser
- d. Spreadsheet application

**Answer: b) Automobile fuel and ignition systems**

---

**13. Device drivers are programs that:**

- a. Translate high-level language to assembly
- b. Translate general operating system commands into specific hardware references
- c. Convert binary to hexadecimal
- d. Debug assembly programs

**Answer: b) Translate general operating system commands into specific hardware references**

---

**14. 32-Bit Protected Mode programs run under:**

- a. Only MS-DOS
- b. Only 64-bit Windows
- c. All 32-bit versions of Microsoft Windows
- d. Only Linux systems

**Answer: c) All 32-bit versions of Microsoft Windows**

---

**15. Which mode is NOT supported by 64-bit Windows?**

- a. 32-Bit Protected Mode
- b. 64-Bit Mode
- c. 16-Bit Real-Address Mode
- d. Both a and b

**Answer: c) 16-Bit Real-Address Mode**

---

**16. Which Linux-based assembler has syntax most similar to MASM?**

- a. GAS
- b. NASM
- c. TASM
- d. FASM

**Answer: b) NASM**

---

**17. Which language provides direct access to computer hardware?**

- a. Java
- b. Python
- c. Assembly language
- d. JavaScript

**Answer: c) Assembly language**

---

**18. Which of the following is a valid reason to learn assembly language?**

- a. Writing embedded programs
- b. Real-time applications requiring precise timing
- c. Game console software optimization
- d. All of the above

**Answer: d) All of the above**

---

**19. TASM stands for:**

- a. Total Assembly Module

- b. Turbo Assembler
- c. Technical Assembly Manager
- d. Text Assembly System

**Answer: b) Turbo Assembler**

---

**20. Which statement is TRUE about assembly language rules?**

- a. Assembly language has more rules than C++
- b. Assembly language has fewer rules than high-level languages
- c. Assembly language and C++ have identical rules
- d. Assembly language has no rules

**Answer: b) Assembly language has fewer rules than high-level languages**

---

**21. A single statement in C++ expands into:**

- a. A single assembly instruction
- b. Multiple assembly language instructions
- c. No assembly instructions
- d. Exactly two assembly instructions

**Answer: b) Multiple assembly language instructions**

---

**22. Which of the following is NOT typically written in assembly language?**

- a. Device drivers
- b. Embedded systems
- c. Large commercial applications
- d. Hardware interface routines

**Answer: c) Large commercial applications**

---

**23. GAS stands for:**

- a. General Assembly System
- b. GNU Assembler
- c. Global Assembly Standard
- d. Graphical Assembly Software

**Answer: b) GNU Assembler**

---

**24. JNI in Java stands for:**

- a. Java Network Interface
- b. Java Native Interface

- c. Java Numeric Integration
- d. Java New Implementation

**Answer: b) Java Native Interface**

---

**25. Why is assembly language not usually used for writing large application programs?**

- a. It's too fast
- b. It takes too much time to write and maintain
- c. It's too portable
- d. It doesn't support variables

**Answer: b) It takes too much time to write and maintain**

---

## **SECTION 2: VIRTUAL MACHINE CONCEPT (Questions 26-45)**

**26. The virtual machine concept was explained by:**

- a. Bill Gates
- b. Andrew Tanenbaum
- c. Dennis Ritchie
- d. Linus Torvalds

**Answer: b) Andrew Tanenbaum**

---

**27. In the virtual machine concept, L0 represents:**

- a. Assembly language
- b. High-level language
- c. Native machine language
- d. Java bytecode

**Answer: c) Native machine language**

---

**28. Which method decodes and executes each instruction as the program runs?**

- a. Compilation
- b. Translation
- c. Interpretation
- d. Linking

**Answer: c) Interpretation**

---

**29. Which method converts an entire program into machine language before execution?**

- a. Interpretation
- b. Translation
- c. Debugging
- d. Loading

**Answer: b) Translation**

---

**30. A virtual machine is defined as:**

- a. A physical computer
- b. A software program that emulates the functions of another computer
- c. A type of memory
- d. A hardware component

**Answer: b) A software program that emulates the functions of another computer**

---

**31. Level 1 in the virtual machine model represents:**

- a. Assembly language
- b. High-level language
- c. Digital logic hardware
- d. Instruction set architecture

**Answer: c) Digital logic hardware**

---

**32. Instruction Set Architecture (ISA) is at which level?**

- a. Level 1
- b. Level 2
- c. Level 3
- d. Level 4

**Answer: b) Level 2**

---

**33. Assembly language appears at which level in the virtual machine model?**

- a. Level 1
- b. Level 2
- c. Level 3
- d. Level 4

**Answer: c) Level 3**

---

**34. High-level languages appear at which level?**

- a. Level 1

- b. Level 2
- c. Level 3
- d. Level 4

**Answer: d) Level 4**

---

**35. Which statement is TRUE about translated programs vs interpreted programs?**

- a. Interpreted programs execute faster
- b. Translated programs often execute more quickly
- c. Both execute at the same speed
- d. Neither executes

**Answer: b) Translated programs often execute more quickly**

---

**36. Java bytecode is executed by:**

- a. The CPU directly
- b. Java Virtual Machine (JVM)
- c. The operating system
- d. The assembler

**Answer: b) Java Virtual Machine (JVM)**

---

**37. A microprogram is:**

- a. A small Java program
- b. A program embedded in the microprocessor chip
- c. A type of assembler
- d. A debugging tool

**Answer: b) A program embedded in the microprocessor chip**

---

**38. Machine language consists of:**

- a. Mnemonics like ADD, SUB
- b. Binary values
- c. English words
- d. Flowcharts

**Answer: b) Binary values**

---

**39. Which of the following uses short mnemonics like ADD, SUB, MOV?**

- a. Machine language
- b. Assembly language

- c. Digital logic
- d. Binary code

**Answer: b) Assembly language**

---

**40. At which level do users typically first write programs in the virtual machine model?**

- a. Level 1 (Digital logic)
- b. Level 2 (ISA)
- c. Level 3 (Assembly language)
- d. Level 4 (High-level language)

**Answer: b) Level 2 (ISA)**

---

**41. Assembly language programs are:**

- a. Interpreted line by line
- b. Translated (assembled) entirely before execution
- c. Never executed
- d. Executed directly by hardware

**Answer: b) Translated (assembled) entirely before execution**

---

**42. The Java Virtual Machine has been implemented on:**

- a. Only Windows systems
- b. Only Mac systems
- c. Many different computer systems
- d. Only Intel processors

**Answer: c) Many different computer systems**

---

**43. Each machine-language instruction is executed by:**

- a. Only computer hardware
- b. Only a microprogram
- c. Either hardware directly or by a microprogram
- d. The operating system

**Answer: c) Either hardware directly or by a microprogram**

---

**44. The concept of layered virtual machines helps explain:**

- a. Only hardware design
- b. The relationship between software and hardware layers
- c. Only software design

- d. Internet protocols

**Answer: b) The relationship between software and hardware layers**

---

**45. Programs written at any virtual machine layer can be:**

- a. Only executed at that layer
- b. Translated or interpreted by the next-lowest layer
- c. Only compiled
- d. Never executed

**Answer: b) Translated or interpreted by the next-lowest layer**

---

## SECTION 3: BINARY INTEGERS (Questions 46-80)

**46. A binary digit is called a:**

- a. Byte
- b. Bit
- c. Word
- d. Nibble

**Answer: b) Bit**

---

**47. Binary numbers are base:**

- a. 8
- b. 10
- c. 2
- d. 16

**Answer: c) 2**

---

**48. Each binary digit can be either:**

- a. 0, 1, or 2
- b. 0 or 1
- c. Any number from 0-9
- d. A letter or number

**Answer: b) 0 or 1**

---

**49. The bit on the left of a binary number is called:**

- a. LSB

- b. MSB
- c. Middle bit
- d. Parity bit

**Answer: b) MSB**

---

**50. MSB stands for:**

- a. Most Simple Bit
- b. Most Significant Bit
- c. Minimum Significant Bit
- d. Maximum Storage Bit

**Answer: b) Most Significant Bit**

---

**51. LSB stands for:**

- a. Last Simple Bit
- b. Lowest Storage Bit
- c. Least Significant Bit
- d. Large Size Bit

**Answer: c) Least Significant Bit**

---

**52. In binary numbering, bits are numbered starting from:**

- a. 1 on the left
- b. 0 on the right
- c. 0 on the left
- d. 1 on the right

**Answer: b) 0 on the right**

---

**53. What is  $2^0$  equal to?**

- a. 0
- b. 1
- c. 2
- d. 10

**Answer: b) 1**

---

**54. What is  $2^3$  equal to?**

- a. 6
- b. 8

- c. 3
- d. 9

**Answer: b) 8**

---

**55. What is  $2^4$  equal to?**

- a. 8
- b. 16
- c. 32
- d. 4

**Answer: b) 16**

---

**56. What is  $2^8$  equal to?**

- a. 128
- b. 256
- c. 512
- d. 64

**Answer: b) 256**

---

**57. What is  $2^{10}$  equal to?**

- a. 512
- b. 1024
- c. 2048
- d. 100

**Answer: b) 1024**

---

**58. What is the decimal value of binary 00001001?**

- a. 8
- b. 9
- c. 10
- d. 11

**Answer: b) 9**

---

**59. What is the decimal value of binary 00001111?**

- a. 14
- b. 15
- c. 16

d. 17

**Answer: b) 15**

---

**60. What is the decimal value of binary 00010000?**

- a. 15
- b. 16
- c. 17
- d. 32

**Answer: b) 16**

---

**61. What is the decimal value of binary 11111111 (unsigned)?**

- a. 254
- b. 255
- c. 256
- d. 128

**Answer: b) 255**

---

**62. What is the decimal value of binary 10000000 (unsigned)?**

- a. 64
- b. 127
- c. 128
- d. 256

**Answer: c) 128**

---

**63. To convert decimal 37 to binary, you repeatedly divide by:**

- a. 8
- b. 10
- c. 2
- d. 16

**Answer: c) 2**

---

**64. What is the binary representation of decimal 13?**

- a. 00001011
- b. 00001101
- c. 00001110
- d. 00001100

**Answer: b) 00001101**

---

**65. What is the binary representation of decimal 7?**

- a. 00000110
- b. 00000111
- c. 00001000
- d. 00000101

**Answer: b) 00000111**

---

**66. What is the binary representation of decimal 16?**

- a. 00001111
- b. 00010000
- c. 00010001
- d. 00001110

**Answer: b) 00010000**

---

**67. What is the binary representation of decimal 32?**

- a. 00011111
- b. 00100000
- c. 00100001
- d. 00011110

**Answer: b) 00100000**

---

**68. What is the result of binary 00000100 + 00000111?**

- a. 00001010
- b. 00001011
- c. 00001100
- d. 00001001

**Answer: b) 00001011**

---

**69. What is 1 + 1 in binary?**

- a. 2
- b. 11
- c. 10
- d. 01

**Answer: c) 10**

---

**70. When adding two binary bits, a carry is generated when:**

- a. 0 + 0
- b. 0 + 1
- c. 1 + 0
- d. 1 + 1

**Answer: d) 1 + 1**

---

**71. The formula to find the number of bits needed to represent n is:**

- a.  $b = \log_{10} n$
- b.  $b = \text{ceiling}(\log_2 n)$
- c.  $b = n / 2$
- d.  $b = n \times 2$

**Answer: b)  $b = \text{ceiling}(\log_2 n)$**

---

**72. How many bits are needed to represent decimal 17?**

- a. 4
- b. 5
- c. 6
- d. 3

**Answer: b) 5**

---

**73. What is the decimal value of binary 01100100?**

- a. 100
- b. 99
- c. 101
- d. 64

**Answer: a) 100**

---

**74. Binary 1101.1110 is easier to read because:**

- a. It uses periods
- b. Dots are inserted every 4 or 8 bits for readability
- c. It's in decimal form
- d. It uses hexadecimal

**Answer: b) Dots are inserted every 4 or 8 bits for readability**

---

**75. What is the decimal value of binary 00110101?**

- a. 52
- b. 53
- c. 54
- d. 35

**Answer: b) 53**

---

**76. What is the binary representation of decimal 255?**

- a. 11111110
- b. 11111111
- c. 100000000
- d. 01111111

**Answer: b) 11111111**

---

**77. A signed binary integer can be:**

- a. Only positive
- b. Only negative
- c. Positive or negative
- d. Only zero

**Answer: c) Positive or negative**

---

**78. An unsigned binary integer is by default:**

- a. Negative
- b. Positive
- c. Zero
- d. Undefined

**Answer: b) Positive**

---

**79. Zero is considered:**

- a. Negative
- b. Positive
- c. Neither positive nor negative
- d. Both positive and negative

**Answer: b) Positive**

---

**80. What is the result of binary 00001111 + 00000010?**

- a. 00010000
- b. 00010001
- c. 00001111
- d. 00010010

**Answer: b) 00010001**

---

## SECTION 4: INTEGER STORAGE SIZES (Questions 81-100)

**81. The basic storage unit for all data in an x86 computer is:**

- a. Bit
- b. Byte
- c. Word
- d. Nibble

**Answer: b) Byte**

---

**82. How many bits are in a byte?**

- a. 4
- b. 8
- c. 16
- d. 32

**Answer: b) 8**

---

**83. How many bytes are in a word?**

- a. 1
- b. 2
- c. 4
- d. 8

**Answer: b) 2**

---

**84. How many bits are in a word?**

- a. 8
- b. 16
- c. 32
- d. 64

**Answer: b) 16**

---

**85. How many bytes are in a doubleword?**

- a. 2
- b. 4
- c. 8
- d. 16

**Answer: b) 4**

---

**86. How many bits are in a doubleword?**

- a. 16
- b. 32
- c. 64
- d. 128

**Answer: b) 32**

---

**87. How many bytes are in a quadword?**

- a. 4
- b. 8
- c. 16
- d. 32

**Answer: b) 8**

---

**88. How many bits are in a quadword?**

- a. 32
- b. 64
- c. 128
- d. 256

**Answer: b) 64**

---

**89. How many bits are in a double quadword?**

- a. 64
- b. 128
- c. 256
- d. 512

**Answer: b) 128**

---

**90. One kilobyte is equal to:**

- a. 1000 bytes
- b. 1024 bytes
- c. 512 bytes
- d. 2048 bytes

**Answer: b) 1024 bytes**

---

**91. One kilobyte equals 2 to the power of:**

- a. 8
- b. 10
- c. 12
- d. 16

**Answer: b) 10**

---

**92. One megabyte is equal to:**

- a. 1,000,000 bytes
- b. 1,048,576 bytes
- c. 1,024,000 bytes
- d. 2,048,000 bytes

**Answer: b) 1,048,576 bytes**

---

**93. One megabyte equals 2 to the power of:**

- a. 10
- b. 16
- c. 20
- d. 24

**Answer: c) 20**

---

**94. One gigabyte equals 2 to the power of:**

- a. 20
- b. 30
- c. 40
- d. 50

**Answer: b) 30**

---

**95. One terabyte equals 2 to the power of:**

- a. 30
- b. 40
- c. 50
- d. 60

**Answer: b) 40**

---

**96. What is the range of an unsigned byte?**

- a. 0 to 127
- b. 0 to 255
- c. 0 to 511
- d. 0 to 65535

**Answer: b) 0 to 255**

---

**97. What is the range of an unsigned word?**

- a. 0 to 255
- b. 0 to 65535
- c. 0 to 32767
- d. 0 to 4294967295

**Answer: b) 0 to 65535**

---

**98. The maximum value of an unsigned byte is:**

- a.  $2^8$
- b.  $2^8 - 1$
- c.  $2^7$
- d.  $2^7 - 1$

**Answer: b)  $2^8 - 1$**

---

**99. One petabyte equals 2 to the power of:**

- a. 40
- b. 50
- c. 60
- d. 70

**Answer: b) 50**

---

**100. One exabyte equals 2 to the power of:**

- a. 50

- b. 60
- c. 70
- d. 80

**Answer: b) 60**

---

## SECTION 5: HEXADECIMAL INTEGERS (Questions 101-130)

**101. Hexadecimal numbers are base:**

- a. 2
- b. 8
- c. 10
- d. 16

**Answer: d) 16**

---

**102. Each hexadecimal digit represents how many binary bits?**

- a. 2
- b. 4
- c. 8
- d. 16

**Answer: b) 4**

---

**103. Two hexadecimal digits together represent:**

- a. A bit
- b. A nibble
- c. A byte
- d. A word

**Answer: c) A byte**

---

**104. In hexadecimal, the letter A represents decimal:**

- a. 9
- b. 10
- c. 11
- d. 15

**Answer: b) 10**

---

**105. In hexadecimal, the letter F represents decimal:**

- a. 10
- b. 14
- c. 15
- d. 16

**Answer: c) 15**

---

**106. In hexadecimal, the letter B represents decimal:**

- a. 10
- b. 11
- c. 12
- d. 13

**Answer: b) 11**

---

**107. In hexadecimal, the letter C represents decimal:**

- a. 10
- b. 11
- c. 12
- d. 13

**Answer: c) 12**

---

**108. In hexadecimal, the letter D represents decimal:**

- a. 11
- b. 12
- c. 13
- d. 14

**Answer: c) 13**

---

**109. In hexadecimal, the letter E represents decimal:**

- a. 12
- b. 13
- c. 14
- d. 15

**Answer: c) 14**

---

**110. What is the binary equivalent of hexadecimal A?**

- a. 1001
- b. 1010
- c. 1011
- d. 1100

**Answer: b) 1010**

---

**111. What is the binary equivalent of hexadecimal F?**

- a. 1110
- b. 1111
- c. 1100
- d. 1101

**Answer: b) 1111**

---

**112. What is the hexadecimal equivalent of binary 1100?**

- a. A
- b. B
- c. C
- d. D

**Answer: c) C**

---

**113. What is the hexadecimal equivalent of binary 1111?**

- a. E
- b. F
- c. D
- d. 15

**Answer: b) F**

---

**114. What is  $16^0$  equal to?**

- a. 0
- b. 1
- c. 16
- d. 10

**Answer: b) 1**

---

**115. What is  $16^1$  equal to?**

- a. 1

- b. 10
- c. 16
- d. 32

**Answer: c) 16**

---

**116. What is  $16^2$  equal to?**

- a. 32
- b. 128
- c. 256
- d. 512

**Answer: c) 256**

---

**117. What is  $16^3$  equal to?**

- a. 1024
- b. 2048
- c. 4096
- d. 8192

**Answer: c) 4096**

---

**118. What is the decimal value of hexadecimal 1A?**

- a. 25
- b. 26
- c. 27
- d. 28

**Answer: b) 26**

---

**119. What is the decimal value of hexadecimal 10?**

- a. 10
- b. 16
- c. 20
- d. 100

**Answer: b) 16**

---

**120. What is the decimal value of hexadecimal FF?**

- a. 254
- b. 255

- c. 256
- d. 16

**Answer: b) 255**

---

**121. To convert decimal to hexadecimal, repeatedly divide by:**

- a. 2
- b. 8
- c. 10
- d. 16

**Answer: d) 16**

---

**122. What is the hexadecimal representation of decimal 255?**

- a. FE
- b. FF
- c. 100
- d. EF

**Answer: b) FF**

---

**123. What is the hexadecimal representation of decimal 16?**

- a. 0F
- b. 10
- c. 11
- d. 1F

**Answer: b) 10**

---

**124. What is the sum of hexadecimal  $6A2 + 49A$ ?**

- a. A3C
- b. B3C
- c. C3C
- d. D3C

**Answer: b) B3C**

---

**125. What is the binary equivalent of hexadecimal 5?**

- a. 0100
- b. 0101
- c. 0110

d. 0111

**Answer: b) 0101**

---

**126. What is the hexadecimal representation of binary 0001 0110 1010 0111?**

- a. 16A7
- b. 17A6
- c. 15A8
- d. 18A5

**Answer: a) 16A7**

---

**127. Hexadecimal is useful because:**

- a. It's the only number system computers understand
- b. Large binary numbers are cumbersome to read
- c. It's faster than binary
- d. It uses fewer digits than decimal

**Answer: b) Large binary numbers are cumbersome to read**

---

**128. How many hexadecimal digits are needed to represent one byte?**

- a. 1
- b. 2
- c. 4
- d. 8

**Answer: b) 2**

---

**129. The hexadecimal digits include:**

- a. 0-9 only
- b. A-F only
- c. 0-9 and A-F
- d. 0-15

**Answer: c) 0-9 and A-F**

---

**130. What is the decimal value of hexadecimal 3BA4?**

- a. 15,268
- b. 15,286
- c. 14,268
- d. 16,268

**Answer: a) 15,268**

---

## SECTION 6: SIGNED BINARY INTEGERS (Questions 131-160)

**131. In signed binary representation, the MSB indicates:**

- a. The magnitude
- b. The sign
- c. The parity
- d. The checksum

**Answer: b) The sign**

---

**132. In signed binary, if the MSB is 0, the number is:**

- a. Negative
- b. Positive
- c. Zero
- d. Undefined

**Answer: b) Positive**

---

**133. In signed binary, if the MSB is 1, the number is:**

- a. Positive
- b. Negative
- c. Zero
- d. Undefined

**Answer: b) Negative**

---

**134. Negative integers use which representation?**

- a. One's complement
- b. Two's complement
- c. Sign-magnitude
- d. Excess notation

**Answer: b) Two's complement**

---

**135. The two's complement of an integer is its:**

- a. Inverse

- b. Additive inverse
- c. Multiplicative inverse
- d. Square root

**Answer: b) Additive inverse**

---

**136. When you add a number to its two's complement, the result is:**

- a. The original number
- b. One
- c. Zero
- d. Two

**Answer: c) Zero**

---

**137. To create two's complement, you:**

- a. Add 1
- b. Subtract 1
- c. Invert bits and add 1
- d. Invert bits and subtract 1

**Answer: c) Invert bits and add 1**

---

**138. What is the two's complement of binary 00000001?**

- a. 11111110
- b. 11111111
- c. 10000001
- d. 00000001

**Answer: b) 11111111**

---

**139. Two's complement representation eliminates the need for:**

- a. Addition circuits
- b. Multiplication circuits
- c. Separate subtraction circuits
- d. Division circuits

**Answer: c) Separate subtraction circuits**

---

**140. The expression A - B can be converted to:**

- a.  $A \times B$
- b.  $A + (-B)$

- c. A / B
- d. A - (-B)

**Answer: b) A + (-B)**

---

**141. What is the decimal value of signed binary 11111111 (8-bit)?**

- a. 255
- b. -1
- c. -255
- d. 1

**Answer: b) -1**

---

**142. What is the decimal value of signed binary 10000000 (8-bit)?**

- a. 128
- b. -128
- c. 127
- d. -127

**Answer: b) -128**

---

**143. What is the range of a signed byte?**

- a. 0 to 255
- b. -128 to 127
- c. -127 to 128
- d. -256 to 255

**Answer: b) -128 to 127**

---

**144. For signed binary, the range is from:**

- a.  $-2^n$  to  $2^n - 1$
- b.  $-2^{n-1}$  to  $2^{n-1} - 1$
- c. 0 to  $2^n - 1$
- d.  $-2^{n-1}$  to  $2^{n-1}$

**Answer: b)  $-2^{n-1}$  to  $2^{n-1} - 1$**

---

**145. The range of a signed word is:**

- a. -32768 to 32767
- b. -32767 to 32768
- c. 0 to 65535

- d. -65536 to 65535

**Answer: a) -32768 to 32767**

---

**146. To convert signed decimal -43 to binary, first:**

- a. Convert 43 to binary, then create two's complement
- b. Convert -43 directly
- c. Add 128 to -43
- d. Subtract 43 from 256

**Answer: a) Convert 43 to binary, then create two's complement**

---

**147. The binary representation of -43 (8-bit) is:**

- a. 00101011
- b. 11010100
- c. 11010101
- d. 10101011

**Answer: c) 11010101**

---

**148. To determine if a hexadecimal integer is negative, check if the MSB digit is:**

- a.  $\leq 7$
- b.  $\geq 8$
- c. = 0
- d. = F

**Answer: b)  $\geq 8$**

---

**149. Hexadecimal 8A20 is:**

- a. Positive
- b. Negative
- c. Zero
- d. Undefined

**Answer: b) Negative**

---

**150. Hexadecimal 7FD9 is:**

- a. Positive
- b. Negative
- c. Zero
- d. Undefined

**Answer: a) Positive**

---

**151. The two's complement operation is:**

- a. One-way only
- b. Reversible
- c. Destructive
- d. Undefined for negative numbers

**Answer: b) Reversible**

---

**152. What is the two's complement of hexadecimal 6A3D?**

- a. 95C2
- b. 95C3
- c. 95C4
- d. 95C1

**Answer: b) 95C3**

---

**153. In creating hexadecimal two's complement, each digit is subtracted from:**

- a. 10
- b. 15
- c. 16
- d. F

**Answer: b) 15**

---

**154. If the highest bit of a signed binary number is 1:**

- a. Convert directly to decimal
- b. Create two's complement first, then convert to decimal
- c. The number is positive
- d. Ignore the sign bit

**Answer: b) Create two's complement first, then convert to decimal**

---

**155. What is the decimal value of signed binary 11110000 (8-bit)?**

- a. 240
- b. -16
- c. -240
- d. 16

**Answer: b) -16**

---

**156. For an n-bit signed integer, only \_\_\_ bits represent the magnitude:**

- a. n
- b. n - 1
- c. n + 1
- d. n / 2

**Answer: b) n - 1**

---

**157. The maximum positive value for a signed byte is:**

- a. 128
- b. 127
- c. 255
- d. 256

**Answer: b) 127**

---

**158. The minimum value for a signed byte is:**

- a. -127
- b. -128
- c. -255
- d. -256

**Answer: b) -128**

---

**159. What is the 8-bit two's complement representation of -1?**

- a. 00000001
- b. 11111110
- c. 11111111
- d. 10000001

**Answer: c) 11111111**

---

**160. Binary subtraction using two's complement converts A - B to:**

- a. A × (-B)
- b. A ÷ B
- c. A + two's complement of B
- d. B + two's complement of A

**Answer: c) A + two's complement of B**

---

## SECTION 7: CHARACTER STORAGE (Questions 161-180)

**161. ASCII stands for:**

- a. American Standard Code for Information Interface
- b. American Standard Code for Information Interchange
- c. Assembly Standard Code for Information Interchange
- d. American System Code for Information Interchange

**Answer: b) American Standard Code for Information Interchange**

---

**162. ASCII uses how many bits?**

- a. 6
- b. 7
- c. 8
- d. 16

**Answer: b) 7**

---

**163. The ASCII character set maps characters to:**

- a. Floating-point numbers
- b. Integers
- c. Strings
- d. Boolean values

**Answer: b) Integers**

---

**164. In ASCII, values 128 through 255 are used for:**

- a. Control characters
- b. Graphic symbols and Greek characters (on IBM-compatible)
- c. Numbers only
- d. Lowercase letters only

**Answer: b) Graphic symbols and Greek characters (on IBM-compatible)**

---

**165. ANSI stands for:**

- a. American National Standards Interface
- b. American National Standards Institute
- c. Assembly National Standard Information
- d. American Native System Interface

**Answer: b) American National Standards Institute**

---

**166. The ANSI character set defines how many characters?**

- a. 128
- b. 256
- c. 512
- d. 65536

**Answer: b) 256**

---

**167. Unicode was created to:**

- a. Replace binary numbers
- b. Define characters and symbols for all major languages
- c. Speed up computers
- d. Replace hexadecimal

**Answer: b) Define characters and symbols for all major languages**

---

**168. UTF-8 has the same byte values as:**

- a. Unicode
- b. ANSI
- c. ASCII
- d. EBCDIC

**Answer: c) ASCII**

---

**169. UTF-16 encodes each character in:**

- a. 8 bits
- b. 16 bits
- c. 32 bits
- d. 64 bits

**Answer: b) 16 bits**

---

**170. UTF-32 encodes each character in:**

- a. 8 bits
- b. 16 bits
- c. 32 bits
- d. 64 bits

**Answer: c) 32 bits**

---

**171. A null-terminated string ends with:**

- a. A newline character
- b. A single byte containing zero
- c. A space character
- d. The letter 'Z'

**Answer: b) A single byte containing zero**

---

**172. Which languages use null-terminated strings?**

- a. Java and Python
- b. C and C++
- c. FORTRAN and COBOL
- d. JavaScript and Ruby

**Answer: b) C and C++**

---

**173. The ASCII code for the letter 'A' (uppercase) is:**

- a. 40h
- b. 41h
- c. 61h
- d. 65h

**Answer: b) 41h**

---

**174. The ASCII code for the letter 'a' (lowercase) is:**

- a. 41h
- b. 61h
- c. 97h
- d. Both b and c

**Answer: d) Both b and c (61h = 97 decimal)**

---

**175. ASCII control characters have codes in the range:**

- a. 0 through 31
- b. 32 through 127
- c. 128 through 255
- d. 65 through 90

**Answer: a) 0 through 31**

---

**176. ASCII code 8 represents:**

- a. Tab
- b. Backspace
- c. Line feed
- d. Carriage return

**Answer: b) Backspace**

---

**177. ASCII code 10 represents:**

- a. Tab
- b. Backspace
- c. Line feed
- d. Carriage return

**Answer: c) Line feed**

---

**178. ASCII code 13 represents:**

- a. Tab
- b. Backspace
- c. Line feed
- d. Carriage return

**Answer: d) Carriage return**

---

**179. ASCII code 9 represents:**

- a. Horizontal tab
- b. Vertical tab
- c. Backspace
- d. Escape

**Answer: a) Horizontal tab**

---

**180. Recent versions of Microsoft Windows use which encoding?**

- a. ASCII
- b. UTF-8
- c. UTF-16
- d. UTF-32

**Answer: c) UTF-16**

---

## SECTION 8: BOOLEAN EXPRESSIONS (Questions 181-210)

**181. Boolean algebra was invented by:**

- a. Charles Babbage
- b. George Boole
- c. Ada Lovelace
- d. Alan Turing

**Answer: b) George Boole**

---

**182. A boolean expression implies a value of:**

- a. 0 or 1
- b. True or false
- c. Yes or no
- d. All of the above

**Answer: b) True or false**

---

**183. The NOT operator is:**

- a. Binary
- b. Unary
- c. Ternary
- d. Quaternary

**Answer: b) Unary**

---

**184. The AND and OR operators are:**

- a. Unary
- b. Binary
- c. Ternary
- d. Quaternary

**Answer: b) Binary**

---

**185. The NOT operation reverses:**

- a. Only true to false
- b. Only false to true
- c. A boolean value
- d. Nothing

**Answer: c) A boolean value**

---

**186. What is NOT TRUE?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: b) FALSE**

---

**187. What is NOT FALSE?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: a) TRUE**

---

**188. For AND operation, the output is true only when:**

- a. At least one input is true
- b. Both inputs are true
- c. Both inputs are false
- d. At least one input is false

**Answer: b) Both inputs are true**

---

**189. What is TRUE AND TRUE?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: a) TRUE**

---

**190. What is TRUE AND FALSE?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: b) FALSE**

---

**191. What is FALSE AND FALSE?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: b) FALSE**

---

**192. For OR operation, the output is false only when:**

- a. At least one input is true
- b. Both inputs are true
- c. Both inputs are false
- d. At least one input is false

**Answer: c) Both inputs are false**

---

**193. What is TRUE OR FALSE?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: a) TRUE**

---

**194. What is FALSE OR FALSE?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: b) FALSE**

---

**195. What is FALSE OR TRUE?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: a) TRUE**

---

**196. In operator precedence, which has the highest priority?**

- a. AND
- b. OR
- c. NOT
- d. XOR

**Answer: c) NOT**

---

**197. The correct order of precedence (highest to lowest) is:**

- a. AND, OR, NOT
- b. OR, AND, NOT
- c. NOT, AND, OR
- d. NOT, OR, AND

**Answer: c) NOT, AND, OR**

---

**198. For the expression  $\neg X \vee Y$ , which operation is performed first?**

- a. OR
- b. AND
- c. NOT
- d. XOR

**Answer: c) NOT**

---

**199. What is the result of 11111111 AND 00011100?**

- a. 11111111
- b. 00011100
- c. 00000000
- d. 11100011

**Answer: b) 00011100**

---

**200. What is the result of 11101100 OR 00011100?**

- a. 11111111
- b. 11111100
- c. 00011100
- d. 11101100

**Answer: b) 11111100**

---

**201. A truth table shows:**

- a. Only inputs
- b. Only outputs
- c. All possible inputs and outputs
- d. Errors in logic

**Answer: c) All possible inputs and outputs**

---

**202. A boolean function with 2 inputs has how many rows in its truth table?**

- a. 2
- b. 4
- c. 8
- d. 16

**Answer: b) 4**

---

**203. A boolean function with 3 inputs has how many rows in its truth table?**

- a. 4
- b. 6
- c. 8
- d. 16

**Answer: c) 8**

---

**204. A boolean function with 4 inputs has how many rows in its truth table?**

- a. 8
- b. 12
- c. 16
- d. 32

**Answer: c) 16**

---

**205. A multiplexer uses:**

- a. A selector bit to select one of two outputs
- b. Addition to combine inputs
- c. Subtraction to separate inputs
- d. Multiplication to scale inputs

**Answer: a) A selector bit to select one of two outputs**

---

**206. What is the value of  $(T \wedge F) \vee T$ ?**

- a. TRUE

- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: a) TRUE**

---

**207. What is the value of  $\neg(F \vee T)$ ?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: b) FALSE**

---

**208. What is the value of  $\neg F \vee \neg T$ ?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: a) TRUE**

---

**209. Boolean algebra is used in:**

- a. Describing digital circuit design
- b. Computer program logical operations
- c. Both a and b
- d. Neither a nor b

**Answer: c) Both a and b**

---

**210. The notation  $\wedge$  represents:**

- a. OR operation
- b. AND operation
- c. NOT operation
- d. XOR operation

**Answer: b) AND operation**

---

## **SECTION 9: DATA REPRESENTATION TERMINOLOGY (Questions 211-225)**

**211. A binary integer is:**

- a. An integer stored as ASCII text
- b. An integer stored in memory in raw format
- c. A floating-point number
- d. A string of digits

**Answer: b) An integer stored in memory in raw format**

---

**212. Binary integers are stored in multiples of:**

- a. 4 bits
- b. 8 bits
- c. 10 bits
- d. 16 bits

**Answer: b) 8 bits**

---

**213. A digit string is:**

- a. A binary number
- b. A string of ASCII characters
- c. A floating-point number
- d. A boolean value

**Answer: b) A string of ASCII characters**

---

**214. The digit string "65" represents:**

- a. Binary 65
- b. The ASCII characters '6' and '5'
- c. Hexadecimal 65
- d. Octal 65

**Answer: b) The ASCII characters '6' and '5'**

---

**215. The decimal digit string for 65 is:**

- a. "41"
- b. "65"
- c. "101"
- d. "01000001"

**Answer: b) "65"**

---

**216. The hexadecimal digit string for decimal 65 is:**

- a. "41"
- b. "65"
- c. "101"
- d. "1000001"

**Answer: a) "41"**

---

**217. The binary digit string for decimal 65 is:**

- a. "41"
- b. "65"
- c. "01000001"
- d. "101"

**Answer: c) "01000001"**

---

**218. The octal digit string for decimal 65 is:**

- a. "41"
- b. "65"
- c. "101"
- d. "1000001"

**Answer: c) "101"**

---

**219. Octal numbers are base:**

- a. 2
- b. 8
- c. 10
- d. 16

**Answer: b) 8**

---

**220. Octal uses digits:**

- a. 0-1
- b. 0-7
- c. 0-9
- d. 0-F

**Answer: b) 0-7**

---

**221. When decimal 65 is stored in memory, it is stored as:**

- a. Two ASCII characters '6' and '5'

- b. Binary 01000001
- c. The literal text "65"
- d. Hexadecimal 65

**Answer: b) Binary 01000001**

---

**222. A debugging program would display byte 01000001 as:**

- a. "A"
- b. "65"
- c. "41"
- d. "01000001"

**Answer: c) "41"**

---

**223. If byte 01000001 is copied to video memory, it displays:**

- a. The number 65
- b. The letter "A"
- c. The hex value 41
- d. Binary 01000001

**Answer: b) The letter "A"**

---

**224. A number's interpretation depends on:**

- a. Its size
- b. The context in which it appears
- c. The processor type
- d. The operating system

**Answer: b) The context in which it appears**

---

**225. 01000001 is the ASCII code for:**

- a. The number 1
- b. The letter A
- c. The number 65
- d. The number 41

**Answer: b) The letter A**

---

## **SECTION 10: BINARY SUBTRACTION (Questions 226-235)**

**226. The simpler way to do binary subtraction is to:**

- a. Directly subtract bit by bit
- b. Reverse the sign of subtrahend and add
- c. Convert to decimal first
- d. Use hexadecimal

**Answer: b) Reverse the sign of subtrahend and add**

---

**227. Binary 01101 minus 00111 equals:**

- a. 00101
- b. 00110
- c. 00111
- d. 01000

**Answer: b) 00110**

---

**228. When subtracting in binary and 0 - 1 occurs, you must:**

- a. Stop the operation
- b. Borrow from the next position
- c. The result is 0
- d. The result is 1

**Answer: b) Borrow from the next position**

---

**229. Binary 13 - 7 using subtraction equals:**

- a. 5
- b. 6
- c. 7
- d. 8

**Answer: b) 6**

---

**230. To subtract using two's complement, you need:**

- a. No extra bits
- b. An extra bit for the sign
- c. Two extra bits
- d. Half the bits

**Answer: b) An extra bit for the sign**

---

**231. When using two's complement subtraction, you ignore:**

- a. The LSB
- b. The MSB
- c. The carry out of the highest bit
- d. All zeros

**Answer: c) The carry out of the highest bit**

---

**232. Binary 00001101 - 00000111 equals:**

- a. 00000101
- b. 00000110
- c. 00000111
- d. 00001000

**Answer: b) 00000110**

---

**233. In binary subtraction, borrowing changes 10 (binary) to:**

- a. 1
- b. 2
- c. 0
- d. 11

**Answer: b) 2 (decimal, which becomes 10 binary)**

---

**234. The advantage of two's complement subtraction is:**

- a. It's faster
- b. It uses the same circuitry as addition
- c. It uses less memory
- d. It's more accurate

**Answer: b) It uses the same circuitry as addition**

---

**235. When performing A - B using two's complement:**

- a. Calculate A + (-B)
- b. Calculate -A + B
- c. Calculate A × B
- d. Calculate A ÷ B

**Answer: a) Calculate A + (-B)**

---

## SECTION 11: ADDITIONAL PRACTICE QUESTIONS

### (Questions 236-260)

236. What is  $2^5$  equal to?

- a. 16
- b. 25
- c. 32
- d. 64

Answer: c) 32

---

237. What is  $2^6$  equal to?

- a. 32
- b. 64
- c. 128
- d. 256

Answer: b) 64

---

238. What is  $2^7$  equal to?

- a. 64
- b. 128
- c. 256
- d. 512

Answer: b) 128

---

239. What is the hexadecimal representation of decimal 100?

- a. 60
- b. 64
- c. 6A
- d. 100

Answer: b) 64

---

240. What is the decimal representation of hexadecimal 64?

- a. 64
- b. 100
- c. 96
- d. 104

**Answer: b) 100**

---

**241. What is the binary representation of hexadecimal 3?**

- a. 0010
- b. 0011
- c. 0100
- d. 0001

**Answer: b) 0011**

---

**242. What is the binary representation of hexadecimal 7?**

- a. 0101
- b. 0110
- c. 0111
- d. 1000

**Answer: c) 0111**

---

**243. What is the binary representation of hexadecimal 9?**

- a. 1000
- b. 1001
- c. 1010
- d. 1011

**Answer: b) 1001**

---

**244. A nibble consists of:**

- a. 2 bits
- b. 4 bits
- c. 8 bits
- d. 16 bits

**Answer: b) 4 bits**

---

**245. How many nibbles are in a byte?**

- a. 1
- b. 2
- c. 4
- d. 8

**Answer: b) 2**

---

**246. The formula  $\text{dec} = (D_1 \times B^1) + (D_0 \times B^0)$  is used to convert:**

- a. Binary to hexadecimal
- b. Any base to decimal
- c. Decimal to binary
- d. Hexadecimal to binary

**Answer: b) Any base to decimal**

---

**247. What is the decimal value of binary 11001010?**

- a. 200
- b. 202
- c. 204
- d. 206

**Answer: b) 202**

---

**248. What is the decimal value of binary 11110000?**

- a. 240
- b. 241
- c. 242
- d. 243

**Answer: a) 240**

---

**249. What is the hexadecimal representation of binary 11001010?**

- a. C8
- b. CA
- c. CC
- d. CE

**Answer: b) CA**

---

**250. What is the hexadecimal representation of binary 11110000?**

- a. EF
- b. F0
- c. FF
- d. FE

**Answer: b) F0**

---

**251. One zettabyte equals 2 to the power of:**

- a. 60
- b. 70
- c. 80
- d. 90

**Answer: b) 70**

---

**252. One yottabyte equals 2 to the power of:**

- a. 70
- b. 80
- c. 90
- d. 100

**Answer: b) 80**

---

**253. The ASCII code for space character is:**

- a. 00h
- b. 20h
- c. 30h
- d. 40h

**Answer: b) 20h**

---

**254. The ASCII code for digit '0' is:**

- a. 00h
- b. 20h
- c. 30h
- d. 40h

**Answer: c) 30h**

---

**255. The ASCII code for digit '9' is:**

- a. 09h
- b. 39h
- c. 49h
- d. 59h

**Answer: b) 39h**

---

**256. The difference between ASCII codes for 'A' and 'a' is:**

- a. 10h
- b. 20h
- c. 30h
- d. 40h

**Answer: b) 20h**

---

**257. What is TRUE XOR FALSE?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: a) TRUE**

---

**258. What is TRUE XOR TRUE?**

- a. TRUE
- b. FALSE
- c. UNDEFINED
- d. NULL

**Answer: b) FALSE**

---

**259. XOR outputs TRUE when:**

- a. Both inputs are TRUE
- b. Both inputs are FALSE
- c. Inputs are different
- d. Inputs are the same

**Answer: c) Inputs are different**

---

**260. The notation  $\vee$  represents:**

- a. AND operation
- b. OR operation
- c. NOT operation
- d. XOR operation

**Answer: b) OR operation**

---

## SUMMARY

This question bank contains **260 multiple choice questions** covering all major topics from Chapter 1:

1. **Introduction to Assembly Language** (Questions 1-25)
2. **Virtual Machine Concept** (Questions 26-45)
3. **Binary Integers** (Questions 46-80)
4. **Integer Storage Sizes** (Questions 81-100)
5. **Hexadecimal Integers** (Questions 101-130)
6. **Signed Binary Integers** (Questions 131-160)
7. **Character Storage** (Questions 161-180)
8. **Boolean Expressions** (Questions 181-210)
9. **Data Representation Terminology** (Questions 211-225)
10. **Binary Subtraction** (Questions 226-235)
11. **Additional Practice** (Questions 236-260)

**Key Topics to Focus On:**

- Number system conversions (binary, decimal, hexadecimal)
- Two's complement representation
- Storage sizes (byte, word, doubleword, quadword)
- ASCII character codes
- Boolean operations (AND, OR, NOT)
- Virtual machine concept levels
- Powers of 2 (memorize  $2^0$  through  $2^{10}$  at minimum)
- Hexadecimal arithmetic

**Good luck with your CBT exam!**