

CPE 301 - Assembly Language Programming

Chapter 1: Basic Concepts - MCQ Question Bank

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 + 0000010?

- 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. ≤ 7
- b. ≥ 8
- c. = 0
- d. = F

Answer: b) ≥ 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. $A \times (-B)$
- b. $A \div B$
- 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 $A \times B$
- d. Calculate $A \div B$

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 $dec = (D_1 \times B^1) + (D_0 \times B^0)$ 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!