

Unit 03 – Data Representation

MCQ Questions

1. The binary number equivalent to the 27_{10} is,
(1) 000111 (2) 111000 (3) 011011 (4) 101011 (5) 111010 (2011)
2. $C1A_{16} + 4A2_{16} =$
(1) 523_{16} (2) FBC_{16} (3) FBB_{16} (4) $0BC_{16}$ (5) $10BC_{16}$ (2011)
3. The binary number equivalent to 37_{10} is,
(1) 0100101. (2) 0100111. (3) 0100100. (4) 0110110. (5) 0110111. (2012)
4. $144_8 + 175_8 =$
(1) 225_8 (2) 341_8 (3) 441_8 (4) 531_8 (5) 314_8 (2012)
5. The binary number equivalent to the 25_{10} is,
(1) 0100101. (2) 0100111. (3) 0011001. (4) 0010110. (5) 0010111. (2013)
6. $124_8 + 165_8 =$
(1) 201_8 (2) 289_{10} (3) 289_8 (4) 311_8 (5) 389_8 (2013)
7. What is the two's complement of -6_{10} ?
(1) 11111010 (2) 00000110 (3) 11111001 (4) 01011111 (5) 00000101 (2013)
8. The decimal number equivalent to the 100111_2 is,
(1) 40 (2) 39 (3) 38 (4) 37 (5) 36 (2014)
9. $4A6_{16} + 99_{10} =$
(1) 615_{16} (2) 615_{10} (3) 509_{10} (4) 509_{16} (5) 659_{16} (2014)
10. Representation of 5_{10} and -9_{10} in 8-bit Two's complement forms are,
(1) 00000101 and 11110111 respectively.
(2) 11111011 and 11110111 respectively.
(3) 00000101 and 10001001 respectively.
(4) 00000101 and 11110110 respectively.
(5) 11111011 and 11110110 respectively. (2014)

11. The decimal number equivalent to 110110_2 is
 (1) 39 (2) 48 (3) 54 (4) 55 (5) 108 (2015)
12. $48B_{16} + 00101011_2 =$
 (1) $4B6_{16}$ (2) 310_{16} (3) 503_{16} (4) 513_{16} (5) 559_{16} (2015)
13. What is the two's complement representation of 6_{10} ?
 (1) 11111010 (2) 00000110 (3) 11111001 (4) 01011111 (5) 00000101 (2015)
14. Which of the following binary numbers is equivalent to 109_{10} ?
 (1) 1100100_2 (2) 1101101_2 (3) 1001101_2 (4) 1101001_2 (5) 1101100_2 (2016)
15. $101_{16} + 110_8 =$
 (1) 429_{10} (2) 1011_{10} (3) 329_{10} (4) 529_{10} (5) 137_{10} (2016)
16. What is the two's complement representation of 89_{10} ?
 (1) 01111011 (2) 01011001 (3) 10100111 (4) 01001001 (5) 01011101 (2016)
17. What is the two's complement representation of 45, if an integer is represented by 8 bits?
 (1) 11010011 (2) 10110011 (3) 11001101 (4) 00101111 (5) 00101101 (2017)
18. Which of the following numbers is equivalent to the binary number 101111_2 ?
 (1) 57_8 (2) 57_{16} (3) 57_{10} (4) 59_{16} (5) $5F_{16}$ (2017)
19. $5D_{16} + 10111_2 =$
 (1) 73_8 (2) 75_{16} (3) 116_8 (4) 163_8 (5) 164_8 (2017)
20. What is the binary representation of 9.25_{10} ?
 (1) 1110011101 (2) 00001001.01 (3) 0000100101 (4) 1000100101 (5) 10001001.01 (2017)
21. Consider the following three numbers in decimal, octal and hexadecimal notations, respectively.
 $A - 231_{10}$ $B - 347_8$ $C - E7_{16}$
 Which of the above is / are equivalent to 11100111_2 in binary notation?
 (1) A Only (2) B Only (3) A and C Only (4) B and C Only (5) All A, B, and C (2018)

22. What is the decimal equivalent to binary 110101.11_2 ?
 (1) 53.00_{10} (2) 53.50_{10} (3) 53.75_{10} (4) 54.25_{10} (5) 54.75_{10} (2018)
23. Which of the following represents the bitwise AND operation of the two binary numbers 01010101 and 10101010?
 (1) 00000000 (2) 00001111 (3) 11001100 (4) 11110000 (5) 11111111 (2019)
24. Which of the following represents the result of the binary arithmetic operation of $11001100 - 01010101$?
 (1) 00110011 (2) 01100110 (3) 01110111 (4) 10011001 (5) 10101010 (2019)
25. Which of the following statements is / are correct about two's complement?
 A - Subtraction is carried out as an addition.
 B - Calculations are more efficient.
 C - It is possible to represent negative numbers within the two's complement.
 (1) A Only (2) B Only (3) A only B Only (4) B and C Only (5) All A, B and C (2019)
26. What is the binary equivalent to decimal 54.25?
 (1) 0001111.11 (2) 00101010.01 (3) 00110110.01 (4) 00111011.1 (5) 00111110.1 (2019)
27. Consider the two binary numbers $P = 10110001$ and $Q = 0100110$. If $X = P \text{ OR } Q$ and $Y = P \text{ AND } Q$, what will be the values of X and Y respectively?
 (1) 01001110, 10110001 (2) 10110001, 00000000 (3) 10110001, 11111111
 (4) 11111111, 00000000 (5) 11111111, 10110001 (2020)
28. What is the 2's complement of decimal -12 ?
 (1) 00001100 (2) 00110011 (3) 11110011 (4) 11110100 (5) 11111011 (2020)
29. Which of the following is true about 2's complement?
 (1) An extra bit is used to represent the sign.
 (2) Makes it possible to build low-cost, high-speed hardware to perform arithmetic operations.
 (3) Addition and subtraction are used as two different operations.
 (4) Usually represented in hexadecimal number system.
 (5) Used in first generation computer to perform logic operations. (2020)

30. Consider the character representations in Table 1 and Table 2 given below.

Table 1:

අ	ආ	ඇ	ඈ
OD85	OD86	OD87	OD88

Table 2:

ඈ	ඉ	ඊ	උ
OB85	OB86	OB87	OB88

In which of the character encoding systems given below, the above characters in Table 1 and Table 2 are represented?

- (1) Both Tables 1 and 2: in ASCII (2) Both Tables 1 and 2: in UNICODE
 (3) Table 1: in ASCII, Table 2: in UNICODE (4) Table 1: in EBCDIC, Table 2: in ASCII
 (5) Table 1: in UNICODE, Table 2: in ASCII (2020)

31. What is the correct result of bitwise XOR operation between the two binary numbers 01011100_2 and 11111001_2 ?

- (1) 00000010 (2) 01011000 (3) 01011010 (4) 10100101 (5) 11111101 (2021)

32. What is the correct 2's complement binary representation of decimal -32_{10} using 8 - bits?

- (1) 00100000 (2) 10100000 (3) 11011111 (4) 11100000 (5) 11100001 (2021)

33. What is the correct decimal equivalent of hexadecimal 88.8_{16} ?

- (1) 88.5_{10} (2) 88.8_{10} (3) 129.5_{10} (4) 136.5_{10} (5) 136.8_{10} (2021)

34. A particular command can be used to output the values of every byte in a file in decimal format. Assume a file contains the following text:

Love trees!

Referring to the two Notes (i) and (ii) given below, select the correct output that will result when the said command is run on that file.

- (1) 76 111 118 101 32 116 114 101 101 115 10 (2) 76 111 118 101 116 114 101 101 115 33 10
 (3) 76 111 118 101 32 116 114 101 101 115 33 10 (4) 108 111 118 101 116 114 101 101 115 33 10
 (5) 108 111 118 101 32 116 114 101 101 115 33 10

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Notes:

(i) Some selected rows from the ASCII table are given below:

Decimal	Character	Decimal	Character
10	(LINE FEED)	108	l
32	(SPACE)	111	o
33	!	114	r
76	L	115	s
101	e	116	t
		118	v

(ii) The file ends with a LINEFEED character.

(2021)

35. Which of the following gives the correct results of bitwise AND and bitwise OR operations between the two binary numbers 01010100_2 and 11101001_2 respectively?

- (1) $01000000_2, 11111101_2$ (2) $00000010_2, 10111001_2$ (3) $10111101_2, 11001010_2$
(4) $11000000_2, 00101100_2$ (5) $11111101_2, 01010011_2$

(2022)

36. What is the correct binary equivalent of decimal 12.75_{10} ?

- (1) 1011.01_2 (2) 1011.11_2 (3) 1100.00_2 (4) 1100.11_2 (5) 1100.01_2

(2022)

37. What is the correct 2's complement binary representation of decimal -41_{10} using 8-bits?

- (1) 00101001 (2) 01010110 (3) 10101001 (4) 11010110 (5) 11010111

(2022)

38. The address of an instruction was shown as 10f9 in hexadecimal. What is that address in decimal?

- (1) 25 (2) 1249 (3) 4345 (4) 10159 (5) 16249

(2022)

39. A particular command can be used to output a text file in its binary format. Assume a file contains the following text:

0 Waste!

Referring to the Important notes (i) and (ii) given below, select the correct output that will result when the said command is run on that file.

- (1) 00110000 00100000 01010111 01100001 01110011 01110100 01100101 00001010
- (2) 00110000 01010111 01100001 01110011 01110100 01100101 00100001 00001010
- (3) 00110000 00100000 01010111 01100001 01110011 01110100 01100101 00100001 00001010
- (4) 00110000 00100000 01110111 01100001 01110011 01110100 01100101 00100001 00001010
- (5) 00110000 00100000 01010111 01100001 01110011 01110100 01100101 01100000 00001010

(2022)

Important notes:

- (i) The file ends with a LINE FEED character.
- (ii) Some selected rows from the 7-bit ASCII table are given below:

Character	Binary
(LINE FEED)	0001010
(SPACE)	0100000
!	0100001
0	0110000
W	1010111

Character	Binary
a	1100001
e	1100101
s	1110011
t	1110100
w	1110111

40. What is the correct binary equivalent of decimal 13.125_{10} ?

- (1) 1100.001
- (2) 1100.100
- (3) 1101.001
- (4) 1101.100
- (5) 1101.101

(2023)

41. Which of the following are equivalent to octal 674_8 ?

A – $110\ 111\ 100_2$

B – 444_{10}

C – $2BC_{16}$

- (1) A only
- (2) A and B only
- (3) A and C only
- (4) B and C only
- (5) All A, B and C

(2023)

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42. The address of an instruction was shown as 5A1 in hexadecimal. What is that address in decimal?
 (1) 41 (2) 1441 (3) 1457 (4) 2641 (5) 23056 (2023)
43. A document contains 2048 characters including spaces and line-breaks. How many bits are needed to encode this document in ASCII also using the parity bits?
 (1) 2048 (2) 2048×2 (3) 2048×7 (4) 2048×8 (5) $2048/8$ (2023)
44. What is the correct 2's complement binary representation of decimal -49_{10} using 8-bits?
 (1) 00110001 (2) 01100010 (3) 10011110 (4) 11001111 (5) 11100010 (2023)

Structured Essay Questions

- Show how the computation $5 + (-3)$ is done in 8-bit two's complement arithmetic. Explain how you deal with the carry generated from the most significant bit. (2011)
- Show how the computation $15 + (-5)$ is done in 8-bit two's complement arithmetic. Explain how you deal with the carry generated in the most significant bit. (2012)
- Convert 13_{10} and -19_{10} into two's complement numbers. Use 8-bits to represent a number.
 - Compute $13_{10} - 19_{10}$ by using two's complement numbers obtained in section (a) above and give the answer in two's complement form.
 - Explain how the positive and negative numbers in two's complement can be converted into decimal numbers. (2013)
- Show that 0001_2 is negative 1111_2 . Note that both these numbers are in two's complement form. (2014)
- Assume that in a particular digital device integer represented in 8-bits two's complement form. However, the result of computations is printed in decimal.
 - Give the representation of 10_{10} in the above device.
 - Give the representation of -25_{10} in the above device.
 - Explain how the computation of $10_{10} - 25_{10}$ is done by the device by using your representations given in sections (a) and (b) above.
 - List the steps necessary to transform the result obtained in section (c) above into decimal form in order to print the answer. (2015)

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6.

- (a) Write down the two's complement representation of 12_{10} using 8 bits.
 - (b) Write down the two's complement representation of -68_{10} using 8 bits.
 - (c) Compute $-68_{10} + 12_{10}$ using the above representations (a) and (b)
 - (d) State one advantage of using two's complement representation for data in internal operations of a computer.
- (2018)