

Section : 7

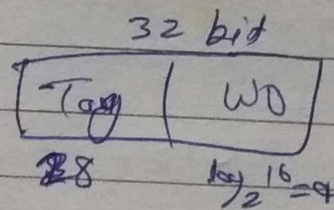
Q 8 A certain processor uses a fully associative cache of size 16 KB. The cache block size is 16 bytes. Assume that the main memory is byte addressable and uses 32-bit address. How many bits are required for the Tag & the Index fields respectively in the addresses generated by the processor.

Solⁿ

$$\text{No. of line (N)} = \frac{16K}{16} = \frac{2^{14}}{2^4} = 2^{10}$$

$$\text{No. of sets (S)} = \frac{N}{P\text{-way}}$$

$$= \frac{2^{10}}{2^{10}} = 1$$



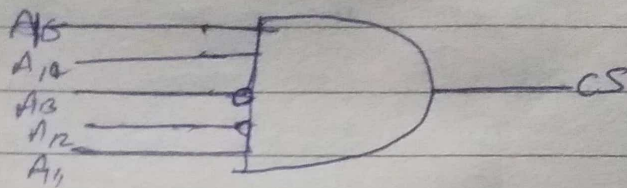
$$\text{Tag} = 28 \text{ bits}$$

$$\text{Index} = 0 \text{ bits}$$

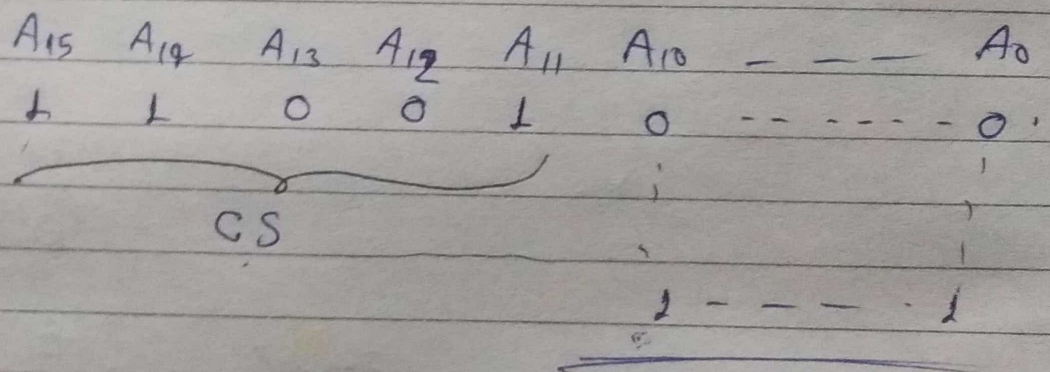
Ans

2

The cheap selected logic for a certain DRAM chip in a memory system design is shown below. Assume that the memory system has 16 address lines denoted by A_{15} to A_0 . What is the range of addresses of memory system that can get enabled by the chip select (CS) signal?



3



C800 to CFFF

Ans

3

Which of the following kinds of derivation is used by LR parsers?

1

Rightmost in reverse

4) In 16-bit 2's complement representation, the decimal number -28 is:-

$$\begin{array}{r} +28 = 0000\ 0000\ 0001\ 1100 \\ -28 = 1111\ 1111\ 1100\ 0100 \end{array}$$

5) $U = \{1, 2, \dots, n\}$

$$A = \{ (x, x) \mid x \in X, x \subseteq U \}$$

statement on (1)

I $|A| = n \times 2^{n-1}$

II $|A| = \sum_{k=1}^n k \binom{n}{k}$

True - ?

Both I & II correct

6) Not valid -

a) $(x \oplus y) \oplus z = x \oplus (y \oplus z)$

b) $(x+y) \oplus z = x \oplus (y+z)$

c) $x \oplus y = x+y$, if $xy=0$

d) $x \oplus y = (xy + x'y')$

$(x+y) \oplus z \neq x \oplus (y+z)$

7. L is regular language over $\Sigma = \{a, b\}$
 Following not regular?

b

a) $L \cdot L^R = \{xy \mid x \in L, y^R \in L\}$

b) $\{ww^R \mid w \in L\}$

c) $\text{Prefix}(L) = \{x \in \Sigma^* \mid \exists y \in \Sigma^* \text{ such that } xy \in L\}$

d) $\text{Suffix}(L) = \{y \in \Sigma^* \mid \exists x \in \Sigma^* \text{ such that } xy \in L\}$

$ww^R \mid w \in L \rightarrow$ not regular

8. $Z = X - Y$

$X, Y, Z \rightarrow$ signed magnitude

n bit representation

?
 minimum bit

Solⁿ

if

$X = 6$
 $Y = -5$

n bit

$Z = 11$

5 bit

So $(n+1)$ bits required minimum Ans

9. X be square matrix, statement on X

- I X is invertible
II Determinant of X is non-zero.

8. True -

- (a) I implies II, II not implies I
(b) II \implies I, I \implies II
(c) I not implies II, II not implies I.
(d) I \times II equivalent.

10. G be arbitrary group. following relation on G

$R_1: \forall a, b \in G, a R_1 b$ if and only if $\exists g \in G$ such that $a = g^{-1}bg$

(b) $R_2: \forall a, b \in G, a R_2 b$ if and only if $a = b^{-1}$.

Equivalence relations?

→ Only R_1 equivalence relation