Question 1 CORRECT

The expenditure on the project _____ as follows: equipment Rs.20 lakhs, salaries Rs.12 lakhs, and contingency Rs.3 lakhs.

A break down

B break

✓ breaks down

D breaks

GATE CS 2019

Question 2 CORRECT

The search engine's business model _____ around the fulcrum of trust.

- ✓ revolves
- B plays
- C sinks
- D bursts

GATE CS 2019

Question 3 CORRECT

A court is to a judge as _____ is to a teacher

A a student

B a punishment

C a syllabus

✓ a school

GATE CS 2019

Question 4 CORRECT

The police arrested four criminals – P, Q, R and S. The criminals knew each other. They made the following statements:

```
P says “Q committed the crime.”
Q says “S committed the crime.”
R says “ I did not do it.”
S says “What Q said about me is false”.
```

Assume only one of the arrested four committed the crime and only one of the statements made above is true. Who committed the crime?

A P

✓ R

C S

D Q

GATE CS 2019

Question 5 CORRECT

Two cars at the same time from the same location and go in the same direction. The speed of the first car is 50 km/h and the speed of the second car is 60 km/h. The number of hours it takes for the distance between the two cars to be 20 km is _____. **Note:** This was Numerical Type question.

A 1

✓ 2

C 3

D 6

GATE CS 2019

Question 6 CORRECT

Ten friends planned to share equally the cost of buying a gifts for their teacher. When two of them decided not to contribute, each of the other friends had to pay Rs. 150 more. The cost of the gift was Rs. _____ .

A 666

B 3000

✓ 6000

D 12000

GATE CS 2019

Question 7 CORRECT

"A recent High Court judgement has sought to dispel the idea of begging as a disease – which leads to its stigmatization and criminalization – and to regard it as a symptom. The underlying disease is the failure of the state to protect citizens who fall through the social security net." Which one of the following statements can be inferred from the given passage?

A Beggars are lazy people who beg because they are unwilling to work

✓ Beggars are created because of the lack of social welfare schemes

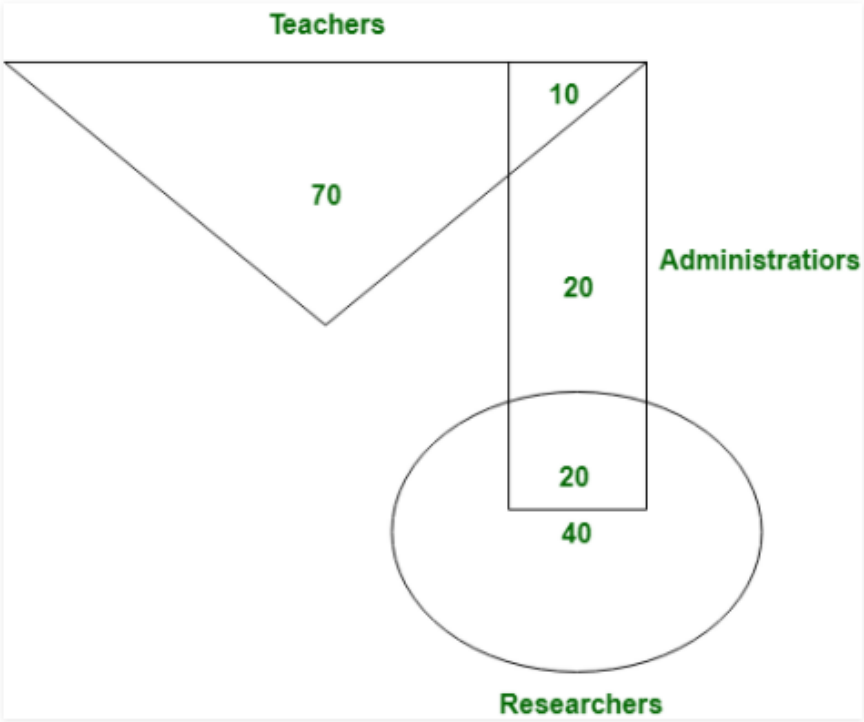
C Begging is an offence that has to be dealt with firmly

D Begging has to be banned because it adversely affects the welfare of the state

GATE CS 2019

Question 8 CORRECT

In the given diagram, teachers are represented in the triangle, researchers in the circle and administrators in the rectangle. Out of the total number of the people, the percentage of administrators shall be in the range of _____ .



A 0 to 15

B 16 to 30

✓ 31 to 45

D 46 to 60

GATE CS 2019

Question 9 CORRECT

In a college, there are three student clubs, Sixty students are only in the Drama club, 80 students are only in the Dance club, 30 students are only in Maths club, 40 students are in both Drama and Dance clubs, 12 students are in both Dance and Maths clubs, 7 students are in both Drama and Maths clubs, and 2 students are in all clubs. If 75% of the students in the college are not in any of these clubs, then the total number of students in the college is _____.

A 1000

B 975

✓ 900

D 225

GATE CS 2019

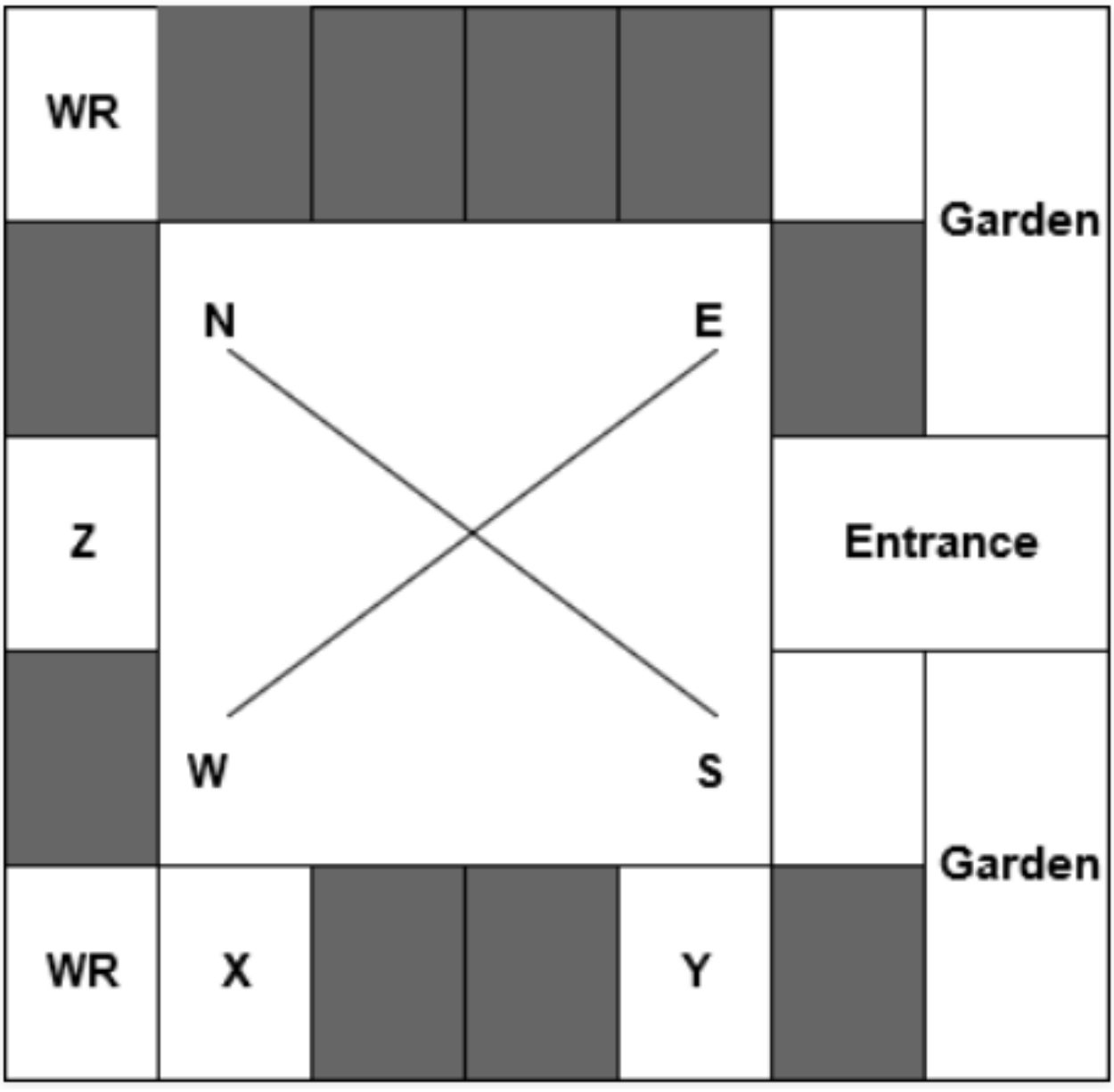
Question 10 CORRECT

Three of the five students are allocated to a hostel put in special requests to the warden, Given the floor plan of the vacant rooms, select the allocation plan that will accommodate all their requests.

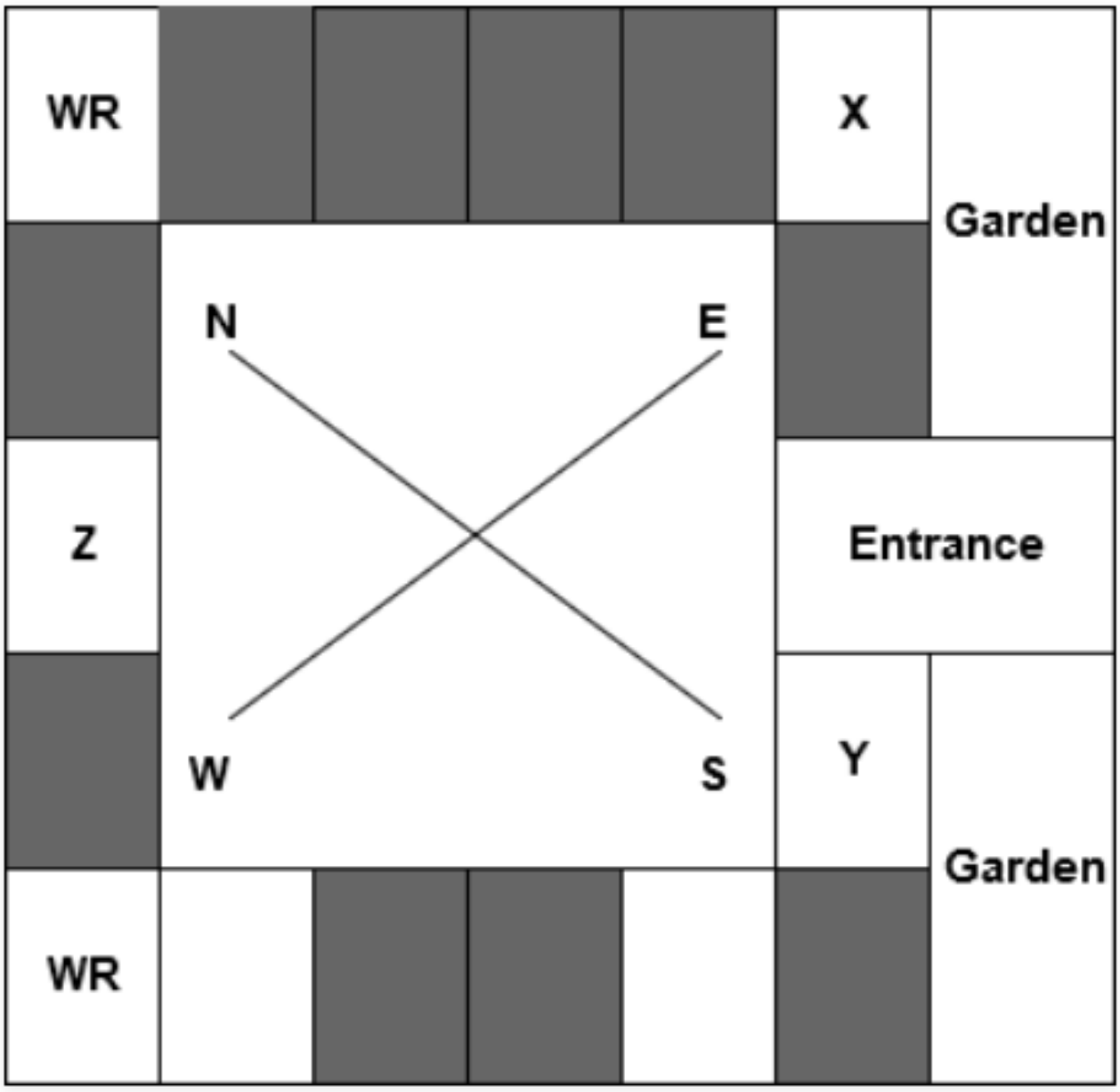
- **Request by X:** Due to pollen allergy, I want to avoid a wing next to the garden.
- **Request by Y:** I want to live as far from the washrooms as possible since I am very much sensitive to smell.
- **Request by Z:** I believe in Vaastu and so I want to stay in South-West wing.

The shaded rooms are already occupied. WR is washroom

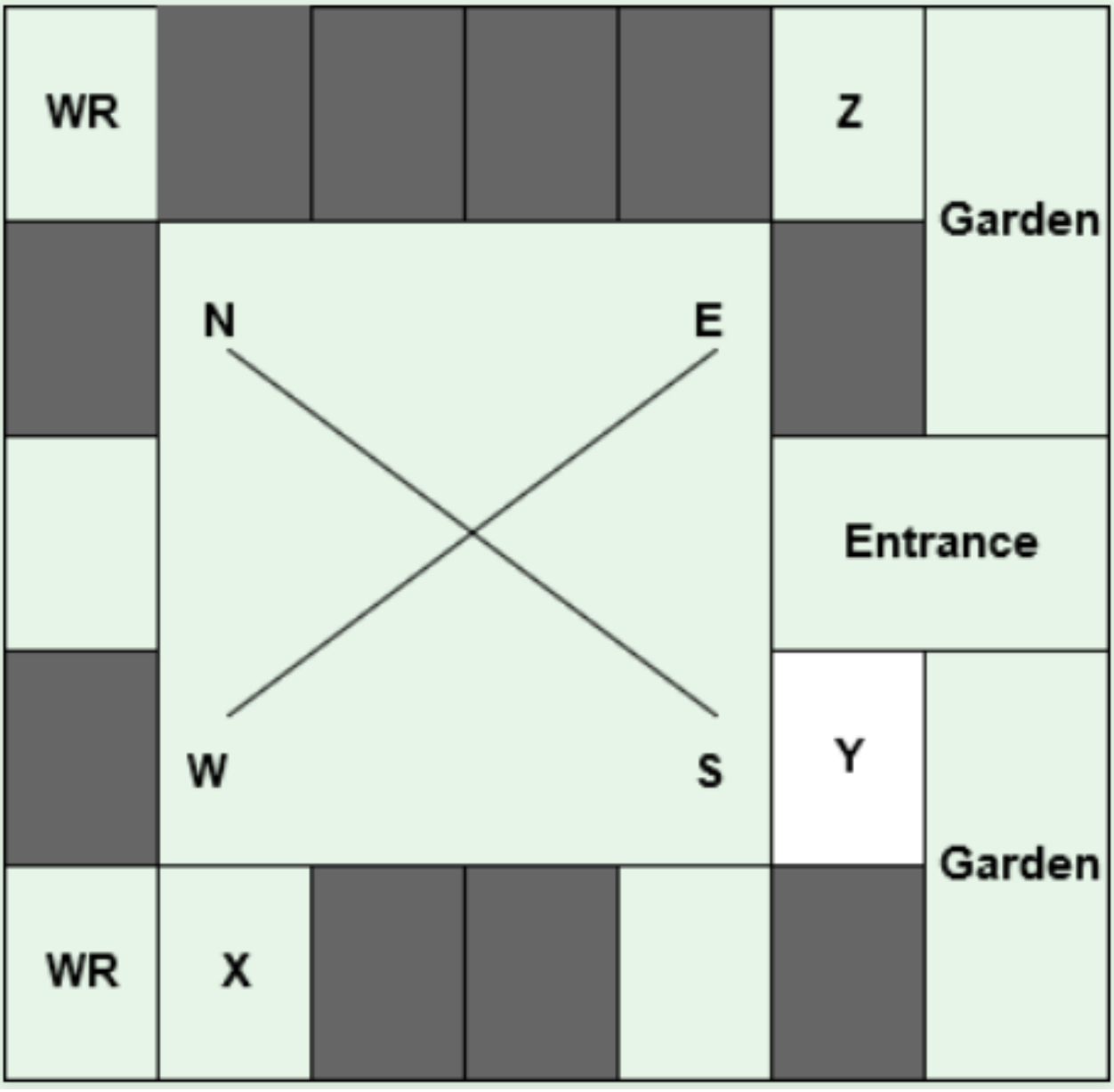
A

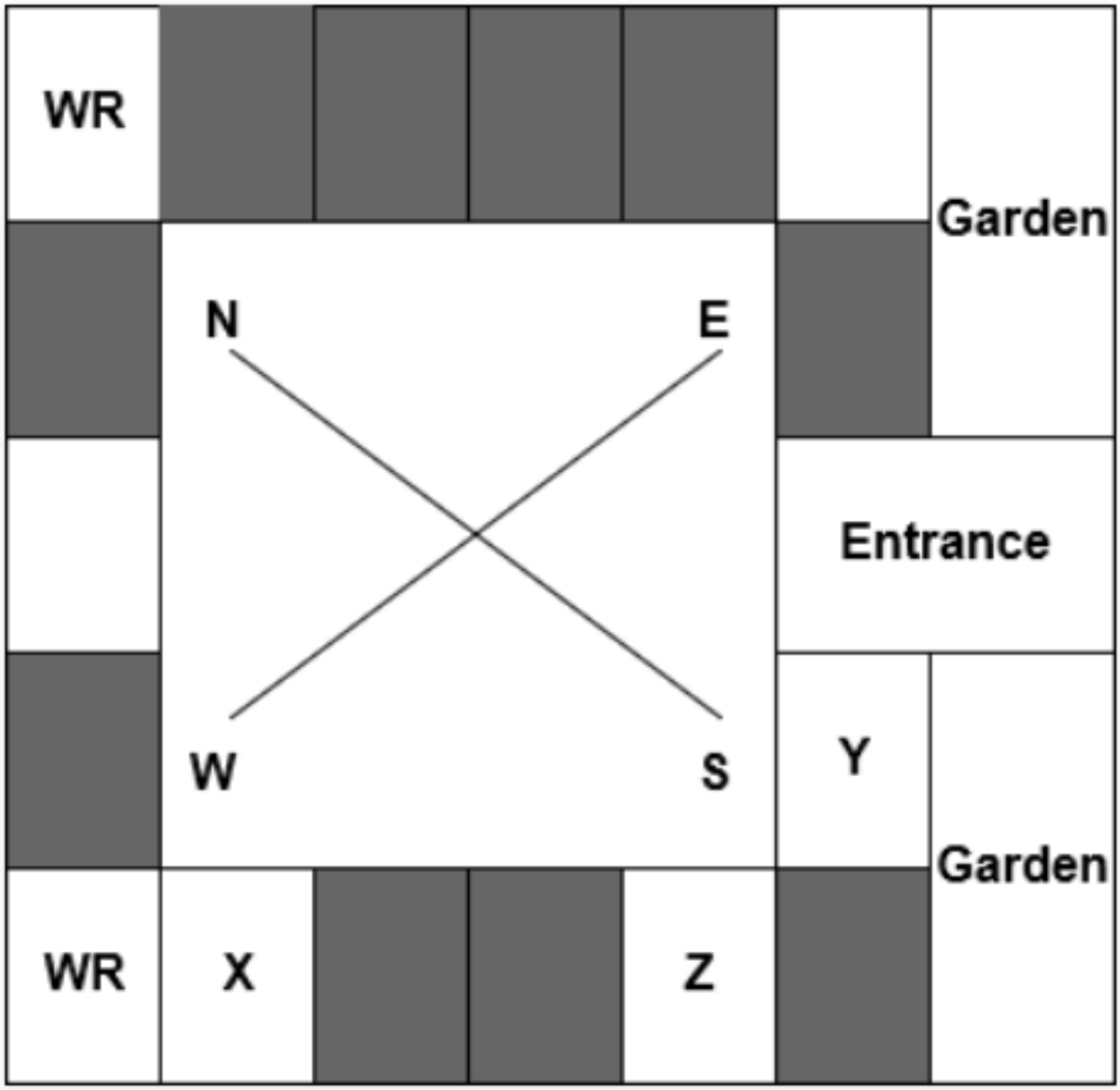


B



C





GATE CS 2019

Question 11 CORRECT

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 a 32-bit address. How many bits are required for the Tag and the Index fields respectively in the addresses generated by the processor?

A 24 bits and 0 bits

B 28 bits and 4 bits

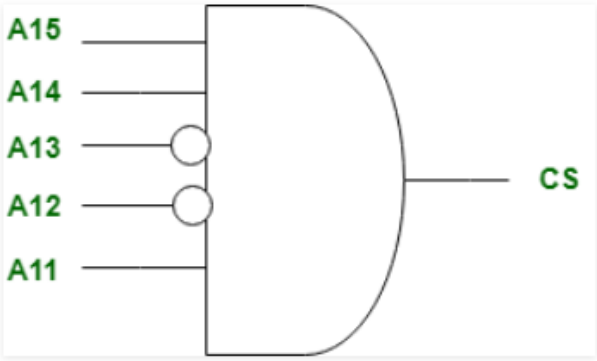
C 24 bits and 4 bits

✓ 28 bits and 0 bits

GATE CS 2019

Question 12 CORRECT

The chip select 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 A15 to A0. What is the range of address (in hexadecimal) of the memory system that can get enabled by the chip select (CS) signal?



✓ C800 to CFFF

B CA00 to CAFF

C C800 to C8FF

D DA00 to DFFF

GATE CS 2019

Question 13 CORRECT

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

A Leftmost

B Leftmost in reverse

C Rightmost

✓ Rightmost in reverse

GATE CS 2019

Question 14 CORRECT

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

A 1111 1111 0001 1100

B 0000 0000 1110 0100

✓ 1111 1111 1110 0100

D 1000 0000 1110 0100

GATE CS 2019

Question 15 CORRECT

Consider Z = X − Y where X, Y and Z are all in sign-magnitude form. X and Y are each represented in n bits. To avoid overflow, the representation of Z would require a minimum of:

A n bits

B n−1 bits

✓ n+1 bits

D n+2 bits

GATE CS 2019

Question 16 CORRECT

Let X be a square matrix. Consider the following two statements on X.

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

Which one of the following is TRUE?

A I implies II; II does not imply I

B II implies I; I does not imply II

C I does not imply II; II does not imply I

✓ I and II are equivalent statements

GATE CS 2019

Question 17 CORRECT

Let G be an arbitrary group. Consider the following relations on G:

- **R_1:** $\forall a, b \in G$, aR_1b if and only if $\exists g \in G$ such that $a = g^{-1}bg$
- **R_2:** $\forall a, b \in G$, aR_2b if and only if $a = b^{-1}$

Which of the above is/are equivalence relation/relations?

A R_1 and R_2

✓ R_1 only

C R_2 only

D Neither R_1 nor R_2

GATE CS 2019

Question 18 CORRECT

Consider the following two statements about database transaction schedules:

- **I.** Strict two-phase locking protocol generates conflict serializable schedules that are also recoverable.
- **II.** Timestamp-ordering concurrency control protocol with Thomas' Write Rule can generate view serializable schedules that are not conflict serializable.

Which of the above statements is/are TRUE?

A I only

B II only

✓ Both I and II

D Neither I nor II

GATE CS 2019

Question 19 CORRECT

Let G be an undirected complete graph on n vertices, where n > 2. Then, the number of different Hamiltonian cycles in G is equal to

A n!

B n - 1!

C 1

✓ (n-1)! / 2

GATE CS 2019

Question 20 CORRECT

Let U = {1, 2, …,n} and A = {(x, X)| x∈X, X⊆U }. Consider the following two statements on |A|.

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

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

Which of the above statements is/are TRUE?

A Only I

B Only II

✓ Both I and II

D Neither I nor II

GATE CS 2019

Question 21 CORRECT

Which one of the following is NOT a valid identity?

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

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

C $x \oplus y = x + y$, if $xy = 0$

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

GATE CS 2019

Question 22 CORRECT

Compute

$$\lim_{x \to 3} \frac{x^4 - 81}{2x^2 - 5x - 3}$$

A Limit does not exist

B 1

C 53/12

✓ 108/7

GATE CS 2019

Question 23 CORRECT

Which one of the following statements is NOT correct about the B+ tree data structure used for creating an index of a relational database table?

A B+ Tree is a height-balanced tree

✓ Non-leaf nodes have pointers to data records

C Key values in each node are kept in sorted order

D Each leaf node has a pointer to the next leaf node

GATE CS 2019

Question 24 CORRECT

For Σ = {a, b}, let us consider the regular language

$$L = \{x \mid x = a^{2 + 3k} \text{ or } x = b^{10 + 12k},\ k \geq 0\}$$

Which one of the following can be a pumping length (the constant guaranteed by the pumping lemma) for L?

A 3

B 5

C 9

✓ 24

GATE CS 2019

Question 25 CORRECT

Which of the following protocol pairs can be used to send and retrieve e-mails (in that order)?

A IMAP POP3

✓ SMTP, POP3

C SMTP, MIME

D IMAP, SMTP

GATE CS 2019

Question 26 CORRECT

The following C program is executed on a Unix / Linux system:

```
#include <unistd.h>
  int main() {
    int i;
    for (i = 0; i < 10; i++)
      if (i % 2 == 0) fork();
    return 0;
  }
```

The total number of child process created is _____ . **Note -** This was Numerical Type question.

✓ 31

B 63

C 5

D 6

GATE CS 2019

Question 27 CORRECT

Consider the following C program:

```
#include <stdio.h>
  int jumble(int x, int y) {
    x = 2 * x + y;
    return x;
  }
int main() {
  int x = 2, y = 5;
  y = jumble(y, x);
  x = jumble(y, x);
  printf("%dn", x);
  return 0;

}
```

The value printed by program is _____ . **Note:** This was Numerical Type question.

✓ 26

B 2

C 5

D 12

GATE CS 2019

Question 28 CORRECT

Consider the following given grammar:

```
S → Aa
A → BD
B → b|ε
D → d|ε
```

a	b	d	$
3	2	1	0

Let a, b, d and $ be indexed as follows:
Compute the FOLLOW set of the non-terminal B and write the index values for the symbols in the FOLLOW set in the descending order. (For example, if the FOLLOW set is {a, b, d, $}, then the answer should be 3210). **Note:** This was Numerical Type question.

✓ 31

B 310

C 230

D 23

GATE CS 2019

Question 29 CORRECT

Two numbers are chosen independently and uniformly at random from the set {1, 2, ..., 13}. The probability (rounded off to 3 decimal places) that their 4-bit (unsigned) binary representations have the same most significant bit is _____. **Note:** This was Numerical Type question.

✓ 0.5029

B 0.538

C 0.461

D 0.248

GATE CS 2019

Question 30 CORRECT

An array of 25 distinct elements is to be sorted using quicksort. Assume that the pivot element is chosen uniformly at random. The probability that the pivot element gets placed in the worst possible location in the first round of partitioning (rounded off to 2 decimal places) is _____. **Note:** This was Numerical Type question.

✓ 0.08

B 0.0016

C 0.04

D 0.0008

GATE CS 2019

Question 31 CORRECT

The value of 3^{51} mod 5 is _____ . **Note:** This was Numerical Type question.

A 1

✓ 2

C 3

D 4

GATE CS 2019

Question 32 CORRECT

Consider three concurrent processes P1, P2 and P3 as shown below, which access a shared variable D that has been initialized to 100.

P1	P2	P3
. . . . **D = D + 20** . . .	. . . . **D = D - 50** . .	. . . . **D = D + 10** . . .

The process are executed on a uniprocessor system running a time-shared operating system. If the minimum and maximum possible values of D after the three processes have completed execution are X and Y respectively, then the value of Y–X is _____. **Note:** This was Numerical Type question.

✓ 80

B 130

C 50

D None of these

GATE CS 2019

Question 33 CORRECT

Consider the following C program:

```
#include<stdio.h>
 int main(){
  int arr[] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 0, 1, 2, 5}, *ip = arr + 4;

  printf("%dn", ip[1]);

  return 0;
}
```

The number that will be displayed on execution of the program is _____ .

✓ 6

B 5

C 4

D segmentation error

GATE CS 2019

Question 34 CORRECT

Consider a sequence of 14 elements: A = [-5, -10, 6, 3, -1, -2, 13, 4, -9, -1, 4, 12, -3, 0]. The subsequence sum $S(i,j) = \sum_{k=i}^{j} A[k]$. Determine the maximum of S(i,j), where 0 ≤ i ≤ j < 14. (Divide and conquer approach may be used)

Note: This was Numerical Type question.

- ✓ 29
- B 19
- C 39
- D 09

GATE CS 2019

Question 35 CORRECT

Consider the following C program:

```
void convert(int n) {
  if (n < 0)
    printf(" % d", n);
  else {
    convert(n / 2);
    printf(" % d", n % 2);
  }
}
```

Run on IDE

Which one of the following will happen when the function convert is called with any positive integer n as argument?

A It will print the binary representation of n in the reverse order and terminate.

B It will print the binary representation of n but will not terminate

✓ It will not print anything and will not terminate.

D It will print the binary representation of n and terminate.

GATE CS 2019

Question 36 CORRECT

Consider the following C program:

```
#include<stdio.h>

int r(){
 int static num=7;
 return num--;
}

int main() {

 for(r();r();r()) {
  printf("%d ",r());
  };

 return 0;
}
```

Which one of the following values will be displayed on execution of the programs?

A 41

✓ 52

C 63

D 630

GATE CS 2019

Question 37 CORRECT

Consider three machines M, N and P with IP addresses 100.10.5.2, 100.10.5.5 and 100.10.5.6 respectively. The subnet mask is set to 255.255.255.252 for all the three machines. Which one of the following is true?

A M, N and P all belong to the same subnet

✓ Only N and P belong to the same subnet

C M, N, and P belong to three different subnets

D Only M and N belong to the same subnet

GATE CS 2019

Question 38 CORRECT

Suppose that in an IP-over-Ethernet network, a machine X wishes to find the MAC address of another machine Y in its subnet. Which one of the following techniques can be used for this?

A X sends an ARP request packet with broadcast IP address in its local subnet

B X sends an ARP request packet to the local gateway's MAC address which then finds the MAC address of Y and sends to X

✓ X sends an ARP request packet with broadcast MAC address in its local subnet

D X sends an ARP request packet to the local gateway's IP address which then finds the MAC address of Y and sends to X

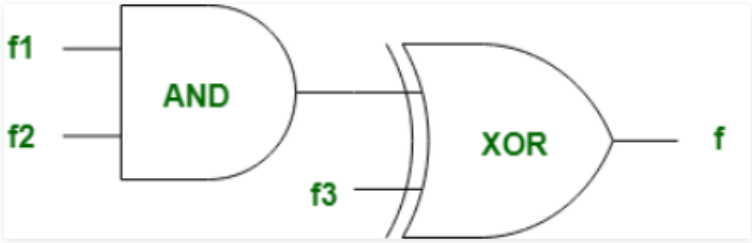
GATE CS 2019

Question 39 CORRECT

Consider three 4-variable functions f_1, f_2 and f_3, which are expressed in sum-of-minterms

$f_1 = \Sigma(0, 2, 5, 8, 14)$
$f_2 = \Sigma(2, 3, 6, 8, 14, 15)$
$f_3 = \Sigma(2, 7, 11, 14)$

For the following circuit with one AND gate and one XOR gate, the output function f can be expressed as:



✓ $\Sigma(7, 8, 11)$

B $\Sigma(2, 14)$

C $\Sigma(0, 2, 3, 5, 6, 7, 8, 11, 14)$

D $\Sigma(2, 7, 8, 11, 14)$

GATE CS 2019

Question 40 CORRECT

Which one of the following languages over $\sum = \{a, b\}$ is NOT context-free?

A $\{a^n b^i \mid i \in \{n, 3n, 5n\}, n \geq 0\}$

✓ $\{wa^n w^R b^n \mid w \in \{a, b\}^*, n \geq 0\}$

C $\{ww^R \mid w \in \{a, b\}^*\}$

D $\{wa^n\ b^n\ w^R \mid w \in \{a, b\}^*, n \geq 0\}$

GATE CS 2019

Question 41 CORRECT

Let the set of functional dependencies F = {QR → S, R → P, S → Q} hold on a relation schema X = (PQRS). X is not in BCNF. Suppose X is decomposed into two schemas and Z where Y = (PR) and Z = (QRS). Consider the two statements given below:

- **I.** Both Y and Z are in BCNF
- **II.** Decomposition of X into Y and Z is dependency preserving and a lossless.

Which of the above statements is/are correct?

A I only

B Neither I nor II

C Both I and II

✓ II only

GATE CS 2019

Question 42 CORRECT

Assume that in a certain computer, the virtual addresses are 64 bits long and the physical addresses are 48 bits long. The memory is word addressable. The page size is 8k Band the word size is 4 bytes. The Translation Look-aside Buffer (TLB) in the address translation path has 128 valid entries. At most how many distinct virtual addresses can be translated without any TLB miss?

A 16×2^{10}

B 8×2^{20}

C 4×2^{20}

✓ 256×2^{10}

GATE CS 2019

Question 43 CORRECT

Consider the following sets:

- S_1: Set of all recursively enumerable languages over the alphabet {0, 1}.
- S_2: Set of all syntactically valid C programs.
- S_3: Set of all languages over the alphabet {0, 1}.
- S_4: Set of all non-regular languages over the alphabet {0, 1}.

Which of the above sets are uncountable?

A S_1 and S_2

✓ S_3 and S_4

C S_1 and S_4

D S_2 and S_3

GATE CS 2019

Question 44 CORRECT

Consider the first order predicate formula:

$$\forall x\ [(\ \forall z\ z|x \Rightarrow ((z = x) \vee (z = 1))) \Rightarrow \exists w(w > x) \wedge (\forall z\ z|w \Rightarrow ((w = z) \vee (z = 1)$$

Here 'a|b' denotes that 'a divides b', where a and b are integers. Consider the following sets:

- **S_1:** {1, 2, 3, ..., 100}
- **S_2:** Set of all positive integers
- **S_3:** Set of all integers

Which of the above sets satisfy φ ?

A S_1 and S_3

✓ S_2 and S_3

C S_1, S_2 and S_3

D S_1 and S_2

GATE CS 2019

Question 45 CORRECT

Consider the following grammar and the semantic actions to support the inherited type declaration attributes. Let X_1, X_2, X_3, X_4, X_5 and X_6 be the placeholders for the non-terminals D, T, L or L_1 in the following table:

Production rule	Semantic action
D ⟶ TL	X1. type = X2. type
T ⟶ int	T. type = int
T ⟶ float	T.type = float
L ⟶ L1, id	X3.type = X4.type addType(id.entry, X5type)
L ⟶ id	addType(id.entry, X6type)

Which one of the following are the appropriate choices for X_1, X_2, X_3 and X_4?

✓ $X_1 = L, X_2 = T, X_3 = L_1, X_4 = L$

B $X_1 = L, X_2 = L, X_3 = L_1, X_4 = T$

C $X_1 = T, X_2 = L, X_3 = L_1, X_4 = T$

D $X_1 = T, X_2 = L, X_3 = T, X_4 = L_1$

GATE CS 2019

Question 46 CORRECT

There are n unsorted arrays: A_1, A_2, ...,A_n. Assume that n is odd. Each of A_1, A_2, ..., A_n contains n distinct elements. There are no common elements between any two arrays. The worst-case time complexity of computing the median of the medians of A_1, A_2, ...,A_n is _____ .

A $O(n \log n)$

✓ $O(n^2)$

C $O(n)$

D $\Omega(n^2 \log n)$

GATE CS 2019

Question 47 CORRECT

Let G be any connection, weighted, undirected graph:

- **I.** G has a unique minimum spanning tree if no two edges of G have the same weight.
- **II.** G has a unique minimum spanning tree if, for every cut G, there is a unique minimum weight edge crossing the cut.

Which of the above two statements is/are TRUE?

A Neither I nor II

B I only

C II only

✓ Both I and II

GATE CS 2019

Question 48 CORRECT

Consider the following snapshot of a system running n concurrent processes. Process i is holding X_i instances of a resource R, $1 \le i \le n$. Assume that all instances of R arecurrently in use. Further, for all i, process i can place a request for at most Y_i additional instances of R while holding the X_t instances it already has. Of the n processes, there are exactly two processes p and q such that $Y_p = Y_q = 0$. Which one of the following conditions guarantees that no other process apart from p and q can complete execution?

✓ $X_p + X_q < \text{Min } \{Y_k \mid 1 \le k \le n, k \ne p, k \ne q\}$

B $\text{Min } (X_p, X_q) \ge \text{Min } \{Y_k \mid 1 \le k \le n, k \ne p, k \ne q\}$

C $\text{Min } (X_p, X_q) \le \text{Max } \{Y_k \mid 1 \le k \le n, k \ne p, k \ne q\}$

D $X_p + X_q < \text{Max } \{Y_k \mid 1 \le k \le n, k \ne p, k \ne q\}$

GATE CS 2019

Question 49 CORRECT

Consider the following statements:

- **I.** The smallest element in a max-heap is always at a leaf node.
- **II.** The second largest element in a max-heap is always a child of the root node.
- **III.** A max-heap can be constructed from a binary search tree in $\Theta(n)$ time.
- **IV.** A binary search tree can be constructed from a max-heap in $\Theta(n)$ time.

Which of the above statements is/are TRUE?

A II, III and IV

✓ I, II and III

C I, III and IV

D I, II and IV

GATE CS 2019

Question 50 CORRECT

Consider the following four processes with arrival times (in milliseconds) and their length of CPU burst (in milliseconds) as shown below:

Process	P1	P2	P3	P4
Arrival time	0	1	3	4
CPU burst time	3	1	3	Z

These processes are run on a single processor using preemptive Shortest Remaining Time First scheduling algorithm. If the average waiting time of the processes is 1 millisecond, then the value of Z is _____. **Note:** This was Numerical Type question.

✓ 2

B 3

C 1

D 4

GATE CS 2019

Question 51 CORRECT

The index node (inode) of a Unix-like file system has 12 direct, one single-indirect and one double-indirect pointer The disk block size is 4 kB and the disk block addresses 32-bits long. The maximum possible file size is (rounded off to 1 decimal place) _____ GB. **Note:** This was Numerical Type question.

✓ 4

B 2

C 1

D 0.50

GATE CS 2019

Question 52 CORRECT

Consider the augmented grammar given below: S′ → S S → |id L → L, S|S Let I_0 = CLOSURE ({[S′ → S]}). The number of items in the set GOTO (I_0, <) is _____.
Note: This was Numerical Type question.

✓ 5

B 4

C 3

D 1

GATE CS 2019

Question 53 CORRECT

Consider the following matrix:

$$\begin{bmatrix} 1 & 2 & 4 & 8 \\ 1 & 3 & 9 & 27 \\ 1 & 4 & 16 & 64 \\ 1 & 5 & 25 & 125 \end{bmatrix}$$

The absolute value of the product of Eigenvalues of R is _____ .
Note: This was Numerical Type question.

✓ 12

B 145

C 125

D 4

GATE CS 2019

Question 54 CORRECT

A certain processor deploys a single-level cache. The cache block size is 8 words and the word size is 4 bytes. The memory system uses a 60 MHz clock. To service a cache-miss, the memory controller first takes 1 cycle to accept the starting address of the block, it then takes 3 cycles to fetch all the eight words of the block, and finally transmits the words of the requested block at the rate of 1 word per cycle. The maximum bandwidth for the memory system when the program running on the processor issues a series of read operations is _____ × 10^6 bytes/sec.

Note: This was Numerical Type question.

✓ 160

B 128

C 256

D 320

GATE CS 2019

Question 55 CORRECT

Let T be a full binary tree with 8 leaves. (A full binary tree has every level full.) Suppose two leaves a and b of T are chosen uniformly and independently at random. The expected value of the distance between a and b in T (i.e., the number of edges in the unique path between a and b) is (rounded off to 2 decimal places) _____ .
Note: This was Numerical Type question.

A 5.71 to 5.73

B 4.85 to 4.86

C 2.71 to 2.73

✓ 4.24 to 4.26

GATE CS 2019

Question 56 CORRECT

Suppose Y is distributed uniformly in the open interval (1, 6). The probability that the polynomial $3x^2 + 6xY + 3Y + 6$ has only real roots is (rounded off to 1 decimal place) _____.
Note: This was Numerical Type question.

✓ 0.80

B 0.17

C 0.20

D 1

GATE CS 2019

Question 57 CORRECT

Let Σ be the set of all bijections from {1, ..., 5} to {1, ..., 5}, where id denotes the identity function, i.e. id(j) = j,$\forall$j. Let $^\circ$ denote composition on functions. For a string $x = x_1x_2 \ldots x_n \in \Sigma n$, $n \geq 0$, let $\pi(x) = x_1{}^\circ x_2{}^\circ \ldots {}^\circ x_n$. Consider the language $L = \{x \in \Sigma^* \mid \pi(x) = id\}$. The minimum number of states in any DFA accepting L is _____ .

Note: This was Numerical Type question.

✓ 120

B 125

C 210

D None of these

GATE CS 2019

Question 58 CORRECT

Consider that 15 machines need to be connected in a LAN using 8-port Ethernet switches. Assume that these switches do not have any separate up link ports. The minimum number of switches needed is _____.
Note: This was Numerical Type question.

✓ 3

B 4

C 5

D 6

GATE CS 2019

Question 59 CORRECT

What is the minimum number of 2-input NOR gates required to implement 4-variable function expressed in sum-of-minterms from as f = Σ(0, 2, 5, 7, 8, 10, 13, 15)? Assume that all the inputs and their complements are available. Answer _____ .
Note: This was Numerical Type question.

✓ 3

B 4

C 5

D 6

GATE CS 2019

Question 60 CORRECT

In an RSA cryptosystem, the value of the public modulus parameter n is 3007. If it is also is known that φ(n) = 2880, where φ( ) denotes Euler's Totient Function, then the prime factors of n which is greater than 50 is _____ .
Note: This was Numerical Type question.

✓ 97

B 31

C 37

D 91

GATE CS 2019

Question 61 CORRECT

A relational database contains two tables Student and Performance as shown below:

Student

Roll_no.	Student_name
1	Amit
2	Priya
3	Vinit
4	Rohan
5	Smita

Performance

Roll_no.	Subject_Code	Marks
1	A	86
1	B	95
1	C	90
2	A	89
2	C	92
3	C	80

The primary key of the Student table is Roll_no. For the Performance table, the columns Roll_no. and Subject_code together from the primary key. Consider the SQL query given below:

```
SELECT S.Student_name, sum(P.Marks)
FROM Student S, Performance P
WHERE  P.Marks  >  84
GROUP BY S.Student_name;
```

The number of rows returned by the above SQL query is _____ .
Note: This was Numerical Type question.

- ✓ 5
- B 4
- C 3
- D None of these.

GATE CS 2019

Question 62 CORRECT

Consider the following C program:

```
#include <stdio.h>

int main() {
 float sum = 0.0, j = 1.0, i = 2.0;

 while (i / j > 0.0625) {

    j = j + j;
    printf("%fn", sum);
 };
 return 0;
}
```

The number of times variable sum will be printed When the above program is executed is _____ .
Note: This was Numerical Type question.

✓ 5

B 6

C 4

D 0

GATE CS 2019

Question 63 CORRECT

Consider the following relation P(X, Y, Z), Q(X, Y, T) and R(Y, V):

P		
X	Y	Z
X1	Y1	Z1
X1	Y1	Z2
X2	Y2	Z2
X2	Y4	Z4

Q		
X	Y	T
X2	Y1	2
X1	Y2	5
X1	Y1	6
X3	Y3	1

R	
Y	V
Y1	V1
Y3	V2
Y2	V3
Y2	V2

How many tuples will be returned by the following relational algebra query?

$\pi_X(\sigma_{(P.Y = R.Y \wedge R.V = v}(P \times R))) - \pi_X(\sigma_{(Q.Y = R.Y \wedge Q.T > 2}(Q \times R)))$

Note: This was Numerical Type question.

A 3

✓ 1

C 2

D 4

GATE CS 2019

Question 64 CORRECT

Consider the following C program:

```c
#include<stdio.h>

int main() {
  int a[] = {2, 4, 6, 8, 10};
  int i, sum = 0, *b = a + 4;

  for (i = 0; i < 5; i++ )
  sum = sum + (*b - i) - *(b - i);

  printf("%dn", sum);
  return 0;
}
```

The output of above C program is _____ . **Note:** This was Numerical Type question.

- ✓ 10
- B 8
- C 6
- D 3

GATE CS 2019

Question 65 CORRECT

If L is a regular language over $\sum = \{a, b\}$, which one of the following languages is NOT regular?

A $L \cdot L^R \{xy \mid x \in L, y^R \in L\}$

B Suffix (L) = $\{y \in \sum^* \mid \exists x \in \sum^*$ such that $xy \in L\}$

C Prefix (L) = $\{x \in \sum^* \mid \exists y \in \sum^*$ such that $xy \in L\}$

✓ $\{ww^R \mid w \in L\}$

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