# GATE CS 2010

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## Q.1 - Q.5 Carry ONE mark each

1) Let $G = (V, E)$ be a graph. Define $\xi(G) = \sum d \times i_d$, where $i_d$ is the number of vertices of degree $d$ in $G$. If $S$ and $T$ are two different trees with $\xi(S) = \xi(T)$, then

(GATE CS 2010)

a) $|S| = 2|T|$ b) $|S| = |T| - 1$ c) $|S| = |T|$ d) $|S| = |T| + 1$

2) Newton-Raphson method is used to compute a root of the equation $x^2 - 13 = 0$ with 3.5 as the initial value. The approximation after one iteration is

(GATE CS 2010)

a) 3.575 b) 3.676 c) 3.667 d) 3.607

3) What is the possible number of reflexive relations on a set of 5 elements?

(GATE CS 2010)

a) $2^{10}$ b) $2^{15}$ c) $2^{20}$ d) $2^{25}$

4) Consider the set $S = \{1, \omega, \omega^2\}$, where $\omega$ and $\omega^2$ are cube roots of unity. If $*$ denotes the multiplication operation, the structure $(S, *)$ forms

(GATE CS 2010)

a) A group b) A ring c) An integral domain d) A field

5) What is the value of $\lim_{n\to\infty} \left(1 - \frac{1}{n}\right)^{2n}$?

(GATE CS 2010)

a) 0 b) $e^{-2}$ c) $e^{-1/2}$ d) 1

6) The minterm expansion of $f(P, Q, R) = PQ + QR + PR$ is

(GATE CS 2010)

a) $m_2 + m_4 + m_6 + m_7$
b) $m_0 + m_1 + m_3 + m_5$
c) $m_0 + m_1 + m_6 + m_7$
d) $m_2 + m_3 + m_4 + m_5$

7) A main memory unit with a capacity of 4 megabytes is built using $1M \times 1$-bit DRAM chips. Each DRAM chip has $1K$ rows of cells with $1K$ cells in each row. The time taken for a single refresh operation is 100 nanoseconds. The time required to perform one refresh operation on all the cells in the memory unit is

(GATE CS 2010)

a) 100 nanoseconds
b) $100 \times 2^{10}$ nanoseconds
c) $100 \times 2^{20}$ nanoseconds
d) $3200 \times 2^{20}$ nanoseconds

8) $P$ is a 16-bit signed integer. The 2's complement representation of $P$ is $(F87B)_{16}$. The 2's complement representation of $8 \times P$ is

(GATE CS 2010)

a) $(C3D8)_{16}$ b) $(187B)_{16}$ c) $(F878)_{16}$ d) $(987B)_{16}$

9) The Boolean expression for the output $f$ of the multiplexer shown below is

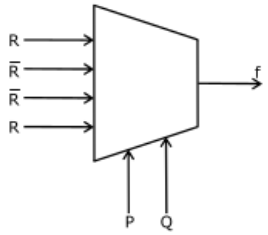



Fig. 1

(GATE CS 2010)

a) $P \oplus Q \oplus R$ b) $\overline{P \oplus Q \oplus R}$ c) $P + Q + R$ d) $\overline{P + Q + R}$

10) In a binary tree with $n$ nodes, every node has an odd number of descendants. Every node is considered to be its own descendant. What is the number of nodes in the tree that have exactly one child?

(GATE CS 2010)

a) 0 b) 1 c) $(n-1)/2$ d) $n-1$

11) What does the following program print?

```
#include <stdio.h>
void f(int *p, int *q) {
 p = q;
 *p = 2;
}
int i = 0, j = 1;
int main() {
 f(&i, &j);
 printf("%d %d\n", i, j);
 return 0;
}
```

(GATE CS 2010)

a) 2 2 b) 2 1 c) 0 1 d) 0 2

12) Two alternative packages $A$ and $B$ are available for processing a database having $10^k$ records. Package $A$ requires $0.0001n^2$ time units and package $B$ requires $10n \log_{10} n$ time units to process $n$ records. What is the smallest value of $k$ for which package $B$ will be preferred over $A$?

(GATE CS 2010)

a) 12 b) 10 c) 6 d) 5

13) Which data structure in a compiler is used for managing information about variables and their attributes?

(GATE CS 2010)

a) Abstract syntax tree
b) Symbol table
c) Semantic stack
d) Parse table

14) Which languages necessarily need heap allocation in the runtime environment?

(GATE CS 2010)

a) Those that support recursion
b) Those that use dynamic scoping
c) Those that allow dynamic data structures
d) Those that use global variables

15) One of the header fields in an IP datagram is the Time to Live (TTL) field. Which of the following statements best explains the need for this field?

(GATE CS 2010)

a) It can be used to prioritize packets
b) It can be used to reduce delays
c) It can be used to optimize throughput
d) It can be used to prevent packet looping

16) Which one of the following is not a client server application?

(GATE CS 2010)

a) Internet chat b) Web browsing c) E-mail d) Ping

17) Let $L_1$ be a recursive language. Let $L_2$ and $L_3$ be languages that are recursively enumerable but not recursive. Which of the following statements is not necessarily true?

(GATE CS 2010)

a) $L_2 - L_1$ is recursively enumerable
b) $L_1 - L_3$ is recursively enumerable
c) $L_2 \cap L_1$ is recursively enumerable
d) $L_2 \cup L_1$ is recursively enumerable

18) Consider a $B^+$-tree in which the maximum number of keys in a node is 5. What is the minimum number of keys in any non-root node?

(GATE CS 2010)

a) 1 b) 2 c) 3 d) 4

19) A relational schema for a train reservation database is given below
Passenger(pid, pname, age)
Reservation(pid, class, tid)

| pid | pname | Age |
|---|---|---|
| 0 | 'Sachin' | 65 |
| 1 | 'Rahul' | 66 |
| 2 | 'Sourav' | 67 |
| 3 | 'Anil' | 69 |

What pids are returned by the following SQL query for the above instance of the tables?

| pid | class | tid |
|---|---|---|
| 0 | 'AC' | 8200 |
| 1 | 'AC' | 8201 |
| 2 | 'SC' | 8201 |
| 5 | 'AC' | 8203 |
| 1 | 'SC' | 8204 |
| 3 | 'AC' | 8202 |

```
SELECT pid
FROM Reservation
WHERE class = 'AC' AND
EXISTS (SELECT *
FROM Passenger
WHERE age > 65 AND
Passenger.pid = Reservation.pid)
```

(GATE CS 2010)

a) $1, 0$ b) $1, 2$ c) $1, 3$ d) $1, 5$

20) Which of the following concurrency control protocols ensure both conflict serializability and freedom from deadlock?
I. 2-phase locking
II. Time-stamp ordering

(GATE CS 2010)

a) I only b) II only c) Both I and II d) Neither I nor II

21) The cyclomatic complexity of each of the modules $A$ and $B$ shown below is 10. What is the cyclomatic complexity of the sequential integration shown on the right hand side?

(GATE CS 2010)

a) 19 b) 21 c) 20 d) 10

22) What is the appropriate pairing of items in the two columns listing various activities encountered in a software life cycle?

| | |
|---|---|
| P. Requirements Capture | 1. Module Development and Integration |
| Q. Design | 2. Domain Analysis |
| R. Implementation | 3. Structural and Behavioral Modeling |
| S. Maintenance | 4. Performance Tuning |

(GATE CS 2010)

a) P-3, Q-2, R-4, S-1
b) P-2, Q-3, R-1, S-4
c) P-3, Q-2, R-1, S-4
d) P-2, Q-3, R-4, S-1

23) Consider the methods used by processes $P1$ and $P2$ for accessing their critical sections whenever needed, as given below. The initial values of shared boolean variables $S1$ and $S2$ are randomly assigned.

| **Method used by P1** | **Method used by P2** |
|---|---|
| while ($S1 == S2$); | while ($S1 != S2$); |
| Critical Section | Critical Section |
| $S1 = S2$; | $S2 = \text{not}(S1)$; |

Which one of the following statements describes the properties achieved?

(GATE CS 2010)

a) Mutual exclusion but not progress
b) Progress but not mutual exclusion
c) Neither mutual exclusion nor progress
d) Both mutual exclusion and progress

24) A system uses FIFO policy for page replacement. It has 4 page frames with no pages loaded to begin with. The system first accesses 100 distinct pages in some order and then accesses the same 100 pages but now in the reverse order. How many page faults will occur?

(GATE CS 2010)

a) 196 b) 192 c) 197 d) 195

25) Which of the following statements are true?
I. Shortest remaining time first scheduling may cause starvation
II. Preemptive scheduling may cause starvation
III. Round robin is better than FCFS in terms of response time

(GATE CS 2010)

a) I only b) I and III only c) II and III only d) I, II and III

## Q.26 - Q.55 Carry ONE mark each

26) Consider a company that assembles computers. The probability of a faulty assembly of any computer is $p$. The company therefore subjects each computer to a testing process. This testing process gives the correct result for any computer with a probability of $q$. What is the probability of a computer being declared faulty?

(GATE CS 2010)

a) $pq + (1-p)(1-q)$
b) $(1-q)\,p$
c) $(1-p)\,q$
d) $pq$

27) What is the probability that divisor of $10^{99}$ is a multiple of $10^{96}$?

(GATE CS 2010)

a) 1/625 b) 4/625 c) 12/625 d) 16/625

28) The degree sequence of a simple graph is the sequence of the degrees of the nodes in the graph in decreasing order. Which of the following sequences can not be the degree sequence of any graph?
I. $7, 6, 5, 4, 4, 3, 2, 1$
II. $6, 6, 6, 6, 3, 3, 2, 2$
III. $7, 6, 6, 4, 4, 3, 2, 2$
IV. $8, 7, 7, 6, 4, 2, 1, 1$

(GATE CS 2010)

a) I and II b) III and IV c) IV only d) II and IV

29) Consider the following matrix

$$A = \begin{pmatrix} 2 & 3 \\ x & y \end{pmatrix}$$

If the eigenvalues of $A$ are 4 and 8, then

(GATE CS 2010)

a) $x = 4, y = 10$
b) $x = 5, y = 8$
c) $x = -3, y = 9$
d) $x = -4, y = 10$

30) Suppose the predicate $F(x, y, t)$ is used to represent the statement that person $x$ can fool person $y$ at time $t$. Which one of the statements below expresses best the meaning of the formula $\forall x \exists y \exists t (\neg F(x, y, t))$?

(GATE CS 2010)

a) Everyone can fool some person at some time
b) No one can fool everyone all the time
c) Everyone cannot fool some person all the time
d) No one can fool some person at some time

31) What is the Boolean expression for the output $f$ of the combinational logic circuit of NOR gates given below?

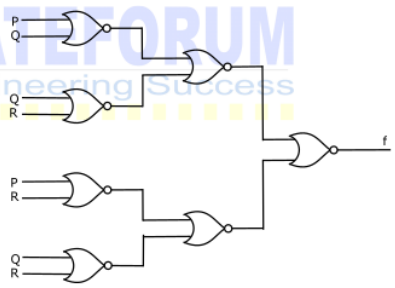



Fig. 2

(GATE CS 2010)

a) $\overline{Q + R}$
b) $\overline{P + Q}$
c) $\overline{P + R}$
d) $\overline{P + Q + R}$

32) In the sequential circuit shown below, if the initial value of the output $Q_1 Q_0$ is 00, what are the next four values of $Q_1 Q_0$?

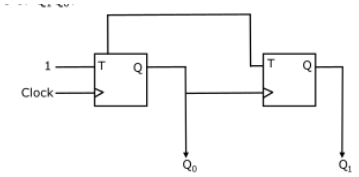



Fig. 3

(GATE CS 2010)

a) $11, 10, 01, 00$
b) $10, 11, 01, 00$
c) $10, 00, 01, 11$
d) $11, 10, 00, 01$

33) A 5-stage pipelined processor has Instruction Fetch (IF), Instruction Decode (ID), Operand Fetch (OF), Perform Operation (PO) and Write Operand (WO) stages. The IF, ID, OF and WO stages take 1 clock cycle each for any instruction. The PO stage takes 1 clock cycle for ADD and SUB instructions, 3 clock cycles for MUL instruction, and 6 clock cycles for DIV instruction respectively. Operand forwarding is used in the pipeline. What is the number of clock cycles needed to execute the following sequence of instructions?

$I_0$: MUL $R_2, R_0, R_1$ $R_2 \leftarrow R_0 * R_1$
$I_1$: DIV $R_5, R_3, R_4$ $R_5 \leftarrow R_3/R_4$
$I_2$: ADD $R_2, R_5, R_2$ $R_2 \leftarrow R_5 + R_2$
$I_3$: SUB $R_5, R_2, R_6$ $R_5 \leftarrow R_2 - R_6$

(GATE CS 2010)

a) 13 b) 15 c) 17 d) 19

34) The weight of a sequence $a_0, a_1, \ldots, a_{n-1}$ of real numbers is defined as $a_0 + a_1/2 + \ldots + a_{n-1}/2^{n-1}$. A subsequence of a sequence is obtained by deleting some elements from the sequence, keeping the order of the remaining elements the same. Let $X$ denote the maximum possible weight of a subsequence of $a_0, a_1, \ldots, a_{n-1}$. Then $X$ is equal to

(GATE CS 2010)

a) $\max(Y, a_0 + Y)$ b) $\max(Y, a_0 + Y/2)$ c) $\max(Y, a_0 + 2Y)$ d) $a_0 + Y/2$

35) What is the value printed by the following C program?

```
#include <stdio.h>
int f(int *a, int n)
{
 if (n <= 0) return 0;
 else if (*a % 2 == 0) return *a + f(a+1, n-1);
 else return *a - f(a+1, n-1);
}
int main()
{
 int a[] = {12, 7, 13, 4, 11, 6};
 printf("%d", f(a, 6));
 return 0;
}
```

(GATE CS 2010)

a) −9 b) 5 c) 15 d) 19

36) The following C function takes a simply-linked list as input argument. It modifies the list by moving the last element to the front of the list and returns the modified list. Some part of the code is left blank.

```
typedef struct node {
 int value;
 struct node *next;
} Node;

Node *move_to_front(Node *head) {
 Node *p, *q;
 if ((head == NULL) || (head->next == NULL)) return head;
 q = NULL; p = head;
 while (p->next != NULL) {
```

```
 q = p;
 p = p->next;
}
 _____________________________
 return head;
}
```

Choose the correct alternative to replace the blank line.

(GATE CS 2010)

a) q = NULL; p-¿next = head; head = p;
b) q-¿next = NULL; head = p; p-¿next = head;
c) head = p; p-¿next = q; q-¿next = NULL;
d) q-¿next = NULL; p-¿next = head; head = p;

37) The program below uses six temporary variables a, b, c, d, e, f.

```
a = 1
b = 10
c = 20
d = a + b
e = c + d
f = c + e
b = c + e
e = b + f
d = 5 + e
return d + f
```

Assuming that all operations take their operands from registers, what is the minimum number of registers needed to execute this program without spilling?

(GATE CS 2010)

a) 2 b) 3 c) 4 d) 6

38) The grammar $S \rightarrow aSa \mid bS \mid c$ is

(GATE CS 2010)

a) LL(1) but not LR(1)
b) LR(1) but not LL(1)
c) Both LL(1) and LR(1)
d) Neither LL(1) nor LR(1)

39) Let $L = \{w \in (0+1)^* \mid w$ has even number of 1s$\}$, i.e. $L$ is the set of all bit strings with even number of 1s. Which one of the regular expressions below represents $L$?

(GATE CS 2010)

a) $(0^*10^*1)^*$ b) $0^*(10^*10^*)^*$ c) $0^*(10^*1)^*0^*$ d) $0^*1(10^*1)^*10^*$

40) Consider the languages $L_1 = \{0^i1^j \mid i \neq j\}$, $L_2 = \{0^i1^j \mid i = j\}$, $L_3 = \{0^i1^j \mid i = 2j+1\}$, $L_4 = \{0^i1^j \mid i \neq 2j\}$. Which one of the following statements is true?

(GATE CS 2010)

a) Only $L_2$ is context free
b) Only $L_2$ and $L_3$ are context free
c) Only $L_1$ and $L_2$ are context free
d) All are context

41) Let $w$ be any string of length $n$ in $\{0, 1\}^*$. Let $L$ be the set of all substrings of $w$. What is the minimum number of states in a non-deterministic finite automaton that accepts $L$?

(GATE CS 2010)

a) $n - 1$ b) $n$ c) $n + 1$ d) $2^{n-1}$

42) Consider the following schedule for transactions $T_1$, $T_2$ and $T_3$:

| $T_1$ | $T_2$ | $T_3$ |
|---|---|---|
| Read($X$) | | |
| | Read($Y$) | |
| | | Read($Y$) |
| | Write($Y$) | |
| | | Write($X$) |
| | Write($X$) | |
| Read($X$) | | |
| Write($X$) | | |

Which one of the schedules below is the correct serialization of the above?

(GATE CS 2010)

a) $T_1 \rightarrow T_3 \rightarrow T_2$
b) $T_2 \rightarrow T_1 \rightarrow T_3$
c) $T_2 \rightarrow T_3 \rightarrow T_1$
d) $T_3 \rightarrow T_1 \rightarrow T_2$

43) The following functional dependencies hold for relations $R(A, B, C)$ and $S(B, D, E)$:

$$B \rightarrow A$$
$$A \rightarrow C$$

The relation $R$ contains 200 tuples and the relation $S$ contains 100 tuples. What is the maximum number of tuples possible in the natural join $R \bowtie S$?

(GATE CS 2010)

a) 100 b) 200 c) 300 d) 2000

44) The following program is to be tested for statement coverage:

```
begin
if (a == b) {S1; exit;}
else if (c == d) {S2;}
else {S3; exit;}
S4;
end
```

The test cases $T_1$, $T_2$, $T_3$ and $T_4$ given below are expressed in terms of the properties satisfied by the values of variables $a$, $b$, $c$ and $d$. The exact values are not given.
$T_1$: $a$, $b$, $c$ and $d$ are all equal
$T_2$: $a$, $b$, $c$ and $d$ are all distinct
$T_3$: $a = b$ and $c \neq d$
$T_4$: $a \neq b$ and $c = d$
Which of the test suites given below ensures coverage of statements $S_1$, $S_2$, $S_3$ and $S_4$?

(GATE CS 2010)

a) $T_1, T_2, T_3$ b) $T_2, T_4$ c) $T_3, T_4$ d) $T_1, T_2, T_4$

45) The following program consists of 3 concurrent processes and 3 binary semaphores. The semaphores are initialized as $S_0 = 1$, $S_1 = 0$, $S_2 = 0$.

| Process P0 | Process P1 | Process P2 |
|---|---|---|
| while (true) {<br>wait ($S_0$);<br>print '0'<br>release ($S_1$);<br>release ($S_2$);<br>} | wait ($S_1$);<br>Release ($S_0$); | wait ($S_2$);<br>release ($S_0$); |

How many times will process $P_0$ print '0'?

(GATE CS 2010)

a) At least twice b) Exactly twice c) Exactly thrice d) Exactly once

46) A system has $n$ resources $R_0, \ldots, R_{n-1}$, and $k$ processes $P_0, \ldots, P_{k-1}$. The implementation of the resource request logic of each process $P_i$ is as follows:

```
if (i % 2 == 0) {
 if (i < n) request R_i;
 if (i+2 < n) request R_{i+2};
}
else {
 if (i < n) request R_{n-i};
 if (i+2 < n) request R_{n-i-2};
}
```

In which one of the following situations is a deadlock possible?

(GATE CS 2010)

a) $n = 40, k = 26$ b) $n = 21, k = 12$ c) $n = 20, k = 10$ d) $n = 41, k = 19$

47) Suppose computers $A$ and $B$ have IP addresses 10.105.1.113 and 10.105.1.91 respectively and they both use the same net mask $N$. Which of the values of $N$ given below should not be used if $A$ and $B$ should belong to the same network?

(GATE CS 2010)

a) 255.255.255.0
b) 255.255.255.128
c) 255.255.255.192
d) 255.255.255.224

## Common Data Questions: 48 and 49

48) A computer system has an L1 cache, an L2 cache, and a main memory unit connected as shown below. The block size in L1 cache is 4 words. The block size in L2 cache is 16 words. The memory access times are 2 nanoseconds, 20 nanoseconds and 200 nanoseconds for L1 cache, L2 cache and main memory unit respectively.

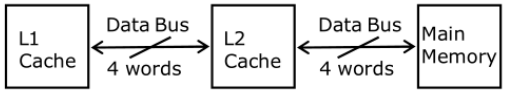



Fig. 4

When there is a miss in L1 cache and a hit in L2 cache, a block is transferred from L2 cache to L1 cache. What is the time taken for this transfer?

(GATE CS 2010)

a) 2 nanoseconds b) 20 nanoseconds c) 22 nanoseconds d) 88 nanoseconds

49) When there is a miss in both L1 cache and L2 cache, first a block is transferred from main memory to L2 cache, and then a block is transferred from L2 cache to L1 cache. What is the total time taken for these transfers?

(GATE CS 2010)

a) 222 nanoseconds b) 888 nanoseconds c) 902 nanoseconds d) 968 nanoseconds

## Common Data Questions: 50 and 51

Consider a complete undirected graph with vertex set $\{0, 1, 2, 3, 4\}$. Entry $W_{ij}$ in the matrix $W$ below is the weight of the edge $\{i, j\}$.

$$W = \begin{pmatrix} 0 & 1 & 8 & 1 & 4 \\ 1 & 0 & 12 & 4 & 9 \\ 8 & 12 & 0 & 7 & 3 \\ 1 & 4 & 7 & 0 & 2 \\ 4 & 9 & 3 & 2 & 0 \end{pmatrix}$$

50) What is the minimum possible weight of a spanning tree $T$ in this graph such that vertex 0 is a leaf node in the tree $T$?

(GATE CS 2010)

a) 7 b) 8 c) 9 d) 10

51) What is the minimum possible weight of a path $P$ from vertex 1 to vertex 2 in this graph such that $P$ contains at most 3 edges?

(GATE CS 2010)

a) 7 b) 8 c) 9 d) 10

## Linked Answer Questions: Q.52 to Q.55 Carry Two Marks Each

## Statement for Linked Answer Questions: 52 and 53

A hash table of length 10 uses open addressing with hash function $h(k) = k \bmod 10$, and linear probing. After inserting 6 values into an empty hash table, the table is as shown below

| | |
|---|---|
| 0 | |
| 1 | |
| 2 | 42 |
| 3 | 23 |
| 4 | 34 |
| 5 | 52 |
| 6 | 46 |
| 7 | 33 |
| 8 | |
| 9 | |

52) Which one of the following choices gives a possible order in which the key values could have been inserted in the table?

(GATE CS 2010)

a) 46, 42, 34, 52, 23, 33
b) 34, 42, 23, 52, 33, 46
c) 46, 34, 42, 23, 52, 33
d) 42, 46, 33, 23, 34, 52

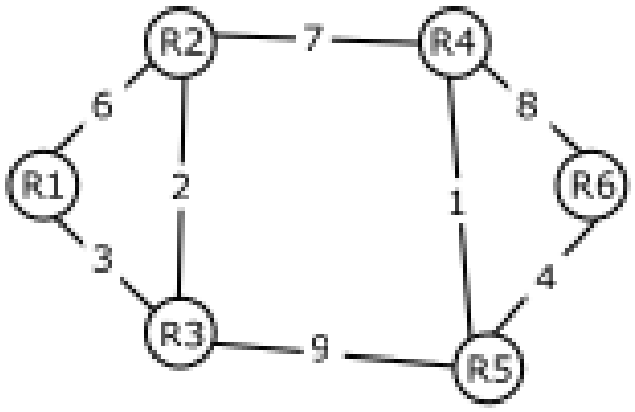
53) How many different insertion sequences of the key values using the same hash function and linear probing will result in the hash table shown above?

(GATE CS 2010)

a) 10 b) 20 c) 30 d) 40

## Statement for Linked Answer Questions: 54 and 55

Consider a network with 6 routers $R_1$ to $R_6$ connected with links having weights as shown in the following diagram.




54) All the routers use the distance vector based routing algorithm to update their routing tables.Eachrouter starts with its routing table initialized to contain an entry for each neighbour with the weightof the respective connecting link. After all the routing tables stabilize, how many links in the network will never be used for carrying any data? (GATE CS 2010)

a) 4 b) 3 c) 2 d) 1

55) Suppose the weights of all unused links in the previous question are changed to 2 and the distance vector algorithm is used again until all routing tables stabilize. How many links will now remain unused?

(GATE CS 2010)

a) 0 b) 1 c) 2 d) 3

## Q. No 56 and 60 Carry one mark each

56) Choose the most appropriate word from the options given below to complete the following sentence:

His rather casual remarks on politics _____ his lack of seriousness about the subject.

(GATE CS 2010)

a) masked b) belied c) betrayed d) suppressed

57) Which of the following options is closest in meaning to the word Circuitous. (GATE CS 2010)

a) cyclic b) indirect c) confusing d) crooked

58) Choose the most appropriate word from the options given below to complete the following sentence:If we manage to _____ our natural resources, we would leave a better planet for our children. (GATE CS 2010)

a) uphold b) restrain c) cherish d) conserve

59) 25 persons are in a room. 15 of them play hockey, 17 of them play football and 10 of them play both hockey and football. Then the number of persons playing neither hockey nor football is: (GATE CS 2010)

a) 2 b) 17 c) 13 d) 3

60) The question below consists of a pair of related words followed by four pairs of words. Select the pair that best expresses the relation in the original pair.Unemployed: Worker (GATE CS 2010)

a) fallow: land b) unaware: sleeper c) wit: jester d) renovated: house

## Q. No. 61 – 65 Carry Two Marks Each

61) If $137 + 276 = 435$, how much is $731 + 672$? (GATE CS 2010)

a) 534 b) 1403 c) 1623 d) 1513

62) Hari ($H$), Gita ($G$), Irfan ($I$) and Saira ($S$) are siblings (i.e. brothers and sisters). All were born on 1st January. The age difference between any two successive siblings (that is born one after another) is less than 3 years. Given the following facts:

i. Hari's age + Gita's age > Irfan's age + Saira's age.

ii. The age difference between Gita and Saira is 1 year. However Gita is not the oldest and Saira is not the youngest.

iii. There are no twins.

In what order were they born (oldest first)? (GATE CS 2010)

a) HSIG b) SGHI c) IGSH d) IHSG

63) Modern warfare has changed from large scale clashes of armies to suppression of civilian populations. Chemical agents that do their work silently appear to be suited to such warfare; and regretfully, there exist people in military establishments who think that chemical agents are useful tools for their cause. Which of the following statements best sums up the meaning of the above passage: (GATE CS 2010)

a) Modern warfare has resulted in civil strife.
b) Chemical agents are useful in modern warfare.
c) Use of chemical agents in warfare would be undesirable.
d) People in military establishments like to use chemical agents in war.

64) 5 skilled workers can build a wall in 20 days; 8 semi-skilled workers can build a wall in 25 days; 10 unskilled workers can build a wall in 30 days. If a team has 2 skilled, 6 semi-skilled and 5 unskilled workers, how long will it take to build the wall? (GATE CS 2010)

a) 20 b) 18 c) 16 d) 15

65) Given digits $2, 2, 3, 3, 4, 4, 4, 4$ how many distinct 4 digit numbers greater than 3000 can be formed? (GATE CS 2010)

a) 50 b) 51 c) 52 d) 54