Examination: **M.Tech Computer Science & Engineering**

SECTION 1 - SECTION 1

Question No.1

The discarded box was glowing in the dark because it _____ some of the rays of radium.

- has absorbed
- is absorbed
- is absorbing
- has been absorbed

Question No.2

Consider n processes sharing the CPU in a round robin fashion. Assuming that each process switch takes s seconds, what must be the quantum size q such that the overhead resulting from process switching is minimized but at the same time each process is guaranteed to get its turn at the CPU at least every t seconds?

- $q \geq (t - ns)/(n + 1)$
- $q \geq (t - ns)/(n - 1)$
- $q \leq (t - ns)/(n + 1)$
- $q \leq (t - ns)/(n - 1)$

Question No.3

If A + B means A is the mother of B;
A – B means A is the brother B;
A % B means A is the father of B and
A x B means A is the sister of B,

Which of the following shows that P is the maternal uncle of Q?

- P + S x N – Q
- Q – S % P
- P – M + N x Q
- Q – N + M x P

Question No.4

Given the following expression grammar:

$$E \rightarrow E * F \mid F+E \mid F$$
$$F \rightarrow F-F \mid id$$

Which of the following is TRUE?

- – has higher precedence than *
- + and — have same precedence
- * has higher precedence than +
- + has higher precedence than *

Question No.5

Which of the following is not a software life cycle model?

- Prototyping Model
- Capability Maturity Model
- Spiral Model
- Waterfall Model

Question No.6

The world's largest solar park has launched in which state?

- Karnataka
- Odisha
- Rajasthan
- Madhya Pradesh

Question No.7

Removal of an element from empty stack results in

- Recursion
- Error
- Underflow
- Overflow

Question No.8

Which of the following class of statement usually produces no executable code when compiled?

- Assignment statements
- Declaration
- Input and output statements
- Structural statements

Question No.9

In microprocessor, a DMA transfer implies

- Direct transfer of data between memory and accumulator
- A fast transfer of data between microprocessor and input-output devices
- Direct transfer of data between memory and input-output devices without use of microprocessor
- None of the above

Question No.10

Which symbol is used to indicate the derivation of a child class from base class in C++?

- ::
- ||
- ;
- :

Question No.11

An abstract data type is

- Same as an abstract class
- A data type that cannot be instantiated
- A data type for which only the operations defined on it can be used, but none else
- All of these

Question No.12

Find the languages L1 and L2 can be generated from the corresponding grammars G1 and G2 given as fallows?

G1: S → AB
A →aA/a
B → bB/ Є

G2: S → AB
A →aA/ Є
B → bB/b

- L1: $\{a^m b^n / m>=0, n>=1\}$ and L2: $\{a^m b^n / m>=1, n>=0\}$
- L1: $\{a^m b^n / m>=1, n>=0\}$ and L2: $\{a^m b^n / m>0, n>=1\}$
- L1: $\{a^m b^n / m, n>=0\}$ and L2: $\{a^m b^n / m>=1, n>=0\}$
- L1: $\{a^m b^n / m, n>=0\}$ and L2: $\{a^m b^n / m>0, n>=1\}$

Question No.13

Mantissa is a pure fraction in sign magnitude form. The decimal number 0.239×2^{13} has the following hexadecimal representation (without normalization and rounding off)

- 0D 24
- 0D 4D
- 4D 0D
- 4D 3D

Question No.14

An entity is represented in E-R diagram using

- Rhombus
- Triangle
- Ellipse

- Rectangle

Question No.15

Find the right Antonym of **AUDACITY**

- Boldness
- Meekness
- Bravery
- Courage

Question No.16

Which of the following is programming language level synchronization tool?

- Program Counter
- Integer variable
- Semaphore
- Monitor

Question No.17

Match List I (Type of memory) with List II (Used as) and select the correct answer using the code given below the lists.

List-I	List-II
A) Primary Index	1.Non-key and non-ordered
B) Clustering Index	2. Key and non-ordered
C) Secondary Index (key)	3. Key and ordering
D) Secondary Index (non-key)	4. Non-key and ordered

- A-3,B-2, C-4, D-1
- A-4,B-3, C-1,D-2
- A-3,B-4, C-2,D-1
- A-4,B-1, C-2,D-3

Question No.18

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

List-I	List-II
A)Requirement Capture	1.Module Development and Integration
B) Design	2. Domain Analysis
C)Implementation	3. Structural and Behavioural Modelling
D) Maintenance	4. Performance Tuning

- A-3,B-2, C-1,D-4
- A-2,B-3, C-4,D-1
- A-3,B-2, C-4,D-1
- A-2,B-3, C-1, D-4

Question No.19

How many elements are required to create an IoT architecture?

- Five
- Seven
- Nine
- Three

Question No.20

Ram, who is half as efficient as Krish, will take 24 days to complete a task if he worked alone. If Ram and Krish worked together, how long will they take to complete the task?

- 8 Days
- 10 Days
- 6 Days
- 12 Days

Question No.21

Consider the following:

SELECT	1
HAVING	2
WHERE	3
ORDER BY	4
FROM	5
GROUP BY	6

What is the CORRECT order for evaluating an SQL statement?

- 234516
- 136254
- 534126
- 536214

Question No.22

This country has sought India's support in handling the Rohingya issue by mounting pressure on Myanmar to take back the refugees who have taken shelter in the country.

- Bangladesh
- The United States of America
- Nepal
- Vietnam

Question No.23

The programming C and C++ are not strongly typed because

- Union types in these (C and C++) languages are not type checked.
- Both C and C++ allow functions for which parameters are not type checked and also the union types in these languages are not type checked
- Both C and C++ allow functions for which parameters are not type checked
- Both C and C++ allow functions for which parameters are type checked

Question No.24

Consider the following DB relation:
Student (Sid, Sname, gender, marks)

Which of the following query is/are CORRECT to retrieve female students scored more marks than marks of all male students? (I=Sid, N=name, G=gender, M=marks)

Q_1 $\Pi_{Sid}\left[\begin{matrix}\sigma(Student)\\ gender = female\end{matrix}\right] - \Pi_{Sid}\left[\begin{matrix}Student \triangleright\!\triangleleft \rho(\text{Student})\\ gender = I, N, G, M\ female\\ \wedge G = male\\ \vee marks >= M\end{matrix}\right]$

Q_2 $\Pi_{Sid}\left[\begin{matrix}\sigma(Student)\\ gender = female\end{matrix}\right] - \Pi_{Sid}\left[\begin{matrix}Student \triangleright\!\triangleleft \rho(\text{Student})\\ gender = I, N, G, M\ female\\ \wedge G = male\\ \wedge marks >= M\end{matrix}\right]$

Q_3 $\Pi_{Sid}\left[\begin{matrix}\sigma(Student)\\ gender = female\end{matrix}\right] - \Pi_{I}\left[\begin{matrix}Student \triangleright\!\triangleleft \rho(\text{Student})\\ gender = I, N, G, M\ male\\ \wedge G = female\\ \wedge marks >= M\end{matrix}\right]$

- Q_1 only correct
- Q_2 only correct
- Q_3 only correct
- None of these

Question No.25

If the cost price of 20 articles is equal to the selling price of 25 articles, what is the % profit or % loss made by the merchant?

- 25% Profit
- 20% Profit
- 25% Loss
-

20% Loss

Question No.26

600 125 30 ? 7.2 6.44 6.288

- 11
- 6
- 10
- 15

Question No.27

Which of the following is a black box testing method?

- Decision table based testing
- Robust worst case analysis
- Boundary value analysis
- Cause effect graphing technique

Question No.28

A relation R has eight attributes which contains only atomic values. R is said to be in

- BCNF
- 2NF, but not in 3NF
- 1NF, but not in 2NF
- 3NF, but not in BCNF

Question No.29

An n-dimensional array V is defined as follows:

V[i, j] = i - j for all i, j, 1 <= i <= n, 1 <= j <= n

The sum of the elements of array V is

- n-1
- 0
- $n^2 – 3n + 2$
- $n^2(n+1)/2$

Question No.30

Most Packet switching networks, uses the principle of

- Stop and Forward
- Cut and Forward
- Store and Forward
- Stop and wait

Question No.31

What is the output of following C code?

```
# include <stdio.h>
# include <string.h>
intmain () {
        char* str = "Hello World!";
        printf ("%ld, %ld\n", sizeof(str), strlen(str));
}
```

- 8, 12
- 13, 13
- 12, 12
- 8, 13

Question No.32

Which social media platform has been recently accused of data breach in relation to the Cambridge Analytica Controversy?

- Whatsapp
- Facebook
- LinkedIn
- Twitter

Question No.33

The C language is

- Regular Language
- Context Free Language
- Context Sensitive Language
- Object Oriented Language

Question No.34

The data model that describes how the data actually stored is called as

- Conceptual model
- Final model
- Physical model
- Internal model

Question No.35

Which of the following devices should get highest priority in assigning interrupts?

- Keyboard
- Floppy Disk
- Hard disk
- Printer

Question No.36

. Select the CORRECT option for following C code segment

```
# include <stdio.h>
int main () {
        int a = a;
        printf ("%d\n", a);
}
```

- Will generate infinite recursion during run-time
- Will generate compile time error
- Will compile correctly with garbage value in ‘a’
- Will generate run time error

Question No.37

Consider a standard Circular Queue implementation whose size is 11 and the elements of the queue, q are q[0], q[1], q[2].....,q[10].The front and rear pointers are initialized to point at q[2]. In which position will the ninth element be added?

- q[1]
- q[0]
- q[10]
- q[9]

Question No.38

The maximum number of binary trees that can be formed with three unlabeled nodes is:

- 3
- 5
- 4
- 1

Question No.39

Which of the following addressing mode permits relocation without any change what so ever in the code?

- Indirect addressing
- Base Register addressing
- PC relative addressing
- Indexed addressing

Question No.40

The current economic scenario (1) / could possibly undo (2) / the growth that followed (3) / the economic liberalisation of 1991. (4)

- C
- B
- A
- D

Question No.41

Which of the following is NOT a characteristic of Common LISP?

- Extensive Control Structures
- Machine Dependent
- Dynamic updating of programs
- Expression Based

Question No.42

The type of the statement “CREATE TABLE EMPLOYEE(EID NUMBER)” is

- DCL
- DDL
- DML
- Integrity Constraint

Question No.43

Consider a unit square centred at origin. The coordinates of the square are translated by a factor $\left(\frac{1}{2}, 1\right)$ and rotated by an angle of 90°. What will be the coordinates of the new square?

- $\left(\frac{-1}{2}, 0\right), \left(\frac{-1}{2}, 1\right), \left(\frac{-3}{2}, 1\right), \left(\frac{-3}{2}, 0\right)$
- $\left(\frac{-1}{2}, 0\right), \left(\frac{1}{2}, 0\right), \left(\frac{-3}{2}, 1\right), \left(\frac{-3}{2}, 0\right)$
- $\left(\frac{-1}{2}, 0\right), \left(\frac{1}{2}, 1\right), \left(\frac{-3}{2}, 1\right), \left(\frac{-3}{2}, 0\right)$
- $\left(\frac{-1}{2}, 0\right), \left(\frac{1}{2}, 1\right), \left(\frac{3}{2}, 1\right), \left(\frac{3}{2}, 0\right)$

Question No.44

A CPU has 24-bit instructions. A program starts at address 300 (in decimal). Which one of the following is a legal program counter (all values in decimal) ?

- 600
- 700
- 400
- 500

Question No.45

Consider a 2−way set associative cache with 256 blocks and uses LRU replacement. Initially the cache is empty. Conflict misses are those misses which occur due to the contention of multiple blocks for the same cache set. Compulsory misses occur due to first time access to the block. The following sequence of access to memory blocks:

{0,128,256,128,0,128,256,128,1,129,257,129,1,129,257,129}

is repeated 10 times. The number of conflict misses experienced by the cache is _____?

- 76
- 68
- 72
- 64

Question No.46

A company needs to develop a strategy for software product development for which it has a choice of two programming languages L1 and L2. The number of Lines of Code (LOC) developed using L2 is estimated to be twice the LOC developed with L1. The product will have to be maintained for five years. Various parameters for the company are given in the table below.

Parameter	Language (L1)	Language (L2)
Man years needed for development	LOC/10000	LOC/10000
Development cost per man year	1000000	750000
Maintenance time	5 years	5 years
Cost of maintenance per year	100000	50000

Total cost of the project includes cost of development and maintenance. What is the LOC for L1 for which the cost of the project using L1 is equal to the cost of the project using L2?

- 5000
- 4333
- 4000
- 4667

Question No.47

System calls are usually invoked by using

- A software interrupt
- An indirect Jump
- Polling
- A privileged instruction

Question No.48

How many 32K X 1 RAM chips are needed to provide a memory capacity of 256 K-bytes ?

- 64
- 32
- 8
- 128

Question No.49

In the theory of cloud computing, Choose the INCORRECT statement.

- LongJump is WYSIWYG editor
- For a cloud-based virtual computer, the network interface may be a highly variable resource
- Tools are available that can monitor a cloud network's performance at geographical different points and over different third-party ISP connections
- Vertical scaling allows you to use a virtual system to run more virtual machines.

Question No.50

The number of token in the following C statement is:

```
printf("i = %d, &i = %x", i, &i)
```

- 3
- 26
- 10
- 21

Question No.51

The number of non isomorphic simple graphs up to three nodes is

- 10
- 15
- 9
- 7

Question No.52

Among the following data link layer protocols, which protocols performs maximum retransmission in case of packet drop.

i. Stop and Wait
ii. Go Back N
iii. Selective Repeat

- i, ii and iii
- i and ii
- Only iii
- Only ii

Question No.53

For the following C++ code segment, output will be

```
int x = 5;
std::cout << (x++ == 6 || x == 5) << ", " << x << std::endl;
```

- 1, 5
- 0, 5
- 0, 6
- 1, 6

Question No.54

MAC address consists of

- 64 bits
- 48 bits
- 32 bits
- 52 bits

Question No.55

Which type of memory allocation is supported by linked list?

- Fixed
- Static
- Compile Time
- Dynamic

Question No.56

The height of a binary tree is the maximum number of edges in any root to leaf path. The maximum number of nodes in a binary tree of height h is:

- $2^{h+1}-1$
- 2^{h+1}
- $2^{h}-1$
- $2^{h-1}-1$

Question No.57

Designers should aim to produce strongly _____ and weakly _____ designs

- Cohesive, Coupled
- Cohesive, Maintainable
- Adoptable, Cohesive
- Coupled, Cohesive

Question No.58

A pointer in C which has not been initialized is known as

- Null Pointer
- Static Pointer
- Dangling pointer
- Wild Pointer

Question No.59

Consider the following relations:

Bank (bname, city)
Travel (pname, city)

```
SELECT T1. pname
FROM Travel T1
WHERE NOT EXISTS (SELECT B. city From Bank B
WHERE B.name = 'SBI'
EXCEPT
SELECT T2.city
FROM Travel T2
WHERE T1. pname = T2. pname)
```

This query finds names of the persons:

- Who have travelled in all city where SBI is located
- Who have not travelled in any city where SBI is located
- Who have travelled in any city where SBI is located
- Who have not travelled in all city where SBI is located

Question No.60

Where is the headquarters of European Bank for Reconstruction and Development (EBRD)?

- Paris
- New York
- London
- Berlin

Question No.61

The selection operation in relational algebra is denoted by

- Lambda
- Greek
- Pi
- Sigma

Question No.62

The subnet mask for a particular network is 255.255.31.0. Which of the following pairs of IP addresses could belong to this network?

- 128.8.129.43 and 128.8.161.55
- 191.203.31.87 and 191.234.31.88
- 172.57.88.62 and 172.56.87.233
- 10.35.28.2 and 10.35.29.4

Question No.63

Which option is correct for the following C code segment?

```
# include <stdio.h>
int main() {
        intarr[5] = {0, 1, 2, 3, 4};
int *ptr = &arr[2];
printf("%d\n", ++*ptr--);
 }
```

- Will not compile
- Will output 1
- Will output 3
- Will output 2

Question No.64

The RST 6 instruction in 8085 microprocessor transfers the program execution to following location.

- 60H
- 24H
- 48H
- 30H

Question No.65

Belady's anomaly occurs in

- FIFO
- NRU
- LIFO
- LRU

Question No.66

Who led the US Delegation to India at the Global Entrepreneurship Summit held at Hyderabad in the year 2017?

- Donald Trump
- Jim Mattis
- Rex Tillerson
- Ivanka Trump

Question No.67

Which of the following graphics primitives are considered as the basic building blocks of computer graphics?

1. Points
2. Lines
3. Polylines
4. Polygons

- 1, 2, 3 and 4
- 1, 2 and 3
- 1 and 2
- Only 1

Question No.68

The address resolution protocol is used for

- Finding the IP address of the default gateway
- Finding the IP address from DNS
- Finding MAC address that corresponds to an IP address
- Finding IP address that corresponds to a MAC address

Question No.69

The below given sentence can be replaced with one word from the options below: Choose the correct word.

A person who walks while sleeping

- Somnambulist
- Ardent
- Athlete
- Ambulant

Question No.70

Find out the alternative which will replace the question mark.
CUP: LIP: :BIRD: ?

- BUSH
- GRASS
- FOREST
- BEAK

Question No.71

How many distinct binary search trees can be created out of 4 distinct keys?

- 24
- 5
- 42
- 14

Question No.72

Which is the most appropriate match for the items in the first column with the items in the second column?

List-I	List-II
A) Indirect Addressing	1.Array Implementation
B) Indexed Addressing	2. Writing re-locatable code
C) Base Register Addressing	3. Passing array as parameter

- A-1,B-3, C-2
- A-3,B-2, C-1
- A-3,B-1, C-2
- A-2,B-3, C-1

Question No.73

Consider the following expression grammar. The semantic rules for expression calculation are stated next to each grammar production rule:

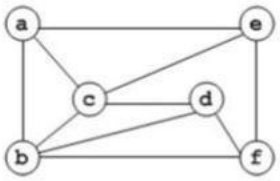
$E \rightarrow$number	E.val =number.val
| E '+' E	$E^{(1)}.val = E^{(2)}.val + E^{(3)}.val$
| E 'x' E	$E^{(1)}.val = E^{(2)}.val \times E^{(3)}.val$

The above grammar and the semantic rules are fed to a YACC tool (which is an LALR (1) parser generator) for parsing and evaluating arithmetic expressions. Which one of the following is true about the action of YACC for the given grammar?

- It detects shift-reduce conflict, and resolves the conflict in favour of a reduce over a shift action
- It detects shift-reduce conflict, and resolves the conflict in favour of a shift over a reduceaction
- It detects recursion and eliminates recursion
- It detects reduce-reduce conflict, and resolves

Question No.74

What is the chromatic number of the following graph?



- 3
- 2
- 4
- 5

Question No.75

Anil on his own purchased this plot _____ his son.

- With
- To
- Of
- For

Question No.76

Number of states of minimum finite automata for the fallowing languages respectively

L1: $\{a^m b^n / m, n >= 0\}$

L2: $\{a^m b^n / m >= 1, n >= 2\}$

- 3, 5
- 3, 4
- 2, 3
- 4, 5

Question No.77

A point P(2,5) is rotated about a pivot point (1,2) by 60^o. What is the new transformed point corresponding to P?

- (1, -4)
- (-1,4)
- (1,4)
- (-4,1)

Question No.78

Choose the antonym for word
"Unprecedented"

- Unexceptional
- Remarkable

- Freakish
- Unusual

Question No.79

When a copy of an entire object is passed to a function, then it is referred to as

- Pass by Pointer
- Pass by Reference
- Pass by text
- Pass by value

Question No.80

The performance of a pipelined processor suffers if

- The pipeline stages have different delays
- Consecutive instructions are dependent on each other
- The pipeline stages share dependent hardware resources
- All of these

Question No.81

Which of the following is a tautology?

- (a v b) → (b ^ c)
- (a→b)→)(b→c)
- (a v b) →(b→c)
- (a ^ b)→ (b v c)

Question No.82

What is the converse of assertion “I stay only if you go”?

- If you do not go then I do not stay
- If I do not stay then you go
- I stay if you go
- If I stay then you go

Question No.83

What is the time complexity of inserting a node in doubly linked list?

- O(1)
- O(logn)
- O(nlogn)
- O(n)

Question No.84

Which of the following is true according to satisfiable property ?

- A statement is satisfiable if there is no interpretation for which it is true
- A statement is satisfiable if there is some interpretation for which it is false
- A statement is satisfiable if there is some interpretation for which it is true
- A statement is satisfiable if there is no interpretation for which it is false

Question No.85

The following C function takes a 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. Choose the CORRECT answer.

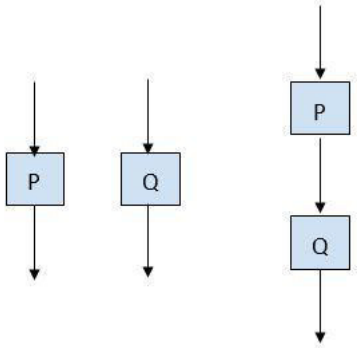
```
typedefstruct node
{
 int value;
 struct node *next;
} Node;

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;
 }
```

- q->next = NULL; p->next = head; head = p;
- q = NULL; p->next = head; head = p;
- q->next = NULL; head = p; p->next = head;
- head = p; p->next = q; q->next = NULL;

Question No.86

The cyclomatic complexity of each of the modules P and Q shown below is 10. What is the cyclomatic complexity of the sequential integration shown on the right hand side?



- 10
- 21
- 20
- 19

Question No.87

Suppose that a system has *n* number of nodes. Then the number of nodes required in cutting latency in half is:

- *n+1*
- *3n*
- *2n-2*
- *4n*

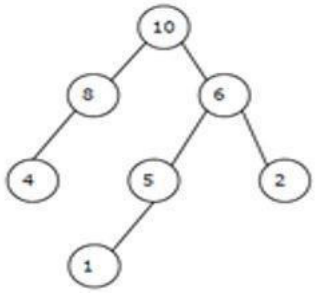
Question No.88

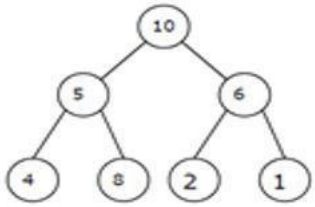
Choose the word which is MOST similar in meaning to the word
Shrewdly

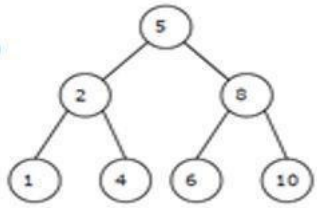
- Rudely
- Roughly
- Courteously
- Astutely

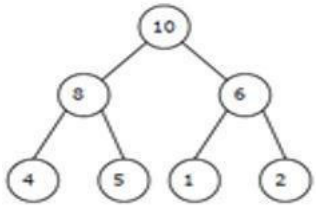
Question No.89

Which of the following is a max-heap?









Question No.90

When a process is rolled out of memory, it loses its ability to utilize the CPU (at slightest for a while). Under which of the following circumstances, a process loses its ability to utilize the CPU when it does not get rolled out?

- When thrashing occurs
- While swapping
- When an interrupt occurs
- When deadlock occurs

Question No.91

The average of four consecutive even number is 27. The largest of these number is

- 32
- 36
- 30
- 28

Question No.92

The data blocks of a very large file in the Unix file system are allocated using

- Linked Allocation
- Contiguous Allocation
- An extension of indexed allocation
- Indexed allocation

Question No.93

A process executes the code

```
fork();
fork();
fork();
```

The total number of child processes created is

- 3
- 7
- 8
- 4

Question No.94

Application layer is implemented in

- Ethernet
- End System
- NIC
- SUBNET

Question No.95

Courier charges for packages to a certain destination are Rs. 65 for the first 250 grams and Rs. 10 for each additional 100 grams or part thereof. What could be the possible weight in Kg of a package for which the charge is Rs.155 ?

- 1.325 kg
- 1.155 kg
- 1.280 kg
- 1.148 kg

Question No.96

Let A is a DCFL, B is Regular set and C is a CFL. Which of the following is INCORRECT Statement?

- A/B is a DCFL
- A∩C is a DCFL
- A∩B is a DCFL
- C/B is a CFL

Question No.97

Which is the number that comes next in the sequence? 9, 8, 8, 8, 7, 8, 6, …

- 8
- 6
- 4
- 5

Question No.98

Post-order traversal of a given binary search tree say T, produces the following sequence of keys 10, 9, 23, 22, 27, 25, 15, 50, 95, 60, 40, 29. Whic one of the following sequences of keys can be the result of an in-order traversal of the tree T?

- 95, 50, 60, 40, 27, 23, 22, 25, 10, 9, 15, 29
- 29, 15, 9, 10, 25, 22, 23, 27, 40, 60, 50, 95
- 9, 10, 15, 22, 40, 50, 60, 95, 23, 25, 27, 29
- 9, 10, 15, 22, 23, 25, 27, 29, 40, 50, 60, 95

Question No.99

Consider the following statements.

(i) LDA 3000H
(ii) LXI D, F0F1H

Then, the number of memory cycles needed to perform the following 8085 instructions are:

- 4 cycles for (i) and 3cycles for (ii)
- 2 cycles for (i) and 2cycles for (ii)
- 3cycles for (i) and 3cycles for (ii)
- 4 cycles for (i) and 4cycles for (ii)

Question No.100

What is the output of the following C code? Assume that the address of x is 1000 (in decimal) and an integer requires 4 bytes of memory.

```
int main ()
{
  unsigned int x[4][3] = {{1, 2, 3}, {4, 5, 6},
                          {7, 8, 9}, {10, 11, 12}};
  printf ("%u, %u, %u", x+3, *(x+3), *(x+2), *(x+2) +2);
}
```

- 1036, 36, 24, 1032
- 36,36, 24, 32
- 36, 1036, 1024, 32
- 1036, 1036, 1024, 1032