



Volume 1
All previous year
ISRO CSE Questions

GATE OVERFLOW FOR ISRO CSE

Edition 1 2025

GATE Overflow Team
led by

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Computer Science & IT



QnA



Chat



FB Group

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1.1.1 Algorithm Design: ISRO CSE 2023 | Question: 47

The asymptotic complexity of 4 functions f_1, f_2, f_3, f_4 are

1. $f_1(n) = 2^n$
2. $f_2(n) = n^{(3/2)}$
3. $f_3(n) = n \log n$
4. $f_4(n) = n^{\log n}$

Arrange them in increasing order of, complexity

- | | |
|-------------------------|-------------------------|
| A. f_2, f_3, f_4, f_1 | B. f_1, f_2, f_3, f_4 |
| C. f_3, f_2, f_4, f_1 | D. f_3, f_1, f_2, f_4 |

isro-cse-2023 asymptotic-notations time-complexity algorithm-design

[Answer key](#)

1.1.2 Algorithm Design: ISRO-DEC2017-44



A sorting technique is called stable if

- A. If it takes $O(n \log n)$ time.
- B. It uses divide and conquer technique.
- C. Relative order of occurrence of non-distinct elements is maintained.
- D. It takes $O(n)$ space.

isrodec2017 sorting algorithm-design data-structures

[Answer key](#)



1.2.1 Algorithm Design Techniques: GATE CSE 1994 | Question: 1.19, ISRO2016-31

Algorithm design technique used in quicksort algorithm is?

- | | |
|------------------------|------------------|
| A. Dynamic programming | B. Backtracking |
| C. Divide and conquer | D. Greedy method |

gate1994 algorithms algorithm-design-techniques quick-sort easy isro2016

[Answer key](#)

1.2.2 Algorithm Design Techniques: GATE CSE 1998 | Question: 1.21, ISRO2008-16



Which one of the following algorithm design techniques is used in finding all pairs of shortest distances in a graph?

- | | |
|------------------------|-----------------------|
| A. Dynamic programming | B. Backtracking |
| C. Greedy | D. Divide and Conquer |

gate1998 algorithms algorithm-design-techniques easy isro2008

[Answer key](#)

1.2.3 Algorithm Design Techniques: ISRO CSE 2007 | Question: 55



Selection sort algorithm design technique is an example of

- A. Greedy method
- B. Divide-and-conquer
- C. Dynamic Programming
- D. Backtracking

isro2007 algorithms algorithm-design-techniques easy

[Answer key](#)

1.2.4 Algorithm Design Techniques: ISRO CSE 2011 | Question: 66



Which of the following algorithm design technique is used in merge sort?

- A. Greedy method
- B. Backtracking
- C. Dynamic programming
- D. Divide and Conquer

isro2011 algorithms algorithm-design-techniques merge-sort

[Answer key](#)

1.2.5 Algorithm Design Techniques: ISRO CSE 2018 | Question: 16



The following paradigm can be used to find the solution of the problem in minimum time:

Given a set of non-negative integer and a value K , determine if there is a subset of the given set with sum equal to K :

- a. Divide and Conquer
- b. Dynamic Programming
- c. Greedy Algorithm
- d. Branch and Bound

isro2018 algorithm-design-techniques algorithms

[Answer key](#)

1.3

Asymptotic Notations (2)



1.3.1 Asymptotic Notations: ISRO-DEC2017-18

Consider the recurrence equation

$$T(n) = \begin{cases} 2T(n-1), & \text{if } n > 0 \\ 1, & \text{otherwise} \end{cases}$$

Then $T(n)$ is (in $\text{big } O$ order)

- A. $O(n)$
- B. $O(2^n)$
- C. $O(1)$
- D. $O(\log n)$

isrodec2017 recurrence-relation asymptotic-notations

[Answer key](#)

1.3.2 Asymptotic Notations: ISRO-DEC2017-19



```
//Consider the program
void function(int n)
{
    int i,j,count=0;
    for(i=n/2;i<=n;i++)
        for(j=1;j<=n;j=j*2)
            count++;
}
```

The complexity of the program is

- A. $O(\log n)$
- B. $O(n^2)$
- C. $O(n^2 \log n)$
- D. $O(n \log n)$

Answer key**1.4****Binary Search (2)****1.4.1 Binary Search: ISRO CSE 2007 | Question: 59**

The time taken by binary search algorithm to search a key in a sorted array of n elements is

- A. $O(\log_2 n)$
- B. $O(n)$
- C. $O(n \log_2 n)$
- D. $O(n^2)$

Answer key**1.4.2 Binary Search: ISRO CSE 2014 | Question: 28**

Suppose there are 11 items in sorted order in an array. How many searches are required on the average, if binary search is employed and all searches are successful in finding the item?

- A. 3.00
- B. 3.46
- C. 2.81
- D. 3.33

Answer key**1.5****Decision Table (1)****1.5.1 Decision Table: ISRO CSE 2007 | Question: 69**

A rule in a limited entry decision table is a

- A. row of the table consisting of condition entries
- B. row of the table consisting of action entries
- C. column of the table consisting of condition entries and the corresponding action entries
- D. columns of the table consisting of conditions of the stub

Answer key**1.6****Dijkstras Algorithm (2)****1.6.1 Dijkstras Algorithm: ISRO CSE 2007 | Question: 80**

Dijkstra's algorithm is used to

- A. Create LSAs
- B. Flood an internet with information
- C. Calculate the routing tables
- D. Create a link state database

Answer key**1.6.2 Dijkstras Algorithm: ISRO CSE 2023 | Question: 20**

Match the following:

--	--

(A) Floyd Warshall	(i) shortest path between two vertices
(B) Dijkstra	(ii) single source shortest path
(C) Kruskal's	(iii) Minimum spanning tree
(D) Bellman ford	(iv) solving all pair shortest path

- A. (A)-(iii), (B)-(ii), (C)-(iv), (D)-(i)
 C. (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)

- B. (A)-(iv), (B)-(i), (C)-(iii), (D)-(ii)
 D. (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)

isro-cse-2023 minimum-spanning-tree dijkstras-algorithm

Answer key 

1.7

Dynamic Programming (1)



1.7.1 Dynamic Programming: ISRO-DEC2017-20

Match the following and choose the correct answer for the order *A,B,C,D*

A. Strassen matrix multiplication	p. Decrease and Conquer
B. Insertion sort	q. Dynamic Programming
C. Guassian Elimination	r. Divide and Conquer
D. Floyd shortest path algorithm	s. Transform and Conquer

- A. a-r, b-s, c-p, d-q
 C. a-q, b-s, c-p, d-r

- B. a-r, b-p, c-s, d-q
 D. a-s, b-p, c-q, d-r

isrodec2017 algorithms algorithm-design matrix dynamic-programming

Answer key 

1.8

Expression Evaluation (1)



1.8.1 Expression Evaluation: ISRO CSE 2023 | Question: 43

The minimum number of arithmetic operations required to evaluate the expression $f(z) = 8x^3 + 3z + 12$

- A. 4 B. 5 C. 3 D. 6

isro-cse-2023 arithmetic-series algorithm-design expression-evaluation

Answer key 

1.9

Graph Algorithms (3)



1.9.1 Graph Algorithms: ISRO CSE 2017 | Question: 17

Which of the following data structure is useful in traversing a given graph by breadth first search?

- A. Stack B. Queue C. List D. None of the above

isro2017 data-structures graph-algorithms breadth-first-search easy

Answer key 

1.9.2 Graph Algorithms: ISRO CSE 2017 | Question: 76



Which of the following algorithms solves the all pair shortest path problem?

- A. Prim's algorithm
- B. Dijkstra's algorithm
- C. Bellman ford algorithm
- D. Floyd warshalls algorithm

isro2017 algorithms graph-algorithms

Answer key

1.9.3 Graph Algorithms: ISRO CSE 2018 | Question: 33



Which of the following is application of Breath First Search on the graph?

- A. Finding diameter of the graph
- B. Finding bipartite graph
- C. Both (a) and (b)
- D. None of the above

isro2018 graph-algorithms breadth-first-search algorithms

Answer key

1.10 Hashing (3)

Hashing (3)

1.10.1 Hashing: GATE CSE 1989 | Question: 1-vii, ISRO2015-14



A hash table with ten buckets with one slot per bucket is shown in the following figure. The symbols $S1$ to $S7$ initially entered using a hashing function with linear probing. The maximum number of comparisons needed in searching an item that is not present is

0	S7
1	S1
2	
3	S4
4	S2
5	
6	S5
7	
8	S6
9	S3

- A. 4
- B. 5
- C. 6
- D. 3

hashing isro2015 gate1989 algorithms normal

Answer key

1.10.2 Hashing: ISRO CSE 2020 | Question: 24



In linear hashing, if blocking factor bfr , loading factor i and file buckets N are known, the number of records will be

- A. $cr = i + bfr + N$
- B. $r = i - bfr - N$
- C. $r = i + bfr - N$
- D. $r = i^* bfr^* N$

isro-2020 algorithms hashing normal

Answer key

1.10.3 Hashing: ISRO-DEC2017-50



The characters of the string K R P C S N Y T J M are inserted into a hash table of the size of size 10 using a hash function

$$h(x) = (\text{ord}(x) - \text{ord}(A) + 1) \bmod 10$$

If linear probing is used to resolve collisions, then the following insertion causes the collision

A. Y

B. C

C. M

D. P

isrodec2017 hashing easy

Answer key

1.11

Huffman Code (1)



1.11.1 Huffman Code: ISRO CSE 2020 | Question: 34

Huffman tree is constructed for the following data :{A,B,C,D,E} with frequency {0.17,0.11,0.24,0.33 and 0.15} respectively. 100 00 01101 is decoded as

A. BACE

B. CADE

C. BAD

D. CADD

isro-2020 algorithms huffman-code normal

Answer key

1.12

Identify Function (6)



1.12.1 Identify Function: ISRO CSE 2007 | Question: 23

Study the following program

```
//precondition: x>=0
public void demo(int x)
{
    System.out.print(x % 10);
    if (x % 10 != 0)
    {
        demo(x/10);
    }
    System.out.print(x%10);
}
```

Which of the following is printed as a result of the call demo (1234)?

A. 1441

B. 3443

C. 12344321

D. 43211234

isro2007 algorithms identify-function

Answer key



1.12.2 Identify Function: ISRO CSE 2008 | Question: 69

What is the value of $F(4)$ using the following procedure:

```
function F(K : integer)
integer;
begin
if (k<3) then F:=k else F:=F(k-1)*F(k-2)+F(k-3)
end;
```

A. 5

B. 6

C. 7

D. 8

isro2008 algorithms recursion identify-function

Answer key



1.12.3 Identify Function: ISRO CSE 2011 | Question: 40

Consider the following pseudocode

```
x:=1;
i:=1;
while ( x <= 500)
```

```

begin
x:=2^x;
i:=i+1;
end

```

What is the value of i at the end of the pseudocode?

- A. 4 B. 5 C. 6 D. 7

isro2011 algorithms identify-function

[Answer key](#)



1.12.4 Identify Function: ISRO CSE 2018 | Question: 12

An array A consists of n integers in locations $A[0], A[1], \dots, A[n - 1]$. It is required to shift the elements of the array cyclically to the left by k places, where $1 \leq k \leq (n - 1)$. An incomplete algorithm for doing this in linear time, without using another array is given below. Complete the algorithm by filling in the blanks.

```

min=n; i=0;
while(_____) {
    temp= A[i]; j=i;
    while(_____) {
        A[j]= _____;
        j=(j+k) mod n;
        if(j<min) then
            min = j;
    }
    A[(n+i-k) mod n]=_____;
    i=_____;
}

```

- a. $i > \text{min}; \quad j! = (n + 1) \pmod{n}; \quad A[j + k] \quad \text{temp}; \quad i + 1;$
- b. $i < \text{min}; \quad j! = (n + i) \pmod{n}; \quad A[j + k] \quad \text{temp}; \quad i + 1;$
- c. $i > \text{min}; \quad j! = (n + i + k) \pmod{n}; \quad A[j + k] \quad \text{temp}; \quad i + 1;$
- d. $i < \text{min}; \quad j! = (n + i - k) \pmod{n}; \quad A[(j + k) \pmod{n}] \quad \text{temp}; \quad i + 1;$

isro2018 algorithms identify-function

[Answer key](#)



1.12.5 Identify Function: ISRO CSE 2018 | Question: 7

Assume A and B are non-zero positive integers. The following code segment:

```

while(A!=B){
    if*(A> B)
        A -= B;
    else
        B -= A;
}
cout<<A; // printing the value of A

```

- a. Computes the LCM of two numbers
- c. Computes the GCD of two numbers
- b. Divides the larger number by the smaller number
- d. Finds the smaller of two numbers

isro2018 algorithms identify-function

[Answer key](#)



1.12.6 Identify Function: ISRO CSE 2018 | Question: 72

Consider the following C code segment

```

int f(int x)
{
    if(x<1) return 1;
    else return (if(x-1)+g(x));
}
int g(int x)
{
    if(x<2) return 2;
    else return (if(x-1)+g(x/2));
}

```

Of the following, which best describes the growth of $f(x)$ as a function of x ?

- a. Linear
- b. Exponential
- c. Quadratic
- d. Cubic

isro2018 algorithms identify-function time-complexity

[Answer key](#)

1.13

Linear Probing (3)

1.13.1 Linear Probing: ISRO CSE 2014 | Question: 64



Consider a 13 element hash table for which $f(key)=key \bmod 13$ is used with integer keys. Assuming linear probing is used for collision resolution, at which location would the key 103 be inserted, if the keys 661, 182, 24 and 103 are inserted in that order?

- A. 0
- B. 1
- C. 11
- D. 12

isro2014 hashing linear-probing

[Answer key](#)

1.13.2 Linear Probing: ISRO CSE 2016 | Question: 29



A Hash Function f defined as $f(key) = key \bmod 7$. With linear probing while inserting the keys 37, 38, 72, 48, 98, 11, 56 into a table indexed from 0, in which location key 11 will be stored (Count table index 0 as 0^{th} location)?

- A. 3
- B. 4
- C. 5
- D. 6

hashing isro2016 linear-probing

[Answer key](#)

1.13.3 Linear Probing: ISRO CSE 2018 | Question: 36



A hash table with 10 buckets with one slot per bucket is depicted here. The symbols, $S1$ to $S7$ are initially entered using a hashing function with linear probing. The maximum number of comparisons needed in searching an item that is not present is

0	S_7
1	S_1
2	
3	S_4
4	S_2
5	
6	S_5
7	
8	S_6
9	S_3

- A. 4 B. 5 C. 6 D. 3

isro2018 algorithms hashing linear-probing

[Answer key](#)

1.14

Machine Learning (1)



1.14.1 Machine Learning: ISRO CSE 2023 | Question: 16

Which of the following clustering technique is used by K- Means Algorithm:

- A. Hierarchical Technique B. Partitional technique
 C. Divisive D. Agglomerative

isro-cse-2023 non-gatecse machine-learning

[Answer key](#)

1.15

Master Theorem (1)



1.15.1 Master Theorem: ISRO CSE 2020 | Question: 21

The master theorem

- A. assumes the subproblems are unequal sizes
 B. can be used if the subproblems are of equal size
 C. cannot be used for divide and conquer algorithms
 D. cannot be used for asymptotic complexity analysis

isro-2020 algorithms master-theorem easy

[Answer key](#)

1.16

Matrix Chain Ordering (1)



1.16.1 Matrix Chain Ordering: ISRO CSE 2020 | Question: 79

Consider product of three matrices M_1, M_2 and M_3 having w rows and x columns, x rows and y columns, and y rows and z columns. Under what condition will it take less time to compute the product as $(M_1 M_2) M_3$ than to compute $M_1 (M_2 M_3)$?

- A. Always take the same time
 C. $x > y$ B. $(1/x + 1/z) < (1/w + 1/y)$
 D. $(w + x) > (y + z)$

Answer key**1.17****Merge Sort (3)****1.17.1 Merge Sort: GATE CSE 1999 | Question: 1.14, ISRO2015-42**

If one uses straight two-way merge sort algorithm to sort the following elements in ascending order:

20, 47, 15, 8, 9, 4, 40, 30, 12, 17

then the order of these elements after second pass of the algorithm is:

- A. 8, 9, 15, 20, 47, 4, 12, 17, 30, 40
- B. 8, 15, 20, 47, 4, 9, 30, 40, 12, 17
- C. 15, 20, 47, 4, 8, 9, 12, 30, 40, 17
- D. 4, 8, 9, 15, 20, 47, 12, 17, 30, 40

Answer key**1.17.2 Merge Sort: ISRO CSE 2007 | Question: 58**

The average case and worst case complexities for Merge sort algorithm are

- | | |
|----------------------------|-----------------------------------|
| A. $O(n^2), O(n^2)$ | B. $O(n^2), O(n \log_2 n)$ |
| C. $O(n \log_2 n), O(n^2)$ | D. $O(n \log_2 n), O(n \log_2 n)$ |

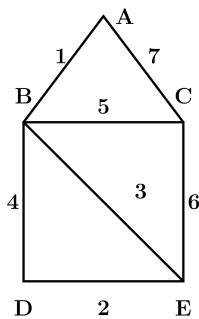
Answer key**1.17.3 Merge Sort: ISRO CSE 2018 | Question: 35**

Given two sorted list of size m and n respectively. The number of comparisons needed in the worst case by the merge sort algorithm will be:

- | | |
|---------------------------|---------------------------|
| A. $m \times n$ | B. maximum of m and n |
| C. minimum of m and n | D. $m + n - 1$ |

Answer key**1.18****Minimum Spanning Tree (2)****1.18.1 Minimum Spanning Tree: ISRO CSE 2023 | Question: 19**

Find the minimum spanning distance and the corresponding number of edges for the following graph



- A. 10,3 B. 11,4 C. 15,4 D. 28,7

isro-cse-2023 minimum-spanning-tree graph-algorithms algorithms

[Answer key](#)



1.18.2 Minimum Spanning Tree: ISRO2015-41

The number of spanning trees for a complete graph with seven vertices is

- A. 2^5 B. 7^5 C. 3^5 D. $2^{2 \times 5}$

isro2015 algorithms minimum-spanning-tree

[Answer key](#)



1.19

P NP NPC NPH (2)

1.19.1 P NP NPC NPH: GATE CSE 2004 | Question: 30, ISRO2017-10

The problem 3-SAT and 2-SAT are

- | | |
|--------------------------------------|---|
| A. both in P | B. both NP complete |
| C. NP-complete and in P respectively | D. undecidable and NP complete respectively |

gatecse-2004 algorithms p-np-npc-nph easy isro2017 out-of-gatecse-syllabus

[Answer key](#)



1.19.2 P NP NPC NPH: GATE CSE 2006 | Question: 16, ISRO-DEC2017-27

Let S be an NP-complete problem and Q and R be two other problems not known to be in NP. Q is polynomial time reducible to S and S is polynomial-time reducible to R. Which one of the following statements is true?

- | | |
|---------------------|-----------------|
| A. R is NP-complete | B. R is NP-hard |
| C. Q is NP-complete | D. Q is NP-hard |

gatecse-2006 algorithms p-np-npc-nph normal isrodec2017 out-of-gatecse-syllabus

[Answer key](#)

1.20

Quick Sort (2)

1.20.1 Quick Sort: ISRO-DEC2017-48



Quick-sort is run on 2 inputs shown below to sort in ascending order :

- A. $1, 2, 3, \dots, n$ B. $n, n-1, n-2, \dots, 1$

Let C_1 and C_2 be the number of comparisons made for **A** and **B** respectively. Then,

- A. $C_1 > C_2$
 C. $C_1 < C_2$
- B. $C_1 = C_2$
 D. Cannot say anything for arbitrary n

isrodec2017 sorting quick-sort algorithm-design asymptotic-notations

[Answer key](#)



1.20.2 Quick Sort: ISRO2015-12

A machine needs a minimum of 100 sec to sort 1000 names by quick sort. The minimum time needed to sort 100 names will be approximately

- A. 50.2 sec B. 6.7 sec C. 72.7 sec D. 11.2 sec

isro2015 algorithms quick-sort

[Answer key](#)



1.21

Recurrence Relation (5)

1.21.1 Recurrence Relation: GATE CSE 1994 | Question: 1.7, ISRO2017-14

The recurrence relation that arises in relation with the complexity of binary search is:

- A. $T(n) = 2T\left(\frac{n}{2}\right) + k$, k is a constant
 C. $T(n) = T\left(\frac{n}{2}\right) + \log n$
- B. $T(n) = T\left(\frac{n}{2}\right) + k$, k is a constant
 D. $T(n) = T\left(\frac{n}{2}\right) + n$

gate1994 algorithms recurrence-relation easy isro2017

[Answer key](#)



1.21.2 Recurrence Relation: GATE CSE 2004 | Question: 83, ISRO2015-40

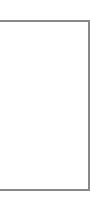
The time complexity of the following C function is (assume $n > 0$)

```
int recursive (int n) {
    if(n == 1)
        return (1);
    else
        return (recursive (n-1) + recursive (n-1));
}
```

- A. $O(n)$ B. $O(n \log n)$ C. $O(n^2)$ D. $O(2^n)$

gatcse-2004 algorithms recurrence-relation time-complexity normal isro2015

[Answer key](#)



1.21.3 Recurrence Relation: GATE CSE 2006 | Question: 51, ISRO2016-34

Consider the following recurrence:

$$T(n) = 2T(\sqrt{n}) + 1, T(1) = 1$$

Which one of the following is true?

- A. $T(n) = \Theta(\log \log n)$
 C. $T(n) = \Theta(\sqrt{n})$
- B. $T(n) = \Theta(\log n)$
 D. $T(n) = \Theta(n)$

algorithms recurrence-relation isro2016 gatcse-2006

[Answer key](#)



1.21.4 Recurrence Relation: ISRO CSE 2011 | Question: 56



Let $T(n)$ be defined by $T(1) = 10$ and $T(n+1) = 2n + T(n)$ for all integers $n \geq 1$. Which of the following represents the order of growth of $T(n)$ as a function of n ?

- A. $O(n)$ B. $O(n \log n)$ C. $O(n^2)$ D. $O(n^3)$

isro2011 algorithms time-complexity recurrence-relation

Answer key

1.21.5 Recurrence Relation: ISRO CSE 2018 | Question: 37



The running time of an algorithm is given by:

$$\begin{aligned}T(n) &= T(n-1) + T(n-2) - T(n-3), \text{ if } n > 3 \\&= n, \text{ otherwise}\end{aligned}$$

Then what should be the relation between $T(1), T(2), T(3)$, so that the order of the algorithm is constant?

- a. $T(1) = T(2) = T(3)$ b. $T(1) + T(3) = 2T(2)$
c. $T(1) - T(3) = T(2)$ d. $T(1) + T(2) = T(3)$

isro2018 algorithms recurrence-relation time-complexity

Answer key

1.22

Recursion (1)



1.22.1 Recursion: ISRO-DEC2017-73

Consider the function

```
int fun(x: integer)
{
    If x>100 then fun=x-10;
    else
        fun=fun(fun(x+11));
}
```

For the input $x = 95$, the function will return

- A. 89 B. 90 C. 91 D. 92

isrodec2017 programming-in-c recursion

Answer key

1.23

Relations (1)



1.23.1 Relations: ISRO CSE 2017 | Question: 80

The time complexity of computing the transitive closure of a binary relation on a set of n elements is known to be

- a. $O(n \log n)$
b. $O(n^{3/2})$
c. $O(n^3)$
d. $O(n)$

Answer key**1.24****Searching (2)****1.24.1 Searching: GATE CSE 1996 | Question: 2.13, ISRO2016-28**

The average number of key comparisons required for a successful search for sequential search on n items is

- A. $\frac{n}{2}$ B. $\frac{n-1}{2}$ C. $\frac{n+1}{2}$ D. None of the above

Answer key**1.24.2 Searching: ISRO CSE 2011 | Question: 70**

Number of comparisons required for an unsuccessful search of an element in a sequential search organized, fixed length, symbol table of length L is

- A. L B. L/2 C. (L+1)/2 D. 2L

Answer key**1.25****Sorting (10)****1.25.1 Sorting: GATE CSE 2006 | Question: 14, ISRO2011-14**

Which one of the following in place sorting algorithms needs the minimum number of swaps?

- A. Quick sort B. Insertion sort C. Selection sort D. Heap sort

Answer key**1.25.2 Sorting: ISRO CSE 2008 | Question: 77**

How many comparisons are needed to sort an array of length 5 if a straight selection sort is used and array is already in the opposite order?

- A. 1 B. 10 C. 15 D. 20

Answer key**1.25.3 Sorting: ISRO CSE 2014 | Question: 62**

Consider the following sorting algorithms.

- Quicksort
- Heapsort
- Mergesort

Which of them perform in least time in the worst case?

- A. I and II only B. II and III only C. III only D. I, II and III

[Answer key](#)

1.25.4 Sorting: ISRO CSE 2017 | Question: 15



Which one of the following in-place sorting algorithms needs the minimum number of swaps?

- A. Insertion Sort
- B. Quick Sort
- C. Heap Sort
- D. Selection Sort

isro2017 algorithms sorting

[Answer key](#)

1.25.5 Sorting: ISRO CSE 2017 | Question: 49



The number of swappings needed to sort the numbers 8, 22, 7, 9, 31, 5, 13 in ascending order using bubble sort is

- A. 11
- B. 12
- C. 13
- D. 10

isro2017 algorithms sorting

[Answer key](#)

1.25.6 Sorting: ISRO CSE 2018 | Question: 66



Of the following sorting algorithms, which has a running time that is least dependent on the initial ordering of the input?

- a. Merge Sort
- b. Insertion Sort
- c. Selection Sort
- d. Quick Sort

isro2018 algorithms sorting

[Answer key](#)

1.25.7 Sorting: ISRO CSE 2020 | Question: 33



If an array A contains the items 10, 4, 7, 23, 67, 12 and 5 in that order, what will be the resultant array A after third pass of insertion sort?

- A. 67, 12, 10, 5, 4, 7, 23
- B. 4, 7, 10, 23, 67, 12, 5
- C. 4, 5, 7, 67, 10, 12, 23
- D. 10, 7, 4, 67, 23, 12, 5

isro-2020 algorithms sorting normal

[Answer key](#)

1.25.8 Sorting: ISRO CSE 2020 | Question: 65



Of the following sort algorithms, which has execution time that is least dependant on initial ordering of the input?

- A. Insertion sort
- B. Quick sort
- C. Merge sort
- D. Selection sort

isro-2020 algorithms sorting normal

[Answer key](#)

1.25.9 Sorting: ISRO CSE 2023 | Question: 6



Worst case time complexity of heap sort for n elements?

- A. $O(n \log n)$
- B. $O(\log n)$
- C. $O(n^2)$
- D. $O(n)$

isro-cse-2023 algorithms heap-sort sorting

[Answer key](#)

1.25.10 Sorting: ISRO-2013-12



Which of the following sorting algorithms has the minimum running time complexity in the best and average case?

- A. Insertion sort, Quick sort
- B. Quick sort, Quick sort
- C. Quick sort, Insertion sort
- D. Insertion sort, Insertion sort

isro2013 sorting

[Answer key](#)

1.26

Symbol Table (1)



1.26.1 Symbol Table: ISRO CSE 2016 | Question: 39

Access time of the symbolic table will be logarithmic if it is implemented by

- A. Linear list
- B. Search tree
- C. Hash table
- D. Self organization list

isro2016 algorithms symbol-table

[Answer key](#)

1.27

Time Complexity (3)



1.27.1 Time Complexity: GATE CSE 2007 | Question: 15, ISRO2016-26

Consider the following segment of C-code:

```
int j, n;
j = 1;
while (j <= n)
    j = j * 2;
```

The number of comparisons made in the execution of the loop for any $n > 0$ is:

- A. $\lceil \log_2 n \rceil + 1$
- B. n
- C. $\lceil \log_2 n \rceil$
- D. $\lfloor \log_2 n \rfloor + 1$

gatecse-2007 algorithms time-complexity normal isro2016

[Answer key](#)

1.27.2 Time Complexity: ISRO CSE 2014 | Question: 67



What is the time complexity for the following C module? Assume that $n > 0$.

```
int module(int n)
{
    if (n == 1)
        return 1;
    else
        return (n + module(n-1));
}
```

- A. $O(n)$
- B. $O(\log n)$
- C. $O(n^2)$
- D. $O(n!)$

isro2014 algorithms time-complexity

[Answer key](#)

1.27.3 Time Complexity: ISRO CSE 2020 | Question: 36



What is the complexity of the following code?

```
sum=0;
```

```

for(i=1;i<=n;i*=2)
    for(j=1;j<=n;j++)
        sum++;

```

Which of the following is not a valid string?

- A. $O(n^2)$ B. $O(n \log n)$ C. $O(n)$ D. $O(n \log n \log n)$

isro-2020 algorithms time-complexity normal

[Answer key](#) 

Answer Keys

1.1.1	C	1.1.2	C	1.2.1	C	1.2.2	A	1.2.3	X
1.2.4	D	1.2.5	B	1.3.1	B	1.3.2	D	1.4.1	A
1.4.2	A	1.5.1	C	1.6.1	C	1.6.2	B	1.7.1	B
1.8.1	D	1.9.1	B	1.9.2	D	1.9.3	C	1.10.1	B
1.10.2	D	1.10.3	X	1.11.1	A	1.12.1	D	1.12.2	A
1.12.3	B	1.12.4	D	1.12.5	C	1.12.6	B	1.13.1	B
1.13.2	C	1.13.3	B	1.14.1	B	1.15.1	B	1.16.1	B
1.17.1	B	1.17.2	D	1.17.3	D	1.18.1	B	1.18.2	B
1.19.1	C	1.19.2	B	1.20.1	B	1.20.2	B	1.21.1	B
1.21.2	D	1.21.3	B	1.21.4	C	1.21.5	X	1.22.1	C
1.23.1	C	1.24.1	C	1.24.2	A	1.25.1	C	1.25.2	B
1.25.3	B	1.25.4	D	1.25.5	D	1.25.6	A	1.25.7	B
1.25.8	C	1.25.9	A	1.25.10	A	1.26.1	B	1.27.1	D
1.27.2	A	1.27.3	X						

2.1

Artificial Intelligence (1)

2.1.1 Artificial Intelligence: ISRO CSE 2023 | Question: 78



Which of the following is not a connective of First Order Logic with reference to AI (Artificial Intelligence)?

- A. \wedge B. \vee C. \Leftrightarrow D. \neg

isro-cse-2023 artificial-intelligence first-order-logic

[Answer key](#)

2.2

Machine Learning (1)

2.2.1 Machine Learning: ISRO CSE 2023 | Question: 79



A hybrid Bayesian network contains

- A. Only continuous variables
C. Both discrete and discontinuous variables
B. Only discrete variables
D. Both continuous and discrete variables

isro-cse-2023 non-gatecse machine-learning probability

[Answer key](#)

2.3

Neural Network (2)

2.3.1 Neural Network: ISRO CSE 2011 | Question: 2



Which of the following is an unsupervised neural network?

- A. RBS
C. Back propagation
B. Hopfield
D. Kohonen

isro2011 neural-network non-gatecse

[Answer key](#)

2.3.2 Neural Network: ISRO CSE 2018 | Question: 75



In neural network, the network capacity is defined as:

- The traffic (tarry capacity of the network)
- The total number of nodes in the network
- The number of patterns that can be stored and recalled in a network
- None of the above

isro2018 non-gatecse neural-network

[Answer key](#)

Answer Keys

2.1.1

C

2.2.1

D

2.3.1

D

2.3.2

C

**3.0.1 ISRO-2013-34**

In 8086, the jump condition for the instruction *JNBE* is?

- A. CF = 0 or ZF = 0
- B. ZF = 0 and SF = 1
- C. CF = 0 and ZF = 0
- D. CF = 0

isro2013 8086 non-gatecse

Answer key

3.1**8085 Microprocessor (6)****3.1.1 8085 Microprocessor: ISRO CSE 2008 | Question: 39**

Consider the following Assembly language program

MVIA 30 H

ACI 30 H

XRA A

POP H

After the execution of the above program, the contents of the accumulator will be

- A. 30 H
- B. 60 H
- C. 00 H
- D. contents of stack

isro2008 8085-microprocessor non-gatecse

Answer key

3.1.2 8085 Microprocessor: ISRO CSE 2008 | Question: 45

The TRAP is one of the interrupts available in INTEL 8085. Which one of the following statements is true of TRAP ?

- A. it is level triggered
- B. it is negative edge triggered
- C. it is +ve edge triggered
- D. it is both +ve and -ve edges triggered

isro2008 co-and-architecture 8085-microprocessor non-gatecse

Answer key

3.1.3 8085 Microprocessor: ISRO CSE 2017 | Question: 20

Which interrupt in 8085 Microprocessor is unmaskable?

- a. RST 5.5
- b. RST 7.5
- c. TRAP
- d. Both (a) and (b)

isro2017 8085-microprocessor non-gatecse

Answer key

3.1.4 8085 Microprocessor: ISRO-2013-35

How many number of times the instruction sequence below will loop before coming out of the loop?

MOV AL, 00H

A1: INC AL

JNZ A1

- A. 1
C. 256
B. 255
D. Will not come out of the loop.

isro2013 8085-microprocessor non-gatecse

Answer key 



3.1.5 8085 Microprocessor: ISRO-2013-36

In 8085 microprocessor, the ISR for handling trap interrupt is at which location?

- A. $3CH$ B. $34H$ C. $74H$ D. $24H$

isro2013 8085-microprocessor non-gatecse

Answer key 



3.1.6 8085 Microprocessor: ISRO2015-61

The contents of the flag register after execution of the following program by 8085 microprocessor will be

Program

```
SUB A
MVI B,(01) H
DCR B
HLT
```

- A. $(54)_H$ B. $(00)_H$ C. $(01)_H$ D. $(45)_H$

8085-microprocessor non-gatecse isro2015

Answer key 



3.2

Addressing Modes (11)

3.2.1 Addressing Modes: GATE CSE 1996 | Question: 1.16, ISRO2016-42

Relative mode of addressing is most relevant to writing:

- A. Co – routines B. Position – independent code
C. Shareable code D. Interrupt Handlers

gate1996 co-and-architecture addressing-modes easy isro2016

Answer key 



3.2.2 Addressing Modes: GATE CSE 2008 | Question: 33, ISRO2009-80

Which of the following is/are true of the auto-increment addressing mode?

- I. It is useful in creating self-relocating code
II. If it is included in an Instruction Set Architecture, then an additional ALU is required for effective address calculation
III. The amount of increment depends on the size of the data item accessed

- A. I only B. II only C. III only D. II and III only

gatecse-2008 addressing-modes co-and-architecture normal isro2009

Answer key 



3.2.3 Addressing Modes: GATE IT 2006 | Question: 39, ISRO2009-42



Which of the following statements about relative addressing mode is FALSE?

- A. It enables reduced instruction size
- B. It allows indexing of array element with same instruction
- C. It enables easy relocation of data
- D. It enables faster address calculation than absolute addressing

gateit-2006 co-and-architecture addressing-modes normal isro2009

[Answer key](#)

3.2.4 Addressing Modes: ISRO CSE 2009 | Question: 21, UGCNET-Dec2012-II: 12



In which addressing mode, the effective address of the operand is generated by adding a constant value to the content of a register?

- A. Absolute mode
- B. Indirect mode
- C. Immediate mode
- D. Index mode

isro2009 co-and-architecture ugcnetcse-dec2012-paper2 addressing-modes

[Answer key](#)

3.2.5 Addressing Modes: ISRO CSE 2011 | Question: 5



MOV [BX], AL type of data addressing is called?

- A. register
- B. immediate
- C. register indirect
- D. register relative

isro2011 co-and-architecture addressing-modes

[Answer key](#)

3.2.6 Addressing Modes: ISRO CSE 2017 | Question: 19



The most appropriate matching for the following pairs :

- | | |
|------------------------------|----------------|
| X. Indirect Addressing | i. Loop |
| Y. Immediate Addressing | ii. Pointers |
| Z. Auto Decrement Addressing | iii. Constants |
-
- | | |
|---------------------|---------------------|
| A. X-iii, Y-ii, Z-i | B. X-ii, Y-iii, Z-i |
| C. X-iii, Y-i, Z-ii | D. X-ii, Y-i, Z-iii |

isro2017 co-and-architecture addressing-modes match-the-following easy

[Answer key](#)

3.2.7 Addressing Modes: ISRO CSE 2020 | Question: 1



The immediate addressing mode can be used for

1. Loading internal registers with initial values
2. Perform arithmetic or logical operation on data contained in instructions

Which of the following is true?

- A. Only 1
- B. Only 2
- C. Both 1 and 2
- D. Immediate mode refers to data in cache

isro-2020 co-and-architecture normal addressing-modes

[Answer key](#)

3.2.8 Addressing Modes: ISRO CSE 2020 | Question: 15



A stack organized computer is characterised by instructions with

- A. indirect addressing
- B. direct addressing
- C. zero addressing
- D. index addressing

isro-2020 co-and-architecture addressing-modes normal

[Answer key](#)

3.2.9 Addressing Modes: ISRO CSE 2020 | Question: 3



Which of the following affects the processing power assuming they do not influence each other

1. Data bus capability
 2. Address scheme
 3. Clock speed
- A. 3 only B. 1 and 3 only C. 2 and 3 only D. 1, 2 and 3

isro-2020 co-and-architecture addressing-modes normal

[Answer key](#)

3.2.10 Addressing Modes: ISRO CSE 2020 | Question: 8



Consider a 32-bit processor which supports 70 instructions. Each instruction is 32 bit long and has 4 fields namely opcode, two register identifiers and an immediate operand of unsigned integer type. Maximum value of the immediate operand that can be supported by the processor is 8191. How many registers the processor has?

- A. 32 B. 64 C. 128 D. 16

isro-2020 co-and-architecture addressing-modes normal

[Answer key](#)

3.2.11 Addressing Modes: ISRO-DEC2017-43



Consider an instruction of the type $LW R1, 20(R2)$ which during execution reads a 32-bit word from memory and stores it in a 32-bit register $R1$. The effective address of the memory location is obtained by adding a constant 20 and contents of $R2$. Which one best reflects the source operand?

- A. Immediate addressing B. Register addressing
C. Register Indirect addressing D. Indexed addressing

isrodec2017 addressing-modes co-and-architecture

[Answer key](#)

3.3

Array (1)

3.3.1 Array: ISRO-DEC2017-38



A CPU has a $32KB$ direct mapped cache with $128 - byte$ block size. Suppose A is a $2-d$ array of size 512×512 with elements that occupy $8 bytes$ each. Consider the code segment

```
for(i=0;i<512;i++)  
{  
    for(j=0;j<512;j++)  
    {  
        x += A[i][j];  
    }  
}
```

Assuming that array is stored in order $A[0][0], A[0][1], A[0][2] \dots$, the number of cache misses is

- A. 16384
- B. 512
- C. 2048
- D. 1024

isrodec2017 co-and-architecture cache-memory array

[Answer key](#)

3.4

CO and Architecture (3)



3.4.1 CO and Architecture: ISRO CSE 2009 | Question: 34

The microinstructions stored in the control memory of a processor have a width of 26 bits. Each microinstruction is divided into three fields. a micro operation field of 13 bits, a next address field (X), and a MUX select field (Y). There are 8 status bits in the inputs of the MUX. How many bits are there in the X and Y fields, and what is the size of the control memory in number of words?

- A. 10,3,1024
- B. 8,5,256
- C. 5,8,2048
- D. 10,3,512

isro2009 co-and-architecture control-unit

[Answer key](#)



3.4.2 CO and Architecture: ISRO CSE 2020 | Question: 2

Statements associated with registers of a CPU are given. Identify the false statement.

- A. The program counter holds the memory address of the instruction in execution
- B. Only opcode is transferred to the control unit
- C. An instruction in the instruction register consists of the opcode and the operand
- D. The value of the program counter is incremented by 1 once its value has been read to the memory address register

isro-2020 co-and-architecture control-unit normal

[Answer key](#)



3.4.3 CO and Architecture: ISRO CSE 2023 | Question: 23

For a given finite number of instructions to be executed, which architecture of the processor provides fastest execution?

- A. ANSA - Advanced Network system Architecture
- B. Super-scalar
- C. ISA - Instruction Set Architecture
- D. All of the above

isro-cse-2023 co-and-architecture

[Answer key](#)

3.5

Cache Memory (13)



3.5.1 Cache Memory: GATE CSE 2001 | Question: 1.7, ISRO2008-18

More than one word are put in one cache block to:

- A. exploit the temporal locality of reference inB.aexploit the spatial locality of reference in a program program
- C. reduce the miss penalty
- D. none of the above

gatecse-2001 co-and-architecture easy cache-memory isro2008

[Answer key](#)

3.5.2 Cache Memory: GATE IT 2004 | Question: 12, ISRO2016-77



Consider a system with 2 level cache. Access times of Level 1 cache, Level 2 cache and main memory are 1 ns , 10 ns , and 500 ns respectively. The hit rates of Level 1 and Level 2 caches are 0.8 and 0.9, respectively. What is the average access time of the system ignoring the search time within the cache?

- A. 13.0
- B. 12.8
- C. 12.6
- D. 12.4

gateit-2004 co-and-architecture cache-memory normal isro2016

[Answer key](#)

3.5.3 Cache Memory: ISRO CSE 2007 | Question: 14



The principal of the locality of reference justifies the use of

- A. virtual memory
- B. interrupts
- C. main memory
- D. cache memory

isro2007 co-and-architecture cache-memory

[Answer key](#)

3.5.4 Cache Memory: ISRO CSE 2007 | Question: 46



Consider a small 2-way set-associative cache memory, consisting of four blocks. For choosing the block to be replaced, use the least recently (LRU) scheme. The number of cache misses for the following sequence of block addresses is 8, 12, 0, 12, 8

- A. 2
- B. 3
- C. 4
- D. 5

isro2007 co-and-architecture cache-memory

[Answer key](#)

3.5.5 Cache Memory: ISRO CSE 2011 | Question: 16



Consider a direct mapped cache with 64 blocks and a block size of 16 bytes. To what block number does the byte address 1206 map to

- A. does not map
- B. 6
- C. 11
- D. 54

isro2011 co-and-architecture cache-memory

[Answer key](#)

3.5.6 Cache Memory: ISRO CSE 2011 | Question: 42



The search concept used in associative memory is

- A. Parallel search
- B. Sequential search
- C. Binary search
- D. Selection search

isro2011 co-and-architecture cache-memory

[Answer key](#)

3.5.7 Cache Memory: ISRO CSE 2017 | Question: 21



A cache memory needs an access time of 30 ns and main memory 150 ns , what is average access time of CPU (assume hit ratio = 80%)?

- A. 60 ns
- B. 30 ns
- C. 150 ns
- D. 70 ns

isro2017 co-and-architecture cache-memory

[Answer key](#)

3.5.8 Cache Memory: ISRO CSE 2018 | Question: 73



For a multi-processor architecture, in which protocol a write transaction is forwarded to only those processors that are known to possess a copy of newly altered cache line?

- a. Snoopy bus protocol
- b. Cache coherency protocol
- c. Directory based protocol
- d. None of the above

isro2018 cache-memory

[Answer key](#)

3.5.9 Cache Memory: ISRO CSE 2020 | Question: 43



Which of the following is an efficient method of cache updating?

- A. Snoopy writes
- B. Write through
- C. Write within
- D. Buffered write

isro-2020 co-and-architecture cache-memory normal

[Answer key](#)

3.5.10 Cache Memory: ISRO CSE 2020 | Question: 47



How many total bits are required for a direct-mapped cache with 128 KB of data and 1 word block size, assuming a 32-bit address and 1 word size of 4bytes?

- A. 2 Mbits
- B. 1.7 Mbits
- C. 2.5 Mbits
- D. 1.5 Mbits

isro-2020 co-and-architecture cache-memory direct-mapping normal

[Answer key](#)

3.5.11 Cache Memory: ISRO-2013-16



How much speed do we gain by using the cache, when cache is used 80% of the time? Assume cache is faster than main memory.

- A. 5.27
- B. 2.00
- C. 4.16
- D. 6.09

isro2013 co-and-architecture cache-memory

[Answer key](#)

3.5.12 Cache Memory: ISRO-DEC2017-37



A two-way set associative cache memory unit with a capacity of 16KB is built using a block size of

8 words. The word length is 32 – bits. The physical address space is 4GB.

The number of bits in the TAG, SET fields are

- A. 20,7
- B. 19,8
- C. 20,8
- D. 21,9

isrodec2017 cache-memory co-and-architecture

[Answer key](#)

3.5.13 Cache Memory: ISRO-DEC2017-42



In designing a computer's cache system, the cache block (or cache line) size is an important parameter. Which one of the following statements is correct in this context?

- A. Smaller block size incurs lower cache miss penalty.

- B. Smaller block size implies better spatial locality.
- C. Smaller block size implies smaller cache tag.
- D. Smaller block size implies lower cache hit time.

isrodec2017 co-and-architecture cache-memory

[Answer key](#)

3.6

Cpu (2)

3.6.1 Cpu: ISRO CSE 2011 | Question: 41



If a microcomputer operates at 5 MHz with an 8-bit bus and a newer version operates at 20 MHz with a 32-bit bus, the maximum speed-up possible approximately will be

- A. 2
- B. 4
- C. 8
- D. 16

isro2011 co-and-architecture cpu

[Answer key](#)

3.6.2 Cpu: ISRO CSE 2014 | Question: 10



The number of logical CPUs in a computer having two physical quad-core chips with hyper threading enabled is _____

- A. 1
- B. 2
- C. 8
- D. 16

co-and-architecture isro2014 cpu non-gatecse

[Answer key](#)

3.7

DMA (1)

3.7.1 DMA: ISRO-2013-14



A processor is fetching instructions at the rate of 1 MIPS. A DMA module is used to transfer characters to RAM from a device transmitting at 9600 bps. How much time will the processor be slowed down due to DMA activity?

- A. 9.6ms
- B. 4.8ms
- C. 2.4ms
- D. 1.2ms

isro2013 dma

[Answer key](#)

3.8

Disk (1)

3.8.1 Disk: ISRO CSE 2020 | Question: 46



A magnetic disk has 100 cylinders, each with 10 tracks of 10 sectors. If each sector contains 128 bytes, what is the maximum capacity of the disk in kilobytes?

- A. 1,280,000
- B. 1280
- C. 1250
- D. 128,000

isro-2020 co-and-architecture disk normal

[Answer key](#)

3.9

Floating Point Representation (2)

3.9.1 Floating Point Representation: ISRO CSE 2007 | Question: 53



In the Big-Endian system, the computer stores

- A. MSB of data in the lowest memory address of data unit
- B. LSB of data in the lowest memory address of data unit
- C. MSB of data in the highest memory address of data unit
- D. LSB of data in the highest memory address of data unit

isro2007 co-and-architecture floating-point-representation little-endian-big-endian

[Answer key](#)

3.9.2 Floating Point Representation: ISRO CSE 2020 | Question: 5



An array of 2 two byte integers is stored in big endian machine in byte addresses as shown below. What will be its storage pattern in little endian machine ?

Address	Data
0 × 104	78
0 × 103	56
0 × 102	34
0 × 101	12

A.

Address	Data
0 × 104	12
0 × 103	56
0 × 102	34
0 × 101	78

B.

Address	Data
0 × 104	12
0 × 103	34
0 × 102	56
0 × 101	78

C.

Address	Data
0 × 104	56
0 × 103	78
0 × 102	12
0 × 101	34

Address	Data
0 × 104	56
D. 0 × 103	12
0 × 102	78
0 × 101	34

isro-2020 co-and-architecture floating-point-representation normal little-endian-big-endian

Answer key 

3.10

IO Handling (6)



3.10.1 IO Handling: GATE CSE 2008 | Question: 64, ISRO2009-13

Which of the following statements about synchronous and asynchronous I/O is NOT true?

- A. An ISR is invoked on completion of I/O in synchronous I/O but not in asynchronous I/O
- B. In both synchronous and asynchronous I/O, an ISR (Interrupt Service Routine) is invoked after completion of the I/O
- C. A process making a synchronous I/O call waits until I/O is complete, but a process making an asynchronous I/O call does not wait for completion of the I/O
- D. In the case of synchronous I/O, the process waiting for the completion of I/O is woken up by the ISR that is invoked after the completion of I/O

gatecse-2008 operating-system io-handling normal isro2009

Answer key 



3.10.2 IO Handling: ISRO CSE 2008 | Question: 36

An interrupt in which the external device supplies its address as well as the interrupt requests is known as

- | | |
|---------------------------|-------------------------|
| A. vectored interrupt | B. maskable interrupt |
| C. non maskable interrupt | D. designated interrupt |

isro2008 co-and-architecture io-handling interrupts

Answer key 



3.10.3 IO Handling: ISRO CSE 2009 | Question: 78



On receiving an interrupt from an I/O device, the CPU

- A. Halts for a predetermined time
- B. Branches off to the interrupt service routine after completion of the current instruction
- C. Branches off to the interrupt service routine immediately
- D. Hands over control of address bus and data bus to the interrupting device

isro2009 co-and-architecture io-handling

Answer key 



3.10.4 IO Handling: ISRO CSE 2011 | Question: 39

Two control signals in microprocessor which are related to Direct Memory Access (DMA) are

- A. INTR & INTA
- C. S0 & S1

isro2011 co-and-architecture io-handling dma

- B. RD & WR
- D. HOLD & HLDA

[Answer key](#)



3.10.5 IO Handling: ISRO CSE 2011 | Question: 58

In DMA transfer scheme, the transfer scheme other than burst mode is

- A. cycle technique
- C. cycle stealing technique
- B. stealing technique
- D. cycle bypass technique

isro2011 co-and-architecture io-handling dma

[Answer key](#)



3.10.6 IO Handling: ISRO CSE 2018 | Question: 65

Of the following, which best characterizes computers that use memory-mapped I/O?

- a. The computer provides special instructions for manipulating I/O ports
- b. I/O ports are placed at addresses on the bus and are accessed just like other memory locations
- c. To perform I/O operations, it is sufficient to place the data in an address register and call channel to perform the operation
- d. I/O can be performed only when memory management hardware is turned on

isro2018 co-and-architecture io-handling

[Answer key](#)

3.11

Instruction Format (5)



3.11.1 Instruction Format: ISRO CSE 2009 | Question: 79

Compared to CISC processors, RISC processors contain

- A. More registers and smaller instruction set
- C. less registers and smaller instruction set
- B. larger instruction set
- D. more transistor elements

isro2009 co-and-architecture instruction-format

[Answer key](#)



3.11.2 Instruction Format: ISRO CSE 2016 | Question: 24

In which class of Flynn's taxonomy, Von Neumann architecture belongs to?

- A. SISD
- B. SIMD
- C. MIMD
- D. MISD

co-and-architecture isro2016 instruction-format

[Answer key](#)



3.11.3 Instruction Format: ISRO CSE 2018 | Question: 31

A byte addressable computer has a memory capacity of $2^m KB$ (k bytes) and can perform 2^n operations. An instruction involving 3 operands and one operator needs maximum of:

- a. $3m$ bits
- b. $3m + n$ bits
- c. $m + n$ bits
- d. none of the above

isro2018 co-and-architecture instruction-format

[Answer key](#)

3.11.4 Instruction Format: ISRO CSE 2018 | Question: 6



A data driven machine is one that executes an instruction if the needed data is available. The physical ordering of the code listing does not dictate the course of execution. Consider the following pseudo-code:

- A. Multiply E by 0.5 to get F
- C. Add B with 0.5 to get D
- E. Add A with 10.5 to get C

- B. Add A and B to get E
- D. Add E and F to get G

Assume A, B, C are already assigned values and

the desired output is G . Which of the following sequence of execution is valid?

- a. B, C, D, A, E
- b. C, B, E, A, D
- c. A, B, C, D, E
- d. E, D, C, B, A

isro2018 co-and-architecture instruction-format

[Answer key](#)

3.11.5 Instruction Format: ISRO CSE 2020 | Question: 49



One instruction tries to write an operand before it is written by previous instruction. This may lead to a dependency called

- A. True dependency
- C. Output dependency
- B. Anti-dependency
- D. Control Hazard

isro-2020 co-and-architecture instruction-format normal

[Answer key](#)

3.12

Interrupts (3)



3.12.1 Interrupts: ISRO CSE 2008 | Question: 37

The ability to temporarily halt the CPU and use this time to send information on buses is called

- A. direct memory access
- C. polling
- B. vectoring the interrupt
- D. cycle stealing

isro2008 co-and-architecture interrupts

[Answer key](#)

3.12.2 Interrupts: ISRO CSE 2009 | Question: 22



A certain microprocessor requires 4.5 microseconds to respond to an interrupt. Assuming that the three interrupts I_1, I_2 and I_3 require the following execution time after the interrupt is recognized:

- i. I_1 requires 25 microseconds
- ii. I_2 requires 35 microseconds
- iii. I_3 requires 20 microseconds

I_1 has the highest priority and I_3 has the lowest. What is the possible range of time for I_3 to be executed assuming that it may or may not occur simultaneously with other interrupts?

- A. 24.5 microseconds to 39.5 microseconds
- C. 4.5 microseconds to 24.5 microseconds
- B. 24.5 microseconds to 93.5 microseconds
- D. 29.5 microseconds to 93.5 microseconds

isro2009 co-and-architecture interrupts

[Answer key](#)

3.12.3 Interrupts: ISRO CSE 2023 | Question: 32



Which of the following is false about interrupts?

- A. Interrupts can be triggered by a hardware or by a software
- B. Hardware interrupts may be triggered by sending a signal to CPU through a system bus
- C. Software interrupts may be triggered by executing system calls
- D. Trap is a hardware generated interrupt

isro-cse-2023 co-and-architecture interrupts

Answer key

3.13

Machine Instruction (3)

3.13.1 Machine Instruction: GATE CSE 2006 | Question: 09, ISRO2009-35



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)?

- A. 400
- B. 500
- C. 600
- D. 700

gatecse-2006 co-and-architecture machine-instruction easy isro2009

Answer key

3.13.2 Machine Instruction: ISRO CSE 2008 | Question: 42



Which of the following architecture is/are not suitable for realising SIMD?

- A. Vector processor
- B. Array processor
- C. Von Neumann
- D. All of the above

isro2008 co-and-architecture machine-instruction

Answer key

3.13.3 Machine Instruction: ISRO CSE 2020 | Question: 16



A computer which issues instructions in order, has only 2 registers and 3 opcodes ADD, SUB and MOV. Consider 2 different implementations of the following basic block :

Case 1	Case 2
$t1 = a + b;$	$t2 = c + d;$
$t2 = c + d;$	$t3 = e - t2;$
$t3 = e - t2;$	$t1 = a + b;$
$t4 = t1 - t2;$	$t4 = t1 - t2;$

Assume that all operands are initially in memory. Final value of computation also has to reside in memory. Which one is better in terms of memory accesses and by how many MOV instructions?

- A. Case 2,2
- B. Case 2,3
- C. Case 1,2
- D. Case 1,3

isro-2020 co-and-architecture machine-instruction normal

Answer key

3.14

Memory Interfacing (8)

3.14.1 Memory Interfacing: ISRO CSE 2007 | Question: 37



In comparison with static RAM memory, the dynamic Ram memory has

- A. lower bit density and higher power consumption
- B. higher bit density and higher power consumption
- C. lower bit density and lower power consumption
- D. higher bit density and lower power consumption

isro2007 co-and-architecture memory-interfacing

[Answer key](#)

3.14.2 Memory Interfacing: ISRO CSE 2009 | Question: 23



The process of organizing the memory into two banks to allow 8-and 16-bit data operation is called

- A. Bank switching
- B. Indexed mapping
- C. Two-way memory interleaving
- D. Memory segmentation

isro2009 co-and-architecture memory-interfacing

[Answer key](#)

3.14.3 Memory Interfacing: ISRO CSE 2011 | Question: 54



Number of chips (128×8 RAM) needed to provide a memory capacity of 2048 bytes

- A. 2
- B. 4
- C. 8
- D. 16

isro2011 co-and-architecture memory-interfacing

[Answer key](#)

3.14.4 Memory Interfacing: ISRO CSE 2014 | Question: 1



Consider a 33 MHz cpu based system. What is the number of wait states required if it is interfaced with a 60 ns memory? Assume a maximum of 10 ns delay for additional circuitry like buffering and decoding.

- A. 0
- B. 1
- C. 2
- D. 3

co-and-architecture isro2014 memory-interfacing

[Answer key](#)

3.14.5 Memory Interfacing: ISRO CSE 2014 | Question: 17



If each address space represents one byte of storage space, how many address lines are needed to access RAM chips arranged in a 4×6 array, where each chip is $8\text{ K} \times 4$ bits?

- A. 13
- B. 15
- C. 16
- D. 17

co-and-architecture memory-interfacing isro2014

[Answer key](#)

3.14.6 Memory Interfacing: ISRO CSE 2014 | Question: 40



Assume that 16-bit CPU is trying to access a double word stating at an odd address. How many memory operations are required to access the data?

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

Answer key**3.14.7 Memory Interfacing: ISRO CSE 2017 | Question: 18**How many 128×8 bit RAMs are required to design $32 K \times 32$ bit RAM?

- A. 512 B. 1024 C. 128 D. 32

Answer key**3.14.8 Memory Interfacing: ISRO2015-77**In $X = (M + N \times O) / (P \times Q)$, how many one-address instructions are required to evaluate it?

- A. 4 B. 6 C. 8 D. 10

Answer key**3.15****Memory Management (1)****3.15.1 Memory Management: ISRO2015-62**

The minimum time delay between the initiation of two independent memory operations is called

- A. Access time B. Cycle time C. Rotational time D. Latency time

Answer key**3.16****Microprocessors (2)****3.16.1 Microprocessors: GATE CSE 1998 | Question: 2.10, ISRO2008-17**

The address space of 8086 CPU is

- A. one Megabyte B. 256 Kilobytes
C. 1 K Megabytes D. 64 Kilobytes

Answer key**3.16.2 Microprocessors: ISRO CSE 2011 | Question: 37**

Find the memory address of the next instruction executed by the microprocessor (8086), when operated in real mode for CS=1000 and IP=E000

- A. 10E00 B. 1E000 C. F000 D. 1000E

Answer key**3.17****Microprogramming (1)**

3.17.1 Microprogramming: ISRO CSE 2018 | Question: 34



Micro program is:

- a. the name of a source program in micro computers
- b. set of microinstructions that defines the individual operations in response to a machine-language instruction
- c. a primitive form of macros used in assembly language programming
- d. a very small segment of machine code

isro2018 co-and-architecture microprogramming

[Answer key](#)

3.18

Parallel Programming (1)



3.18.1 Parallel Programming: ISRO CSE 2018 | Question: 71

A particular parallel program computation requires 100 sec when executed on a single processor, if 40% of this computation is inherently sequential (i.e. will not benefit from additional processors), then theoretically best possible elapsed times of this program running with 2 and 4 processors, respectively, are:

- a. 20 sec and 10 sec
- b. 30 sec and 15 sec
- c. 50 sec and 25 sec
- d. 70 sec and 55 sec

isro2018 co-and-architecture parallel-programming

[Answer key](#)

3.19

Pipelining (10)



3.19.1 Pipelining: GATE CSE 2002 | Question: 2.6, ISRO2008-19

The performance of a pipelined processor suffers if:

- A. the pipeline stages have different delays
- B. consecutive instructions are dependent on each other
- C. the pipeline stages share hardware resources
- D. All of the above

gatecse-2002 co-and-architecture pipelining easy isro2008

[Answer key](#)

3.19.2 Pipelining: GATE CSE 2003 | Question: 10, ISRO-DEC2017-41



For a pipelined CPU with a single ALU, consider the following situations

- I. The $j + 1^{st}$ instruction uses the result of the j^{th} instruction as an operand
- II. The execution of a conditional jump instruction
- III. The j^{th} and $j + 1^{st}$ instructions require the ALU at the same time.

Which of the above can cause a hazard

- A. I and II only
- B. II and III only
- C. III only
- D. All the three

gatecse-2003 co-and-architecture pipelining normal isrodec2017

[Answer key](#)

3.19.3 Pipelining: GATE CSE 2007 | Question: 37, ISRO2009-37



Consider a pipelined processor with the following four stages:

- IF: Instruction Fetch
- ID: Instruction Decode and Operand Fetch
- EX: Execute
- WB: Write Back

The IF, ID and WB stages take one clock cycle each to complete the operation. The number of clock cycles for the EX stage depends on the instruction. The ADD and SUB instructions need 1 clock cycle and the MUL instruction needs 3 clock cycles in the EX stage. Operand forwarding is used in the pipelined processor. What is the number of clock cycles taken to complete the following sequence of instructions?

ADD	R2, R1, R0	$R2 \leftarrow R1 + R0$
MUL	R4, R3, R2	$R4 \leftarrow R3 * R2$
SUB	R6, R5, R4	$R6 \leftarrow R5 - R4$

- A. 7 B. 8 C. 10 D. 14

gatecse-2007 co-and-architecture pipelining normal isro2009

Answer key

3.19.4 Pipelining: GATE CSE 2012 | Question: 20, ISRO2016-23



Register renaming is done in pipelined processors:

- A. as an alternative to register allocation at compile time
- B. for efficient access to function parameters and local variables
- C. to handle certain kinds of hazards
- D. as part of address translation

gatecse-2012 co-and-architecture pipelining easy isro2016

Answer key

3.19.5 Pipelining: GATE IT 2007 | Question: 6, ISRO2011-25



A processor takes 12 cycles to complete an instruction I. The corresponding pipelined processor uses 6 stages with the execution times of 3, 2, 5, 4, 6 and 2 cycles respectively. What is the asymptotic speedup assuming that a very large number of instructions are to be executed?

- A. 1.83 B. 2 C. 3 D. 6

gateit-2007 co-and-architecture pipelining normal isro2011

Answer key

3.19.6 Pipelining: ISRO CSE 2016 | Question: 19



Consider a non-pipelined processor with a clock rate of 2.5 gigahertz and average cycles per instruction of four. The same processor is upgraded to a pipelined processor with five stages; but due to the internal pipeline delay, the clock speed is reduced to 2 gigahertz. Assume that there are no stalls in the pipeline. The speedup achieved in this pipelined processor is

- A. 3.2 B. 3.0 C. 2.2 D. 2.0

co-and-architecture pipelining isro2016

[Answer key](#)

3.19.7 Pipelining: ISRO CSE 2020 | Question: 6



A non-pipelined CPU has 12 general purpose registers ($R_0, R_1, R_2, \dots, R_{12}$). Following operations are supported

- ADD Ra, Rb, Rr Add Ra to Rb and store the result in Rr
- MUL Ra, Rb, Rr Multiply Ra to Rb and store the result in Rr

MUL operation takes two clock cycles, ADD takes one clock cycle.

Calculate minimum number of clock cycles required to compute the value of the expression $XY + XYZ + YZ$. The variable X, Y, Z are initially available in registers R_0, R_1 and R_2 and contents of these registers must not be modified.

- A. 5 B. 6 C. 7 D. 8

isro-2020 co-and-architecture pipelining normal

[Answer key](#)

3.19.8 Pipelining: ISRO CSE 2020 | Question: 7



Consider a 5- segment pipeline with a clock cycle time 20 ns in each sub operation. Find out the approximate speed-up ratio between pipelined and non-pipelined system to execute 100 instructions. (if an average, every five cycles, a bubble due to data hazard has to be introduced in the pipeline)

- A. 5 B. 4.03 C. 4.81 D. 4.17

isro-2020 co-and-architecture pipelining normal

[Answer key](#)

3.19.9 Pipelining: ISRO CSE 2023 | Question: 24



An instruction pipeline can be implemented by means of

- A. LIFO buffer B. FIFO buffer C. Stack D. None of the above

isro-cse-2023 co-and-architecture pipelining

[Answer key](#)

3.19.10 Pipelining: ISRO-2013-15



A pipeline P operating at 400 MHz has a speedup factor of 6 and operating at 70% efficiency. How many stages are there in the pipeline?

- A. 5 B. 6 C. 8 D. 9

isro2013 co-and-architecture pipelining

[Answer key](#)

3.20

Register (2)

3.20.1 Register: ISRO CSE 2007 | Question: 08



A read bit can be read

- A. and written by CPU
C. by peripheral and written by CPU

- B. and written by peripheral
D. by CPU and written by the peripheral

isro2007 co-and-architecture register

Answer key 



3.20.2 Register: ISRO CSE 2008 | Question: 55

The Memory Address Register

- A. is a hardware memory device which denotes the location of the current instruction being executed.
B. is a group of electrical ckt, that performs the intent of instructions fetched from memory
C. contains the address of the memory location that is to be read from or stored into
D. contains a copy of the designated memory location specified by the MAR after a "read" or the new contents of the memory prior to a "write"

isro2008 co-and-architecture register

Answer key 

3.21

Runtime Environment (1)



3.21.1 Runtime Environment: GATE CSE 2008 | Question: 37, ISRO2009-38

The use of multiple register windows with overlap causes a reduction in the number of memory accesses for:

- I. Function locals and parameters
II. Register saves and restores
III. Instruction fetches
- A. I only B. II only C. III only D. I,II and III

gatecse-2008 co-and-architecture normal isro2009 runtime-environment

Answer key 

Answer Keys

3.0.1	C	3.1.1	C	3.1.2	D	3.1.3	C	3.1.4	C
3.1.5	D	3.1.6	A	3.2.1	B	3.2.2	C	3.2.3	D
3.2.4	D	3.2.5	C	3.2.6	B	3.2.7	C	3.2.8	C
3.2.9	D	3.2.10	B	3.2.11	D	3.3.1	A	3.4.1	A
3.4.2	A	3.4.3	B	3.5.1	B	3.5.2	C	3.5.3	D
3.5.4	C	3.5.5	C	3.5.6	A	3.5.7	A	3.5.8	C
3.5.9	A	3.5.10	D	3.5.11	C	3.5.12	B	3.5.13	A
3.6.1	B	3.6.2	D	3.7.1	D	3.8.1	C	3.9.1	A, D
3.9.2	C	3.10.1	B	3.10.2	A	3.10.3	B	3.10.4	D
3.10.5	C	3.10.6	B	3.11.1	A	3.11.2	A	3.11.3	D
3.11.4	B	3.11.5	C	3.12.1	D	3.12.2	B	3.12.3	D
3.13.1	C	3.13.2	C	3.13.3	A	3.14.1	B	3.14.2	C

3.14.3	D	3.14.4	D	3.14.5	D	3.14.6	C	3.14.7	B
3.14.8	C	3.15.1	B	3.16.1	A	3.16.2	B	3.17.1	B
3.18.1	D	3.19.1	D	3.19.2	D	3.19.3	B	3.19.4	C
3.19.5	B	3.19.6	A	3.19.7	B	3.19.8	B	3.19.9	B
3.19.10	D	3.20.1	D	3.20.2	C	3.21.1	A		



4.0.1 ISRO CSE 2020 | Question: 60



A given grammar is called ambiguous if

- A. two or more productions have the same non-terminal on the left hand side
- B. a derivation tree has more than one associated sentence
- C. there is a sentence with more than one derivation tree corresponding to it
- D. brackets are not present in the grammar

isro-2020 compiler-design ambiguous-grammar easy

[Answer key](#)

4.0.2 ISRO CSE 2023 | Question: 21



Which sequence below best describes the order in which the phases of a compiler typically work?

- A. Syntax analysis, lexical analysis, χ semantic analysis, code optimization, intermediate code generation
- B. Lexical analysis, syntax analysis, semantic analysis, code optimization, intermediate code generation
- C. Syntax analysis, lexical analysis, syntax analysis, semantic analysis, syntax analysis, intermediate code generation, code optimization
- D. Lexical analysis, syntax analysis, semantic analysis, intermediate code generation, code optimization

isro-cse-2023 compiler-design

[Answer key](#)

4.1

Assembler (2)

4.1.1 Assembler: ISRO CSE 2016 | Question: 43



A simple two-pass assembler does which of the following in the first pass:

- A. Checks to see if the instructions are legal in the current assembly mode
- B. It allocates space for the literals.
- C. It builds the symbol table for the symbols and their values.
- D. All of these

compiler-design assembler isro2016

[Answer key](#)

4.1.2 Assembler: ISRO CSE 2020 | Question: 14



In a two-pass assembler, resolution of subroutine calls and inclusion of labels in the symbol table is done during

- A. second pass
- B. first pass and second pass respectively
- C. second pass and first pass respectively
- D. first pass

[Answer key](#)

4.2

Code Optimization (9)

4.2.1 Code Optimization: ISRO CSE 2008 | Question: 68



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

- A. declaration
- B. assignment statements
- C. input and output statements
- D. structural statements

[Answer key](#)

4.2.2 Code Optimization: ISRO CSE 2009 | Question: 43



Substitution of values for names (whose values are constants) is done in

- A. Local optimization
- B. Loop optimization
- C. Constant folding
- D. Strength reduction

[Answer key](#)

4.2.3 Code Optimization: ISRO CSE 2011 | Question: 13



Which of the following statements about peephole optimization is False?

- A. It is applied to a small part of the code
- B. It can be used to optimize intermediate code
- C. To get the best out of this, it has to be applied repeatedly
- D. It can be applied to the portion of the code that is not contiguous

[Answer key](#)

4.2.4 Code Optimization: ISRO CSE 2011 | Question: 3



In compiler terminology reduction in strength means

- A. Replacing run time computation by compile time computation
- B. Removing loop invariant computation
- C. Removing common subexpressions
- D. replacing a costly operation by a relatively cheaper one

[Answer key](#)

4.2.5 Code Optimization: ISRO CSE 2016 | Question: 44



Peephole optimization is form of

- A. Loop optimization
- B. Local optimization
- C. Constant folding
- D. Data flow analysis

[Answer key](#)

4.2.6 Code Optimization: ISRO CSE 2018 | Question: 29



DU-chains(Definition-Use) in compiler design:

- a. consist of a definition of a variable and all its uses, reachable from that definition
- b. are created using a form static code analysis
- c. are prerequisite for many compiler optimization including constant propagation and common sub-expression elimination
- d. All of the above

isro2018 compiler-design code-optimization

Answer key

4.2.7 Code Optimization: ISRO CSE 2018 | Question: 30



Which of the following comment about peep-hole optimization is true?

- a. It is applied to small part of the code and applied repeatedly
- b. It can be used to optimize intermediate code
- c. It can be applied to a portion of the code that is not contiguous
- d. It is applied in symbol table to optimize the memory requirements.

isro2018 compiler-design code-optimization

Answer key

4.2.8 Code Optimization: ISRO CSE 2020 | Question: 42



Which of the following is a type of a out-of-order execution, with the reordering done by a compiler

- A. loop unrolling
- B. dead code elimination
- C. strength reduction
- D. software pipelining

isro-2020 compiler-design code-optimization normal

Answer key

4.2.9 Code Optimization: ISRO-DEC2017-67



Consider the code segment

```
int i,j,x,y,m,n;
n = 20;
for(i=0;i<n;i++)
{
    for(j=0;j<n;j++)
    {
        if(i%2)
        {
            x += ((4*j)+5*i);
            y += (7+4*j);
        }
    }
}
m=x+y;
```

Which one of the following is false?

- A. The code contains loop invariant computation
- B. There is scope of common sub-expression elimination in this code
- C. There is scope of strength reduction in this code

- D. There is scope of dead code elimination in this code

isrodec2017 code-optimization compiler-design

[Answer key](#)

4.3

Compilation Phases (1)

4.3.1 Compilation Phases: ISRO CSE 2020 | Question: 17



Which one indicates a technique of building cross compilers?

- A. Beta cross B. Canadian cross C. Mexican cross D. X-cross

isro-2020 compiler-design compilation-phases normal

[Answer key](#)

4.4

Compiler tokenization (1)

4.4.1 Compiler tokenization: ISRO CSE 2020 | Question: 13



The number of tokens in the following C code segment is

```
switch(inputvalue)
{
    case 1 : b =c*d; break;
    default : b =b++; break;
}
```

- A. 27 B. 29 C. 26 D. 24

isro-2020 compiler-design compiler-tokenization easy

[Answer key](#)

4.5

Context Free Grammar (1)

4.5.1 Context Free Grammar: ISRO CSE 2018 | Question: 64



A particular BNF definition for a "word" is given by the following rules.

```
<word> ::= <letter> | <letter> <charpair> | <letter> <intpair>
<charpair> ::= <letter> <letter> | <charpair> <letter> <letter>
<intpair> ::= <integer> <integer> | <intpair> <integer> <integer>
<letter> ::= a | b | c | ..... | Y | Z
<integer> ::= 0 | 1 | 2 | ..... | 9
```

Which of the following lexical entries can be derived from < word >?

- I. pick
II. picks
III. c44

- A. I, II and III B. I and II only C. I and III only D. II and III only

isro2018 compiler-design grammar context-free-grammar

[Answer key](#)

4.6

Expression Evaluation (1)

4.6.1 Expression Evaluation: ISRO CSE 2009 | Question: 32



The expression $1 * 2 \wedge 3 * 4 \wedge 5 * 6$ will be evaluated as

- A. 32^{30}
- B. 162^{30}
- C. 49152
- D. 173458

In original question 5 is not given.

isro2009 compiler-design expression-evaluation

[Answer key](#)

4.7

Grammar (5)

4.7.1 Grammar: GATE CSE 2006 | Question: 32, ISRO2016-35



Consider the following statements about the context free grammar

$$G = \{S \rightarrow SS, S \rightarrow ab, S \rightarrow ba, S \rightarrow \epsilon\}$$

- I. G is ambiguous
- II. G produces all strings with equal number of a 's and b 's
- III. G can be accepted by a deterministic PDA.

Which combination below expresses all the true statements about G ?

- A. I only
- B. I and III only
- C. II and III only
- D. I, II and III

gatecse-2006 compiler-design grammar normal isro2016

[Answer key](#)

4.7.2 Grammar: ISRO CSE 2014 | Question: 52



Consider the following grammar.

- $S \rightarrow AB$
- $A \rightarrow a$
- $A \rightarrow BaB$
- $B \rightarrow bbA$

Which of the following statements is FALSE?

- A. The length of every string produced by this grammar is even
- B. No string produced by this grammar has three consecutive a 's
- C. The length of substring produced by B is always odd
- D. No string produced by this grammar has four consecutive b 's

isro2014 compiler-design grammar parsing

[Answer key](#)

4.7.3 Grammar: ISRO CSE 2020 | Question: 35



Given the grammar

- $s \rightarrow T^* S \mid T$
- $T \rightarrow U + T \mid U$
- $U \rightarrow a \mid b$

Which of the following statements is wrong?

- A. Grammar is not ambiguous
 C. Right to left evaluation of * and + happens
- B. Priority of + over * is ensured
 D. None of these

isro-2020 compiler-design grammar easy

[Answer key](#)



4.7.4 Grammar: ISRO CSE 2020 | Question: 75

A grammar is defined as

- $A \rightarrow BC$
- $B \rightarrow x \mid Bx$
- $C \rightarrow B \mid D$
- $D \rightarrow y \mid Ey$
- $E \rightarrow z$

The non terminal alphabet of the grammar is

- A. $\{A, B, C, D, E\}$
 B. $\{B, C, D, E\}$
 C. $\{A, B, C, D, E, x, y, z\}$
 D. $\{x, y, z\}$

isro-2020 compiler-design grammar parsing easy

[Answer key](#)



4.7.5 Grammar: ISRO-2013-6

Which of the following productions eliminate left recursion in the productions given below:

$$S \rightarrow Aa \mid b$$

$$A \rightarrow Ac \mid Sd \mid \epsilon$$

- A. $S \rightarrow Aa \mid b, A \rightarrow bdA', A' \rightarrow A'c \mid A'ba \mid A \mid \epsilon$
 B. $S \rightarrow Aa \mid b, A \rightarrow A' \mid bdA', A' \rightarrow cA' \mid adA' \mid \epsilon$
 C. $S \rightarrow Aa \mid b, A \rightarrow A'c \mid A'd, A' \rightarrow bdA' \mid cA \mid \epsilon$
 D. $S \rightarrow Aa \mid b, A \rightarrow cA' \mid adA' \mid bdA', A' \rightarrow A \mid \epsilon$

isro2013 parsing grammar

[Answer key](#)



4.8

Heap Allocation (1)

4.8.1 Heap Allocation: ISRO-DEC2017-66



Which languages necessarily need heap allocation in the runtime environment?

- A. Those that support recursion
 C. Those that use global variables
- B. Those that use dynamic scoping
 D. Those that allow dynamic data structures

isrodec2017 runtime-environment heap-allocation operating-system data-structures

[Answer key](#)

4.9

Intermediate Code (2)

4.9.1 Intermediate Code: ISRO CSE 2008 | Question: 38



Relative to the program translated by a compiler, the same program when interpreted runs

- A. Faster
- B. Slower
- C. At the same speed
- D. May be faster or slower

isro2008 compiler-design intermediate-code

[Answer key](#)

4.9.2 Intermediate Code: ISRO CSE 2018 | Question: 28



Incremental-Compiler is a compiler:

- a. which is written in a language that is different from the source language
- b. compiles the whole source code to generate object code afresh
- c. compiles only those portion of source code that have been modified
- d. that runs on one machine but produces object code for another machine

isro2018 compiler-design intermediate-code

[Answer key](#)

4.10

Lexical Analysis (2)

4.10.1 Lexical Analysis: GATE CSE 2000 | Question: 1.18, ISRO2015-25



The number of tokens in the following C statement is

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

- A. 3
- B. 26
- C. 10
- D. 21

gatecse-2000 compiler-design lexical-analysis easy isro2015

[Answer key](#)

4.10.2 Lexical Analysis: ISRO 2017-79



The output of a lexical analyzer is

- A. A parse tree
- B. Intermediate code
- C. Machine code
- D. A stream of tokens

isro2017 compiler-design lexical-analysis

[Answer key](#)

4.11

Memory Management (1)

4.11.1 Memory Management: ISRO CSE 2023 | Question: 31



As part of segmentation memory allocation strategy, which of the following assigns segment numbers for various segments of a program like code segment and data segment?

- A. Compiler
- B. Assembler
- C. Loader
- D. Linker

Answer key**4.12****Operator Grammar (1)****4.12.1 Operator Grammar: ISRO2015-26**

Which grammar rules violate the requirement of the operator grammar? A, B, C are variables and a, b, c are terminals

- i. $A \rightarrow BC$
 - ii. $A \rightarrow CcBb$
 - iii. $A \rightarrow BaC$
 - iv. $A \rightarrow \epsilon$
-
- a. (i) only
 - b. (i) and (ii)
 - c. (i) and (iii)
 - d. (i) and (iv)

Answer key**4.13****Operator Precedence (1)****4.13.1 Operator Precedence: GATE CSE 2000 | Question: 2.21, ISRO2015-24**

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?

- | | |
|-----------------------------------|-----------------------------------|
| A. * has higher precedence than + | B. — has higher precedence than * |
| C. + and — have same precedence | D. + has higher precedence than * |

Answer key**4.14****Parameter Passing (2)****4.14.1 Parameter Passing: GATE CSE 2004 | Question: 2,ISRO2017-54**

Consider the following function

```
void swap(int a, int b)
{
    int temp;
    temp = a;
    a = b;
    b = temp;
}
```

In order to exchange the values of two variables x and y .

- A. call $swap(x, y)$
- B. call $swap(&x, &y)$
- C. $swap(x, y)$ cannot be used as it does not return any value

D. $\text{swap}(x,y)$ cannot be used as the parameters are passed by value

gatecse-2004 compiler-design programming-in-c parameter-passing easy isro2017 runtime-environment

Answer key 



4.14.2 Parameter Passing: ISRO2015-80

Consider the following code fragment

```
void foo(int x, int y)
{
    x+=y;
    y+=x;
}
main()
{
    int x=5.5;
    foo(x,x);
}
```

What is the final value of x in both call by value and call by reference, respectively?

- A. 5 and 16 B. 5 and 12 C. 5 and 20 D. 12 and 20

isro2015 compiler-design runtime-environment parameter-passing

Answer key 

4.15

Parsing (9)



4.15.1 Parsing: ISRO CSE 2011 | Question: 43

Which variable does not drive a terminal string in grammar?

- $S \rightarrow AB$
- $A \rightarrow a$
- $B \rightarrow b$
- $B \rightarrow C$

- A. A B. B C. C D. S

isro2011 compiler-design parsing

Answer key 



4.15.2 Parsing: ISRO CSE 2014 | Question: 5

What is the number of steps required to derive the string (((() () () for the following grammar?

- $S \rightarrow SS$
- $S \rightarrow (S)$
- $S \rightarrow \epsilon$

- A. 10 B. 12
C. 15 D. 16

isro2014 compiler-design parsing

Answer key 

4.15.3 Parsing: ISRO CSE 2016 | Question: 40



Recursive descent parsing is an example of

- A. Top-down parsers
- B. Bottom-up parsers
- C. Predictive parsers
- D. None of the above

isro2016 compiler-design parsing

[Answer key](#)

4.15.4 Parsing: ISRO CSE 2016 | Question: 41



A top-down parser generates

- A. Rightmost Derivation
- B. Rightmost derivation in reverse
- C. Leftmost derivation
- D. Leftmost derivation in reverse

isro2016 compiler-design parsing

[Answer key](#)

4.15.5 Parsing: ISRO CSE 2023 | Question: 22



In the context of parsing techniques, LL(1) refers to:

- A. Grammars that parse the input from left to right, produce a rightmost derivation, with a lookahead of 1 symbol.
- B. Grammars that parse the input from left to right, produce a leftmost derivation, with a lookahead of 1 symbol.
- C. Grammars that parse the input from left to right, and backtrack at most once.
- D. Grammars that parse the input from right to left, produce a leftmost derivation, and backtrack at most once.

isro-cse-2023 compiler-design parsing theory-of-computation

[Answer key](#)

4.15.6 Parsing: ISRO-2013-5



Shift reduce parsing belongs to a class of

- A. Bottom up parsing.
- B. Top down parsing.
- C. Recursive parsing.
- D. Predictive parsing.

isro2013 parsing

[Answer key](#)

4.15.7 Parsing: ISRO2015-27



Which one of the following is a top-down parser?

- A. Recursive descent parser
- B. Shift left associative parser
- C. SLR(k) parser
- D. LR(k) parser

isro2015 compiler-design parsing

[Answer key](#)

4.15.8 Parsing: ISRO2015-28



Yacc stands for

- A. yet accept compiler constructs
- B. yet accept compiler compiler
- C. yet another compiler constructs
- D. yet another compiler compiler

Answer key**4.15.9 Parsing: ISRO2015-29**

Which statement is true?

- A. LALR parser is more powerful and costly as compare to other parsers
- B. All CFG's are LP and not all grammars are uniquely defined
- C. Every SLR grammar is unambiguous but not every unambiguous grammar is SLR
- D. LR(K) is the most general back tracking shift reduce parsing method

Answer key**4.16****Runtime Environment (1)****4.16.1 Runtime Environment: GATE CSE 1998 | Question: 1.25, ISRO2008-41**

In a resident – OS computer, which of the following systems must reside in the main memory under all situations?

- A. Assembler
- B. Linker
- C. Loader
- D. Compiler

Answer key**4.17****Symbol Table (1)****4.17.1 Symbol Table: ISRO CSE 2011 | Question: 78**

A symbol table of length 152 is processing 25 entries at any instant. What is occupation density?

- A. 0.164
- B. 127
- C. 8.06
- D. 6.08

Answer key**4.18****Variable Binding (1)****4.18.1 Variable Binding: ISRO-2013-7**

Consider the following psuedocode:

```

x: integer := 1
y: integer := 2
procedure add
    x:= x + y
procedure second (P: Procedure)
    x: integer := 2
    P()
procedure first
    y: integer := 3
    second (add)
first ()
write_integer(x)
  
```

What does it print if the language uses dynamic scoping with deep binding?

- A. 2
- B. 3
- C. 4
- D. 5

Answer key

Answer Keys

4.0.1	C	4.0.2	D	4.1.1	D	4.1.2	C	4.2.1	A
4.2.2	C	4.2.3	X	4.2.4	D	4.2.5	B	4.2.6	D
4.2.7	X	4.2.8	D	4.2.9	D	4.3.1	B	4.4.1	C
4.5.1	D	4.6.1	C	4.7.1	B	4.7.2	D	4.7.3	D
4.7.4	A	4.7.5	B	4.8.1	D	4.9.1	B	4.9.2	C
4.10.1	C	4.10.2	D	4.11.1	C	4.12.1	D	4.13.1	B
4.14.1	D	4.14.2	C	4.15.1	C	4.15.2	A	4.15.3	A
4.15.4	C	4.15.5	B	4.15.6	A	4.15.7	A	4.15.8	D
4.15.9	C	4.16.1	C	4.17.1	A	4.18.1	C		



5.0.1 ISRO CSE 2014 | Question: 58



Assume the following information.

- Original timestamp value = 46
- Receive timestamp value = 59
- Transmit timestamp value = 60
- Timestamp at arrival of packet = 69

Which of the following statements is correct?

- A. Receive clock should go back by 3 milliseconds
- B. Transmit and Receive clocks are synchronized
- C. Transmit clock should go back by 3 milliseconds
- D. Receive clock should go ahead by 1 milliseconds

isro2014 computer-networks icmp

[Answer key](#)

5.0.2 ISRO-2013-19



What is the maximum number of characters (7 bits + parity) that can be transmitted in a second on a 19.2 Kbps line. This asynchronous transmission requires 1 start bit and 1 stop bit.

- A. 192
- B. 240
- C. 1920
- D. 1966

isro2013 serial-communication

[Answer key](#)

5.0.3 ISRO-2013-44



Which algorithm is used to shape the bursty traffic into a fixed rate traffic by averaging the data rate?

- | | |
|---------------------------|----------------------------|
| A. Solid bucket algorithm | B. Spanning tree algorithm |
| C. Hocken helm algorithm | D. Leaky bucket algorithm |

isro2013 computer-networks

[Answer key](#)

5.0.4 ISRO CSE 2009 | Question: 5



What is the primary purpose of a VLAN?

- | | |
|--|---|
| A. Demonstrating the proper layout for a network | B. Simulating a network |
| C. To create a virtual private network | D. Segmenting a network inside a switch or device |

isro2009 computer-networks

[Answer key](#)

5.0.5 ISRO CSE 2007 | Question: 19



Assume that each character code consists of 8 bits. The number of characters that can be transmitted per second through a synchronous serial line at 2400 baud rate, and with two stop bits is

- A. 109 B. 216 C. 218 D. 219

isro2007 serial-communication

Answer key 



5.0.6 ISRO2015-51

How many characters per sec (7 bits + 1 parity) can be transmitted over a 2400 bps line if the transfer is synchronous (1 start and 1 stop bit)?

- A. 300 B. 240 C. 250 D. 275

isro2015 computer-networks serial-communication

Answer key 



5.0.7 ISRO-DEC2017-33

Assume that Source S and Destination D are connected through an intermediate router R . How many times a packet has to visit the network layer and data link layer during a transmission from S to D ?

- A. Network layer—4 times, Data link layer—4 times
- B. Network layer—4 times, Data link layer—6 times
- C. Network layer—2 times, Data link layer—4 times
- D. Network layer—3 times, Data link layer—4 times

isrodec2017 computer-networks

Answer key 



5.0.8 ISRO CSE 2023 | Question: 80

Match the following and select the correct option:

(i)	Encryption	(P)	Manipulation of identification of a host (through NIC identifier)
(ii)	MAC cloning	(Q)	Determining version and name of OS and OS utilities
(iii)	ARP spoofing	(R)	Protecting the confidentiality
(i)	Finger printing	(S)	Poisioning the IP to MAC address mapping

- A. (i) – (R), (ii) – (P), (i) – (S), (i) – (Q)
- B. (i) – (P), (ii) – (R), (i) – (S), (i) – (Q)
- C. (i) – (R), (ii) – (S), (i) – (P), (i) – (Q)
- D. (i) – (R), (ii) – (Q), (i) – (S), (i) – (P)

isro-cse-2023 computer-networks match-the-following



5.0.9 ISRO CSE 2023 | Question: 65

For internal data communication through computer network, a 5 layer protocol hierarchy is proposed. Applications to be used in this network generate 270 bytes long messages. At each of the layers, a 6 -byte header is added. What fraction of network bandwidth(in %) is wasted due to headers?

- A. 5% B. 20% C. 10% D. 15%

5.0.10 ISRO CSE 2023 | Question: 59

Which of the following is the cause of Ping of death issue related to ICMP packets?

- A. Buffer overflow
- B. Divide by ZERO
- C. Missing input sanitisation
- D. Privilege escalation

Answer key**5.0.11 ISRO CSE 2023 | Question: 17**

Match the following context of information Security which are closely associated

Matching

(i)	Ingress Filtering	(P)	Data Leakage Prevention
(ii)	Egress Filtering	(Q)	Hiding identity of systems
(iii)	NAT	(R)	Keep Track of TCP/IP connections
(iv)	Stateful firewall	(S)	Malicious traffic prevention

- A. (i) - (S), (ii) - (P), (iii) - (Q), (iv) - (R)
- B. (i) - (P), (ii) - (R), (iii) - (S), (iv) - (Q)
- C. (i) - (S), (ii) - (R), (iii) - (P), (iv) - (Q)
- D. (i) - (R), (ii) - (Q), (iii) - (S), (iv) - (P)

Answer key**5.1****Application Layer Protocols (1)****5.1.1 Application Layer Protocols: GATE CSE 2008 | Question: 14, ISRO2016-74**

What is the maximum size of data that the application layer can pass on to the TCP layer below?

- A. Any size
- B. 2^{16} bytes - size of TCP header
- C. 2^{16} bytes
- D. 1500 bytes

Answer key**5.2****CRC Polynomial (4)****5.2.1 CRC Polynomial: GATE CSE 2007 | Question: 68, ISRO2016-73**

The message 11001001 is to be transmitted using the CRC polynomial $x^3 + 1$ to protect it from errors. The message that should be transmitted is:

- A. 11001001000
- B. 11001001011
- C. 11001010
- D. 110010010011

Answer key**5.2.2 CRC Polynomial: ISRO CSE 2018 | Question: 11**

_____ can detect burst error of length less than or equal to degree of the polynomial and detects burst errors that affect odd number of bits.

- A. Hamming Code
- B. CRC
- C. VRC
- D. None of the above

Answer key**5.2.3 CRC Polynomial: ISRO-2013-40**

If the frame to be transmitted is 1101011011 and the CRC polynomial to be used for generating checksum is $x^4 + x + 1$, then what is the transmitted frame?

- | | |
|-------------------|-------------------|
| A. 11010110111011 | B. 11010110111101 |
| C. 11010110111110 | D. 11010110111001 |

Answer key**5.2.4 CRC Polynomial: ISRO2015-52**

In CRC if the data unit is 100111001 and the divisor is 1011 then what is dividend at the receiver?

- A. 100111001101
- B. 100111001011
- C. 100111001
- D. 100111001110

Answer key**5.3 CSMA CD (2)****5.3.1 CSMA CD: ISRO CSE 2008 | Question: 6**

Which of the following transmission media is not readily suitable to CSMA operation?

- A. Radio
- B. Optical fibers
- C. Coaxial cable
- D. Twisted pair

Answer key**5.3.2 CSMA CD: ISRO CSE 2016 | Question: 69**

In Ethernet CSMA/CD, the special bit sequence transmitted by media access management to handle collision is called

- A. Preamble
- B. Postamble
- C. Jam
- D. None of these

Answer key**5.4****Communication (7)**

5.4.1 Communication: ISRO CSE 2007 | Question: 20



If the bandwidth of a signal is 5 kHz and the lowest frequency is 52 kHz, what is the highest frequency

- A. 5 kHz
- B. 10 kHz
- C. 47 kHz
- D. 57 kHz

isro2007 communication

[Answer key](#)

5.4.2 Communication: ISRO CSE 2007 | Question: 22



Phase transition for each bit are used in

- A. Amplitude modulation
- B. Carrier modulation
- C. Manchester encoding
- D. NRZ encoding

isro2007 computer-networks communication

[Answer key](#)

5.4.3 Communication: ISRO CSE 2007 | Question: 24, ISRO CSE 2016 | Question: 67



Bit stuffing refers to

- A. inserting a 0 in user stream to differentiate it with a flag
- B. inserting a 0 in flag stream to avoid ambiguity
- C. appending a nipple to the flag sequence
- D. appending a nipple to the use data stream

isro2007 communication isro2016

[Answer key](#)

5.4.4 Communication: ISRO CSE 2008 | Question: 9



What is the bandwidth of the signal that ranges from 40 kHz 4 MHz

- A. 36 MHz
- B. 360 kHz
- C. 3.96 MHz
- D. 396 kHz

isro2008 communication non-gatecse

[Answer key](#)

5.4.5 Communication: ISRO CSE 2011 | Question: 1



The encoding technique used to transmit the signal in giga ethernet technology over fiber optic medium is

- A. Differential Manchester encoding
- B. Non return to zero
- C. 4B/5B encoding
- D. 8B/10B encoding

computer-networks isro2011 communication

[Answer key](#)

5.4.6 Communication: ISRO CSE 2014 | Question: 45



Consider a 50 kbps satellite channel with a 500 milliseconds round trip propagation delay. If the sender wants to transmit 1000 bit frames, how much time will it take for the receiver to receive the frame?

- A. 250 milliseconds
- B. 20 milliseconds
- C. 520 milliseconds
- D. 270 milliseconds

Answer key**5.4.7 Communication: ISRO2015-49**

What frequency range is used for microwave communications, satellite and radar?

- A. Low frequency: 30 kHz to 300 kHz
- B. Medium frequency: 300 kHz to 3 MHz
- C. Super high frequency: 3000 MHz to 30000 MHz
- D. Extremely high frequency: 30000 kHz

Answer key**5.5****Cryptography (8)****5.5.1 Cryptography: ISRO CSE 2009 | Question: 7**

Advanced Encryption Standard (AES) is based on

- | | |
|-----------------------------|----------------------------|
| A. Asymmetric key algorithm | B. Symmetric key algorithm |
| C. Public key algorithm | D. Key exchange |

Answer key**5.5.2 Cryptography: ISRO CSE 2017 | Question: 35**

MD5 is a widely used hash function for producing hash value of

- | | | | |
|------------|-------------|-------------|--------------|
| A. 64 bits | B. 128 bits | C. 512 bits | D. 1024 bits |
|------------|-------------|-------------|--------------|

Answer key**5.5.3 Cryptography: ISRO CSE 2018 | Question: 78**

Which one of the following algorithm is not used in asymmetric key cryptography?

- | | |
|-----------------------------------|-----------------------------|
| a. RSA Algorithm | b. Gillie-Hellman Algorithm |
| c. Electronic Code Book Algorithm | d. None of the above |

Answer key**5.5.4 Cryptography: ISRO CSE 2020 | Question: 44**

In a columnar transportation cipher, the plain text is “the tomato is a plant in the night shade family”, keyword is “TOMATO”. The cipher text is

- A. ”TINESAX / EOAHTFX / HTLTHEY / MAIIAIX / TAPNGDL / OSTNHSX”
- B. ”TINESAX / EOAHTFX / MAIIAIX / HTLTHEY / TAPNGDL / OSTNHSX”
- C. ”TINESAX / EOAHTFX / HTLTHEY / MAIIAIX / OSTNHSX / TAPNGDL”
- D. ”EOAHTFX / TINESAX / HTLTHEY / MAIIAIX / TAPNGDL / OSTNHSX”

Answer key

5.5.5 Cryptography: ISRO CSE 2020 | Question: 45



Avalanche effect in cryptography refers

- A. Large changes in cipher text when the keyword is changed minimally
- B. Large changes in cipher text when the plain text is changed
- C. Large Impact of keyword change to length of the cipher text
- D. None of the above

isro-2020 computer-networks cryptography normal

[Answer key](#)

5.5.6 Cryptography: ISRO-2013-21



What will be the cipher text produced by the following cipher function for the plain text ISRO with key $k = 7$. [Consider ' $A' = 0, 'B' = 1, \dots, 'Z' = 25]$

$$C_k(M) = (kM + 13) \bmod 26$$

- A. RJCH
- B. QIBG
- C. GQPM
- D. XPIN

isro2013 cryptography

[Answer key](#)

5.5.7 Cryptography: ISRO-2013-46



Which of the following encryption algorithms is based on the Feistal structure?

- A. Advanced Encryption Standard
- B. RSA public key cryptographic algorithm
- C. Data Encryption standard
- D. RC4

isro2013 cryptography

[Answer key](#)

5.5.8 Cryptography: ISRO-DEC2017-29



Using public key cryptography, X adds a digital signature σ to a message M , encrypts $\langle M, \sigma \rangle$ and sends it to Y , where it is decrypted. Which one of the following sequence of keys is used for operations ?

- A. Encryption: X' 's private key followed by Y' 's private key; Decryption: X' 's public key followed by Y' 's public key.
- B. Encryption: X' 's private key followed by Y' 's public key; Decryption: X' 's public key followed by Y' 's private key.
- C. Encryption: X' 's private key followed by Y' 's public key; Decryption: Y' 's private key followed by X' 's public key.
- D. Encryption: X' 's public key followed by Y' 's private key; Decryption: Y' 's public key followed by X' 's private key.

isrodec2017 network-security cryptography

[Answer key](#)

5.6

Data Transfer Speed (1)

5.6.1 Data Transfer Speed: ISRO CSE 2023 | Question: 45



In a computer network using CSMA/CD, the minimum frame size for data transfer is 1500 bytes. What will be the data transfer speed in this network over 1 Km 375 cable, if the signal speed in the cable is 250000Km/sec and no repeaters are used in this network?

- A. 1 Gbps
- B. 100 Mbps
- C. 500 Mbps
- D. 1.5 Gbps

isro-cse-2023 csma-cd computer-networks data-transfer-speed

[Answer key](#)

5.7

Distance Vector Routing (1)



5.7.1 Distance Vector Routing: ISRO CSE 2017 | Question: 34

Match with the suitable one :

List-1

- (A) Multicast group membership
- (B) Interior gateway protocol
- (C) Exterior gateway protocol
- (D) RIP

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

isro2017 computer-networks distance-vector-routing

List-2

- 1. Distance Vector routing
- 2. IGMP
- 3. OSPF
- 4. BGP

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

[Answer key](#)

5.8

Dns (2)



5.8.1 Dns: ISRO CSE 2016 | Question: 80

When a DNS server accepts and uses incorrect information from a host that has no authority giving that information, then it is called

- A. DNS lookup
- C. DNS spoofing
- B. DNS hijacking
- D. None of the mentioned

isro2016 computer-networks dns

[Answer key](#)

5.8.2 Dns: ISRO2015-44



The DNS maps the IP address to

- A. A binary address as strings
- C. A hierarchy of domain names
- B. A n alphanumeric address
- D. A hexadecimal address

isro2015 computer-networks dns

[Answer key](#)

5.9

Encoding (2)



5.9.1 Encoding: ISRO CSE 2007 | Question: 13

By using an eight bit optical encoder the degree of resolution that can be obtained is (approximately)

A. 1.8°

B. 3.4°

C. 2.8°

D. 1.4°

isro2007 communication encoding

Answer key 



5.9.2 Encoding: ISRO CSE 2020 | Question: 52

To send same bit sequence, NRZ encoding require

- A. Same clock frequency as Manchester encoding
- B. Half the clock frequency as Manchester encoding
- C. Twice the clock frequency as Manchester encoding
- D. A clock frequency which depend on number of zeroes and ones in the bit sequence

isro-2020 computer-networks encoding normal

Answer key 



5.10

Error Correction (2)

5.10.1 Error Correction: ISRO CSE 2011 | Question: 48

The hamming distance between the octets of 0xAA and 0x55 is

A. 7

B. 5

C. 8

D. 6

isro2011 computer-networks error-correction hamming-code

Answer key 



5.10.2 Error Correction: ISRO CSE 2023 | Question: 3

Which of the following is true?

- A. Both Parity and Cyclic Redundancy Check are error correcting codes
- B. Both Parity and Low Density Parity Check Code are error correcting codes
- C. Both Reed-Solomon code and Low Density Parity Check Code are error correcting codes
- D. Both Cyclic Redundancy Check and Low Density Parity Check Code are error correcting codes

isro-cse-2023 error-correction computer-networks

Answer key 



5.11

Error Detection (4)

5.11.1 Error Detection: ISRO CSE 2008 | Question: 79

Repeated execution of simple computation may cause compounding of

- A. round-off errors
- C. run-time errors

- B. syntax errors
- D. logic errors

isro2008 computer-networks error-detection

Answer key 



5.11.2 Error Detection: ISRO CSE 2011 | Question: 50

Data is transmitted continuously at 2.048 Mbps rate for 10 hours and received 512 bits errors. What is the bit error rate?

A. 6.9 e-9

B. 6.9 e-6

C. 69 e-9

D. 4 e-9

isro2011 computer-networks error-detection

Answer key 



5.11.3 Error Detection: ISRO CSE 2023 | Question: 26

Which of the following methods is used to detect double errors?

A. Odd Parity

C. Checksum (CRC)

B. Even Parity

D. Checksum (XOR)

isro-cse-2023 computer-networks error-detection

Answer key 



5.11.4 Error Detection: ISRO-2013-18

How many check bits are required for 16 bit data word to detect 2 bit errors and single bit correction using hamming code?

A. 5

B. 6

C. 7

D. 8

isro2013 error-detection

Answer key 

5.12

Ethernet (6)



5.12.1 Ethernet: ISRO CSE 2007 | Question: 21

An Ethernet hub

A. functions as a repeater

C. connects to a token-ring network

B. connects to a digital PBX

D. functions as a gateway

isro2007 computer-networks ethernet

Answer key 



5.12.2 Ethernet: ISRO CSE 2008 | Question: 5

In Ethernet, the source address field in the MAC frame is the _____ address.

A. original sender's physical

C. next destination's physical

B. previous station's physical

D. original sender's service port

isro2008 computer-networks ethernet

Answer key 



5.12.3 Ethernet: ISRO CSE 2014 | Question: 61

A mechanism or technology used in Ethernet by which two connected devices choose common transmission parameters such as speed, duplex mode and flow control is called

A. Autosense

B. Synchronization

C. Pinging

D. Auto negotiation

isro2014 computer-networks ethernet

Answer key 



5.12.4 Ethernet: ISRO CSE 2017 | Question: 33

An Ethernet frame that is less than the IEEE 802.3 minimum length of 64 octets is called

- A. Short frame B. Small frame C. Mini frame D. Runt frame

isro2017 computer-networks ethernet

Answer key 



5.12.5 Ethernet: ISRO-2013-38

In the Ethernet, which field is actually added at the physical layer and is not part of the frame.

- A. Preamble B. CRC C. Address D. Location

isro2013 computer-networks ethernet

Answer key 



5.12.6 Ethernet: ISRO-2013-39

Ethernet layer- 2 switch is a network element type which gives.

- A. Different collision domain and same broadcast domain.
B. Different collision domain and different broadcast domain.
C. Same collision domain and same broadcast domain.
D. Same collision domain and different broadcast domain.

isro2013 computer-networks ethernet

Answer key 

5.13

Firewall (1)



5.13.1 Firewall: ISRO CSE 2018 | Question: 77

What is one advantage of setting up a DMZ (Demilitarized Zone) with two firewalls?

- A. You can control where traffic goes in the three networks
B. You can do statefull packet filtering
C. You can do load balancing
D. Improve network performance

isro2018 computer-networks network-security firewall

Answer key 

5.14

IP Addressing (3)



5.14.1 IP Addressing: ISRO CSE 2008 | Question: 32

The network 198.78.41.0 is a

- A. Class A network B. Class B network
C. Class C network D. Class D network

isro2008 computer-networks ip-addressing

Answer key 



5.14.2 IP Addressing: ISRO CSE 2014 | Question: 6

The process of modifying IP address information in IP packet headers while in transit across a traffic routing device is called

- A. Port address translation (PAT) B. Network address translation (NAT)

C. Address mapping

D. Port mapping

isro2014 computer-networks ip-addressing

Answer key 



5.14.3 IP Addressing: ISRO-DEC2017-31

In the IPv4 addressing format, the number of networks allowed under Class C addresses is

A. 2^{20}

B. 2^{24}

C. 2^{14}

D. 2^{21}

isrodec2017 computer-networks ip-addressing

Answer key 

5.15

IP Packet (3)



5.15.1 IP Packet: ISRO CSE 2009 | Question: 74

Use of IPSEC in tunnel mode results in

A. IP packet with same header
C. IP packet without header

B. IP packet with new header
D. No changes in IP packet

isro2009 computer-networks ip-packet

Answer key 



5.15.2 IP Packet: ISRO CSE 2014 | Question: 31

A IP packet has arrived in which the fragmentation offset value is 100, the value of HLEN is 5 and the value of total length field is 200. What is the number of the last byte?

A. 194

B. 394

C. 979

D. 1179

computer-networks ip-packet isro2014

Answer key 



5.15.3 IP Packet: ISRO CSE 2014 | Question: 55

An IP packet has arrived with the first 8 bits as 01000010. Which of the following is correct?

- A. The number of hops this packet can travel is 2
- B. The total number of bytes in header is 16 bytes
- C. The upper layer protocol is ICMP
- D. The receiver rejects the packet

isro2014 computer-networks ip-packet

Answer key 

5.16

Inter Process Communication (1)



5.16.1 Inter Process Communication: ISRO CSE 2020 | Question: 58

Remote Procedure Calls are used for

- A. communication between two processes remotely different from each other on the same system
- B. communication between two processes on the same system
- C. communication between two processes on the separate systems
- D. none of the above

Answer key**5.17****Ipv6 (1)****5.17.1 Ipv6: ISRO-2013-42****IPv6 does not support which of the following addressing modes?**

- A. Unicast addressing
- B. Multicast addressing
- C. Broadcast addressing
- D. Anycast addressing

Answer key**5.18****LAN Technologies (1)****5.18.1 LAN Technologies: ISRO CSE 2008 | Question: 4****On a LAN ,where are IP datagrams transported?**

- A. In the LAN header
- B. In the application field
- C. In the information field of the LAN frame
- D. After the TCP header

Answer key**5.19****Link State Routing (1)****5.19.1 Link State Routing: ISRO CSE 2007 | Question: 26****If there are five routers and six networks in intranet using link state routing, how many routing tables are there?**

- A. 1
- B. 5
- C. 6
- D. 11

Answer key**5.20****MAC Protocol (4)****5.20.1 MAC Protocol: ISRO CSE 2009 | Question: 4****Which of the following is a MAC address?**

- A. 192.166.200.50
- B. 00056A:01A01A5CCA7FF60
- C. 568, Airport Road
- D. 01:A5:BB:A7:FF:60

Answer key**5.20.2 MAC Protocol: ISRO CSE 2011 | Question: 20****The IEEE standard for WiMax technology is**

- A. IEEE 802.16
- B. IEEE 802.36
- C. IEEE 812.16
- D. IEEE 806.16

Answer key

5.20.3 MAC Protocol: ISRO CSE 2014 | Question: 71



Which of the following is not a valid multicast MAC address?

- A. 01:00:5E:00:00:00
- B. 01:00:5E:00:00:FF
- C. 01:00:5E:00:FF:FF
- D. 01:00:5E:FF:FF:FF

computer-networks mac-protocol isro2014

[Answer key](#)

5.20.4 MAC Protocol: ISRO CSE 2017 | Question: 32



Which media access control protocol is used by IEEE 802.11 wireless LAN?

- A. CDMA
- B. CSMA/CA
- C. ALOHA
- D. None of the above

isro2017 computer-networks mac-protocol

[Answer key](#)

5.21

Network Layer (2)



5.21.1 Network Layer: ISRO CSE 2009 | Question: 2

In networking, UTP stands for

- A. Unshielded T-connector port
- B. Unshielded twisted pair
- C. Unshielded terminating pair
- D. Unshielded transmission process

isro2009 computer-networks network-layer

[Answer key](#)

5.21.2 Network Layer: ISRO CSE 2017 | Question: 28



In networking terminology UTP means

- A. Uniquitous teflon port
- B. Uniformly terminating port
- C. Unshielded twisted pair
- D. Unshielded T-connector port

isro2017 computer-networks network-layer

[Answer key](#)

5.22

Network Layering (3)



5.22.1 Network Layering: ISRO CSE 2007 | Question: 75

When a host on network A sends a message to a host on network B, which address does the router look at?

- A. Port
- B. IP
- C. Physical
- D. Subnet mask

isro2007 computer-networks network-layering

[Answer key](#)

5.22.2 Network Layering: ISRO CSE 2011 | Question: 32



In which layer of network architecture, the secured socket layer (SSL) is used?

- A. physical layer
- B. session layer
- C. application layer
- D. presentation layer

isro2011 computer-networks network-security network-layering

[Answer key](#)

5.22.3 Network Layering: ISRO2015-58



Which layers of the OSI reference model are host-to-host layers?

- A. Transport, session, presentation, application
- B. Session, presentation, application
- C. Datalink, transport, presentation, application
- D. Physical, datalink, network, transport

isro2015 computer-networks network-layering

[Answer key](#)

5.23

Network Protocols (11)



5.23.1 Network Protocols: ISRO CSE 2007 | Question: 63

Which of these is not a feature of WAP 2.0

- A. Push and Pull Model
- B. Interface to a storage device
- C. Multimedia messaging
- D. Hashing

isro2007 network-protocols

[Answer key](#)



5.23.2 Network Protocols: ISRO CSE 2008 | Question: 10

Which Project 802 standard provides for a collision-free protocol?

- A. 802.2
- B. 802.3
- C. 802.5
- D. 802.6

isro2008 computer-networks network-protocols

[Answer key](#)



5.23.3 Network Protocols: ISRO CSE 2009 | Question: 3

The address resolution protocol (ARP) is used for

- A. Finding the IP address from the DNS
- B. Finding the IP address of the default gateway
- C. Finding the IP address that corresponds to a MAC address
- D. Finding the MAC address that corresponds to an IP address

isro2009 computer-networks network-protocols

[Answer key](#)



5.23.4 Network Protocols: ISRO CSE 2011 | Question: 12

The network protocol which is used to get MAC address of a node by providing IP address is

- A. SMTP
- B. ARP
- C. RIP
- D. BOOTP

isro2011 computer-networks network-protocols

[Answer key](#)



5.23.5 Network Protocols: ISRO CSE 2011 | Question: 69

Lightweight Directory Access protocol is used for

- A. Routing the packets
C. obtaining IP address
B. Authentication
D. domain name resolving

isro2011 computer-networks network-protocols

[Answer key](#)



5.23.6 Network Protocols: ISRO CSE 2016 | Question: 70

Which network protocol allows hosts to dynamically get a unique IP number on each bootup

- A. DHCP B. BOOTP C. RARP D. ARP

isro2016 computer-networks network-protocols

[Answer key](#)



5.23.7 Network Protocols: ISRO CSE 2017 | Question: 31

Which of the following protocol is used for transferring electronic mail messages from one machine to another?

- A. TELNET B. FTP C. SNMP D. SMTP

isro2017 computer-networks network-protocols

[Answer key](#)



5.23.8 Network Protocols: ISRO-2013-47

The protocol data unit for the transport layer in the internet stack is

- A. Segment B. Message C. Datagram D. Frame

isro2013 network-protocols

[Answer key](#)



5.23.9 Network Protocols: ISRO-DEC2017-30

Which of the following are used to generate a message digest by the network security protocols?

- (P) SHA-256
(Q) AES
(R) DES
(S) MD5

- A. P and S only B. P and Q only C. R and S only D. P and R only

isrodec2017 network-security network-protocols

[Answer key](#)



5.23.10 Network Protocols: ISRO-DEC2017-35

Consider the set of activities related to e-mail

- A:** Send an e-mail from a mail client to mail server.
B: Download e-mail headers from mailbox and retrieve mails from server to cache
C: Checking e-mail through a web browser

The application level protocol used for each activity in the same sequence is

- A. SMTP,HTTPS,IMAP
- B. SMTP,POP,IMAP
- C. SMTP,IMAP,HTTPS
- D. SMTP,IMAP,POP

isrodec2017 computer-networks application-layer-protocols network-protocols

[Answer key](#)



5.23.11 Network Protocols: ISRO2015-56

Which statement is false?

- A. PING is a TCP/IP application that sends datagrams once every second in the hope of an echo response from the machine being PINGED
- B. If the machine is connected and running a TCP/IP protocol stack, it should respond to the PING datagram with a datagram of its own
- C. If PING encounters an error condition, an ICMP message is not returned
- D. PING displays the time of the return response in milliseconds or one of several error messages

isro2015 computer-networks network-protocols

[Answer key](#)

5.24

Network Security (12)



5.24.1 Network Security: ISRO CSE 2007 | Question: 68

SSL is not responsible for

- A. Mutual authentication of client & server
- B. Secret communication
- C. Data Integrity protection
- D. Error detection and correction

isro2007 computer-networks network-security

[Answer key](#)



5.24.2 Network Security: ISRO CSE 2007 | Question: 70

The standard for certificates used on internet is

- A. X.25
- B. X.301
- C. X.409
- D. X.509

isro2007 computer-networks network-security

[Answer key](#)



5.24.3 Network Security: ISRO CSE 2007 | Question: 71

Hashed message is signed by a sender using

- A. his public key
- B. his private key
- C. receiver's public key
- D. receiver's private key

isro2007 computer-networks network-security

[Answer key](#)



5.24.4 Network Security: ISRO CSE 2008 | Question: 59

A public key encryption system

- A. allows anyone to decode the transmissions
- B. allows only the correct sender to decode the data

- C. allows only the correct receiver to decode the data
- D. does not encode the data before transmitting it

isro2008 computer-networks network-security

[Answer key](#)



5.24.5 Network Security: ISRO CSE 2009 | Question: 6

SHA-1 is a

- A. encryption algorithm
- B. decryption algorithm
- C. key exchange algorithm
- D. message digest function

isro2009 computer-networks network-security

[Answer key](#)



5.24.6 Network Security: ISRO CSE 2011 | Question: 18

An example of poly-alphabetic substitution is

- A. P-box
- B. S-box
- C. Caesar cipher
- D. Vigenere cipher

isro2011 computer-networks network-security

[Answer key](#)



5.24.7 Network Security: ISRO CSE 2014 | Question: 24

In a system an RSA algorithm with $p = 5$ and $q = 11$, is implemented for data security. What is the value of the decryption key if the value of the encryption key is 27?

- A. 3
- B. 7
- C. 27
- D. 40

isro2014 computer-networks network-security

[Answer key](#)



5.24.8 Network Security: ISRO CSE 2017 | Question: 36

Which protocol suite designed by IETF to provide security for a packet at the Internet layer?

- A. IPSec
- B. NetSec
- C. PacketSec
- D. SSL

isro2017 computer-networks network-security

[Answer key](#)



5.24.9 Network Security: ISRO CSE 2017 | Question: 37

Pretty Good Privacy (PGP) is used in:

- A. Browser security
- B. FTP security
- C. Email security
- D. None of the above

isro2017 computer-networks network-security

[Answer key](#)



5.24.10 Network Security: ISRO CSE 2018 | Question: 46

In cryptography, the following uses transposition ciphers and the keyword is LAYER. Encrypt the following message. (Spaces are omitted during encryption)

WELCOME TO NETWORK SECURITY!

- a. WMEKREETSILTWTWETCOOCYONRU!
- c. LTWETONRU!WMEKR COOCYEETSI

- b. EETSICOOCYWMERKONRU!LTWET
- d. ONRU!COOCYLTWETEETSIWMEKR

isro2018 computer-networks network-security

Answer key 



5.24.11 Network Security: ISRO CSE 2018 | Question: 74

Avalanche effect in cryptography

- a. Is desirable property of cryptographic algorithm
- b. Is undesirable property of cryptographic algorithm
- c. Has no effect on encryption algorithm
- d. None of the above

isro2018 computer-networks network-security

Answer key 



5.24.12 Network Security: ISRO-2013-45

A packet filtering firewall can

- A. Deny certain users from accessing a service
- B. Block worms and viruses from entering the network
- C. Disallow some files from being accessed through FTP
- D. Block some hosts from accessing the network

isro2013 computer-networks network-security

Answer key 

5.25

Network topologies (2)



5.25.1 Network topologies: ISRO CSE 2017 | Question: 27

Physical topology of FDDI is?

- A. Bus
- B. Ring
- C. Star
- D. None of the above

isro2017 computer-networks network-topologies

Answer key 



5.25.2 Network topologies: ISRO CSE 2017 | Question: 30

If there are n devices (nodes) in a network, what is the number of cable links required for a fully connected mesh and a star topology respectively

- A. $n(n - 1)/2, n - 1$
- B. $n, n - 1$
- C. $n - 1, n$
- D. $n - 1, n(n - 1)/2$

isro2017 computer-networks network-topologies

Answer key 

5.26

Out of Gatecse Syllabus (1)

5.26.1 Out of Gatecse Syllabus: GATE CSE 1993 | Question: 6.4, ISRO2008-14



Assume that each character code consists of 8 bits. The number of characters that can be transmitted per second through an asynchronous serial line at 2400 baud rate, and with two stop bits is

- A. 109
- B. 216
- C. 218
- D. 219

gate1993 computer-networks serial-communication normal isro2008 out-of-gatecse-syllabus

[Answer key](#)

5.27

Routers Bridge Hubs Switches (2)

5.27.1 Routers Bridge Hubs Switches: ISRO CSE 2011 | Question: 71



One SAN switch has 24 ports. All 24 supports 8 Gbps Fiber Channel technology. What is the aggregate bandwidth of that SAN switch?

- A. 96 Gbps
- B. 192 Mbps
- C. 512 Gbps
- D. 192 Gbps

isro2011 computer-networks routers-bridge-hubs-switches

[Answer key](#)

5.27.2 Routers Bridge Hubs Switches: ISRO2015-48



A T-switch is used to

- A. Control how messages are passed between computers
- B. Echo every character that is received
- C. Transmit characters one at a time
- D. Rearrange the connections between computing equipments

isro2015 computer-networks routers-bridge-hubs-switches

[Answer key](#)

5.28

Routing (2)

5.28.1 Routing: ISRO CSE 2014 | Question: 16



What is routing algorithm used by OSPF routing protocol?

- A. Distance vector
- B. Flooding
- C. Path vector
- D. Link state

computer-networks routing isro2014

[Answer key](#)

5.28.2 Routing: ISRO CSE 2016 | Question: 68



Dynamic routing protocol enable routers to

- A. Dynamically discover and maintain routes
- B. Distribute routing updates to other routers
- C. Reach agreement with other routers about the network topology
- D. All of the above

isro2016 computer-networks routing

[Answer key](#)

5.29

Sliding Window (3)

5.29.1 Sliding Window: GATE CSE 2009 | Question: 57, ISRO2016-75



Frames of 1000 bits are sent over a 10^6 bps duplex link between two hosts. The propagation time is 25 ms. Frames are to be transmitted into this link to maximally pack them in transit (within the link).

What is the minimum number of bits (I) that will be required to represent the sequence numbers distinctly? Assume that no time gap needs to be given between transmission of two frames.

- A. $I = 2$
- B. $I = 3$
- C. $I = 4$
- D. $I = 5$

gatecse-2009 computer-networks sliding-window normal isro2016

[Answer key](#)

5.29.2 Sliding Window: ISRO CSE 2008 | Question: 8



The TCP sliding window

- A. can be used to control the flow of information
- B. always occurs when the field value is 0
- C. always occurs when the field value is 1
- D. occurs horizontally

isro2008 computer-networks tcp sliding-window

[Answer key](#)

5.29.3 Sliding Window: ISRO CSE 2018 | Question: 44



Station A uses 32 byte packets to transmit messages to Station B using a sliding window protocol. The round trip delay between A and B is 80 ms and the bottleneck bandwidth on the path between A and B is 128 kbps. What is the optimal window size that A should use?

- a. 20
- b. 40
- c. 160
- d. 320

isro2018 computer-networks sliding-window

[Answer key](#)

5.30

Slotted Aloha (1)

5.30.1 Slotted Aloha: ISRO2015-55



A certain population of ALOHA users manages to generate 70 request/sec. If the time is slotted in units of 50 msec, then channel load would be

- A. 4.25
- B. 3.5
- C. 450
- D. 350

isro2015 computer-networks slotted-aloha

[Answer key](#)

5.31

Stop and Wait (1)

5.31.1 Stop and Wait: ISRO-2013-41



What will be the efficiency of a Stop and Wait protocol, if the transmission time for a frame is 20ns and the propagation time is 30ns?

- A. 20%
- B. 25%
- C. 40%
- D. 66%

isro2013 computer-networks stop-and-wait

[Answer key](#)

5.32.1 Subnetting: GATE CSE 2003 | Question: 82, ISRO2009-1

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?

- A. 172.57.88.62 and 172.56.87.23
- B. 10.35.28.2 and 10.35.29.4
- C. 191.203.31.87 and 191.234.31.88
- D. 128.8.129.43 and 128.8.161.55

gatecse-2003 computer-networks subnetting normal isro2009

Answer key

5.32.2 Subnetting: GATE CSE 2007 | Question: 67, ISRO2016-72

The address of a class B host is to be split into subnets with a 6-bit subnet number. What is the maximum number of subnets and the maximum number of hosts in each subnet?

- A. 62 subnets and 262142 hosts.
- B. 64 subnets and 262142 hosts.
- C. 62 subnets and 1022 hosts.
- D. 64 subnets and 1024 hosts.

gatecse-2007 computer-networks subnetting easy isro2016

Answer key

5.32.3 Subnetting: GATE CSE 2012 | Question: 34, ISRO-DEC2017-32

An Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it: 245.248.128.0/20. The ISP wants to give half of this chunk of addresses to Organization *A*, and a quarter to Organization *B*, while retaining the remaining with itself. Which of the following is a valid allocation of addresses to *A* and *B*?

- A. 245.248.136.0/21 and 245.248.128.0/22
- B. 245.248.128.0/21 and 245.248.128.0/22
- C. 245.248.132.0/22 and 245.248.132.0/21
- D. 245.248.136.0/24 and 245.248.132.0/21

gatecse-2012 computer-networks subnetting normal isrodec2017

Answer key

5.32.4 Subnetting: GATE IT 2006 | Question: 63, ISRO2015-57

A router uses the following routing table:

Destination	Mask	Interface
144.16.0.0	255.255.0.0	eth0
144.16.64.0	255.255.224.0	eth1
144.16.68.0	255.255.255.0	eth2
144.16.68.64	255.255.255.224	eth3

Packet bearing a destination address 144.16.68.117 arrives at the router. On which interface will it be forwarded?

- A. eth0
- B. eth1
- C. eth2
- D. eth3

gateit-2006 computer-networks subnetting normal isro2015

[Answer key](#)

5.32.5 Subnetting: ISRO CSE 2007 | Question: 73



Range of IP Address from 224.0.0.0 to 239.255.255.255 are

- A. Reserved for loopback
- B. Reserved for broadcast
- C. Used for multicast packets
- D. Reserved for future addressing

isro2007 computer-networks subnetting

[Answer key](#)

5.32.6 Subnetting: ISRO CSE 2008 | Question: 3



The subnet mask 255.255.255.192

- A. extends the network portion to 16 bits
- B. extends the network portion to 26 bits
- C. extends the network portion to 36 bits
- D. has no effect on the network portion of an IP address

isro2008 computer-networks subnetting

[Answer key](#)

5.32.7 Subnetting: ISRO CSE 2011 | Question: 45



The broadcast address for IP network 172.16.0.0 with subnet mask 255.255.0.0 is

- A. 172.16.0.255
- B. 172.16.255.255
- C. 255.255.255.255
- D. 172.255.255.255

isro2011 computer-networks subnetting

[Answer key](#)

5.32.8 Subnetting: ISRO CSE 2014 | Question: 75



An organization is granted the block 130.34.12.64/26. It needs to have 4 subnets. Which of the following is not an address of this organization?

- A. 130.34.12.124
- B. 130.34.12.89
- C. 130.34.12.70
- D. 130.34.12.132

computer-networks subnetting isro2014

[Answer key](#)

5.32.9 Subnetting: ISRO CSE 2017 | Question: 29



The default subnet mask for a class B network can be

- A. 255.255.255.0
- B. 255.0.0.0
- C. 255.255.192.0
- D. 255.255.0.0

isro2017 computer-networks subnetting

[Answer key](#)

5.32.10 Subnetting: ISRO-2013-43



What is IP class and number of sub-networks if the subnet mask is 255.224.0.0?

- A. Class A, 3
- B. Class A, 8
- C. Class B, 3
- D. Class B, 32

isro2013 computer-networks subnetting

[Answer key](#)



5.32.11 Subnetting: ISRO2015-54

In a class B subnet, we know the IP address of one host and the mask as given below:

IP address : 125.134.112.66

Mask : 255.255.224.0

What is the first address(Network address)?

- A. 125.134.96.0
- B. 125.134.112.0
- C. 125.134.112.66
- D. 125.134.0.0

isro2015 computer-networks subnetting

[Answer key](#)

5.33

Supernetting (1)



5.33.1 Supernetting: ISRO CSE 2014 | Question: 57

A supernet has a first address of 205.16.32.0 and a supernet mask of 255.255.248.0. A router receives 4 packets with the following destination addresses. Which packet belongs to this supernet?

- A. 205.16.42.56
- B. 205.17.32.76
- C. 205.16.31.10
- D. 205.16.39.44

isro2014 computer-networks supernetting

[Answer key](#)

5.34

TCP (6)



5.34.1 TCP: ISRO CSE 2007 | Question: 66

Silly Window Syndrome is related to

- A. Error during transmission
- B. File transfer protocol
- C. Degrade in TCP performance
- D. Interface problem

isro2007 computer-networks tcp

[Answer key](#)



5.34.2 TCP: ISRO CSE 2014 | Question: 60

Suppose you are browsing the world wide web using a web browser and trying to access the web servers. What is the underlying protocol and port number that are being used?

- A. UDP, 80
- B. TCP, 80
- C. TCP, 25
- D. UDP, 25

isro2014 computer-networks tcp

[Answer key](#)



5.34.3 TCP: ISRO CSE 2020 | Question: 53

The persist timer is used in TCP to

- A. To detect crashes from the other end of the connection
- B. To enable retransmission
- C. To avoid deadlock condition
- D. To timeout FIN_WAIT1 condition

isro-2020 computer-networks tcp normal

[Answer key](#)

5.34.4 TCP: ISRO CSE 2020 | Question: 54



Checksum field in TCP header is

- A. ones complement of sum of header and data in bytes
- B. ones complement of sum of header, data and pseudo header in 16 bit words
- C. dropped from IPv6 header format
- D. better than md5 or sh1 methods

isro-2020 computer-networks tcp normal

[Answer key](#)

5.34.5 TCP: ISRO2015-50



How many bits internet address is assigned to each host on a TCP/IP internet which is used in all communication with the host?

- A. 16 bits
- B. 32 bits
- C. 48 bits
- D. 64 bits

isro2015 computer-networks tcp

[Answer key](#)

5.34.6 TCP: ISRO2015-53



An ACK number of 1000 in TCP always means that

- A. 999 bytes have been successfully received
- B. 1000 bytes have been successfully received
- C. 1001 bytes have been successfully received
- D. None of the above

isro2015 computer-networks tcp

[Answer key](#)

5.35

Throughput (2)

5.35.1 Throughput: ISRO CSE 2023 | Question: 44



A host in one org other organisation using another host with 25 m sec RTT. Network 1 Gbps link of this network tuned the administrator 1000 bytes to transfer large packet size to files optimally ovel utilisation > 96%, how big to have chann (in terms of packets) should window size (assuming ACK packets have no be (assuming ACK pals impact)?

- A. 2000 packets
- B. 2400 packets
- C. 3000 packets
- D. 4000 packets

isro-cse-2023 computer-networks sliding-window throughput

5.35.2 Throughput: ISRO-DEC2017-36



Station *A* uses $32 - \text{byte}$ packets to transmit messages to Station *B* using a sliding window protocol.

The round trip time delay between *A* and *B* is 40ms and the bottleneck bandwidth on the path *A* and *B* is 64 kbps . What is the optimal window size that *A* should use?

- A. 5
- B. 10
- C. 40
- D. 80

isrodec2017 computer-networks sliding-window throughput

[Answer key](#)

5.36**Token Ring (1)****5.36.1 Token Ring: GATE CSE 2007 | Question: 66, ISRO2016-71**

In a token ring network the transmission speed is 10^7 bps and the propagation speed is 200 meters/ μs . The 1-bit delay in this network is equivalent to:

- A. 500 meters of cable.
- B. 200 meters of cable.
- C. 20 meters of cable.
- D. 50 meters of cable.

gatecse-2007 computer-networks token-ring out-of-syllabus-now isro2016

Answer key**5.37****Transport Layer (1)****5.37.1 Transport Layer: ISRO CSE 2018 | Question: 45**

Assuming that for a given network layer implementation, connection establishment overhead is 100 bytes and disconnection overhead is 28 bytes. What would be the minimum size of the packet the transport layer needs to keep up, if it wishes to implement a datagram service above the network layer and needs to keep its overhead to a minimum of 12.5%. (ignore transport layer overhead)

- a. 512 bytes
- b. 768 bytes
- c. 1152 bytes
- d. 1024 bytes

isro2018 transport-layer

Answer key**5.38****UDP (1)****5.38.1 UDP: ISRO-DEC2017-34**

Generally, TCP is reliable and UDP is not reliable. DNS which has to be reliable uses UDP because

- A. UDP is slower.
- B. DNS servers has to keep connections.
- C. DNS requests are generally very small and fit well within UDP segments.
- D. None of these.

isrodec2017 computer-networks tcp udp

Answer key**5.39****Wifi (1)****5.39.1 Wifi: ISRO CSE 2017 | Question: 38**

What is WPA?

- A. wired protected access
- B. wi-fi protected access
- C. wired process access
- D. wi-fi process access

isro2017 computer-networks wifi

Answer key**5.40****Wireless Lan (1)**

5.40.1 Wireless Lan: ISRO CSE 2023 | Question: 66



Match the following :

	Versions of 802.11		Speed of Wireless LAN
(i)	802.11ac	(P)	7 Gbps
(ii)	802.11a/g	(Q)	11 Mbps
(iii)	802.11ad	(R)	54 Gbps
(iv)	802.11b	(S)	3.5 Mbps

- A. (i) - (S), (ii) - (R), (iii) - (P), (iv) - (Q)
- B. (i) - (S), (ii) - (R), (iii) - (Q), (iv) - (P)
- C. (i) - (R), (ii) - (S), (iii) - (P), (iv) - (Q)
- D. (i) - (R), (ii) - (Q), (iii) - (P), (iv) - (S)

isro-cse-2023 computer-networks wireless-lan network-protocols

Answer key

5.41

Wireless Networks (1)



5.41.1 Wireless Networks: ISRO CSE 2007 | Question: 74

IEEE 802.11 is standard for

- A. Ethernet
- B. Bluetooth
- C. Broadband Wireless
- D. Wireless LANs

isro2007 computer-networks wireless-networks

Answer key

Answer Keys

5.0.1	A	5.0.2	C	5.0.3	D	5.0.4	D	5.0.5	C
5.0.6	A	5.0.7	D	5.0.8	N/A	5.0.9	C	5.0.10	A
5.0.11	N/A	5.1.1	A	5.2.1	B	5.2.2	B	5.2.3	C
5.2.4	B	5.3.1	A	5.3.2	C	5.4.1	D	5.4.2	C
5.4.3	A	5.4.4	C	5.4.5	D	5.4.6	D	5.4.7	D
5.5.1	B	5.5.2	B	5.5.3	C	5.5.4	A	5.5.5	B
5.5.6	A	5.5.7	C	5.5.8	C	5.6.1	D	5.7.1	A
5.8.1	C	5.8.2	C	5.9.1	D	5.9.2	B	5.10.1	C
5.10.2	C	5.11.1	A	5.11.2	A	5.11.3	C	5.11.4	6

5.12.1	A	5.12.2	B	5.12.3	D	5.12.4	D	5.12.5	A
5.12.6	A	5.13.1	A	5.14.1	C	5.14.2	B	5.14.3	D
5.15.1	B	5.15.2	C	5.15.3	D	5.16.1	C	5.17.1	C
5.18.1	C	5.19.1	B	5.20.1	D	5.20.2	A	5.20.3	D
5.20.4	B	5.21.1	B	5.21.2	C	5.22.1	B	5.22.2	D
5.22.3	A	5.23.1	D	5.23.2	C	5.23.3	D	5.23.4	B
5.23.5	B	5.23.6	A	5.23.7	D	5.23.8	A	5.23.9	A
5.23.10	C	5.23.11	C	5.24.1	D	5.24.2	D	5.24.3	B
5.24.4	C	5.24.5	D	5.24.6	D	5.24.7	A	5.24.8	A
5.24.9	C	5.24.10	B	5.24.11	A	5.24.12	D	5.25.1	B
5.25.2	A	5.26.1	C	5.27.1	B	5.27.2	D	5.28.1	D
5.28.2	D	5.29.1	D	5.29.2	A	5.29.3	B	5.30.1	B
5.31.1	B	5.32.1	D	5.32.2	C	5.32.3	A	5.32.4	C
5.32.5	C	5.32.6	B	5.32.7	B	5.32.8	D	5.32.9	D
5.32.10	B	5.32.11	A	5.33.1	D	5.34.1	C	5.34.2	B
5.34.3	C	5.34.4	B;C	5.34.5	B	5.34.6	D	5.35.1	C
5.35.2	B	5.36.1	C	5.37.1	D	5.38.1	C	5.39.1	B
5.40.1	A	5.41.1	D						

6.0.1 ISRO-DEC2017-79

Which of the following related to snowflake schema is true?

- A. Each dimension is represented by a single dimensional table
- B. Maintenance efforts are less
- C. Dimension tables are normalized
- D. It is not an extension of star schema

isrodec2017 databases

Answer key

6.1**Knowledge Representation (2)****6.1.1 Knowledge Representation: ISRO-2013-3**

Opportunistic reasoning is addressed by which of the following knowledge representation?

- A. Script
- B. Blackboard
- C. Production Rules
- D. Fuzzy Logic

isro2013 knowledge-representation

Answer key

**6.1.2 Knowledge Representation: ISRO-DEC2017-78**

Consider the results of a medical experiment that aims to predict whether someone is going to develop myopia based on some physical measurements and heredity. In this case, the input dataset consists of the person's medical characteristics and the target variable is binary: 1 for those who are likely to develop myopia and 0 for those who aren't. This can be best classified as

- | | |
|---------------|----------------------|
| A. Regression | B. Decision Tree |
| C. Clustering | D. Association Rules |

isrodec2017 non-gatece knowledge-representation

Answer key

Answer Keys

6.0.1

C

6.1.1

B

6.1.2

B



7.0.1 ISRO CSE 2009 | Question: 69



The 'command' used to change contents of one database using the contents of another database by linking them on a common key field?

- A. Replace
- B. Join
- C. Change
- D. Update

isro2009 databases bad-question

[Answer key](#)

7.0.2 ISRO-DEC2017-14



Type-IV *JDBC* driver is a driver

- A. which is written in *C++*
- B. which requires an intermediate layer
- C. which communicates through Java sockets
- D. which translates *JDBC* function calls into *API* not native to *DBMS*

isrodec2017 databases

[Answer key](#)

7.1

B Tree (6)



7.1.1 B Tree: GATE CSE 2007 | Question: 63, ISRO2016-59

The order of a leaf node in a B^+ - tree is the maximum number of (value, data record pointer) pairs it can hold. Given that the block size is $1K$ bytes, data record pointer is 7 bytes long, the value field is 9 bytes long and a block pointer is 6 bytes long, what is the order of the leaf node?

- A. 63
- B. 64
- C. 67
- D. 68

gatecse-2007 databases b-tree normal isro2016

[Answer key](#)

7.1.2 B Tree: GATE IT 2005 | Question: 23, ISRO2017-67



A B-Tree used as an index for a large database table has four levels including the root node. If a new key is inserted in this index, then the maximum number of nodes that could be newly created in the process are

- A. 5
- B. 4
- C. 3
- D. 2

gateit-2005 databases b-tree normal isro2017

[Answer key](#)

7.1.3 B Tree: ISRO CSE 2018 | Question: 49



in a file which contains 1 million records and the order of the tree is 100, then what is the maximum number of nodes to be accessed if $B+$ tree index is used?

- a. 5
- b. 4
- c. 3
- d. 10

isro2018 databases b-tree

[Answer key](#)

7.1.4 B Tree: ISRO-2013-26



Calculate the order of leaf (P_{leaf}) and non leaf (P) nodes of a B^+ tree based on the information given below.

Search key field = 12 field

Record pointer = 10 bytes

Block pointer = 8 bytes

Block size = 1KB

- A. $P_{leaf} = 51 \text{ & } p = 46$
- C. $P_{leaf} = 46 \text{ & } p = 51$
- B. $P_{leaf} = 47 \text{ & } p = 52$
- D. $P_{leaf} = 52 \text{ & } p = 47$

isro2013 databases b-tree

[Answer key](#)

7.1.5 B Tree: ISRO-2013-27



The physical location of a record determined by a formula that transforms a file key into a record location is

- A. Hashed file
- B. B -Tree file
- C. Indexed file
- D. Sequential file

isro2013 databases b-tree

[Answer key](#)

7.1.6 B Tree: ISRO2015-39



If a node has K children in B tree, then the node contains exactly _____ keys.

- A. K^2
- B. $K - 1$
- C. $K + 1$
- D. \sqrt{K}

isro2015 databases b-tree

[Answer key](#)

7.2

Bit Mapped Index (1)

7.2.1 Bit Mapped Index: ISRO-DEC2017-12



Consider a table that describes the customers:

Customers(custid, name, gender, rating)

The rating value is an integer in the range 1 to 5 and only two values (male and female) are recorded for *gender*. Consider the query "how many male customers have a rating of 5" ? The best indexing mechanism appropriate for the query is

- A. Linear hashing
- B. Extendible hashing
- C. B+ tree
- D. Bit-mapped index

isrodec2017 databases indexing bit-mapped-index

[Answer key](#)

7.3

Candidate Key (1)

7.3.1 Candidate Key: ISRO CSE 2014 | Question: 42



Let x, y, z, a, b, c be the attributes of an entity set E. If $\{x\}, \{x, y\}, \{a, b\}, \{a, b, c\}, \{x, y, z\}$ are superkeys then which of the following are the candidate keys?

- A. $\{x, y\}$ and $\{a, b\}$
- B. $\{x\}$ and $\{a, b\}$
- C. $\{x, y, z\}$ and $\{a, b, c\}$
- D. $\{z\}$ and $\{c\}$

databases candidate-key isro2014

[Answer key](#)

7.4

Database Normalization (13)



7.4.1 Database Normalization: ISRO CSE 2007 | Question: 51

Armstrong's inference rule does not determine

- A. Reflexivity
- B. Augmentation
- C. Transitivity
- D. Mutual dependency

isro2007 databases database-normalization

[Answer key](#)



7.4.2 Database Normalization: ISRO CSE 2007 | Question: 54

BCNF is not used for cases where a relation has

- A. Two (or more) candidate keys
- B. Two candidate keys and composite
- C. The candidate key overlap
- D. Two mutually exclusive foreign keys

isro2007 databases database-normalization

[Answer key](#)



7.4.3 Database Normalization: ISRO CSE 2011 | Question: 29

Which normal form is based on the concept of 'full functional dependency' is

- A. First Normal Form
- B. Second Normal Form
- C. Third Normal Form
- D. Fourth Normal Form

isro2011 databases database-normalization

[Answer key](#)



7.4.4 Database Normalization: ISRO CSE 2011 | Question: 53

In functional dependency Armstrong inference rules refers to

- A. Reflexive, Augmentation and Decomposition
- B. Transitive, Augmentation and Reflexive
- C. Augmentation, Transitive, Reflexive and Decomposition
- D. Reflexive, Transitive and Decomposition

isro2011 databases database-normalization

[Answer key](#)



7.4.5 Database Normalization: ISRO CSE 2014 | Question: 22

Consider the schema $R(A, B, C, D)$ and the functional dependencies $A \rightarrow B$ and $C \rightarrow D$. If the decomposition is made as $R_1(A, B)$ and $R_2(C, D)$, then which of the following is TRUE?

- A. Preserves dependency but cannot perform lossless join
- B. Preserves dependency and performs lossless join
- C. Does not preserve dependency and cannot perform lossless join

- D. Does not preserve dependency but perform lossless join

databases isro2014 database-normalization

[Answer key](#)



7.4.6 Database Normalization: ISRO CSE 2014 | Question: 30

Every time the attribute A appears, it is matched with the same value of attribute B but not the same value of attribute C. Which of the following is true?

- | | |
|--|--|
| A. $A \rightarrow (B,C)$ | B. $A \rightarrow B, A \rightarrow> C$ |
| C. $A \rightarrow B, C \rightarrow> A$ | D. $A \rightarrow> B, B \rightarrow C$ |

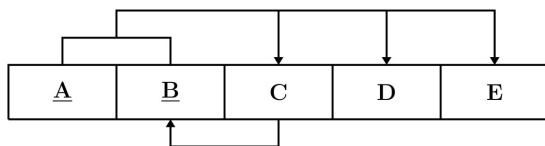
databases database-normalization isro2014

[Answer key](#)



7.4.7 Database Normalization: ISRO CSE 2014 | Question: 63

Consider the following table



The table is in which normal form?

- | | |
|-----------------------------------|-------------------------------|
| A. First Normal Form | B. Second Normal Form |
| C. Third Normal Form but not BCNF | D. Third Normal Form and BCNF |

isro2014 databases database-normalization

[Answer key](#)



7.4.8 Database Normalization: ISRO CSE 2018 | Question: 41

For a database relation $R(a,b,c,d)$ where the domain of a, b, c and d include only atomic values, only the following functional dependencies and those that can be inferred from them hold

$$a \rightarrow c$$

$$b \rightarrow d$$

The relation is in:

- | | |
|--|--|
| a. First normal form but not in second normal form | b. Second normal form but not in third normal form |
| c. Third normal form | d. None of the above |

isro2018 database-normalization databases

[Answer key](#)



7.4.9 Database Normalization: ISRO CSE 2018 | Question: 5

Considering the following table in a relational database :

Last Name	Rank	Room	shift
Smith	Manager	234	Morning
Jones	Custodian	33	Afternoon
Smith	Custodian	33	Evening
Doe	Clerical	222	Morning

According to the data shown in the table, which of the following could be a candidate key of the table?

- a. {Last Name}
- b. {Room}
- c. {Shift}
- d. {Room, Shift}

isro2018 databases database-normalization

[Answer key](#)



7.4.10 Database Normalization: ISRO CSE 2018 | Question: 54

The set of attributes X will be fully functionally dependent on the set of attributes Y if the following conditions are satisfied.

- a. X is functionally dependent on Y
- b. X is not functionally dependent on any subset of Y
- c. Both (a) and (b)
- d. None of these

isro2018 databases database-normalization

[Answer key](#)



7.4.11 Database Normalization: ISRO CSE 2020 | Question: 50

If every non-key attribute functionally dependent on the primary key, then the relation will be in

- A. First normal form
- B. Second normal form
- C. Third normal form
- D. Fourth Normal form

isro-2020 databases database-normalization easy

[Answer key](#)



7.4.12 Database Normalization: ISRO CSE 2023 | Question: 50

Fifth Normal form is concerned with

- A. Join dependency
- B. Domain-key
- C. Multivalued dependency
- D. Functional dependency

isro-cse-2023 database-normalization databases

[Answer key](#)



7.4.13 Database Normalization: ISRO-2013-25

Consider the following dependencies and the BOOK table in a relational database design. Determine the normal form of the given relation.

ISBN → Title

ISBN → Publisher

Publisher → Address

- A. First Normal Form
- B. Second Normal Form
- C. Third Normal Form
- D. BCNF

isro2013 databases database-normalization

[Answer key](#)



7.5

Distributed Computing (1)

7.5.1 Distributed Computing: ISRO CSE 2023 | Question: 35

Which type of data storage system Cassandra is?

- A. Distributed
- B. Centralized
- C. Parallel
- D. Dumb

Answer key**7.6****Division (1)****7.6.1 Division: ISRO-DEC2017-13**

Consider the following schema:

Sailors(sid,sname, rating, age)

Boats(bid, bname, colour)

Reserves(sid, bid, day)

Two boats can have the same name but the colour differentiates them.

The two relations

$$\rho(Tempsids, (\pi_{sid,bid} Reserves) / (\pi_{bid} (\sigma_{bname=Ganga'} Boats))),$$

$$\pi_{sname} (Tempside \bowtie Sailors)$$

If / is division operation, the above set of relations represents the query

- A. Names of sailors who have reserved all boats called Ganga.
- B. Names of sailors who have not reserved any Ganga boat.
- C. Names of sailors who have reserved at least one Ganga boat.
- D. Names of sailors who have reserved at most one Ganga boat.

Answer key**7.7****ER Diagram (5)****7.7.1 ER Diagram: ISRO CSE 2016 | Question: 56**

Goals for the design of the logical scheme include

- A. avoiding data inconsistency
- B. being able to construct query easily
- C. being able to access data efficiently
- D. All of the above

Answer key**7.7.2 ER Diagram: ISRO CSE 2017 | Question: 8**

Which symbol denote derived attributes in ER Model?

- A. Double ellipse
- B. Dashed ellipse
- C. Squared ellipse
- D. Ellipse with attribute name underlined

Answer key**7.7.3 ER Diagram: ISRO CSE 2018 | Question: 52**

In E-R model, Y is the dominant entity and X is subordinate entity

- a. If X is deleted, then Y is also deleted
- b. If Y is deleted, then X is also deleted
- c. If Y is deleted, then X is not deleted

- d. None of the above

isro2018 er-diagram databases

[Answer key](#)



7.7.4 ER Diagram: ISRO CSE 2023 | Question: 62

Entity Relationship model shows the

- A. Static view
- B. Functional view
- C. Dynamic view
- D. All of the above

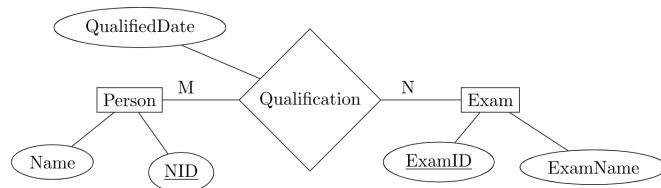
isro-cse-2023 databases er-diagram

[Answer key](#)



7.7.5 ER Diagram: ISRO2015-16

Consider the following Relationship Entity Diagram(ERP)



Which of the following possible relations will not hold if the above ERD is mapped into a relation model?

- A. Person (NID, Name)
- B. Qualification (NID, ExamID, QualifiedDate)
- C. Exam (ExamID, NID, ExamName)
- D. Exam (ExamID, ExamName)

isro2015 databases er-diagram

[Answer key](#)

7.8

File System (6)



7.8.1 File System: ISRO CSE 2009 | Question: 70

A locked database file can be

- A. Accessed by only one user
- B. Modified by users with the correct password
- C. Used to hide sensitive information
- D. Updated by more than one user

isro2009 databases file-system

[Answer key](#)



7.8.2 File System: ISRO CSE 2011 | Question: 46

Which RAID level gives block level striping with double distributed parity?

- A. RAID 10
- B. RAID 2
- C. RAID 6
- D. RAID 5

isro2011 file-system

[Answer key](#)



7.8.3 File System: ISRO CSE 2017 | Question: 4

What does a data dictionary will identify?

- A. Field name B. Field format C. Field types D. All of the above

isro2017 databases file-system

Answer key 



7.8.4 File System: ISRO CSE 2017 | Question: 45

Which of these is characteristic of RAID 5?

- A. Dedicated parity
C. Hamming code parity
B. Double parity
D. Distributed parity

isro2017 databases file-system non-gatecse

Answer key 



7.8.5 File System: ISRO CSE 2018 | Question: 53

Immunity of the external schemas (or application programs) to changes in the conceptual scheme is referred to as:

- a. Physical Data Independence
c. Both (a) and (b)
b. Logical Data Independence
d. None of the above

isro2018 databases file-system

Answer key 



7.8.6 File System: ISRO2015-13

Six files F1, F2, F3, F4, F5 and F6 have 100, 200, 50, 80, 120, 150 records respectively. In what order should they be stored so as to optimize access. Assume each file is accessed with the same frequency

- A. F3, F4, F1, F5, F6, F2
B. F2, F6, F5, F1, F4, F3
C. F1, F2, F3, F4, F5, F6
D. Ordering is immaterial as all files are accessed with the same frequency.

isro2015 file-system

Answer key 

7.9

Functional Dependency (1)



7.9.1 Functional Dependency: ISRO2015-20

Let R = (A, B, C, D, E, F) be a relation scheme with the following dependencies C → F, E → A, EC → D, A → B. Which of the following is a key of R?

- A. CD B. EC C. AE D. AC

isro2015 databases database-normalization functional-dependency

Answer key 

7.10

Indexing (4)



7.10.1 Indexing: GATE CSE 2008 | Question: 16, ISRO2016-60

A clustering index is defined on the fields which are of type

- A. non-key and ordering B. non-key and non-ordering

C. key and ordering

D. key and non-ordering

gatecse-2008 easy databases indexing isro2016

Answer key 



7.10.2 Indexing: ISRO CSE 2018 | Question: 51

Which of the following is dense index?

- A. Primary index
- C. Secondary index

- B. Clustered index
- D. Secondary non-key index

isro2018 indexing

Answer key 



7.10.3 Indexing: ISRO-2013-61, ISRO CSE 2008 | Question: 35

Embedded pointer provides

- A. A secondary access path
- C. An inverted index

- B. A physical record key
- D. A primary key

isro2013 databases indexing isro2008

Answer key 



7.10.4 Indexing: ISRO2015-18

Given a block can hold either 3 records or 10 key pointers. A database contains n records, then how many blocks do we need to hold the data file and the dense index

- A. $13n/30$
- B. $n/3$
- C. $n/10$
- D. $n/30$

isro2015 databases indexing

Answer key 

7.11

Joins (1)



7.11.1 Joins: ISRO CSE 2023 | Question: 27

In SQL the statement select * from R, S is equivalent to

- A. Select * from R natural join S
- B. Select * from R cross join S
- C. Select * from R outer join S
- D. Select * from R inner join S

isro-cse-2023 databases joins easy

Answer key 

7.12

Normal Forms (1)



7.12.1 Normal Forms: ISRO-DEC2017-15

Consider the following table: Faculty(facName, dept, office, rank, dateHired)

facName	dept	office	rank	dateHired
Ravi	Art	A101	Professor	1975
Murali	Math	M201	Assistant	2000

facName	dept	office	rank	dateHired
Narayanan	Art	A101	Associate	1992
Lakshmi	Math	M201	Professor	1982
Mohan	CSC	C101	Professor	1980
Sreeni	Math	M203	Associate	1990
Tanuja	CSC	C101	Instructor	2001
Ganesh	CSC	C105	Associate	1995

(Assume that no faculty member within a single department has same name. Each faculty member has only one office identified in *office*). *3NF* refers to third normal form and *BCNF* refers to Boyce-Codd Normal Form

Then *Faculty* is

- A. Not in 3NF, in BCNF
- B. In 3NF, not in BCNF
- C. In 3NF, in BCNF
- D. Not in 3NF, not in BCNF

isrodec2017 databases database-normalization normal-forms

[Answer key](#)

7.13

Query (2)

7.13.1 Query: ISRO CSE 2023 | Question: 28



Which of the following SQL query deletes all tuples in the teacher relation for those teachers associated with a department located in the building with name CSE and which is in department relation:

- a. DELETE FROM teacher
WHERE dept_name IN 'CSE';
- b. DELETE FROM department
WHERE building = 'CSE';
- c. DELETE FROM teacher
WHERE dept_name IN (
 SELECT dept_name
 FROM department
 WHERE building = 'CSE');
- d. DELETE FROM teacher
WHERE dept_name IN 'CSE';

isro-cse-2023 databases sql query

[Answer key](#)



7.13.2 Query: ISRO-DEC2017-16

Consider the following query :

```
SELECT E.eno, COUNT(*)
FROM Employees E
GROUP BY E.eno
```

If an index on *eno* is available, the query can be answered by scanning only the index if

- A. the index is only hash and clustered
- B. the index is only *B+* tree and clustered
- C. index can be hash or *B+* tree and clustered or non-clustered

D. index can be hash or $B+$ tree and clustered

isrodec2017 sql databases indexing query

Answer key 

7.14

Rdbms (2)

7.14.1 Rdbms: ISRO CSE 2007 | Question: 50



A view of database that appears to an application program is known as

- A. Schema
- B. Subschema
- C. Virtual table
- D. None of these

isro2007 databases rdbms

Answer key 

7.14.2 Rdbms: ISRO CSE 2011 | Question: 21



Which type of DBMS provides support for maintaining several versions of the same entity?

- A. Relational Database Management System
- B. Hierarchical
- C. Object Oriented Database Management System
- D. Network

isro2011 databases rdbms

Answer key 

7.15

Referential Integrity (2)

7.15.1 Referential Integrity: GATE CSE 1997 | Question: 6.10, ISRO2016-54



Let $R(a, b, c)$ and $S(d, e, f)$ be two relations in which d is the foreign key of S that refers to the primary key of R . Consider the following four operations R and S

- I. Insert into R
- II. Insert into S
- III. Delete from R
- IV. Delete from S

Which of the following can cause violation of the referential integrity constraint above?

- A. Both I and IV
- B. Both II and III
- C. All of these
- D. None of these

gate1997 databases referential-integrity easy isro2016

Answer key 

7.15.2 Referential Integrity: ISRO CSE 2009 | Question: 72



Purpose of 'Foreign Key' in a table is to ensure

- A. Null Integrity
- B. Referential Integrity
- C. Domain Integrity
- D. Null and Domain Integrity

isro2009 databases referential-integrity

Answer key 

7.16

Relational Algebra (4)

7.16.1 Relational Algebra: GATE CSE 1999 | Question: 1.18, ISRO2016-53



Consider the join of a relation R with a relation S . If R has m tuples and S has n tuples then the maximum and minimum sizes of the join respectively are

- A. $m + n$ and 0
- B. mn and 0
- C. $m + n$ and $|m - n|$
- D. mn and $m + n$

gate1999 databases relational-algebra easy isro2016

[Answer key](#)

7.16.2 Relational Algebra: GATE CSE 2000 | Question: 1.23, ISRO2016-57



Given the relations

- employee (name, salary, dept-no), and
- department (dept-no, dept-name, address),

Which of the following queries cannot be expressed using the basic relational algebra operations ($\sigma, \pi, \times, \bowtie, \cup, \cap, -$)?

- A. Department address of every employee
- B. Employees whose name is the same as their department name
- C. The sum of all employees' salaries
- D. All employees of a given department

gatecse-2000 databases relational-algebra easy isro2016

[Answer key](#)

7.16.3 Relational Algebra: ISRO CSE 2007 | Question: 52



Which operation is used to extract specified columns from a table?

- A. Project
- B. Join
- C. Extract
- D. Substitute

isro2007 databases relational-algebra

[Answer key](#)

7.16.4 Relational Algebra: ISRO CSE 2008 | Question: 33



The join operation can be defined as

- A. a cartesian product of two relations followed by a selection
- B. a cartesian product of two relations
- C. a union of two relations followed by cartesian product of the two relations
- D. a union of two relations

isro2008 databases relational-algebra

[Answer key](#)

7.17

Relational Model (2)

7.17.1 Relational Model: ISRO CSE 2014 | Question: 11



An aggregation association is drawn using which symbol?

- A. A line which loops back on to the same table
- B. A small open diamond at the end of a line connecting two tables
- C. A small closed diamond at the end of a line connecting two tables
- D. A small closed triangle at the end of a line connecting two tables

isro2014 databases relational-model

[Answer key](#)

7.17.2 Relational Model: ISRO2015-21



If D_1, D_2, \dots, D_n are domains in a relational model, then the relation is a table, which is a subset of

- A. $D_1 \oplus D_2 \oplus \dots \oplus D_n$
- B. $D_1 \times D_2 \times \dots \times D_n$
- C. $D_1 \cup D_2 \cup \dots \cup D_n$
- D. $D_1 \cap D_2 \cap \dots \cap D_n$

databases isro2015 relational-model

[Answer key](#)

7.18

SQL (14)

7.18.1 SQL: GATE CSE 2005 | Question: 77, ISRO2016-55



The relation **book** (title, price) contains the titles and prices of different books. Assuming that no two books have the same price, what does the following SQL query list?

```
select title
from book as B
where (select count(*)
      from book as T
      where T.price>B.price) < 5
```

- A. Titles of the four most expensive books
- B. Title of the fifth most inexpensive book
- C. Title of the fifth most expensive book
- D. Titles of the five most expensive books

gatecse-2005 databases sql easy isro2016

[Answer key](#)

7.18.2 SQL: ISRO CSE 2007 | Question: 47



Which commands are used to control access over objects in relational database?

- A. CASCADE & MVD
- B. GRANT & REVOKE
- C. QUE & QUIST
- D. None of these

isro2007 databases sql

[Answer key](#)

7.18.3 SQL: ISRO CSE 2007 | Question: 48



Which of the following is aggregate function in SQL?

- A. Avg
- B. Select
- C. Ordered by
- D. distinct

Answer key**7.18.4 SQL: ISRO CSE 2017 | Question: 7**

Employee	Department	OT_allowance
RAMA	Mechanical	5000
GOPI	Electrical	2000
SINDHU	Computer	4000
MAHESH	Civil	1500

What is the output of the following SQL query?

```
select count(*) from
  ((select Employee, Department from Overtime_allowance)
  natural join
  (select Department, OT_allowance from Overtime_allowance)
  as T);
```

- A. 16 B. 4 C. 8 D. None of the above

Answer key**7.18.5 SQL: ISRO CSE 2018 | Question: 40**

Given relations R(w,x) and S(y,z), the result of

```
SELECT DISTINCT w, x
FROM R, S
```

Is guaranteed to be same as R, if

- a. R has no duplicates and S is non-empty
 c. S has no duplicates and R is non-empty
- b. R and S have no duplicates
 d. R and S have the same number of tuples

Answer key**7.18.6 SQL: ISRO CSE 2018 | Question: 42**

Consider the set of relations given below and the SQL query that follows:

```
Students: (Roll_number, Name, Date_of_birth)
Coursed: (Course_number, Course_name, Instructor)
Grades: (Roll_number, Course_number, Grade)
```

```
SELECT DISTINCT Name
FROM Students, Courses, Grades
WHERE Students.Roll_number = Grades.Roll_number
      AND Courses.Instructor = Sriram
      AND Courses.Course_number = Grades.Course_number
      AND Grades.Grade = A
```

Which of the following sets is computed by the above query?

- a. Names of Students who have got an A grade in all courses taught by Sriram
 b. Names of Students who have got an A grade in all courses
 c. Names of Students who have got an A grade in at least one of the courses taught by Sriram
 d. None of the above

Answer key**7.18.7 SQL: ISRO CSE 2020 | Question: 48**

Properties of ‘DELETE’ and ‘TRUNCATE’ commands indicate that

- A. After the execution of ‘TRUNCATE’ operation, COMMIT, and ROLLBACK statements cannot be performed to retrieve the lost data, while ‘DELETE’ allow it
- B. After the execution of ‘DELETE’ and ‘TRUNCATE’ operation retrieval is easily possible for the lost data
- C. After the execution of ‘DELETE’ operation, COMMIT and ROLLBACK statements can be performed to retrieve the lost data, while TRUNCATE do not allow it
- D. After the execution of ‘DELETE’ and ‘TRUNCATE’ operation no retrieval is possible for the lost data

Answer key**7.18.8 SQL: ISRO CSE 2020 | Question: 51**

The SQL query

```
SELECT columns
FROM TableA
RIGHT OUTER JOIN TableB
ON A.columnName = B.columnName
WHERE A.columnName IS NULL
```

returns the following:

- A. All rows in Table B, which meets equality condition above and, none from Table A which meets the condition.
- B. All rows in Table A, which meets equality condition above and none from Table B, which meets the condition.
- C. All rows in Table B, which meets the equality condition
- D. All rows in Table A, which meets the equality condition

Answer key**7.18.9 SQL: ISRO CSE 2023 | Question: 7**

Consider a database table T containing two columns X and Y each of type Integer. After the creation of the table, one record ($X = 1, Y = 1$) is inserted in the table. Let MX and MY denote the respective maximum values of X and Y among all records in the table at any point in time. Using MX and MY , new records are inserted in the table 128 times with X and Y values being $MX + 1, 2 \times MY + 1$ respectively. It may be noted that each time after the insertion, values of MX and MY change. What will be the output of the following SQL query after the steps mentioned above are carried out?

SELECT Y FROM T WHERE X = 7;

- A. 127
- B. 15
- C. 129
- D. 257

Answer key**7.18.10 SQL: ISRO-2013-24**

Consider the following relational schema:

- Suppliers (sid:integer, sname:string, saddress:string)
- Parts (pid:integer, pname:string, pcolor:string)
- Catalog (sid:integer, pid:integer, pcost:real)

What is the result of the following query?

```
(SELECT Catalog.pid from Suppliers, Catalog
WHERE Suppliers.sid = Catalog.sid)
MINUS
(SELECT Catalog.pid from Suppliers, Catalog
WHERE Suppliers.sname <> 'Sachin' and Suppliers.sid = Catalog.sid)
```

- Pid of parts supplied by all except Sachin
- Pid of parts supplied only by Sachin
- Pid of parts available in catalog supplied by Sachin
- Pid of parts available in catalog supplied by all except Sachin

Answer key**7.18.11 SQL: ISRO-DEC2017-11**

Consider the schema

Sailors(sid,sname,rating,age) with the following data

sid	sname	rating	age
22	Dustin	7	45
29	Borg	1	33
31	Pathy	8	55
32	Robert	8	25
58	Raghu	10	17
64	Herald	7	35
71	Vishnu	10	16
74	King	9	35
85	Archer	3	26
84	Bob	3	64
96	Flinch	3	17

For the query

```
SELECT S.rating, AVG(S.age) AS avgage FROM Sailors S
Where S.age >= 18
GROUP BY S.rating
HAVING 1<(SELECT COUNT(*) FROM$ Sailors S2 Where S.rating=S2.rating)
```

The number of rows returned is

A. 6

B. 5

C. 4

D. 3

isrodec2017 sql databases

[Answer key](#)



7.18.12 SQL: ISRO2015-19

The maximum length of an attribute of type text is

A. 127

B. 255

C. 256

D. It is variable

isro2015 databases sql

[Answer key](#)



7.18.13 SQL: ISRO2015-22

Consider the following relational query on the above database:

```
SELECT S.name FROM Suppliers S  
Where S.sid NOT IN (SELECT C.sid FROM Catalog C  
WHERE C.pid NOT IN (SELECT P.pid FROM Parts P WHERE P.color <>'blue'))
```

- A. Find the names of all suppliers who have supplied non-blue part.
- B. Find the names of all suppliers who have not supplied non-blue part.
- C. Find the names of all suppliers who have supplied only non-blue parts
- D. Find the names of all suppliers who have not supplied only non-blue part.

isro2015 databases sql ambiguous

[Answer key](#)



7.18.14 SQL: ISRO2015-23

Consider the following schema:

Emp (Empcode, Name, Sex, Salary, Deptt)

A simple SQL query is executed as follows:

```
SELECT Deptt FROM Emp  
GROUP by Deptt  
Having avg (Salary) > {select avg (Salary) from Emp}
```

The output will be

- A. Average salary of male employee is the average salary of the organization
- B. Average salary of male employee is less than the average salary of the organization
- C. Average salary of male employee is equal to the average salary of the organization
- D. Average salary of male employee is more than the average salary of the organization

isro2015 databases sql

[Answer key](#)



7.19

Transaction and Concurrency (12)

7.19.1 Transaction and Concurrency: GATE CSE 2003 | Question: 29, ISRO2009-73

Which of the following scenarios may lead to an irrecoverable error in a database system?

- A. A transaction writes a data item after it is read by an uncommitted transaction
- B. A transaction reads a data item after it is read by an uncommitted transaction
- C. A transaction reads a data item after it is written by a committed transaction
- D. A transaction reads a data item after it is written by an uncommitted transaction

gatecse-2003 databases transaction-and-concurrency easy isro2009

Answer key 

7.19.2 Transaction and Concurrency: GATE CSE 2006 | Question: 20, ISRO2015-17



Consider the following log sequence of two transactions on a bank account, with initial balance 12000, that transfer 2000 to a mortgage payment and then apply a 5% interest.

1. T1 start
2. T1 B old = 12000 new = 10000
3. T1 M old = 0 new = 2000
4. T1 commit
5. T2 start
6. T2 B old = 10000 new = 10500
7. T2 commit

Suppose the database system crashes just before log record 7 is written. When the system is restarted, which one statement is true of the recovery procedure?

- A. We must redo log record 6 to set B to 10500
- B. We must undo log record 6 to set B to 10000 and then redo log records 2 and 3
- C. We need not redo log records 2 and 3 because transaction T1 has committed
- D. We can apply redo and undo operations in arbitrary order because they are idempotent

gatecse-2006 databases transaction-and-concurrency normal isro2015

Answer key 

7.19.3 Transaction and Concurrency: ISRO 2017-5



Which of the following concurrency control protocol ensures both conflict and free from deadlock?

- | | |
|------------------------|----------------------|
| A. Time stamp ordering | B. 2 Phase locking |
| C. Both (a) and (b) | D. None of the above |

isro2017 databases transaction-and-concurrency

Answer key 

7.19.4 Transaction and Concurrency: ISRO CSE 2007 | Question: 60



Which of the following is correct with respect to Two phase commit protocol?

- | | |
|----------------------------|--------------------------|
| A. Ensures serializability | B. Prevents Deadlock |
| C. Detects Deadlock | D. Recover from Deadlock |

isro2007 databases transaction-and-concurrency

Answer key 

7.19.5 Transaction and Concurrency: ISRO CSE 2009 | Question: 71



Which of the following contains complete record of all activity that affected the contents of a database during a certain period of time?

- A. Transaction log
- C. Report writer

- B. Query language
- D. Data manipulation language

isro2009 databases transaction-and-concurrency

[Answer key](#)

7.19.6 Transaction and Concurrency: ISRO CSE 2011 | Question: 15



What is the equivalent serial schedule for the following transactions?

Transaction

T1	T2	T3
		R(Y)
		R(Z)
R(X)		
W(X)		
		W(Y)
		W(Z)
	W(Z)	
R(Y)		
W(Y)		

	R(Y)	
	W(Y)	
	R(X)	
	W(X)	

- A. $T_1 - T_2 - T_3$
 C. $T_2 - T_1 - T_3$
 B. $T_3 - T_1 - T_2$
 D. $T_1 - T_3 - T_2$

isro2011 databases transaction-and-concurrency

[Answer key](#)



7.19.7 Transaction and Concurrency: ISRO CSE 2016 | Question: 58

Trigger is

- A. Statement that enables to start any DBMS
 B. Statement that is executed by the user when debugging an application program
 C. The condition that the system tests for the validity of the database user
 D. Statement that is executed automatically by the system as a side effect of a modification of the database

isro2016 databases transaction-and-concurrency

[Answer key](#)



7.19.8 Transaction and Concurrency: ISRO CSE 2017 | Question: 6

ACID properties of a transactions are

- A. Atomicity, consistency, isolation, database
 B. Atomicity, consistency, isolation, durability
 C. Atomicity, consistency, integrity, durability
 D. Atomicity, consistency, integrity, database

isro2017 databases transaction-and-concurrency

[Answer key](#)



7.19.9 Transaction and Concurrency: ISRO CSE 2018 | Question: 55

Let us assume that transaction T_1 has arrived before transaction T_2 . Consider the schedule $s = r1(A); r2(B) : w2(A); w1(B)$

Which of the following is true?

- a. Allowed under basic timestamp protocol.
- b. Not allowed under basic timestamp protocols because $T1$ is rolled back.
- c. Not allowed under basic timestamp protocols because $T2$ is rolled back.
- d. None of these

isro2018 databases transaction-and-concurrency

[Answer key](#)



7.19.10 Transaction and Concurrency: ISRO CSE 2020 | Question: 22

Raymonds tree based algorithm ensures

- A. no starvation, but deadlock may occur in rare cases
- B. no deadlock, but starvation may occur
- C. neither deadlock nor starvation can occur
- D. deadlock may occur in cases where the process is already starved

isro-2020 databases transaction-and-concurrency normal

[Answer key](#)



7.19.11 Transaction and Concurrency: ISRO CSE 2023 | Question: 49

Amongst the ACID properties of a transaction, the 'Durability' property requires that the changes made to the database by a successful transaction persist

- A. Except in case of an operating system crash
- B. Except in case of a disk crash
- C. Except in case of a power failure
- D. Always, even if there is a failure of any kind

isro-cse-2023 databases transaction-and-concurrency

[Answer key](#)



7.19.12 Transaction and Concurrency: ISRO-2013-23

Which of the following is the highest isolation level in transaction management?

- | | |
|-------------------|---------------------|
| A. Serializable | B. Repeated Read |
| C. Committed Read | D. Uncommitted Read |

isro2013 transaction-and-concurrency

[Answer key](#)

Answer Keys

7.0.1	B	7.0.2	C	7.1.1	A	7.1.2	A	7.1.3	B
7.1.4	C	7.1.5	A	7.1.6	B	7.2.1	D	7.3.1	B
7.4.1	D	7.4.2	C	7.4.3	B	7.4.4	B	7.4.5	A
7.4.6	B	7.4.7	C	7.4.8	A	7.4.9	D	7.4.10	C
7.4.11	C	7.4.12	Q-Q	7.4.13	B	7.5.1	A	7.6.1	A



8.0.1 ISRO CSE 2008 | Question: 48



Which of the following is termed as minimum error code ?

- A. Binary code
- B. Gray code
- C. Excess-3 code
- D. Octal code

isro2008 digital-logic binary-codes

[Answer key](#)

8.0.2 ISRO CSE 2014 | Question: 26



The output of a tristate buffer when the enable input is 0 is

- A. Always 0
- B. Always 1
- C. Retains the last value when enable input was high
- D. Disconnected state

isro2014 digital-logic translation-lookaside-buffer

[Answer key](#)

8.0.3 ISRO CSE 2016 | Question: 15



The Excess-3 code is also called

- A. Cyclic Redundancy Code
- B. Weighted Code
- C. Self-Complementing Code
- D. Algebraic Code

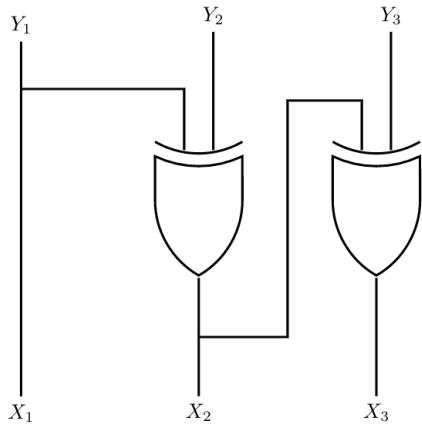
isro2016 digital-logic binary-codes

[Answer key](#)

8.0.4 ISRO CSE 2016 | Question: 12



The logic circuit given below converts a binary code $Y_1Y_2Y_3$ into



- A. Excess-3 code
- B. Gray code
- C. BCD code
- D. Hamming code

digital-logic binary-codes isro2016

[Answer key](#)

8.0.5 ISRO CSE 2023 | Question: 74



A truth table will need how many rows if there are n variables.

- A. 2^*n B. n C. 2^n D. None of the above

isro-cse-2023 digital-logic easy

[Answer key](#)

8.0.6 ISRO CSE 2023 | Question: 10



A logic circuit that provides a LOW output when both inputs are HIGH or both inputs are LOW is

- A. AND B. NAND C. XNOR D. XOR

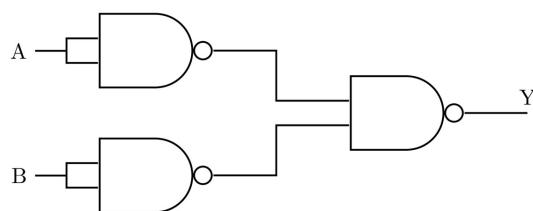
isro-cse-2023 digital-logic easy

[Answer key](#)

8.0.7 ISRO CSE 2023 | Question: 9



The logical operation of the following circuit is



- A. XOR B. NAND C. AND D. OR

isro-cse-2023 digital-logic compiler-design

[Answer key](#)

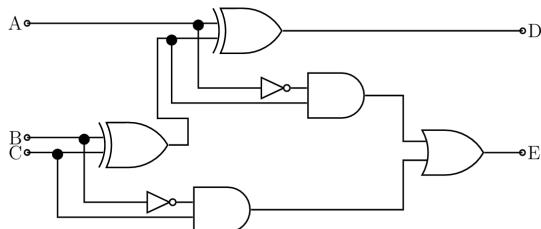
8.1

Adder (6)



8.1.1 Adder: ISRO CSE 2007 | Question: 03

The circuit shown in the given figure is a



- A. full adder
B. full subtracter
C. shift register
D. decade counter

isro2007 digital-logic digital-circuits adder

[Answer key](#)

8.1.2 Adder: ISRO CSE 2016 | Question: 9



For a binary half-subtractor having two inputs A and B, the correct set of logical outputs

D (= A minus B) and X(= borrow) are

- A. $D = AB + \bar{A}\bar{B}$, $X = \bar{A}\bar{B}$
C. $D = \bar{A}\bar{B} + A\bar{B}$, $X = \bar{A}\bar{B}$
B. $D = \bar{A}\bar{B} + A\bar{B}$, $X = A\bar{B}$
D. $D = AB + A\bar{B}$, $X = A\bar{B}$

isro2016 digital-logic adder

Answer key 



8.1.3 Adder: ISRO CSE 2017 | Question: 24

When two n -bit binary numbers are added the sum will contain at the most

- A. n bits B. $n + 2$ bits C. $n + 3$ bits D. $n + 1$ bits

isro2017 digital-logic adder

Answer key 



8.1.4 Adder: ISRO CSE 2020 | Question: 9

In a 8-bit ripple carry adder using identical full adders, each full adder takes 34 ns for computing sum. If the time taken for 8-bit addition is 90 ns, find time taken by each full adder to find carry.

- A. 6 ns B. 7 ns C. 10 ns D. 8 ns

isro-2020 digital-logic combinational-circuit adder normal

Answer key 



8.1.5 Adder: ISRO-DEC2017-71

A 32-bit adder is formed by cascading 4-bit CLA adder. The gate delays (latency) for getting the sum bits is

- A. 16 B. 18 C. 17 D. 19

isrodec2017 co-and-architecture digital-circuits adder

Answer key 



8.1.6 Adder: ISRO2015-7

If half adders and full adders are implements using gates, then for the addition of two 17 bit numbers (using minimum gates) the number of half adders and full adders required will be

- A. 0,17 B. 16,1 C. 1,16 D. 8,8

isro2015 digital-logic adder

Answer key 

8.2

Bcd (1)



8.2.1 Bcd: ISRO-2013-11

When two BCD numbers 0×14 and 0×08 are added what is the binary representation of the resultant number ?

- A. 0×22 B. $0 \times 1c$ C. 0×16 D. results in overflow

isro2013 number-representation bcd

Answer key 

8.3.1 Boolean Algebra: ISRO CSE 2007 | Question: 01

The Boolean expression $Y = (A + \bar{B} + \bar{A}B)\bar{C}$ is given by

- A. AC
- B. $B\bar{C}$
- C. \bar{C}
- D. AB

isro2007 digital-logic boolean-algebra

[Answer key](#)

8.3.2 Boolean Algebra: ISRO CSE 2008 | Question: 11

The Boolean theorem $AB + \bar{A}C + BC = AB + \bar{A}C$ corresponds to

- A. $(A+B) \bullet (\bar{A} + C) \bullet (B+C) = (A+B) \bullet (\bar{A} + C)$
- B. $AB + \bar{A}C + BC = AB + BC$
- C. $AB + \bar{A}C + BC = (A+B) \bullet (\bar{A} + C) \bullet (B+C)$
- D. $(A+B) \bullet (\bar{A} + C) \bullet (B+C) = AB + \bar{A}C$

isro2008 digital-logic boolean-algebra

[Answer key](#)

8.3.3 Boolean Algebra: ISRO CSE 2008 | Question: 24

The Boolean expression $(A + \bar{C})(\bar{B} + \bar{C})$ simplifies to

- | | |
|--------------------------------|---------------------------|
| A. $\bar{C} + A\bar{B}$ | B. $\bar{C}(\bar{A} + B)$ |
| C. $\bar{B}\bar{C} + A\bar{B}$ | D. None of these |

isro2008 digital-logic boolean-algebra

[Answer key](#)

8.3.4 Boolean Algebra: ISRO CSE 2008 | Question: 25

In the expression $\bar{A}(\bar{A} + \bar{B})$ by writing the first term A as $A + 0$, the expression is best simplified as

- A. $A+AB$
- B. AB
- C. A
- D. $A+B$

isro2008 digital-logic boolean-algebra

[Answer key](#)

8.3.5 Boolean Algebra: ISRO CSE 2008 | Question: 28



Which of the following is not a valid rule of XOR?

- A. $0 \text{ XOR } 0 = 0$
- B. $1 \text{ XOR } 1 = 1$
- C. $1 \text{ XOR } 0 = 1$
- D. $B \text{ XOR } B = 0$

isro2008 digital-logic boolean-algebra

[Answer key](#)

8.3.6 Boolean Algebra: ISRO CSE 2009 | Question: 20



Consider the following boolean function of four variables $f(w, x, y, z) = \Sigma(1, 3, 4, 6, 9, 11, 12, 14)$, the function is

- A. Independent of one variable
- B. Independent of two variables
- C. Independent of three variables
- D. Dependent on all variables

isro2009 digital-logic boolean-algebra

[Answer key](#)

8.3.7 Boolean Algebra: ISRO CSE 2011 | Question: 30



In Boolean algebra, rule $(X + Y)(X + Z) =$

- A. $Y + XZ$
- B. $X + YZ$
- C. $XY + Z$
- D. $XZ + Y$

isro2011 digital-logic boolean-algebra

[Answer key](#)

8.3.8 Boolean Algebra: ISRO CSE 2011 | Question: 6



Evaluate $(X \text{ xor } Y) \text{ xor } Y$?

- A. All 1's
- B. All 0's
- C. X
- D. Y

isro2011 digital-logic boolean-algebra

[Answer key](#)

8.3.9 Boolean Algebra: ISRO CSE 2014 | Question: 56



Which of the following is not valid Boolean algebra rule?

- A. $X.X = X$
- B. $(X+Y).X = X$
- C. $\bar{X} + XY = Y$
- D. $(X+Y).(X+Z) = X + YZ$

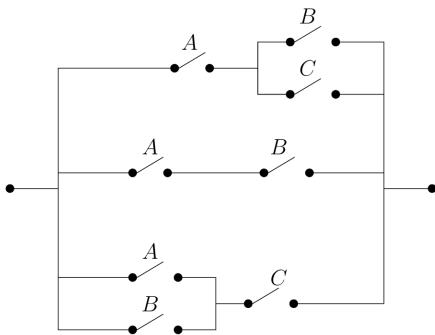
digital-logic boolean-algebra isro2014

[Answer key](#)

8.3.10 Boolean Algebra: ISRO CSE 2016 | Question: 8



The minimum Boolean expression for the following circuit is



- A. $AB + AC + BC$
 C. $A + B$
 B. $A + BC$
 D. $A + B + C$

isro2016 digital-logic boolean-algebra

[Answer key](#)



8.3.11 Boolean Algebra: ISRO CSE 2018 | Question: 62

Any set of Boolean operation that is sufficient to represent all Boolean expression is said to be complete. Which of the following is not complete ?

- A. {AND, OR} B. {AND, NOT} C. {NOT, OR} D. {NOR}

isro2018 digital-logic boolean-algebra

[Answer key](#)



8.3.12 Boolean Algebra: ISRO2015-10

The boolean expression $AB + AB' + A'C + AC$ is independent of the boolean variable

- A. A B. B C. C D. None of these

isro2015 digital-logic boolean-algebra

[Answer key](#)



8.3.13 Boolean Algebra: ISRO2015-5

The complement of the Boolean expression $AB(\bar{B}C + AC)$ is

- A. $(\bar{A} + \bar{B}) + (B + \bar{C}).(\bar{A} + \bar{C})$
 B. $(\bar{A}.\bar{B}) + (B\bar{C} + \bar{A}\bar{C})$
 C. $(\bar{A} + \bar{B}).(B + \bar{C}) + (A + \bar{C})$
 D. $(A+B).(\bar{B} + C) (A+C)$

isro2015 digital-logic boolean-algebra

[Answer key](#)



8.4

Booths Algorithm (1)

8.4.1 Booths Algorithm: ISRO CSE 2009 | Question: 40 , GATE2008-IT_42



The two numbers given below are multiplied using the Booth's algorithm

Multiplicand : 0101 1010 1110 1110

Multiplier : 0111 0111 1011 1101

How many additions/subtractions are required for the multiplication of the above two numbers?

- A. 6
- B. 8
- C. 10
- D. 12

isro2009 digital-logic booths-algorithm

[Answer key](#)

8.5

CO and Architecture (2)

8.5.1 CO and Architecture: ISRO CSE 2023 | Question: 25



The operation executed on data stored in registers is called

- A. Macro-operation
- B. Micro-operation
- C. Bit-operation
- D. Byte-operation

isro-cse-2023 co-and-architecture

[Answer key](#)

8.5.2 CO and Architecture: ISRO CSE 2023 | Question: 8



A full adder circuit requires

- A. two inputs and two outputs
- B. two inputs and three outputs
- C. three inputs and two outputs
- D. three inputs and one output

isro-cse-2023 digital-logic co-and-architecture

[Answer key](#)

8.6

Canonical Normal Form (2)

8.6.1 Canonical Normal Form: ISRO CSE 2016 | Question: 16



The simplified SOP (Sum of Product) from the Boolean expression

$$(P + \overline{Q} + \overline{R}) \cdot (P + Q + R) \cdot (P + Q + \overline{R})$$

is

- A. $(\overline{P} \cdot Q + \overline{R})$
- B. $(P + Q \cdot \overline{R})$
- C. $(P \cdot \overline{Q} + R)$
- D. $(P \cdot Q + R)$

digital-logic canonical-normal-form isro2016

[Answer key](#)

8.6.2 Canonical Normal Form: ISRO-2013-28



The most simplified form of the Boolean function

$$x(A, B, C, D) = \sum(7, 8, 9, 10, 11, 12, 13, 14, 15)$$

(expressed in sum of minterms) is?

- A. $A + A'BCD$
- B. $AB + CD$
- C. $A + BCD$
- D. $ABC + D$

isro2013 digital-logic canonical-normal-form

[Answer key](#)

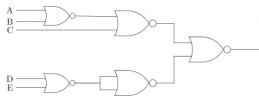
8.7

Circuit Output (14)

8.7.1 Circuit Output: ISRO CSE 2007 | Question: 02



The circuit shown in the following figure realizes the function.



- A. $(\overline{A+B} + C)(\overline{D}\overline{E})$
B. $(\overline{A+B} + C)(D\overline{E})$
C. $(A+\overline{B+C})(\overline{D}E)$
D. $(A+B+\overline{C})(\overline{D}\overline{E})$

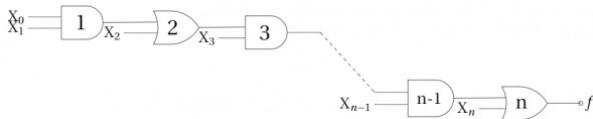
isro2007 digital-logic digital-circuits circuit-output

[Answer key](#)

8.7.2 Circuit Output: ISRO CSE 2008 | Question: 12



In the given network of AND and OR gates f can be written as



- A. $X_0X_1X_2\dots X_n + X_1X_2\dots X_n + X_2X_3\dots X_n + \dots + X_n$
B. $X_0X_1 + X_2X_3 + \dots X_{n-1}X_n$
C. $X_0 + X_1 + X_2 + \dots + X_n$
D. $X_0X_1 + X_3\dots X_{n-1} + X_2X_3 + X_5\dots X_{n-1} + \dots + X_{n-2}X_{n-1} + X_n$

isro2008 digital-logic circuit-output

[Answer key](#)

8.7.3 Circuit Output: ISRO CSE 2008 | Question: 26



The logic operations of two combinational circuits in Figure-I and Figure -II are

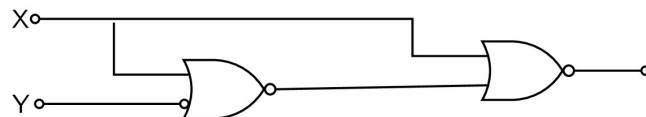


Figure -I

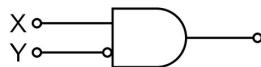


Figure -II

- A. entirely different
B. identical
C. complementary
D. dual

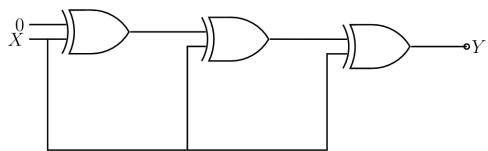
isro2008 digital-logic circuit-output

[Answer key](#)

8.7.4 Circuit Output: ISRO CSE 2008 | Question: 27



The output Y of the given circuit



- A. 1 B. 0 C. X D. X'

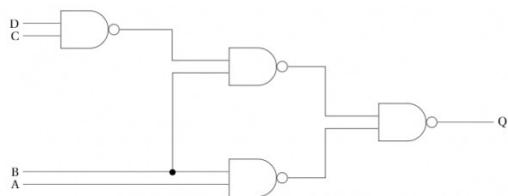
isro2008 digital-logic circuit-output

[Answer key](#)



8.7.5 Circuit Output: ISRO CSE 2014 | Question: 15

Consider the logic circuit given below:



$Q = \underline{\hspace{2cm}}$?

- A. $\overline{AC} + \overline{BC} + CD$
 B. $ABC + \overline{CD}$
 C. $AB + \overline{BC} + \overline{BD}$
 D. $A\overline{B} + A\overline{C} + \overline{CD}$

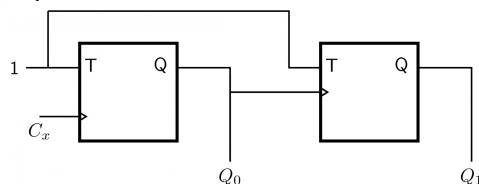
isro2014 digital-logic circuit-output

[Answer key](#)



8.7.6 Circuit Output: ISRO CSE 2014 | Question: 21, UGCNET-Dec2012-III: 23, UGCNET-Dec2013-III: 22

What are the final values of Q_1 and Q_0 after 4 clock cycles, if initial values are 00 in the sequential circuit shown below?



- A. 11 B. 01 C. 10 D. 00

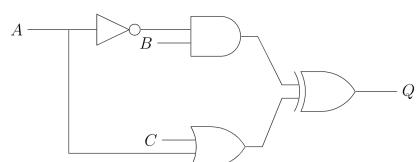
isro2014 digital-logic circuit-output ugcnetcse-dec2012-paper3 ugcnetcse-dec2013-paper3

[Answer key](#)



8.7.7 Circuit Output: ISRO CSE 2014 | Question: 53

Consider the logic circuit given below.

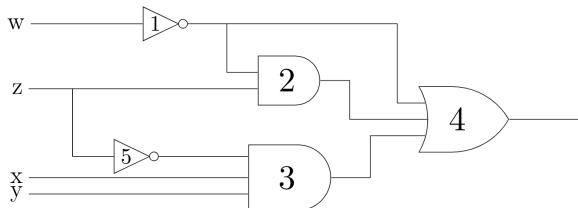


The inverter, AND and OR gates have delays of 6, 10 and 11 nanoseconds respectively. Assuming that wire delays are negligible, what is the duration of glitch for Q before it becomes stable?

- A. 5 B. 11 C. 16 D. 27

[Answer key](#)**8.7.8 Circuit Output: ISRO CSE 2016 | Question: 10**

Consider the following gate network

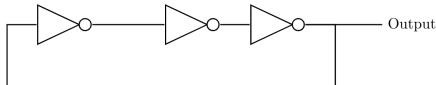


Which one of the following gates is redundant?

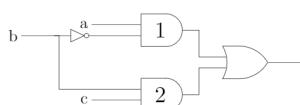
- A. Gate No. 1 B. Gate No. 2 C. Gate No. 3 D. Gate No. 4

[Answer key](#)**8.7.9 Circuit Output: ISRO CSE 2016 | Question: 13**

The circuit given in the figure below is



- A. An oscillating circuit and its output is square wave
 B. The one whose output remains stable in '1' state
 C. The one having output remains stable in '0' state
 D. has a single pulse of three times propagation delay

[Answer key](#)**8.7.10 Circuit Output: ISRO CSE 2018 | Question: 9**

In the diagram above, the inverter (NOT gate) and the AND-gates labeled 1 and 2 have delays of 9, 10 and 12 nanoseconds (ns), respectively. Wire delays are negligible. For certain values a and c , together with certain transition of b , a glitch (spurious output) is generated for a short time, after which the output assumes its correct value. The duration of glitch is:

- a. 7 ns b. 9 ns c. 11 ns d. 13 ns

[Answer key](#)**8.7.11 Circuit Output: ISRO CSE 2020 | Question: 11**

Minimum number of NAND gates required to implement the following binary equation

$$Y = (\overline{A} + \overline{B})(C + D)$$

A. 4

B. 5

C. 3

D. 6

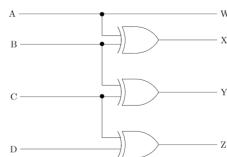
isro-2020 digital-logic combinational-circuit circuit-output normal

Answer key



8.7.12 Circuit Output: ISRO CSE 2020 | Question: 12

If $ABCD$ is a 4-bit binary number, then what is the code generated by the following circuit?



A. BCD code

B. Gray code

C. 8421 code

D. Excess-3 code

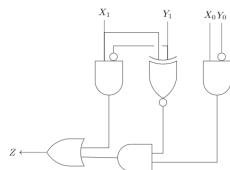
isro-2020 digital-logic combinational-circuit circuit-output normal

Answer key



8.7.13 Circuit Output: ISRO CSE 2020 | Question: 66

The following circuit compares two 2-bit binary numbers, X and Y represented by X_1X_0 and Y_1Y_0 respectively. (X_0 and Y_0 represent Least Significant Bits)



Under what conditions Z will be 1?

A. $X > Y$

B. $X < Y$

C. $X = Y$

D. $X \neq Y$

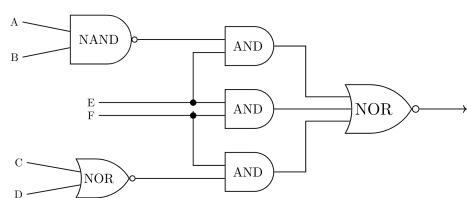
isro-2020 digital-logic digital-circuits circuit-output normal

Answer key



8.7.14 Circuit Output: ISRO CSE 2020 | Question: 77

Consider the following circuit



The function by the network above is

- A. $\overline{AB}E + EF + \overline{CD}F$
- B. $(\overline{E} + AB\overline{F})(C + D + \overline{F})$
- C. $(\overline{AB} + E)(\overline{E} + \overline{F})(C + D + \overline{F})$
- D. $(A + B)\overline{E} + \overline{EF} + CD\overline{F}$

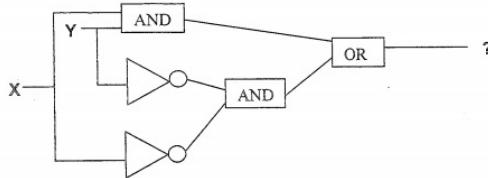
isro-2020 digital-logic combinational-circuit circuit-output normal

Answer key

8.8.1 Combinational Circuit: ISRO CSE 2011 | Question: 47



The output expression of the following gate network is



- A. $X.Y + \bar{X}.\bar{Y}$
- B. $X.Y + X.Y$
- C. $X.Y$
- D. $X + Y$

isro2011 digital-logic combinational-circuit digital-circuits

[Answer key](#)

8.9.1 Decoder: GATE CSE 2007 | Question: 8, ISRO2011-31



How many 3-to-8 line decoders with an enable input are needed to construct a 6-to-64 line decoder without using any other logic gates?

- A. 7
- B. 8
- C. 9
- D. 10

gatecse-2007 digital-logic normal isro2011 decoder

[Answer key](#)

8.10.1 Digital Circuits: ISRO CSE 2017 | Question: 26



Advantage of synchronous sequential circuits over asynchronous one is :

- | | |
|-------------------------------|--------------------------|
| A. Lower hardware requirement | B. Better noise immunity |
| C. Faster operation | D. All of the above |

isro2017 digital-logic digital-circuits bad-question

[Answer key](#)

8.10.2 Digital Circuits: ISRO-DEC2017-72



We consider the addition of two 2's compliment numbers $b_{n-1}b_{n-2}\dots b_0$ and $a_{n-1}a_{n-2}\dots a_0$. A binary adder for adding two unsigned binary numbers is used to add two binary numbers. The sum is denoted by $c_{n-1}c_{n-2}\dots c_0$. The carry out is denoted by c_{out} . The overflow condition is identified by

- A. $c_{out} (\overline{a_{n-1}} \oplus \overline{b_{n-1}})$
- B. $\overline{a_{n-1}}b_{n-1}\overline{c_{n-1}} + \overline{a_{n-1}}\overline{b_{n-1}}c_{n-1}$
- C. $c_{out} \oplus c_{n-1}$

- D. $a_{n-1} \oplus b_{n-1} \oplus c_{n-1}$

isrodec2017 digital-circuits number-representation isro

Answer key 

8.11

Digital Counter (2)

8.11.1 Digital Counter: ISRO CSE 2007 | Question: 34



Ring counter is analogous to

- A. Toggle Switch
C. Stepping Switch
B. Latch
D. S-R flip flop

isro2007 digital-logic digital-counter

Answer key 

8.11.2 Digital Counter: ISRO2015-4



A modulus -12 ring counter requires a minimum of

- A. 10 flip-flops B. 12 flip-flops C. 8 flip-flops D. 6 flip-flops

isro2015 digital-logic digital-counter

Answer key 

8.12

Flip Flop (6)

8.12.1 Flip Flop: GATE CSE 2004 | Question: 18, ISRO2007-31



In an *SR* latch made by cross-coupling two NAND gates, if both *S* and *R* inputs are set to 0, then it will result in

- A. $Q = 0, Q' = 1$
C. $Q = 1, Q' = 1$
B. $Q = 1, Q' = 0$
D. Indeterminate states

gatecse-2004 digital-logic easy isro2007 flip-flop

Answer key 

8.12.2 Flip Flop: ISRO CSE 2007 | Question: 05



The characteristic equation of an *SR* flip-flop is given by :

- A. $Q_{n+1} = S + RQ_n$
C. $Q_{n+1} = \bar{S} + RQ_n$
B. $Q_{n+1} = R\bar{Q}_n + \bar{S}Q_n$
D. $Q_{n+1} = S + \bar{R}Q_n$

isro2007 digital-logic flip-flop

Answer key 

8.12.3 Flip Flop: ISRO CSE 2011 | Question: 74



In an *RS* flip-flop, if the *S* line (Set line) is set high (1) and the *R* line (Reset line) is set low (0), then the state of the flip-flop is :

- A. Set to 1
C. No change in state
B. Set to 0
D. Forbidden

isro2011 digital-logic flip-flop

Answer key 

8.12.4 Flip Flop: ISRO CSE 2016 | Question: 18



The functional difference between *SR* flip-flop and *J-K* flip-flop is that :

- A. *J-K* flip-flop is faster than *SR* flip-flop
- B. *J-K* flip-flop has a feedback path
- C. *J-K* flip-flop accepts both inputs 1
- D. None of them

digital-logic flip-flop isro2016

Answer key

8.12.5 Flip Flop: ISRO CSE 2020 | Question: 80



A new flipflop with inputs X and Y , has the following property

X	Y	Current state	Next state
0	0	Q	1
0	1	Q	\bar{Q}
1	1	Q	0
1	0	Q	Q

Which of the following expresses the next state in terms of X, Y , current state?

- A. $(\bar{X} \wedge \bar{Q}) \vee (\bar{Y} \wedge Q)$
- B. $(\bar{X} \wedge Q) \vee (\bar{Y} \wedge \bar{Q})$
- C. $(X \wedge \bar{Q}) \vee (Y \wedge Q)$
- D. $(X \wedge \bar{Q}) \vee (\bar{Y} \wedge Q)$

isro-2020 digital-logic sequential-circuit flip-flop normal

Answer key

8.12.6 Flip Flop: ISRO-2013-30



In a three stage counter, using *RS* flip flops what will be the value of the counter after giving 9 pulses to its input ? Assume that the value of counter before giving any pulses is 1 :

- A. 1
- B. 2
- C. 9
- D. 10

isro2013 digital-logic flip-flop

Answer key

8.13

Floating Point Representation (6)

8.13.1 Floating Point Representation: ISRO CSE 2007 | Question: 30



0.75 decimal system is equivalent to ____ in octal system

- A. 0.60
- B. 0.52
- C. 0.54
- D. 0.50

isro2007 digital-logic number-representation floating-point-representation

Answer key

8.13.2 Floating Point Representation: ISRO CSE 2007 | Question: 36



Consider a computer system that stores a floating-point numbers with 16-bit mantissa and an 8-bit exponent, each in two's complement. The smallest and largest positive values which can be stored are :

- A. 1×10^{-128} and $2^{15} \times 10^{128}$
C. 1×10^{-128} and $2^{15} \times 10^{127}$
- B. 1×10^{-256} and $2^{15} \times 10^{255}$
D. 1×10^{-128} and $2^{15} - 1 \times 10^{127}$

isro2007 digital-logic number-representation floating-point-representation

Answer key

8.13.3 Floating Point Representation: ISRO CSE 2008 | Question: 23



A computer uses 8 digit mantissa and 2 digit exponent. If $a = 0.052$ and $b = 28E+11$ then $b + a - b$ will :

- A. result in an overflow error
C. be 0
- B. result in an underflow error
D. be $5.28E+11$

isro2008 digital-logic number-representation floating-point-representation

Answer key

8.13.4 Floating Point Representation: ISRO CSE 2011 | Question: 8



What is the decimal value of the floating-point number $C1D00000$ (hexadecimal notation)?
(Assume 32-bit, single precision floating point IEEE representation)

- A. 28 B. -15 C. -26 D. -28

isro2011 digital-logic number-representation floating-point-representation ieee-representation

Answer key

8.13.5 Floating Point Representation: ISRO-DEC2017-75



In IEEE floating point representation, the hexadecimal number $0xC0000000$ corresponds to

- A. -3.0 B. -1.0 C. -4.0 D. -2.0

isrodec2017 ieee-representation floating-point-representation digital-logic

Answer key

8.13.6 Floating Point Representation: ISRO2015-1



Which of the given number has its IEEE - 754 32-bit floating point representation as $(0\ 10000000\ 110\ 0000\ 0000\ 0000\ 0000)$

- A. 2.5 B. 3.0 C. 3.5 D. 4.5

isro2015 digital-logic number-representation floating-point-representation ieee-representation

Answer key

8.14

Functional Completeness (2)



8.14.1 Functional Completeness: ISRO-2013-22

Any set of Boolean operators that is sufficient to represent all Boolean expressions is said to be complete. Which of the following is not complete ?

- A. {*NOT*, *OR*} B. {*NOR*} C. {*AND*, *OR*} D. {*AND*, *NOT*}

Answer key**8.14.2 Functional Completeness: ISRO-DEC2017-76**

Which of the following set of components is sufficient to implement any arbitrary Boolean function?

- A. *XOR* gates, *NOT* gates
- B. *AND* gates, *XOR* gates and 1
- C. 2 to 1 multiplexer
- D. Three input gates that output $(A \cdot B) + C$ for the inputs A, B, C

Answer key**8.15****Hazards (1)****8.15.1 Hazards: ISRO CSE 2016 | Question: 11**

The dynamic hazard problem occurs in

- | | |
|--------------------------------|----------------------------|
| A. combinational circuit alone | B. sequential circuit only |
| C. Both (a) and (b) | D. None of the above |

Answer key**8.16****IEEE Representation (1)****8.16.1 IEEE Representation: ISRO CSE 2014 | Question: 8**

In the standard IEEE 754 single precision floating point representation, there is 1 bit for sign, 23 bits for fraction and 8 bits for exponent. What is the precision in terms of the number of decimal digits?

- A. 5
- B. 6
- C. 7
- D. 8

Answer key**8.17****Interrupts (1)****8.17.1 Interrupts: ISRO CSE 2023 | Question: 5**

In a vectored interrupt

- A. The branch address is assigned to a fixed location in memory
- B. The interrupting source supplies the branch information to the processor
- C. The branch address is obtained from a register in the processor
- D. None of the above

[Answer key](#)**8.18****K Map (1)****8.18.1 K Map: ISRO CSE 2009 | Question: 19**

The switching expression corresponding to $f(A, B, C, D) = \Sigma(1, 4, 5, 9, 11, 12)$ is

- A. $BC'D' + A'C'D + AB'D$
- B. $ABC' + ACD + B'C'D$
- C. $ACD' + A'BC' + AC'D'$
- D. $A'BD + ACD' + BCD'$

[Answer key](#)**8.19****Logic (1)****8.19.1 Logic: ISRO CSE 2023 | Question: 29**

The resulting logic circuit obtained when both inputs of NOR and NAND gates are connected together is:

- A. AND
- B. XOR
- C. OR
- D. NOT

[Answer key](#)**8.20****Matrix Chain Ordering (1)****8.20.1 Matrix Chain Ordering: ISRO CSE 2023 | Question: 72**

The complexity of matrix multiplication of two matrices A and B whose orders are $m \times n$ and $n \times p$ respectively is

- A. $O(m \times p)$
- B. $O(m \times n^2 \times p)$
- C. $O(m \times n \times p^2)$
- D. $O(m \times n \times p)$

[Answer key](#)**8.21****Memory Interfacing (2)****8.21.1 Memory Interfacing: GATE CSE 2009 | Question: 7, ISRO2015-3**

How many $32K \times 1$ RAM chips are needed to provide a memory capacity of $256K$ bytes?

- A. 8
- B. 32
- C. 64
- D. 128

[Answer key](#)

8.21.2 Memory Interfacing: ISRO CSE 2014 | Question: 25



Suppose you want to build a memory with 4 byte words and a capacity of 2^{21} bits. What is type of decoder required if the memory is built using $2K \times 8$ RAM chips?

- A. 5 to 32 B. 6 to 64 C. 4 to 16 D. 7 to 128

digital-logic memory-interfacing isro2014

Answer key

8.22

Min No Gates (2)



8.22.1 Min No Gates: ISRO CSE 2016 | Question: 7

The minimum number of NAND gates required to implement the Boolean function $A + A\bar{B} + A\bar{B}C$ is equal to

- A. 0 (Zero) B. 1 C. 4 D. 7

digital-logic min-no-gates isro2016

Answer key

8.22.2 Min No Gates: ISRO CSE 2017 | Question: 23



What is the minimum number of two-input NAND gates used to perform the function of two-input OR gate?

- A. One B. Two C. Three D. Four

isro2017 digital-logic min-no-gates

Answer key

8.23

Multiplexer (4)



8.23.1 Multiplexer: ISRO CSE 2008 | Question: 22

How many 2-input multiplexers are required to construct a 2^{10} -input multiplexer?

- A. 1023 B. 31 C. 10 D. 127

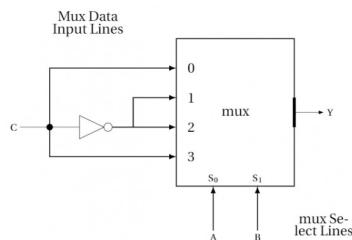
isro2008 digital-logic multiplexer

Answer key

8.23.2 Multiplexer: ISRO CSE 2020 | Question: 10



Following Multiplexer circuit is equivalent to



- A. Sum equation of full adder
B. Carry equation of full adder
C. Borrow equation for full subtractor
D. Difference equation of a full subtractor

isro-2020 digital-logic combinational-circuit multiplexer normal

Answer key

8.23.3 Multiplexer: ISRO CSE 2023 | Question: 70



Which of the following definitions is true

- i. A digital multiplexer takes one input from many inputs and outputs the selected one
 - ii. Four select lines are required for 1-16 multiplexer
 - iii. Eight OR gates are required to implement an octal to binary encoder
- A. (i) and (ii) B. (ii) and (iii) C. (i) alone D. none of the above

isro-cse-2023 digital-logic digital-circuits multiplexer

Answer key

8.23.4 Multiplexer: ISRO2015-8



Minimum number of 2×1 multiplexers required to realize the following function,
 $f = \overline{A} \overline{B}C + \overline{A} \overline{B} \overline{C}$

Assume that inputs are available only in true form and Boolean a constant 1 and 0 are available.

- A. 1 B. 2 C. 3 D. 7

isro2015 digital-logic multiplexer

Answer key

8.24

Number Representation (25)

8.24.1 Number Representation: GATE CSE 1995 | Question: 2.12, ISRO2015-9



The number of 1's in the binary representation of $(3 * 4096 + 15 * 256 + 5 * 16 + 3)$ are:

- A. 8 B. 9 C. 10 D. 12

gate1995 digital-logic number-representation normal isro2015

Answer key

8.24.2 Number Representation: GATE CSE 2005 | Question: 16, ISRO2009-18, ISRO2015-2



The range of integers that can be represented by an n bit $2's$ complement number system is:

- A. -2^{n-1} to $(2^{n-1} - 1)$ B. $-(2^{n-1} - 1)$ to $(2^{n-1} - 1)$
 C. -2^{n-1} to 2^{n-1} D. $-(2^{n-1} + 1)$ to $(2^{n-1} - 1)$

gatecse-2005 digital-logic number-representation easy isro2009 isro2015

Answer key

8.24.3 Number Representation: GATE CSE 2009 | Question: 5, ISRO2017-57



$(1217)_8$ is equivalent to

- A. $(1217)_{16}$ B. $(028F)_{16}$ C. $(2297)_{10}$ D. $(0B17)_{16}$

gatecse-2009 digital-logic number-representation isro2017

Answer key

8.24.4 Number Representation: GATE IT 2006 | Question: 7, ISRO2009-41



The addition of 4 – bit, two's complement, binary numbers 1101 and 0100 results in

- A. 0001 and an overflow
- B. 1001 and no overflow
- C. 0001 and no overflow
- D. 1001 and an overflow

gateit-2006 digital-logic number-representation normal isro2009

[Answer key](#)

8.24.5 Number Representation: ISRO CSE 2007 | Question: 04



When two numbers are added in excess-3 code and the sum is less than 9, then in order to get the correct answer it is necessary to

- A. subtract 0011 from the sum
- B. add 0011 to the sum
- C. subtract 0110 from the sum
- D. add 0110 to the sum

isro2007 digital-logic number-representation

[Answer key](#)

8.24.6 Number Representation: ISRO CSE 2007 | Question: 18



The number of digit 1 present in the binary representation of

$$3 \times 512 + 7 \times 64 + 5 \times 8 + 3$$

- A. 8
- B. 9
- C. 10
- D. 12

isro2007 digital-logic number-representation

[Answer key](#)

8.24.7 Number Representation: ISRO CSE 2007 | Question: 38



The Hexadecimal equivalent of 01111100110111100011 is

- A. CD73E
- B. ABD3F
- C. 7CDE3
- D. FA4CD

isro2007 digital-logic number-representation

[Answer key](#)

8.24.8 Number Representation: ISRO CSE 2007 | Question: 49



One approach to handling fuzzy logic data might be to design a computer using ternary (base-3) logic so that data could be stored as “true,” “false,” and “unknown.” If each ternary logic element is called a flit, how many flits are required to represent at least 256 different values?

- A. 4
- B. 5
- C. 6
- D. 7

isro2007 digital-logic number-representation

[Answer key](#)

8.24.9 Number Representation: ISRO CSE 2008 | Question: 13



If $N^2 = (7601)_8$ where N is a positive integer, then the value of N is

- A. $(241)_5$
- B. $(143)_6$
- C. $(165)_7$
- D. $(39)_{16}$

isro2008 digital-logic number-representation

[Answer key](#)

8.24.10 Number Representation: ISRO CSE 2008 | Question: 20



If $(12x)_3 = (123)_x$, then the value of x is

- A. 3 B. 3 or 4 C. 2 D. None of these

isro2008 digital-logic number-representation

[Answer key](#)

8.24.11 Number Representation: ISRO CSE 2009 | Question: 39 , GATE2008-IT_15



A processor that has carry, overflow and sign flag bits as part of its program status word (PSW) performs addition of the following two 2^7 s complement numbers 01001101 and 11101001. After the execution of this addition operation, the status of the carry, overflow and sign flags, respectively will be

- A. 1,1,0 B. 1,0,0 C. 0,1,0 D. 1,0,1

isro2009 number-representation digital-logic

[Answer key](#)

8.24.12 Number Representation: ISRO CSE 2014 | Question: 27



How many different BCD numbers can be stored in 12 switches ? (Assume two position or on-off switches).

- A. 2^{12} B. $2^{12} - 1$ C. 10^{12} D. 10^3

isro2014 digital-logic number-representation

[Answer key](#)

8.24.13 Number Representation: ISRO CSE 2016 | Question: 14



If $12A7C_{16} = X_8$ then the value of X is

- A. 224174 B. 425174 C. 6173 D. 225174

digital-logic number-representation isro2016

[Answer key](#)

8.24.14 Number Representation: ISRO CSE 2016 | Question: 17



Which of the following binary number is the same as its 2^7 s complement ?

- A. 1010 B. 0101 C. 1000 D. 1001

digital-logic number-representation isro2016

[Answer key](#)

8.24.15 Number Representation: ISRO CSE 2018 | Question: 19



Given $\sqrt{224}_r = 13_r$, the value of radix r is

- a. 10 b. 8 c. 6 d. 5

isro2018 number-representation digital-logic

[Answer key](#)

8.24.16 Number Representation: ISRO CSE 2018 | Question: 3

If a variable can take only integral values from 0 to n , where n is an integer, then the variable can be represented as a bit-field whose width is (the log in the answer are to the base 2, and $\lceil \log n \rceil$ means the floor of $\log n$)

- a. $\lceil \log(n) \rceil + 1$ bits
- b. $\lceil \log(n - 1) \rceil + 1$ bits
- c. $\lceil \log(n + 1) \rceil + 1$ bits
- d. None of the above

isro2018 number-representation digital-logic

[Answer key](#)



8.24.17 Number Representation: ISRO CSE 2018 | Question: 32

A computer uses ternary system instead of the traditional system. An n bit string in the binary system will occupy

- a. $3 + n$ ternary digits
- b. $2n/3$ ternary digits
- c. $n \log_2 3$ ternary digits
- d. $n \log_3 2$ ternary digits

isro2018 digital-logic number-representation

[Answer key](#)



8.24.18 Number Representation: ISRO-2013-13

The number 1102 in base 3 is equivalent to 123 in which base system?

- A. 4
- B. 5
- C. 6
- D. 8

isro2013 number-representation

[Answer key](#)



8.24.19 Number Representation: ISRO-2013-17

Two eight bit bytes 11000011 and 01001100 are added. What are the values of the overflow, carry and zero flags respectively, if the arithmetic unit of the CPU uses 2's complement form?

- A. 0,1,1'
- B. 1,1,0
- C. 1,0,1
- D. 0,1,0

isro2013 digital-logic number-representation

[Answer key](#)



8.24.20 Number Representation: ISRO-2013-77

The binary equivalent of the decimal number 42.75 is

- A. 101010.110
- B. 100110.101
- C. 101010.101
- D. 100110.110

isro2013 digital-logic number-representation

[Answer key](#)



8.24.21 Number Representation: ISRO-2013-8

Which logic gate is used to detect overflow in 2's compliment arithmetic?

- A. OR gate
- B. AND gate
- C. NAND gate
- D. XOR gate



Answer key**8.24.22 Number Representation: ISRO-DEC2017-39**

A computer with *32-bit* word size uses *2's complement* to represent numbers. The range of integers that can be represented by this computer is

- A. -2^{32} to 2^{32}
- B. -2^{31} to $2^{32} - 1$
- C. -2^{31} to $2^{31} - 1$
- D. -2^{31} to $2^{32} - 1$

Answer key**8.24.23 Number Representation: ISRO-DEC2017-40**

Let $M = 11111010$ and $N = 00001010$ be two *8-bit* two's complement number. Their product in two's complement is

- A. 11000100
- B. 10011100
- C. 10100101
- D. 11010101

Answer key**8.24.24 Number Representation: ISRO2015-6**

The code which uses 7 bits to represent a character is :

- A. ASCII
- B. BCD
- C. EBCDIC
- D. Gray

Answer key**8.24.25 Number Representation: ISRO2015-78**

The decimal number has 64 digits. The number of bits needed for its equivalent binary representation is?

- A. 200
- B. 213
- C. 246
- D. 277

Answer key**8.25****Pla (1)****8.25.1 Pla: ISRO-2013-29**

How many programmable fuses are required in a PLA which takes 16 inputs and gives 8 outputs? It has to use 8 OR gates and 32 AND gates.

- A. 1032
- B. 776
- C. 1284
- D. 1536

Answer key**8.26****Shift Registers (1)**

8.26.1 Shift Registers: ISRO CSE 2023 | Question: 71



The time delay obtained through an 8-bit serial register with 400 MHz clock is:

- a. 20 ns
- b. 2.5 μ s
- c. 20 μ s
- d. 2.5 μ s

isro-cse-2023 shift-registers digital-circuits

[Answer key](#)

Answer Keys

8.0.1	B	8.0.2	D	8.0.3	C	8.0.4	X	8.0.5	C
8.0.6	D	8.0.7	D	8.1.1	B	8.1.2	C	8.1.3	D
8.1.4	D	8.1.5	B	8.1.6	C	8.2.1	A	8.3.1	C
8.3.2	A	8.3.3	A	8.3.4	X	8.3.5	B	8.3.6	B
8.3.7	B	8.3.8	C	8.3.9	C	8.3.10	A	8.3.11	A
8.3.12	B	8.3.13	A	8.4.1	B	8.5.1	B	8.5.2	C
8.6.1	B	8.6.2	C	8.7.1	A	8.7.2	X	8.7.3	A
8.7.4	C	8.7.5	C	8.7.6	D	8.7.7	A	8.7.8	B
8.7.9	A	8.7.10	A	8.7.11	A	8.7.12	B	8.7.13	A
8.7.14	B	8.8.1	A	8.9.1	C	8.10.1	X	8.10.2	X
8.11.1	C	8.11.2	B	8.12.1	C	8.12.2	D	8.12.3	A
8.12.4	C	8.12.5	A	8.12.6	B	8.13.1	A	8.13.2	D
8.13.3	C	8.13.4	C	8.13.5	D	8.13.6	C	8.14.1	C
8.14.2	B	8.15.1	C	8.16.1	C	8.17.1	B	8.18.1	A
8.19.1	D	8.20.1	D	8.21.1	C	8.21.2	A	8.22.1	A
8.22.2	C	8.23.1	A	8.23.2	A;D	8.23.3	A	8.23.4	B
8.24.1	C	8.24.2	A	8.24.3	B	8.24.4	C	8.24.5	A
8.24.6	B	8.24.7	C	8.24.8	C	8.24.9	B	8.24.10	D
8.24.11	B	8.24.12	D	8.24.13	D	8.24.14	C	8.24.15	D
8.24.16	A	8.24.17	D	8.24.18	B	8.24.19	D	8.24.20	A
8.24.21	D	8.24.22	C	8.24.23	A	8.24.24	A	8.24.25	B
8.25.1	C	8.26.1	A						



9.1

Counting (1)



9.1.1 Counting: ISRO CSE 2014 | Question: 19

The number of bit strings of length 8 that will either start with 1 or end with 00 is?

- A. 32
- B. 128
- C. 160
- D. 192

isro2014 combinatory counting

Answer key

9.2

Process Scheduling (1)



9.2.1 Process Scheduling: ISRO-2013-53

A CPU scheduling algorithm determines an order for the execution of its scheduled processes. Given 'n' processes to be scheduled on one processor, how many possible different schedules are there?

- A. n
- B. n^2
- C. $n!$
- D. 2^n

isro2013 process-scheduling combinatory

Answer key

Answer Keys

9.1.1

C

9.2.1

C



10.0.1 ISRO-2013-76



The number of edges in a 'n' vertex complete graph is?

- A. $n*(n - 1)/2$
 B. n^2
 C. $n*(n + 1)/2$
 D. $n*(n + 1)$

isro2013 graph-theory

[Answer key](#)

10.0.2 ISRO CSE 2023 | Question: 63



Maximum number of Simple graphs possible with n vertices

- A. $2^{n(n-1)/2}$
 B. $2^{(n-1)/2}$
 C. $2^{(n(n+1)/2)}$
 D. $2^{n(n+1)}$

isro-cse-2023 graph-theory discrete-mathematics

[Answer key](#)

10.0.3 ISRO CSE 2023 | Question: 51



Which of the following are true?

- i. In a graph G with 'n' vertices and 'e' edges, sum of degrees of vertices = $2*e$.
 - ii. Eccentricity of a connected graph can never be equal to radius of the graph
 - iii. Girth of a graph is the shortest cycle of the graph
 - iv. Graph with equal degree for all vertices is multigraph
- a. (i), (ii), (iii)
 b. (ii), (iii), (iv)
 c. (i), (iii), (iv)
 d. None of the above

isro-cse-2023 discrete-mathematics graph-theory

[Answer key](#)

10.1

Degree of Graph (1)



10.1.1 Degree of Graph: ISRO CSE 2009 | Question: 52

If G is a graph with e edges and n vertices the sum of the degrees of all vertices in G is

- A. e
 B. $e/2$
 C. e^2
 D. $2e$

isro2009 graph-theory degree-of-graph

[Answer key](#)

10.2

Euler Graph (2)



10.2.1 Euler Graph: ISRO CSE 2007 | Question: 06

A graph with n vertices and $n - 1$ edges that is not a tree, is

- A. Connected B. Disconnected C. Euler D. A circuit

isro2007 graph-theory euler-graph

Answer key 



10.2.2 Euler Graph: ISRO CSE 2016 | Question: 5

A given connected graph G is a Euler Graph if and only if all vertices of G are of

- A. same degree
B. even degree
C. odd degree
D. different degree

graph-theory euler-graph isro2016

Answer key 



10.3

Graph Coloring (1)

10.3.1 Graph Coloring: ISRO CSE 2007 | Question: 07

If a graph requires k different colours for its proper colouring, then the chromatic number of the graph is

- A. 1 B. k C. $k - 1$ D. $k/2$

isro2007 graph-theory graph-coloring

Answer key 



10.4

Graph Connectivity (10)

10.4.1 Graph Connectivity: GATE CSE 1994 | Question: 1.6, ISRO2008-29

The number of distinct simple graphs with up to three nodes is

- A. 15 B. 10 C. 7 D. 9

gate1994 graph-theory graph-connectivity combinatorics normal isro2008 counting

Answer key 



10.4.2 Graph Connectivity: GATE CSE 2002 | Question: 1.25, ISRO2008-30, ISRO2016-6

The maximum number of edges in a n -node undirected graph without self loops is

- A. n^2 B. $\frac{n(n-1)}{2}$ C. $n - 1$ D. $\frac{(n+1)(n)}{2}$

gatcse-2002 graph-theory easy isro2008 isro2016 graph-connectivity

Answer key 



10.4.3 Graph Connectivity: GATE CSE 2003 | Question: 8, ISRO2009-53

Let G be an arbitrary graph with n nodes and k components. If a vertex is removed from G , the number of components in the resultant graph must necessarily lie down between

- A. k and n
C. $k - 1$ and $n - 1$
- B. $k - 1$ and $k + 1$
D. $k + 1$ and $n - k$

gatcse-2003 graph-theory graph-connectivity normal isro2009

[Answer key](#)

10.4.4 Graph Connectivity: ISRO CSE 2007 | Question: 62



Let X be the adjacency matrix of a graph G with no self loops. The entries along the principal diagonal of X are

- A. all zeros
- B. all ones
- C. both zeros and ones
- D. different

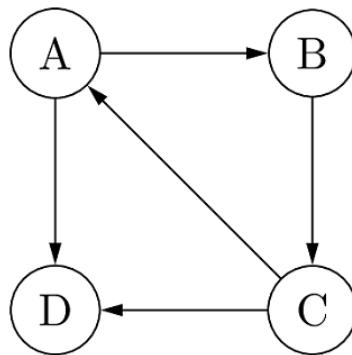
isro2007 graph-theory graph-connectivity

[Answer key](#)

10.4.5 Graph Connectivity: ISRO CSE 2008 | Question: 78



Consider the graph shown in the figure below:



Which of the following is a valid strong component?

- A. a, c, d
- B. a, b, d
- C. b, c, d
- D. a, b, c

isro2008 graph-theory graph-connectivity

[Answer key](#)

10.4.6 Graph Connectivity: ISRO CSE 2009 | Question: 54



A graph in which all nodes are of equal degree, is known as

- A. Multigraph
- B. Non regular graph
- C. Regular graph
- D. Complete graph

isro2009 graph-theory graph-connectivity

[Answer key](#)

10.4.7 Graph Connectivity: ISRO CSE 2009 | Question: 55



In a graph G there is one and only one path between every pair of vertices then G is a

- A. Path
- B. Walk
- C. Tree
- D. Circuit

isro2009 graph-theory graph-connectivity

[Answer key](#)

10.4.8 Graph Connectivity: ISRO CSE 2009 | Question: 56



A simple graph (a graph without parallel edge or loops) with n vertices and k components can have at most

- A. n edges
- B. $n - k$ edges

- C. $(n - k)(n - k + 1)$ edges D. $(n - k)(n - k + 1)/2$ edges

isro2009 graph-theory graph-connectivity

[Answer key](#)



10.4.9 Graph Connectivity: ISRO CSE 2011 | Question: 35

How many edges are there in a forest with v vertices and k components?

- A. $(v + 1) - k$ B. $(v + 1)/2 - k$
 C. $v - k$ D. $v + k$

isro2011 graph-theory graph-connectivity

[Answer key](#)



10.4.10 Graph Connectivity: ISRO CSE 2018 | Question: 38

The number of edges in a regular graph of degree: d and n vertices is:

- A. maximum of n and d
 B. $n + d$
 C. nd
 D. $nd/2$

isro2018 graph-theory graph-connectivity

[Answer key](#)

10.5

Qod Cse 23 (1)

10.5.1 Qod Cse 23: ISRO CSE 2023 | Question: 52



If there are five faces and nine vertices in an undirected planar graph, then number of edges is

- A. 14 B. 16 C. 12 D. None of the above

isro-cse-2023 graph-theory graph-planarity qod-cse qod-cse-23

[Answer key](#)



Answer Keys

10.0.1	A	10.0.2	A	10.0.3	D	10.1.1	D	10.2.1	B
10.2.2	B	10.3.1	B	10.4.1	C	10.4.2	B	10.4.3	C
10.4.4	A	10.4.5	D	10.4.6	C	10.4.7	C	10.4.8	D
10.4.9	C	10.4.10	D	10.5.1	C				



11.0.1 ISRO-DEC2017-6



The proposition $(P \Rightarrow Q) \wedge (Q \Rightarrow P)$ is a

- A. Tautology
- B. Contradiction
- C. Contingency
- D. Absurdity

isrodec2017 discrete-mathematics mathematical-logic easy

[Answer key](#)

11.1

First Order Logic (2)



11.1.1 First Order Logic: GATE CSE 2004 | Question: 23, ISRO2007-32

Identify the correct translation into logical notation of the following assertion.

Some boys in the class are taller than all the girls

Note: $\text{taller}(x, y)$ is true if x is taller than y .

- A. $(\exists x)(\text{boy}(x) \rightarrow (\forall y)(\text{girl}(y) \wedge \text{taller}(x, y)))$
- B. $(\exists x)(\text{boy}(x) \wedge (\forall y)(\text{girl}(y) \wedge \text{taller}(x, y)))$
- C. $(\exists x)(\text{boy}(x) \rightarrow (\forall y)(\text{girl}(y) \rightarrow \text{taller}(x, y)))$
- D. $(\exists x)(\text{boy}(x) \wedge (\forall y)(\text{girl}(y) \rightarrow \text{taller}(x, y)))$

gatecse-2004 mathematical-logic easy isro2007 first-order-logic

[Answer key](#)



11.1.2 First Order Logic: ISRO CSE 2020 | Question: 73

Given that

$B(a)$ means “ a is a bear”

$F(a)$ means “ a is a fish” and

$E(a, b)$ means “ a eats b ”

Then what is the best meaning of

$\forall x[F(x) \rightarrow \forall y(E(y, x) \rightarrow b(y))]$

- A. Every fish is eaten by some bear
- B. Bears eat only fish
- C. Every bear eats fish
- D. Only bears eat fish

isro-2020 mathematical-logic first-order-logic normal

[Answer key](#)

11.2

Propositional Logic (1)



11.2.1 Propositional Logic: ISRO CSE 2017 | Question: 22

Which one of the following Boolean expressions is NOT a tautology?

- A. $((a \rightarrow b) \wedge (b \rightarrow c)) \rightarrow (a \rightarrow c)$
- B. $(a \leftrightarrow c) \rightarrow (\sim b \rightarrow (a \wedge c))$
- C. $(a \wedge b \wedge c) \rightarrow (c \vee a)$

D. $a \rightarrow (b \rightarrow a)$

isro2017 mathematical-logic propositional-logic

Answer key 

Answer Keys

11.0.1

C

11.1.1

D

11.1.2

D

11.2.1

B



12.1

Abelian Group (1)



12.1.1 Abelian Group: ISRO CSE 2018 | Question: 17

$(G, *)$ is an abelian group. Then

- a. $x = x^{-1}$ for any x belonging to G
- b. $x = x^2$ for any x belonging to G
- c. $(x * y)^2 = x^2 * y^2$, for any x, y belonging to G
- d. G is of finite order

isro2018 group-theory set-theory&algebra abelian-group

Answer key

12.2

Equivalence Class (1)



12.2.1 Equivalence Class: ISRO CSE 2007 | Question: 29

The set of all Equivalence Classes of a set A of Cardinality C

- A. is of cardinality 2^C
- B. have the same cardinality as A
- C. forms a partition of A
- D. is of cardinality C^2

isro2007 set-theory&algebra equivalence-class

Answer key

12.3

Functions (2)



12.3.1 Functions: ISRO CSE 2014 | Question: 50

Let A be a finite set having x elements and let B be a finite set having y elements. What is the number of distinct functions mapping B into A .

- A. x^y
- B. $2^{(x+y)}$
- C. y^x
- D. $y!/(y-x)!$

isro2014 set-theory&algebra functions combinatorics

Answer key

12.3.2 Functions: ISRO-DEC2017-5



Let $f(x) = \log|x|$ and $g(x) = \sin x$. If A is the range of $f(g(x))$ and B is the range of $g(f(x))$ then $A \cap B$ is

- A. $[-1, 0]$
- B. $[-1, 0)$
- C. $[-\infty, 0]$
- D. $[-\infty, 1]$

isrodec2017 set-theory&algebra functions

Answer key

12.4

Group Theory (1)



12.4.1 Group Theory: ISRO CSE 2016 | Question: 4

If $(G, .)$ is a group such that $(ab)^{-1} = a^{-1}b^{-1}, \forall a, b \in G$, then G is a/an

- A. Commutative semi group
- B. Abelian group

C. Non-abelian group

D. None of these

set-theory&algebra group-theory isro2016

Answer key 

12.5

Injective (1)

12.5.1 Injective: ISRO-DEC2017-9



The function $f : [0, 3] \rightarrow [1, 29]$ defined by $f(x) = 2x^3 - 15x^2 + 36x + 1$ is

- A. injective and surjective
- B. surjective but not injective
- C. injective but not surjective
- D. neither injective nor surjective

isrodec2017 functions injective surjective

Answer key 

12.6

Relations (3)

12.6.1 Relations: ISRO CSE 2018 | Question: 56



The time complexity of computing the transitive closure of binary relation on a set of n elements is known to be

- a. $O(n)$
- b. $O(n * \log(n))$
- c. $O(n^{\frac{3}{2}})$
- d. $O(n^3)$

isro2018 set-theory&algebra relations time-complexity

Answer key 

12.6.2 Relations: ISRO-DEC2017-1



Suppose A is a finite set with n elements. The number of elements and the rank of the largest equivalence relation on A are

- A. $\{n, 1\}$
- B. $\{n, n\}$
- C. $\{n^2, 1\}$
- D. $\{1, n^2\}$

isrodec2017 set-theory relations

Answer key 

12.6.3 Relations: ISRO-DEC2017-2



Consider the set of integers I . Let D denote "divides with an integer quotient" (e.g. $4D8$ but not $4D7$). Then D is

- A. Reflexive, Not Symmetric, Transitive
- B. Not Reflexive, Not Anti-symmetric, Transitive
- C. Reflexive, Anti-symmetric, Transitive
- D. Not Reflexive, Not Anti-symmetric, Not Transitive

isrodec2017 set-theory&algebra relations

Answer key 

12.7

Set Theory (5)

12.7.1 Set Theory: ISRO CSE 2011 | Question: 27



Which one of the following is true?

- A. $R \cap S = (R \cup S) - [(R - S) \cup (S - R)]$

- B. $R \cup S = (R \cap S) - [(R - S) \cup (S - R)]$
 C. $R \cap S = (R \cup S) - [(R - S) \cap (S - R)]$
 D. $R \cap S = (R \cup S) \cup (R - S)$

isro2011 set-theory&algebra set-theory

Answer key

12.7.2 Set Theory: ISRO CSE 2017 | Question: 9



The symmetric difference of sets $A = \{1, 2, 3, 4, 5, 6, 7, 8\}$ and $B = \{1, 3, 5, 6, 7, 8, 9\}$ is:

- A. $\{1, 3, 5, 6, 7, 8\}$ B. $\{2, 4, 9\}$
C. $\{2, 4\}$ D. $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

isro2017 set-theory&algebra set-theory

Answer key

12.7.3 Set Theory: ISRO CSE 2020 | Question: 76



If $A = \{x, y, z\}$ and $B = \{u, v, w, x\}$, and the universe is $\{s, t, u, v, w, x, y, z\}$. Then $(A \cup \overline{B}) \cap (A \cap B)$ is equal to

- A. $\{u, v, w, x\}$
 - B. $\{\}$
 - C. $\{u, v, w, x, y, z\}$
 - D. $\{u, v, w\}$

isro-2020 discrete-mathematics set-theory&algebra set-theory easy

Answer key

12.7.4 Set Theory: ISRO-2013-74



The number of elements in the power set of the set $\{\{A, B\}, C\}$ is

- A. 7 B. 8 C. 3 D. 4

isro2013 set-theory&alqebra set-theory easy

Answer key

12.7.5 Set Theory: ISRO-DEC2017-8



The number of elements in the power set of $\{\{1,2\}, \{2,1,1\}, \{2,1,1,2\}\}$ is

- A. 3 B. 8 C. 4 D. 2

isrodec2017 set-theory combinatory

Answer key

Answer Keys

12.1.1	C	12.2.1	C	12.3.1	A	12.3.2	A	12.4.1	B
12.5.1	B	12.6.1	D	12.6.2	C	12.6.3	B	12.7.1	A
12.7.2	B	12.7.3	X	12.7.4	D	12.7.5	D		



13.0.1 ISRO CSE 2009 | Question: 49



$x = a \cos(t), y = b \sin(t)$ is the parametric form of

- A. Ellipse B. Hyperbola C. Circle D. Parabola

isro2009 calculus

Answer key

13.1

Differentiation (1)

13.1.1 Differentiation: ISRO CSE 2011 | Question: 59



n -th derivative of x^n is

- A. nx^{n-1} B. $n^n \cdot n!$ C. $nx^n!$ D. $n!$

isro2011 calculus differentiation

Answer key

13.2

Extreme Points (1)

13.2.1 Extreme Points: ISRO-DEC2017-4



If $x = -1$ and $x = 2$ are extreme points of $f(x) = \alpha \log|x| + \beta x^2 + x$ then

- A. $\alpha = -6, \beta = \frac{-1}{2}$ B. $\alpha = 2, \beta = \frac{-1}{2}$
 C. $\alpha = 2, \beta = \frac{1}{2}$ D. $\alpha = -6, \beta = \frac{1}{2}$

isrodec2017 calculus extreme-points

Answer key

13.3

Functions (1)

13.3.1 Functions: ISRO CSE 2018 | Question: 15



The domain of the function $\log(\log \sin(x))$ is:

- a. $0 < x < \pi$
 c. Empty set b. $2n\pi < x < (2n+1)\pi$, for n in N
 d. None of the above

isro2018 calculus functions

Answer key

13.4

Limits (1)

13.4.1 Limits: ISRO CSE 2016 | Question: 3



$\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{x}$ is given by

- A. 0 B. -1 C. 1 D. $\frac{1}{2}$

Answer key**13.5****Maxima Minima (2)****13.5.1 Maxima Minima: ISRO CSE 2009 | Question: 50**The value of x at which y is minimum for $y = x^2 - 3x + 1$ is

- A. $-3/2$ B. $3/2$ C. 0 D. $-5/4$

Answer key**13.5.2 Maxima Minima: ISRO-2013-49**What is the least value of the function $f(x) = 2x^2 - 8x - 3$ in the interval $[0, 5]$?

- A. -15 B. 7 C. -11 D. -3

Answer key**13.6****Vector Calculus (1)****13.6.1 Vector Calculus: ISRO CSE 2009 | Question: 45**

Which of the following statement is correct

- A. $\triangle(U_k V_k) = U_k \triangle V_k + V_k \triangle U_k$
 B. $\triangle(U_k V_k) = U_{k+1} \triangle V_k + V_{k+1} \triangle U_k$
 C. $\triangle(U_k V_k) = V_{k+1} \triangle U_k + U_k \triangle V_k$
 D. $\triangle(U_k V_k) = U_{k+1} \triangle V_k + V_k \triangle U_k$

Answer key**Answer Keys**

13.0.1	A	13.1.1	D	13.2.1	B	13.3.1	C	13.4.1	C
13.5.1	B	13.5.2	C	13.6.1	B				



14.1

Determinant (5)



14.1.1 Determinant: ISRO CSE 2008 | Question: 31

If the two matrices $\begin{bmatrix} 1 & 0 & x \\ 0 & x & 1 \\ 0 & 1 & x \end{bmatrix}$ and $\begin{bmatrix} x & 1 & 0 \\ x & 0 & 1 \\ 0 & x & 1 \end{bmatrix}$ have the same determinant, then the value of x is

- A. $\frac{1}{2}$ B. $\sqrt{2}$ C. $\pm\frac{1}{2}$ D. $\pm\frac{1}{\sqrt{2}}$

isro2008 linear-algebra matrix determinant

Answer key

14.1.2 Determinant: ISRO CSE 2009 | Question: 60



If two adjacent rows of a determinant are interchanged, the value of the determinant

- A. becomes zero
B. remains unaltered
C. becomes infinitive
D. becomes negative of its original value

isro2009 linear-algebra matrix determinant

Answer key

14.1.3 Determinant: ISRO CSE 2009 | Question: 61



If $\begin{vmatrix} 3 & 3 \\ x & 5 \end{vmatrix} = 3$ then the value of x is

- A. 2 B. 3 C. 4 D. 5

isro2009 linear-algebra matrix determinant

Answer key

14.1.4 Determinant: ISRO CSE 2009 | Question: 63



$$\begin{vmatrix} 265 & 240 & 219 \\ 240 & 225 & 198 \\ 219 & 198 & 181 \end{vmatrix} =$$

- A. 779 B. 679 C. 0 D. 256

isro2009 linear-algebra matrix determinant

Answer key

14.1.5 Determinant: ISRO CSE 2023 | Question: 30



Given P is a matrix = $\begin{pmatrix} 3 & 2 & 1 & 4 \\ 4 & 0 & 3 & 1 \\ 6 & 4 & 2 & 8 \\ 2 & 5 & 1 & 3 \end{pmatrix}$

If $\det |P|$ denotes the determinant of matrix P , then which of the following is true:

- A. $\det |P|$ is indeterminate
 C. $\det |P| = 0$
- B. $\det |P|$ is negative
 D. None of the above

isro-cse-2023 linear-algebra determinant matrix

[Answer key](#)

14.2

Eigen Value (2)



14.2.1 Eigen Value: ISRO CSE 2007 | Question: 09

Eigen vectors of $\begin{bmatrix} 1 & \cos\theta \\ \cos\theta & 1 \end{bmatrix}$ are

- A. $\begin{bmatrix} a^n & 1 \\ 0 & a^n \end{bmatrix}$
 B. $\begin{bmatrix} a^n & n \\ 0 & a^n \end{bmatrix}$
 C. $\begin{bmatrix} a^n & na^{n-1} \\ 0 & a^n \end{bmatrix}$
 D. $\begin{bmatrix} a^n & na^{n-1} \\ -n & a^n \end{bmatrix}$

isro2007 linear-algebra matrix eigen-value

[Answer key](#)



14.2.2 Eigen Value: ISRO-2013-33

What is the matrix transformation which takes the independent vectors $\begin{pmatrix} 1 \\ 2 \end{pmatrix}$ and $\begin{pmatrix} 2 \\ 5 \end{pmatrix}$ and transforms them to $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$ and $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$ respectively?

- A. $\begin{pmatrix} 1 & -1 \\ 1 & 0 \end{pmatrix}$
 C. $\begin{pmatrix} -1 & 0 \\ 1 & 1 \end{pmatrix}$
- B. $\begin{pmatrix} 0 & 0 \\ 0.5 & 0.5 \end{pmatrix}$
 D. $\begin{pmatrix} -1 & 1 \\ 1 & 0 \end{pmatrix}$

isro2013 linear-algebra eigen-value

[Answer key](#)

14.3

Matrix (6)



14.3.1 Matrix: ISRO CSE 2008 | Question: 34

If a square matrix A satisfies $A^T A = I$, then the matrix A is

- A. Idempotent B. Symmetric C. Orthogonal D. Hermitian

isro2008 linear-algebra matrix

[Answer key](#)

14.3.2 Matrix: ISRO CSE 2009 | Question: 59



A square matrix A is called orthogonal if $A'A =$

- A. I B. A C. $-A$ D. $-I$

isro2009 linear-algebra matrix

[Answer key](#)

14.3.3 Matrix: ISRO CSE 2009 | Question: 62



If A, B, C are any three matrices, then $A' + B' + C'$ is equal to

- A. a null matrix B. $A + B + C$ C. $(A + B + C)'$ D. $-(A + B + C)$

isro2009 linear-algebra matrix

[Answer key](#)

14.3.4 Matrix: ISRO CSE 2011 | Question: 36



If A and B are square matrices with same order and A is symmetric, then $B^T A B$ is

- A. Skew symmetric
B. Symmetric
C. Orthogonal
D. Idempotent

isro2011 linear-algebra matrix

[Answer key](#)

14.3.5 Matrix: ISRO CSE 2017 | Question: 1



If A is a skew symmetric matrix then A^t is

- A. Diagonal matrix B. A C. 0 D. $-A$

isro2017 linear-algebra matrix

[Answer key](#)

14.3.6 Matrix: ISRO-DEC2017-17



If C is a skew-symmetric matrix of order n and X is $n \times 1$ column matrix, then $X^T C X$ is a

- A. scalar matrix B. null matrix C. unit matrix D. matrix will all elements 1

isrodec2017 matrix linear-algebra

[Answer key](#)

14.4

Rank of Matrix (1)

14.4.1 Rank of Matrix: ISRO CSE 2014 | Question: 72



The rank of the matrix $A = \begin{pmatrix} 1 & 2 & 1 & -1 \\ 9 & 5 & 2 & 2 \\ 7 & 1 & 0 & 4 \end{pmatrix}$ is _____.

- A. 0 B. 1 C. 2 D. 3

Answer key**14.5****Vector Space (1)****14.5.1 Vector Space: ISRO-DEC2017-10**

If vectors $\vec{a} = 2\hat{i} + \lambda\hat{j} + \hat{k}$ and $\vec{b} = \hat{i} - 2\hat{j} + 3\hat{k}$ are perpendicular to each other, then value of λ is

A. $\frac{2}{5}$

B. 2

C. 3

D. $\frac{5}{2}$

Answer key**Answer Keys**

14.1.1	A
14.2.1	Q-Q
14.3.4	B

14.1.2	D
14.2.2	D
14.3.5	D

14.1.3	C
14.3.1	C
14.3.6	B

14.1.4	C
14.3.2	A
14.4.1	C

14.1.5	Q-Q
14.3.3	C
14.5.1	D



15.1

Arithmetic Mean (1)



15.1.1 Arithmetic Mean: ISRO CSE 2011 | Question: 67

The arithmetic mean of attendance of 49 students of class A is 40 and that of 53 students of class B is 35. Then the percentage of arithmetic mean of attendance of class A and B is

- A. 27.2% B. 50.25% C. 51.13% D. 37.4%

isro2011 probability arithmetic-mean

[Answer key](#)

15.2

Combinatory (1)



15.2.1 Combinatory: ISRO-DEC2017-3

A bag contains 19 red balls and 19 black balls. Two balls are removed at a time repeatedly and discarded if they are of the same colour, but if they are different, black ball is discarded and red ball is returned to the bag. The probability that this process will terminate with one red ball is

- A. 1 B. $\frac{1}{21}$ C. 0 D. 0.5

isrodec2017 probability combinatory

[Answer key](#)

15.3

Conditional Probability (3)



15.3.1 Conditional Probability: GATE CSE 1994 | Question: 1.4, ISRO2017-2

Let A and B be any two arbitrary events, then, which one of the following is TRUE?

- A. $P(A \cap B) = P(A)P(B)$ B. $P(A \cup B) = P(A) + P(B)$
 C. $P(A | B) = P(A \cap B)P(B)$ D. $P(A \cup B) \leq P(A) + P(B)$

gate1994 probability conditional-probability normal isro2017

[Answer key](#)

15.3.2 Conditional Probability: ISRO CSE 2007 | Question: 33



Company X shipped 5 computer chips, 1 of which was defective. and company Y shipped 4 computer chips, 2 of which were defective. One computer chip is to be chosen uniformly at a random from the 9 chips shipped by the companies. If the chosen chip is found to be defective, what is the probability that the chip came from the company Y?

- A. $2/9$ B. $4/9$ C. $2/3$ D. $1/2$

isro2007 probability conditional-probability

[Answer key](#)

15.3.3 Conditional Probability: ISRO-2013-71



Let $P(E)$ denote the probability of the occurrence of event E . If $P(A) = 0.5$ and $P(B) = 1$ then the values of $P(A|B)$ and $P(B|A)$ respectively are

- A. 0.5, 0.25 B. 0.25, 0.5 C. 0.5, 1 D. 1, 0.5

isro2013 probability conditional-probability easy

Answer key 

15.4

Mean Mode Median (1)

15.4.1 Mean Mode Median: ISRO CSE 2014 | Question: 74



What is the median of data if its mode is 15 and the mean is 30?

- A. 30 B. 25 C. 22.5 D. 27.5

probability statistics mean-mode-median isro2014

Answer key 

15.5

Normal Distribution (1)

15.5.1 Normal Distribution: ISRO CSE 2009 | Question: 65



If the mean of a normal frequency distribution of 1000 items is 25 and its standard deviation is 2.5, then its maximum ordinate is

- A. $\frac{1000}{\sqrt{2\pi}} e^{-25}$
B. $\frac{1000}{\sqrt{2\pi}}$
C. $\frac{1000}{\sqrt{2\pi}} e^{-2.5}$
D. $\frac{400}{\sqrt{2\pi}}$

isro2009 statistics normal-distribution

Answer key 

15.6

Poisson Distribution (1)

15.6.1 Poisson Distribution: ISRO CSE 2009 | Question: 66



If the pdf of a Poisson distribution is given by $f(x) = \frac{e^{-2} 2^x}{x!}$ then its mean is

- A. 2^x B. 2 C. -2 D. 1

isro2009 probability poisson-distribution

Answer key 

15.7

Probability (5)

15.7.1 Probability: ISRO 2016 Mech: Probability



A and B are two candidates appearing for an interview by a company. The probability that A is selected is 0.5 and the probability that both A and B are selected is at most 0.3. The probability of B getting selected is

- (a) 0.9
(b) <= 0.6
(c) <= 0.3
(d) 0.5

probability isromech2016 engineering-mathematics

[Answer key](#)



15.7.2 Probability: ISRO CSE 2011 | Question: 61

Three coins are tossed simultaneously. The probability that they will fall two heads and one tail is

- A. $\frac{5}{8}$ B. $\frac{1}{8}$ C. $\frac{2}{3}$ D. $\frac{3}{8}$

isro2011 probability

[Answer key](#)



15.7.3 Probability: ISRO CSE 2014 | Question: 37

The probability that two friends are born in the same month is ____ ?

- A. $\frac{1}{6}$ B. $\frac{1}{12}$ C. $\frac{1}{144}$ D. $\frac{1}{24}$

probability isro2014

[Answer key](#)



15.7.4 Probability: ISRO CSE 2018 | Question: 14

A class of 30 students occupy a classroom containing 5 rows of seats, with 8 seats in each row. If the students seat themselves at random, the probability that sixth seat in the fifth row will be empty is:

- a. $\frac{1}{5}$ b. $\frac{1}{3}$ c. $\frac{1}{4}$ d. $\frac{2}{5}$

isro2018 probability

[Answer key](#)



15.7.5 Probability: ISRO CSE 2023 | Question: 53

If a bag contains 6 blue balls, 5 white balls and 4 yellow balls and if a ball is drawn out at random, probability of not getting a white ball is

- A. $\frac{2}{3}$ B. $\frac{1}{3}$ C. $\frac{1}{5}$ D. None of the above

isro-cse-2023 probability

[Answer key](#)

15.8

Probability Density Function (1)



15.8.1 Probability Density Function: GATE CSE 2003 | Question: 60, ISRO2007-45

A program consists of two modules executed sequentially. Let $f_1(t)$ and $f_2(t)$ respectively denote the probability density functions of time taken to execute the two modules. The probability density function of the overall time taken to execute the program is given by

- A. $f_1(t) + f_2(t)$ B. $\int_0^t f_1(x)f_2(x)dx$
 C. $\int_0^t f_1(x)f_2(t-x)dx$ D. $\max\{f_1(t), f_2(t)\}$

gatecse-2003 probability normal isro2007 probability-density-function

[Answer key](#)

15.9

Random Variable (1)

15.9.1 Random Variable: GATE CSE 2005 | Question: 12, ISRO2009-64



Let $f(x)$ be the continuous probability density function of a random variable x , the probability that $a < x \leq b$, is :

- A. $f(b - a)$ B. $\int_a^b f(x)dx$
C. $\int_b^a f(x)dx$ D. $\int_a^b x f(x)dx$

gatecse-2005 probability random-variable easy isro2009

Answer key

15.10

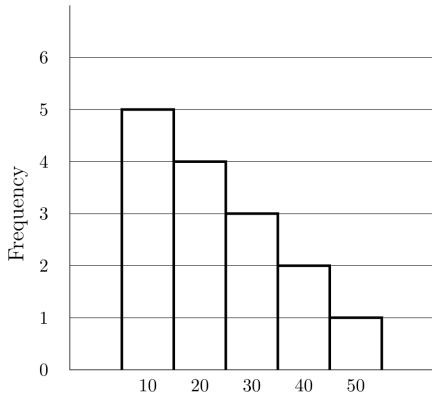
Standard Deviation (1)

15.10.1 Standard Deviation: ISRO CSE 2020 | Question: 56

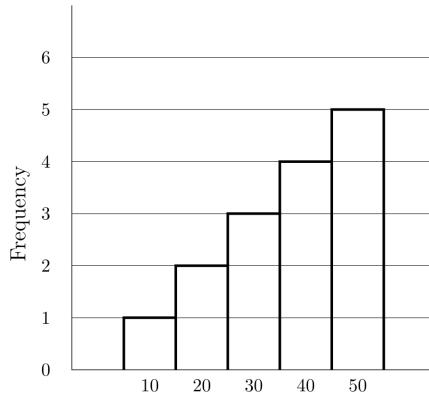


For the distributions given below:

Distribution A



Distribution B



Which of the following is correct for the above distributions?

- A. Standard deviation of A is significantly lower than standard deviation of B
 - B. Standard deviation of A is slightly lower than standard deviation of B
 - C. Standard deviation of A is same as standard deviation of B
 - D. Standard deviation of A is significantly higher than standard deviation of B

isro-2020 probability standard-deviation normal

Answer key

Answer Keys

15.1.1	D
15.4.1	B
15.7.3	B
15.10.1	C

15.2.1	A
15.5.1	D
15.7.4	C

15.3.1	D
15.6.1	B
15.7.5	Q-Q

15.3.2	C
15.7.1	B
15.8.1	C

15.3.3	C
15.7.2	D
15.9.1	C



16.0.1 ISRO CSE 2023 | Question: 94



Eight friends P, Q, R, S, T, V, W and Y are sitting around a square table.

1. Out of eight, four persons are sitting at the corners of the table and the other four are sitting at the mid. points of each side of the table.
2. Persons at the corners are facing the centre while the persons at the mid points of side are facing outside.
3. S is third to the right of P. P is facing the centre.
4. Y is not sitting beside P or S.
5. T is third to the right of R.
6. R is not sitting at the mid - point of any side of the table.
7. R is also not beside Y.
8. There is only one person between P and V.
9. Q is not sitting beside V .

How many people are there between T and Q ?

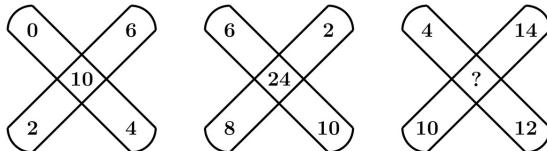
- A. 1 B. 2 C. 3 D. None

isro-cse-2023 analytical-aptitude

16.0.2 ISRO CSE 2023 | Question: 90



Which one will replace the question mark?



- A. 45 B. 8 C. 38 D. 48

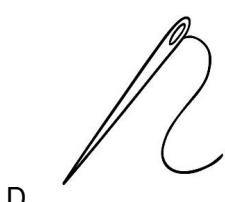
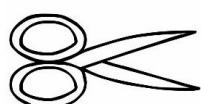
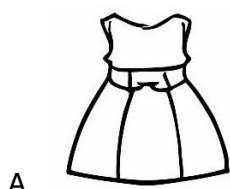
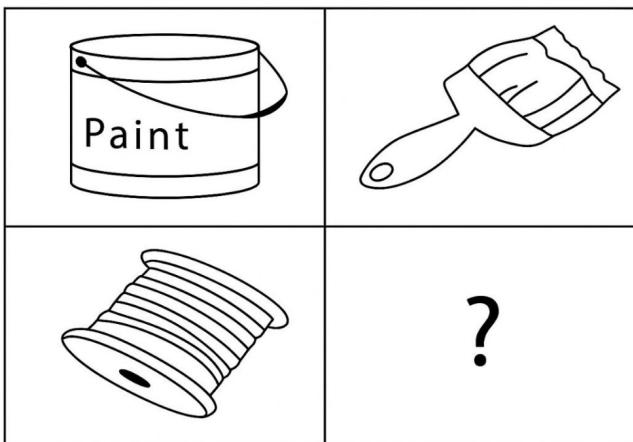
isro-cse-2023 analytical-aptitude

[Answer key](#)

16.0.3 ISRO CSE 2023 | Question: 89



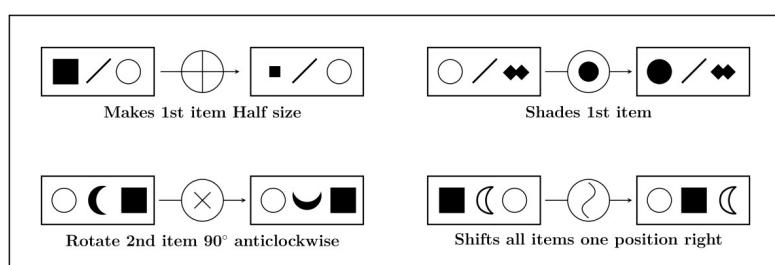
Which option replaces the question mark?

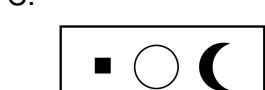
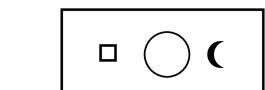
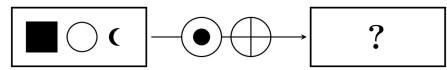


isro-cse-2023 analytical-aptitude

16.0.4 ISRO CSE 2023 | Question: 88

Which option replaces the question mark?





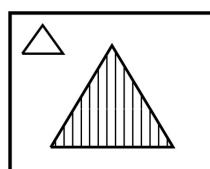
isro-cse-2023 analytical-aptitude

Answer key

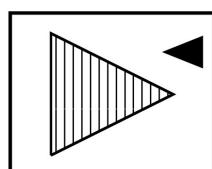
16.0.5 ISRO CSE 2023 | Question: 87



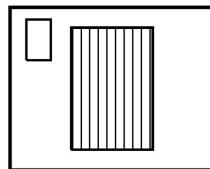
Which option replaces the question mark?



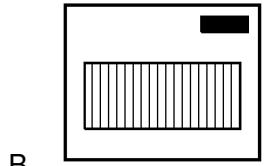
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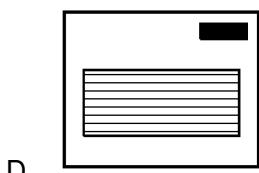
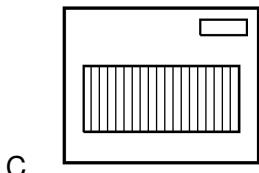


as



is to





isro-cse-2023 analytical-aptitude spatial-aptitude

Answer key

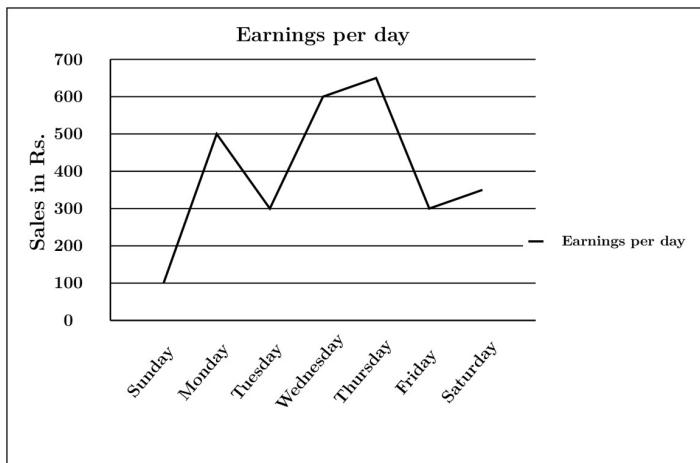
16.1

Data Interpretation (1)

16.1.1 Data Interpretation: ISRO CSE 2023 | Question: 83



Directions : The graph given below represents the variations in earnings in rupees over a week. Study the graph and answer questions given below



The difference in earnings was large between

- A. Sunday-Monday
- B. Tuesday-Wednesday
- C. Thursday-Friday
- D. None of these

isro-cse-2023 data-interpretation analytical-aptitude

Answer key

16.2

Logical Reasoning (1)

16.2.1 Logical Reasoning: ISRO CSE 2023 | Question: 81



Which of the following best completes the passage below?

In a survey of job applicants, two-fifths admitted to being at least a little dishonest. However, the survey may underestimate the proportion of job applicants who are dishonest, because _____.

- A. some dishonest people taking the survey might have claimed on the survey to be honest
- B. some generally honest people taking the survey might have claimed on the survey to be dishonest
- C. some people who claimed on the survey to be at least a little dishonest may be very dishonest
- D. some people who claimed on the survey to be dishonest may have been answering honestly

16.3

Number Series (1)

16.3.1 Number Series: ISRO CSE 2023 | Question: 82



Find out the wrong number in the series.

7, 8, 18, 57, 228, 1165, 6996

A. 7

B. 8

C. 6996

D. 228

[Answer key](#)

16.4

Sequence Series (1)

16.4.1 Sequence Series: ISRO CSE 2007 | Question: 61



The Fibonacci sequence is the sequence of integers

A. 1, 3, 5, 7, 9, 11, 13

C. 0, 1, 3, 4, 7, 11, 18, 29, 47

B. 0, 1, 1, 2, 3, 5, 8, 13, 21, 34

D. 0, 1, 3, 7, 15

[Answer key](#)

16.5

Statements Follow (1)

16.5.1 Statements Follow: ISRO CSE 2023 | Question: 93



Statement: Exporters in the capital are alleging that commercial banks are violating a Reserve Bank of India directive to operate a post-shipment export credit denominated in foreign currency at international rates from January this year.

Courses of Action:

- I. The officers concerned in the commercial banks are to be suspended.
- II. The RBI should be asked to stop giving such directives to commercial banks.

A. Only I follow

C. Either I or II follows

B. Only II follows

D. Neither I nor II follows

16.6

Verbal Reasoning (1)

16.6.1 Verbal Reasoning: ISRO CSE 2023 | Question: 92



Fact 1: Pictures can tell a story.

Fact 2: All storybooks have pictures.

Fact 3: Some storybooks have words.

If the first three statements are facts, which of the following statements must also be a fact?

- I. Pictures can tell a story better than words can.
 - II. The stories in storybooks are very simple.
 - III. Some storybooks have both words and pictures.

- A. I only
- C. III only

- B. II only
- D. None of the statements is a known fact

isro-cse-2023 logical-reasoning verbal-reasoning

Answer key

Answer Keys

16.0.1	A	16.0.2	C	16.0.3	D	16.0.4	B	16.0.5	B
16.1.1	Q-Q	16.2.1	Q-Q	16.3.1	Q-Q	16.4.1	B	16.5.1	Q-Q
16.6.1	Q-Q								



17.1

Geometry (1)



17.1.1 Geometry: ISRO-2013-72

How many diagonals can be drawn by joining the angular points of an octagon?

- A. 14 B. 20 C. 21 D. 28

isro2013 quantitative-aptitude geometry

Answer key

17.2

Inequality (1)



17.2.1 Inequality: ISRO CSE 2016 | Question: 1

Which of the following is true ?

- A. $\sqrt{3} + \sqrt{7} = \sqrt{10}$
 C. $\sqrt{3} + \sqrt{7} < \sqrt{10}$
 B. $\sqrt{3} + \sqrt{7} \leq \sqrt{10}$
 D. $\sqrt{3} + \sqrt{7} > \sqrt{10}$

quantitative-aptitude isro2016 inequality

Answer key

17.3

LCM HCF (1)



17.3.1 LCM HCF: ISRO CSE 2020 | Question: 55

If $x + 2y = 30$, then $\left(\frac{2y}{5} + \frac{x}{3}\right) + \left(\frac{x}{5} + \frac{2y}{3}\right)$ will be equal to

- A. 8 B. 16 C. 18 D. 20

isro-2020 quantitative-aptitude easy lcm-hcf

Answer key

17.4

Optimization (1)



17.4.1 Optimization: ISRO CSE 2023 | Question: 85

What is the maximum area of the rectangle with perimeter 620 mm ?

- A. 24,025 mm²
 C. 24,000 mm²
 B. 22,725 mm²
 D. 24,075 mm²

isro-cse-2023 optimization calculus

Answer key

17.5

Percentage (1)



17.5.1 Percentage: ISRO CSE 2023 | Question: 84

Study the following table carefully and answer the questions given below it:

Years	Toys	Toys	Toys	Toys	Toys
	A	B	C	D	E
1982	200	150	78	90	65
1983	150	180	100	105	70
1984	180	175	92	110	85
1985	195	160	120	125	75
1986	220	185	130	135	80

What was the percentage (approximate) increase in production of D type of toys from 1983 to 1985?

- A. 10 B. 20 C. 19 D. 76

isro-cse-2023 data-interpretation percentage analytical-aptitude

Answer key

17.6

Summation (1)

17.6.1 Summation: ISRO CSE 2016 | Question: 2



What is the sum to infinity of the series,

$$3 + 6x^2 + 9x^4 + 12x^6 + \dots \text{ given } |x| < 1$$

- A. $\frac{3}{(1+x^2)}$ B. $\frac{3}{(1+x^2)^2}$ C. $\frac{3}{(1-x^2)^2}$ D. $\frac{3}{(1-x^2)}$

quantitative-aptitude summation isro2016

Answer key

Answer Keys

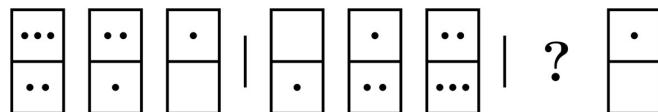
17.1.1	B	17.2.1	D	17.3.1	B	17.4.1	A	17.5.1	C
17.6.1	C								



18.0.1 ISRO CSE 2023 | Question: 95



Which option replaces the question mark



- A.
- B.
- C.
- D.

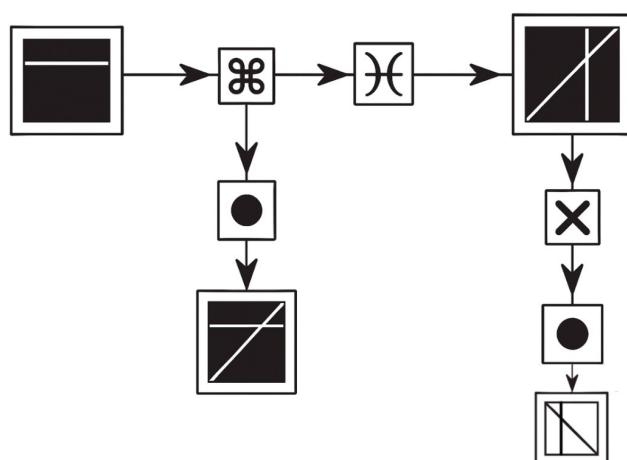
isro-cse-2023 analytical-aptitude

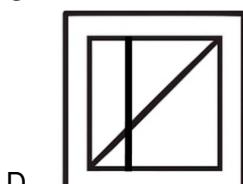
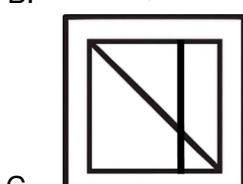
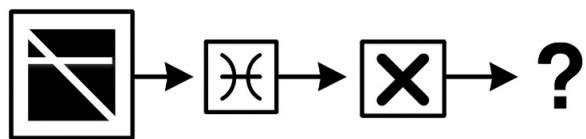
[Answer key](#)



18.0.2 ISRO CSE 2023 | Question: 91

Which option replaces the question mark?





isro-cse-2023 spatial-aptitude

[Answer key](#)

Answer Keys

18.0.1

A

18.0.2

C



19.1

General (1)



19.1.1 General: ISRO CSE 2023 | Question: 86

You are a retail clerk who typically works Monday through Friday. You arrive at work and notice the new schedule is posted, and your manager has given you a Saturday shift. It happens to be your son's birthday on Saturday, and you have a party planned. What is the most appropriate response?

- A. Speak with your manager and explain you have a birthday party planned for your son on Saturday and ask if they can find someone else or if you can find someone to cover your shift
- B. Ask your coworkers if they can cover your shift because you have a birthday party for your son planned
- C. Pretend like you did not see the schedule since you always work Monday through Friday and do not show up on Saturday
- D. Do not say anything to anyone, and plan on calling in sick on Saturday

isro-cse-2023 general logical-reasoning

Answer Keys

19.1.1

A

20.1

Big Data Systems (1)

20.1.1 Big Data Systems: ISRO CSE 2023 | Question: 14



Which of the following scenario may not be a good fit for HDFS in Big data paradigm?

- A. HDFS is not suitable for scenarios requiring multiple/simultaneous writes to the same file
- B. HDFS is suitable for storing data related to applications requiring low latency data access
- C. HDFS is suitable for storing data related to applications requiring high latency data access
- D. None of the above

isro-cse-2023 big-data-systems data-mining-and-warehousing databases

Answer key

Answer Keys

20.1.1

A

21.1

Cloud Computing (3)

21.1.1 Cloud Computing: ISRO CSE 2023 | Question: 36



The cloud infrastructure solely for a single organisation within its premises is

- A. public cloud
- B. private cloud
- C. common cloud
- D. hybrid cloud

isro-cse-2023 cloud-computing

Answer key

21.1.2 Cloud Computing: ISRO CSE 2023 | Question: 37



Temporarily renting the capacity to handle spikes in load is called

- A. Cloud sharing
- B. Cloud computing
- C. Cloud bursting
- D. Cloud loading

isro-cse-2023 non-gatecse cloud-computing

Answer key

21.1.3 Cloud Computing: ISRO-2013-78



Which of the following is not provided as a service in cloud computing?

- A. Infrastructure as a service
- B. Architecture as a service
- C. Software as a service
- D. Platform as a service

isro2013 cloud-computing non-gatecse

Answer key

Answer Keys

21.1.1

B

21.1.2

C

21.1.3

B

22.1

Computer Graphics (7)



22.1.1 Computer Graphics: ISRO CSE 2008 | Question: 2

The term Phong associated with

- A. Ray tracing
- B. shading
- C. Hiddenline removal
- D. a game

isro2008 computer-graphics non-gatecse

[Answer key](#)



22.1.2 Computer Graphics: ISRO CSE 2008 | Question: 74

A Steiner patch is

- A. Biquadratic Bezeir patch
- B. Bicubic patch
- C. Circular patch only
- D. Bilinear Bezier patch

isro2008 non-gatecse computer-graphics

[Answer key](#)



22.1.3 Computer Graphics: ISRO CSE 2011 | Question: 7

Which of the following is true about z -buffer algorithm?

- A. It is a depth sort algorithm
- B. No limitation on total number of objects
- C. Comparisons of objects is done
- D. z -buffer is initialized to background colour at start of algorithm

isro2011 non-gatecse computer-graphics

[Answer key](#)



22.1.4 Computer Graphics: ISRO CSE 2014 | Question: 34

How much memory is required to implement z -buffer algorithm for a $512 \times 512 \times 24$ bit-plane image?

- A. 768 KB
- B. 1 MB
- C. 1.5 MB
- D. 2 MB

non-gatecse computer-graphics isro2014

[Answer key](#)



22.1.5 Computer Graphics: ISRO CSE 2014 | Question: 48

A frame buffer array is addressed in row major order for a monitor with pixel locations starting from $(0,0)$ and ending with $(100,100)$. What is address of the pixel $(6,10)$? Assume one bit storage per pixel and starting pixel location is at 0.

- A. 1016
- B. 1006
- C. 610
- D. 616

isro2014 non-gatecse computer-graphics

[Answer key](#)

22.1.6 Computer Graphics: ISRO CSE 2018 | Question: 39



Perform window to viewport transformation for the point (20,15). Assume that (X_{wmin}, Y_{wmin}) is (0,0) ; (X_{wmax}, Y_{wmax}) is (100,100) ; (X_{vmin}, Y_{vmin}) is (5,5) ; (X_{vmax}, Y_{vmax}) is (20,20) . The value of x and y in the viewport is

- A. $x = 4, y = 4$
- B. $x = 3, y = 3$
- C. $x = 8, y = 7.25$
- D. $x = 3, y = 4$

isro2018 non-gatecse normal computer-graphics

Answer key

22.1.7 Computer Graphics: ISRO-2013-80



In graphics, the number of vanishing points depends on

- A. The number of axes cut by the projection plane
- B. The center of projection
- C. The number of axes which are parallel to the projection plane
- D. The perspective projections of any set of parallel lines that are not parallel to the projection plane

isro2013 computer-graphics non-gatecse

Answer key

22.2

Shading (1)



22.2.1 Shading: ISRO-2013-31

In which of the following shading models of polygons, the interpolation of intensity values is done along the scan line?

- A. Gouraud shading
- B. Phong shading
- C. Constant shading
- D. Flat shading

isro2013 shading non-gatecse

Answer key

22.3

Unix (1)



22.3.1 Unix: ISRO CSE 2011 | Question: 57

Which of the following UNIX command allows scheduling a program to be executed at the specified time?

- A. cron
- B. nice
- C. date and time
- D. schedule

isro2011 unix non-gatecse

Answer key

Answer Keys

22.1.1	B	22.1.2	A	22.1.3	D	22.1.4	A	22.1.5	A
22.1.6	C	22.1.7	D	22.2.1	A	22.3.1	A		

23.1

Computer Peripherals (5)

23.1.1 Computer Peripherals: ISRO CSE 2008 | Question: 44



The device which is used to connect a peripheral to bus is known as

- A. control register
- B. interface
- C. communication protocol
- D. none of these

isro2008 non-gatecse computer-peripherals

[Answer key](#)

23.1.2 Computer Peripherals: ISRO CSE 2011 | Question: 22



A system is having 8 M bytes of video memory for bit-mapped graphics with 64-bit colour. What is the maximum resolution it can support?

- A. 800×600
- B. 1024×768
- C. 1280×1024
- D. 1920×1440

isro2011 computer-peripherals

[Answer key](#)

23.1.3 Computer Peripherals: ISRO CSE 2011 | Question: 23



What is the meaning of \overline{RD} signal in Intel 8151A?

- A. Read (when it is low)
- B. Read (when it is high)
- C. Write (when it is low)
- D. Read and Write (when it is high)

isro2011 non-gatecse computer-peripherals

[Answer key](#)

23.1.4 Computer Peripherals: ISRO CSE 2011 | Question: 9



What is the raw throughput of USB 2.0 technology?

- A. 480 Mbps
- B. 400 Mbps
- C. 200 Mbps
- D. 12 Mbps

isro2011 non-gatecse computer-peripherals

[Answer key](#)

23.1.5 Computer Peripherals: ISRO CSE 2017 | Question: 46



SATA is the abbreviation of

- A. Serial Advanced Technology Attachment
- B. Serial Advanced Technology Architecture
- C. Serial Advanced Technology Adapter
- D. Serial Advanced Technology Array

isro2017 computer-peripherals non-gatecse

[Answer key](#)

23.2

ieee1394 (1)

23.2.1 ieee1394: ISRO-2013-20



IEEE 1394 is related to

- A. RS – 232
- B. USB
- C. Firewire
- D. PCI

Answer key 

Answer Keys

23.1.1	B	23.1.2	B	23.1.3	A	23.1.4	A	23.1.5	A
23.2.1	C								

24.1

Digital Image Processing (3)

24.1.1 Digital Image Processing: ISRO CSE 2014 | Question: 7



What does a pixel mask mean?

- A. string containing only 1's
- C. string containing two 0's
- B. string containing only 0's
- D. string containing 1's and 0's

non-gatecse digital-image-processing isro2014

Answer key

24.1.2 Digital Image Processing: ISRO-2013-10



If the frame buffer has 8 bits per pixel and 8 bits are allocated for each of the R, G, B components, what would be the size of the lookup table?

- A. 24 bytes
- B. 1024 bytes
- C. 768 bytes
- D. 256 bytes

isro2013 digital-image-processing

Answer key

24.1.3 Digital Image Processing: ISRO2015-65



Which of the following is not an image type used in MPEG?

- A. A frame
- B. B frame
- C. D frame
- D. P frame

isro2015 digital-image-processing non-gatecse

Answer key

24.2

Image Compression (1)

24.2.1 Image Compression: ISRO2015-63



Which of the following compression algorithms is used to generate a .png file?

- A. LZ78
- B. Deflate
- C. LZW
- D. Huffman

isro2015 digital-image-processing image-compression non-gatecse

Answer key

Answer Keys

24.1.1

D

24.1.2

C

24.1.3

A

24.2.1

B

25.1

Semiconductor (1)

25.1.1 Semiconductor: ISRO CSE 2011 | Question: 64



When n-type semiconductor is heated?

- A. number of electrons increases while that of holes decreases
- B. number of holes increases while that of electrons decreases
- C. number of electrons and holes remain the same
- D. number of electron and holes increases equally

isro2011 semiconductor non-gatecse

Answer key

Answer Keys

25.1.1

B

26.1

Distributed Computing (1)

26.1.1 Distributed Computing: ISRO CSE 2014 | Question: 80



A computing architecture, which allows the user to use computers from multiple administrative domains to reach a common goal is called as

- A. Grid Computing
- B. Neutral Networks
- C. Parallel Processing
- D. Cluster Computing

isro2014 non-gatecse distributed-computing

Answer key

Answer Keys

26.1.1

A

27.1

Circle (1)

27.1.1 Circle: ISRO CSE 2014 | Question: 9



Let R be the radius of the circle. What is the angle subtended by an arc of length R at the center of the circle?

- A. 1 degree
- B. 1 radian
- C. 90 degrees
- D. π radians

isro2014 circle geometry

[Answer key](#)

27.2

Geometry (3)

27.2.1 Geometry: ISRO CSE 2011 | Question: 76



What is the matrix that represents rotation of an object by θ^0 about the origin in 2D?

- A.

$$\begin{matrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{matrix}$$
- B.

$$\begin{matrix} \sin\theta & -\cos\theta \\ \cos\theta & \sin\theta \end{matrix}$$
- C.

$$\begin{matrix} \cos\theta & -\sin\theta \\ \cos\theta & \sin\theta \end{matrix}$$
- D.

$$\begin{matrix} \sin\theta & -\cos\theta \\ \cos\theta & \sin\theta \end{matrix}$$

isro2011 geometry

[Answer key](#)

27.2.2 Geometry: ISRO CSE 2014 | Question: 54



The conic section that is obtained when a right circular cone is cut through a plane that is parallel to the side of the cone is called _____

- A. parabola
- B. hyperola
- C. circle
- D. ellipse

isro2014 non-gatecse geometry

[Answer key](#)

27.2.3 Geometry: ISRO CSE 2014 | Question: 65



A cube of side 1 unit is placed in such a way that the origin coincides with one of its top vertices and the three axes along three of its edges. What are the co-ordinates of the vertex which is diagonally opposite to the vertex whose co-ordinates are $(1, 0, 1)$?

- A. $(0, 0, 0)$
- B. $(0, -1, 0)$
- C. $(0, 1, 0)$
- D. $(1, 1, 1)$

isro2014 geometry non-gatecse

[Answer key](#)

Answer Keys

27.1.1

B

27.2.1

A

27.2.2

A

27.2.3

B

28.1

Integrated Circuits (4)

28.1.1 Integrated Circuits: ISRO CSE 2007 | Question: 35



The output 0 and 1 level for TTL Logic family is approximately

- A. 0.1 and 5 V
- B. 0.6 and 3.5 V
- C. 0.9 and 1.75 V
- D. -1.75 and 0.9 V

isro2007 digital-logic integrated-circuits non-gatecse

[Answer key](#)

28.1.2 Integrated Circuits: ISRO CSE 2008 | Question: 21



The advantage of MOS devices over bipolar devices is that

- A. it allows higher bit densities and also cost effective
- B. it is easy to fabricate
- C. it is higher-impedance and operational speed
- D. all of these

isro2008 non-gatecse integrated-circuits

[Answer key](#)

28.1.3 Integrated Circuits: ISRO CSE 2011 | Question: 80



Logic family popular for low power dissipation

- A. CMOS
- B. ECL
- C. TTL
- D. DTL

isro2011 non-gatecse integrated-circuits

[Answer key](#)

28.1.4 Integrated Circuits: ISRO CSE 2014 | Question: 46



If the maximum output voltage of a DAC is V volts and if the resolution is R bits then the weight of the most significant bit is _____

- A. $V/(2^R - 1)$
- B. $(2^{R-1}).V/(2^R - 1)$
- C. $(2^{R-1}).V$
- D. $V/(2^{R-1})$

isro2014 non-gatecse integrated-circuits

[Answer key](#)

Answer Keys

28.1.1

B

28.1.2

D

28.1.3

A

28.1.4

B

29.1

Cmm Model (1)

29.1.1 Cmm Model: ISRO CSE 2017 | Question: 47



Capability maturity Model (CMM) is the methodology to

- A. develop and refine an organization's software development process
- B. develop the software
- C. test the software
- D. All of the above

isro2017 is&software-engineering non-gatecse cmm-model

[Answer key](#)

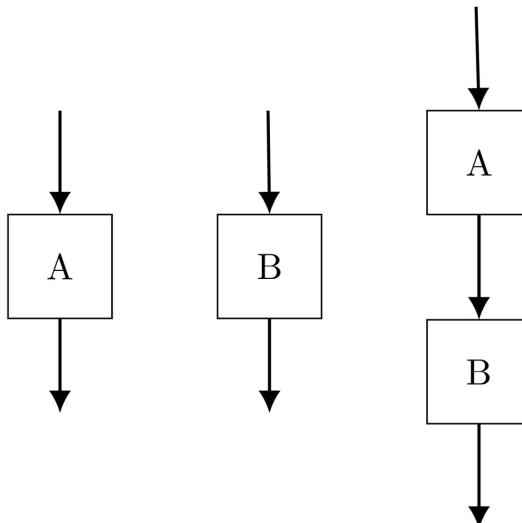
29.2

Cyclomatic Complexity (6)

29.2.1 Cyclomatic Complexity: GATE CSE 2010 | Question: 21,ISRO2017-60



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?



A. 19

B. 21

C. 20

D. 10

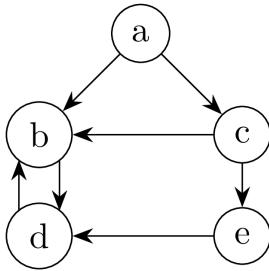
gatecse-2010 is&software-engineering cyclomatic-complexity easy isro2017

[Answer key](#)

29.2.2 Cyclomatic Complexity: ISRO CSE 2011 | Question: 65



The Cyclomatic Complexity metric $V(G)$ of the following control flow graph



- A. 3 B. 4 C. 5 D. 6

isro2011 is&software-engineering cyclomatic-complexity

[Answer key](#)



29.2.3 Cyclomatic Complexity: ISRO CSE 2014 | Question: 4

Consider the following pseudo- code

```
while (m<n)
  if (x>y ) and (a<b) then
    a=a+1
    y=y-1
  end if
m=m+1 end while
```

What is cyclomatic complexity of the above pseudo -code?

- A. 2 B. 3 C. 4 D. 5

isro2014 is&software-engineering cyclomatic-complexity non-gatecse

[Answer key](#)



29.2.4 Cyclomatic Complexity: ISRO CSE 2020 | Question: 69

Consider the following pseudo-code

```
I=0; J=0; K=8;
while(I<K-1) //while-1
{
  J=J+1;
  while(J<K) //while-2
  {
    if(x[I]<x[J])
    {
      temp = x[I];
      x[I]=x[J];
      x[J]=temp;
    }
  } // end of while-2
  I=I+1;
} // end of while-1
```

The cyclomatic complexity of the above is

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

isro-2020 is&software-engineering cyclomatic-complexity normal

[Answer key](#)

29.2.5 Cyclomatic Complexity: ISRO CSE 2023 | Question: 61



McCabe's cyclomatic complexity number of a program control graph 'G' with e edges, n nodes and p disconnected paths is defined as

- A. $n - e + 2p$
- B. $e - n + 2 + p$
- C. $e - n + 2p$
- D. $n - e + p$

isro-cse-2023 is&software-engineering non-gatecse cyclomatic-complexity

[Answer key](#)

29.2.6 Cyclomatic Complexity: ISRO-2013-66



What is the cyclomatic complexity of a module which has seventeen edges and thirteen nodes?

- A. 4
- B. 5
- C. 6
- D. 7

isro2013 is&software-engineering cyclomatic-complexity non-gatecse

[Answer key](#)

29.3

Is&Software Engineering (23)



29.3.1 Is&Software Engineering: ISRO 2017-39

Estimation at software development effort for organic software in basic COCOMO is:

- A. $E = 2.0 \text{ (KLOC)}^{1.05} \text{ PM}$
- B. $E = 3.4 \text{ (KLOC)}^{1.06} \text{ PM}$
- C. $E = 2.4 \text{ (KLOC)}^{1.05} \text{ PM}$
- D. $E = 2.4 \text{ (KLOC)}^{1.07} \text{ PM}$

isro2017 is&software-engineering non-gatecse

[Answer key](#)

29.3.2 Is&Software Engineering: ISRO CSE 2007 | Question: 28



The level of aggregation of information required for operational control is

- A. Detailed
- B. Aggregate
- C. Qualitative
- D. None of the above

isro2007 non-gatecse is&software-engineering

[Answer key](#)

29.3.3 Is&Software Engineering: ISRO CSE 2007 | Question: 76



Which of the following is not an approach to Software Process Assessment?

- A. SPICE(ISO/IEC15504)
- B. Standard CMMI Assessment Method for process improvement
- C. ISO 9001:2000
- D. IEEE 2000:2001

isro2007 is&software-engineering

[Answer key](#)

29.3.4 Is&Software Engineering: ISRO CSE 2007 | Question: 77



A physical DFD specifies

- A. what processes will be used
- B. who generates data and who processes it
- C. what each person in an organization does
- D. which data will be generated

isro2007 is&software-engineering

[Answer key](#)

29.3.5 Is&software Engineering: ISRO CSE 2011 | Question: 17



A context model of a software system can be shown by drawing a

- A. LEVEL-0 DFD
- B. LEVEL-1 DFD
- C. LEVEL-2 DFD
- D. LEVEL-3 DFD

isro2011 is&software-engineering

[Answer key](#)

29.3.6 Is&software Engineering: ISRO CSE 2011 | Question: 51



Warnier Diagram enables the analyst to represent

- A. Class structure
- B. Information Hierarchy
- C. Data Flow
- D. State Transition

isro2011 is&software-engineering non-gatecse

[Answer key](#)

29.3.7 Is&software Engineering: ISRO CSE 2014 | Question: 20



Which of the following is not a maturity level as per Capability Maturity Model?

- A. Initial
- B. Measurable
- C. Repeatable
- D. Optimized

is&software-engineering non-gatecse isro2014

[Answer key](#)

29.3.8 Is&software Engineering: ISRO CSE 2014 | Question: 69



For a software project, the spiral model was employed. When will the spiral stop?

- A. When the software product is retired
- B. When the software product is released after Beta testing
- C. When the risk analysis is completed
- D. After completing five loops

isro2014 is&software-engineering non-gatecse

[Answer key](#)

29.3.9 Is&software Engineering: ISRO CSE 2016 | Question: 61



The extent to which the s/w can continue to operate correctly despite the introduction of invalid inputs is called as

- A. Reliability
- B. Robustness
- C. Fault tolerance
- D. Portability

is&software-engineering isro2016

[Answer key](#)

29.3.10 Is&software Engineering: ISRO CSE 2016 | Question: 62



Which one of the following is a functional requirement ?

- A. Maintainability
- B. Portability
- C. Robustness
- D. None of the mentioned

is&software-engineering isro2016

[Answer key](#)

29.3.11 Is&software Engineering: ISRO CSE 2016 | Question: 63



Configuration management is not concerned with

- A. controlling changes to the source code
- B. choice of hardware configuration for an application
- C. controlllling documentation changes
- D. maintaining versions of software

non-gatecse is&software-engineering isro2016

[Answer key](#)

29.3.12 Is&software Engineering: ISRO CSE 2016 | Question: 65



A company needs to develop a digital signal processing software for one of its newest inventions. The software is expected to have 20000 lines of code. The company needs to determine the effort in person-months needed to develop this software using the basic COCOMO model. The multiplicative factor for this model is given as 2.2 for the software development on embedded systems, while the exponentiation factor is given as 1.5. What is the estimated effort in person-months?

- A. 196.77
- B. 206.56
- C. 199.56
- D. 210.68

non-gatecse is&software-engineering isro2016

[Answer key](#)

29.3.13 Is&software Engineering: ISRO CSE 2017 | Question: 58



Which of the following is not a life cycle model?

- A. Spiral model
- B. Prototyping model
- C. Waterfall model
- D. Capability maturity model

isro2017 is&software-engineering non-gatecse

[Answer key](#)

29.3.14 Is&software Engineering: ISRO CSE 2017 | Question: 61



In software maintenance tackling the changes in the hardware or software environment where the software works, is

- A. Corrective maintenance
- B. Perfective maintenance
- C. Adaptive maintenance
- D. Preventive maintenance

isro2017 is&software-engineering non-gatecse

[Answer key](#)

29.3.15 Is&software Engineering: ISRO CSE 2017 | Question: 65



Which product metric gives the measure of the average length of words and sentence in documents?

- A. SCI number
- B. Cyclomatic complexity
- C. LOC
- D. Fog index

isro2017 is&software-engineering non-gatecse

[Answer key](#)

29.3.16 Is&software Engineering: ISRO CSE 2018 | Question: 47



In a particular program, it is found that 1% of the code account for 50% of the execution time. To code a program in C++, it takes 100 man-days. Coding in assembly language is 10 times harder than coding in C++, but runs 5 times faster. Converting an existing C++ program into an assembly language program is 4 times faster.

To completely write the program in C++ and rewrite the 1% code in assembly language, if a project team needs 13 days, the team consist of

- a. 13 programmers
- b. 10 programmers
- c. 8 programmers
- d. $100/13$ programmers

isro2018 is&software-engineering

[Answer key](#)

29.3.17 Is&software Engineering: ISRO CSE 2018 | Question: 59



The lower degree of cohesion is kind of:

- a. Logical Cohesion
- b. Coincidental Cohesion
- c. Procedural Cohesion
- d. Communicational Cohesion

isro2018 is&software-engineering

[Answer key](#)

29.3.18 Is&software Engineering: ISRO CSE 2018 | Question: 76



Cloaking is a search engine optimization (*SEO*) technique. During cloaking:

- a. Content presented to search engine spider is different from that presented to user's browser
- b. Content present to search engine spider and browser is same
- c. Contents of user's requested website are changed
- d. None of the above

isro2018 is&software-engineering

[Answer key](#)

29.3.19 Is&software Engineering: ISRO CSE 2020 | Question: 64



Regression testing is primarily related to

- A. Functional testing
- B. Development testing
- C. Data flow testing
- D. Maintenance testing

isro-2020 is&software-engineering normal

[Answer key](#)

29.3.20 Is&software Engineering: ISRO CSE 2020 | Question: 67



What is the availability of the software with the following reliability figures

Mean Time Between Failures (MTBF) is 20 days

Mean Time To Repair (MTTR) is 20 hours

- A. 90%
- B. 96%
- C. 24%
- D. 50%

isro-2020 is&software-engineering normal

[Answer key](#)

29.3.21 Is&software Engineering: ISRO CSE 2020 | Question: 68



What is the defect rate for Six sigma?

- A. 1.0 defect per million lines of code
- C. 3.0 defects per million lines of code
- B. 1.4 defects per million lines of code
- D. 3.4 defects per million lines of code

isro-2020 is&software-engineering normal

Answer key

29.3.22 Is&software Engineering: ISRO CSE 2020 | Question: 70



In a class definition with 10 methods, to make the class maximally cohesive, number of direct and indirect connections required among the methods are

- A. 90,0
- B. 45,0
- C. 10,10
- D. 45,45

isro-2020 is&software-engineering normal

Answer key

29.3.23 Is&software Engineering: ISRO CSE 2023 | Question: 60



HIPo chart is also known as

- A. UML diagram
- B. Structure chart
- C. DFD
- D. None of the above

isro-cse-2023 is&software-engineering

Answer key

29.4

Out of Gatecse Syllabus (1)



29.4.1 Out of Gatecse Syllabus: GATE CSE 2014 Set 3 | Question: 19, ISRO2017-78

In the context of modular software design, which one of the following combinations is desirable?

- A. High cohesion and high coupling
- C. Low cohesion and high coupling
- B. High cohesion and low coupling
- D. Low cohesion and low coupling

gatecse-2014-set3 is&software-engineering easy isro2017 out-of-gatecse-syllabus

Answer key

29.5

Project Cost (1)



29.5.1 Project Cost: GATE CSE 2011 | Question: 5, ISRO2016-64

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 lines of code (LOC) developed using L2 is estimated to be twice of 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	₹ 10, 00, 000	₹ 7, 50, 000
Maintenance Time	5 years	5 years

Cost of maintenance per year	₹ 1,00,000	₹ 50,000
------------------------------	------------	----------

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?

- A. 4000 B. 5000 C. 4333 D. 4667

gatecse-2011 is&software-engineering project-cost normal isro2016

[Answer key](#)

29.6

Software Coupling (1)



29.6.1 Software Coupling: ISRO-2013-67

Which of the following types of coupling has the weakest coupling?

- A. Pathological coupling B. Control coupling
C. Data coupling D. Message coupling

isro2013 is&software-engineering software-coupling non-gatecse

[Answer key](#)

29.7

Software Metrics (1)



29.7.1 Software Metrics: ISRO CSE 2018 | Question: 58

The Functions Point (FP) metric is

- A. Calculated from user requirement B. Calculated from lines of code
C. Calculated from software complexity assessment D. None of the above

isro2018 software-metrics is&software-engineering non-gatecse

[Answer key](#)

29.8

Software Productivity (1)



29.8.1 Software Productivity: ISRO2015-60

If in a software project the number of user input, user output, enquiries, files and external interfaces are (15, 50, 24, 12, 8), respectively, with complexity average weighing factor. The productivity if effort = 70 percent-month is

- A. 110.54 B. 408.74 C. 304.78 D. 220.14

isro2015 is&software-engineering software-productivity non-gatecse

[Answer key](#)

29.9

Software Reliability (1)



29.9.1 Software Reliability: ISRO CSE 2007 | Question: 79

Which of the following models used for software reliability

- A. Waterfall B. Musa C. COCOMO D. Rayleigh

isro2007 is&software-engineering software-reliability

[Answer key](#)

29.10

Software Testing (12)

29.10.1 Software Testing: ISRO CSE 2007 | Question: 67



To execute all loops at their boundaries and within their operational bounds is an example of

- A. Black Box Testing
- B. Alpha Testing
- C. Recovery Testing
- D. White Box Testing

isro2007 is&software-engineering software-testing

[Answer key](#)

29.10.2 Software Testing: ISRO CSE 2009 | Question: 67



Activities which ensure that the software that has been built, is traceable to customer requirement is covered as part of

- A. Verification
- B. Validation
- C. Maintenance
- D. Modeling

isro2009 is&software-engineering software-testing

[Answer key](#)

29.10.3 Software Testing: ISRO CSE 2009 | Question: 68



A testing method which is normally used as the acceptance test for a software system, is

- A. Regression Testing
- B. Integration Testing
- C. Unit Testing
- D. System Testing

isro2009 is&software-engineering software-testing

[Answer key](#)

29.10.4 Software Testing: ISRO CSE 2011 | Question: 34



Black Box Software Testing method focuses on the

- A. Boundary condition of the software
- B. Control structure of the software
- C. Functional requirement of the software
- D. Independent paths of the software

isro2011 non-gatecse software-testing is&software-engineering

[Answer key](#)

29.10.5 Software Testing: ISRO CSE 2014 | Question: 23



The test suite (set of test input) used to perform unit testing on a module could cover 70% of the code. What is the reliability of the module if the probability of success is 0.95 during testing?

- A. 0.665 to 0.95
- B. At the most 0.665
- C. At the most 0.95
- D. At least 0.665

isro2014 is&software-engineering software-testing

[Answer key](#)

29.10.6 Software Testing: ISRO CSE 2018 | Question: 48



In unit testing of a module, it is found that for a set of test data, at the maximum 90% of the code alone were tested with the probability of success 0.9. The reliability of module is

- a. Greater than 0.9
- b. Equal to 0.9
- c. At most 0.81
- d. At least 0.81

isro2018 is&software-engineering software-testing

[Answer key](#)

29.10.7 Software Testing: ISRO CSE 2023 | Question: 39



The MCDC software testing technique stands for

- A. Multiple Conditions Decision Coverage
- C. Modified Condition Decision Coverage
- B. Multiple coverage Decision conditions
- D. None of the above

isro-cse-2023 non-gatecse software-testing

[Answer key](#)

29.10.8 Software Testing: ISRO CSE 2023 | Question: 40



Regression testing focuses on validating

- A. module structure
- C. software changes
- B. module interfaces
- D. None of the above

isro-cse-2023 is&software-engineering software-testing

[Answer key](#)

29.10.9 Software Testing: ISRO-2013-68



Which of the following testing methods uses fault simulation technique?

- A. Unit testing
- C. Stress testing
- B. Beta testing
- D. Mutation testing

isro2013 is&software-engineering software-testing non-gatecse

[Answer key](#)

29.10.10 Software Testing: ISRO-2013-69, UGCNET-Dec2012-III: 62



If a program P calls two subprograms P_1 and P_2 and P_1 can fail 50% of the time and P_2 can fail 40% of the time, what is the failure rate of program P ?

- A. 50%
- B. 60%
- C. 70%
- D. 10%

isro2013 is&software-engineering software-testing non-gatecse ugcnetcse-dec2012-paper3

[Answer key](#)

29.10.11 Software Testing: ISRO-DEC2017-77



Consider the following :

A. Condition Coverage	p. Black box testing
B. Equivalence Class partitioning	q. System testing
C. Volume Testing	r. White box testing
D. Beta Testing	s. Performance testing

Matching A, B, C, D in the same order gives,

- A. r,p,s,q
- B. p,r,q,s
- C. s,r,q,p
- D. q,r,s,p

isrodec2017 software-testing is&software-engineering

[Answer key](#)

29.10.12 Software Testing: ISRO2015-59



Alpha and Beta testing are forms of

- A. Acceptance testing
- B. Integration testing
- C. System testing
- D. Unit testing

isro2015 is&software-engineering software-testing

[Answer key](#)

29.11

Spiral Model (1)

29.11.1 Spiral Model: GATE IT 2007 | Question: 4, ISRO2016-66



In the Spiral model of software development, the primary determinant in selecting activities in each iteration is

- A. Iteration size
- B. Cost
- C. Adopted process such as Rational Unified Process or Extreme Programming
- D. Risk

gateit-2007 is&software-engineering spiral-model normal isro2016

[Answer key](#)

29.12

Uml (3)

29.12.1 Uml: ISRO CSE 2007 | Question: 65



Which of the following is not a UML DIAGRAM?

- A. Use Case
- B. Class Diagram
- C. Analysis Diagram
- D. Swimlane Diagram

isro2007 is&software-engineering uml

[Answer key](#)

29.12.2 Uml: ISRO CSE 2007 | Question: 78



In UML diagram of a class

- A. state of object cannot be represented
- B. state is irrelevant
- C. state is represented as an attribute
- D. state is represented as a result of an operation

isro2007 is&software-engineering uml

[Answer key](#)

29.12.3 Uml: ISRO CSE 2011 | Question: 28



The above figure represents which one of the following UML diagram for a single send session of an online chat system?

- A. Package diagram
- B. Activity diagram
- C. Class diagram
- D. Sequence diagram

isro2011 is&software-engineering uml

[Answer key](#)

Answer Keys

29.1.1	A	29.2.1	A	29.2.2	B	29.2.3	C	29.2.4	C
29.2.5	C	29.2.6	C	29.3.1	C	29.3.2	A	29.3.3	D
29.3.4	B	29.3.5	A	29.3.6	B	29.3.7	B	29.3.8	A
29.3.9	B	29.3.10	D	29.3.11	B	29.3.12	A	29.3.13	D
29.3.14	C	29.3.15	D	29.3.16	C	29.3.17	B	29.3.18	A
29.3.19	D	29.3.20	B	29.3.21	D	29.3.22	B	29.3.23	B
29.4.1	B	29.5.1	B	29.6.1	D	29.7.1	C	29.8.1	B
29.9.1	D	29.10.1	D	29.10.2	B	29.10.3	D	29.10.4	C
29.10.5	B	29.10.6	C	29.10.7	C	29.10.8	C	29.10.9	D
29.10.10	C	29.10.11	A	29.10.12	C	29.11.1	D	29.12.1	C
29.12.2	C	29.12.3	B						

30.1

Java (7)

30.1.1 Java: ISRO CSE 2011 | Question: 44



In Java, after executing the following code what are the values of x, y and z?

```
int x,y=10; z=12;
x=y++ + z++;
```

- A. x=22, y=10, z=12
- B. x=24, y=10, z=12
- C. x=24, y=11, z=13
- D. x=22, y=11, z=13

isro2011 non-gatecse java

[Answer key](#)

30.1.2 Java: ISRO CSE 2011 | Question: 72



Find the output of the following Java code line

`System.out.println(Math.floor(-7.4))`

- A. -7
- B. -8
- C. -7.4
- D. -7.0

isro2011 non-gatecse java

[Answer key](#)

30.1.3 Java: ISRO CSE 2014 | Question: 29



Consider the following Java code fragment:

```
public class While
{
    public void loop()
    {
        int x = 0;
        while(1)
        {
            System.out.println("x plus one is" +(x+1));
        }
    }
}
```

- A. There is syntax error in line no. 1
- B. There is syntax errors in line nos. 1 & 6
- C. There is syntax error in line no. 8
- D. There is syntax error in line no. 6

isro2014 java non-gatecse

[Answer key](#)

30.1.4 Java: ISRO CSE 2017 | Question: 74



Which of these is a super class of all errors and exceptions in the Java language?

- A. Runtime Exceptions
- B. Throwable
- C. Catchable
- D. None of the above

isro2017 java

[Answer key](#)

30.1.5 Java: ISRO CSE 2023 | Question: 15



A standard Java API for monitoring and managing applications is

- A. JVM B. JVN C. JMX D. JMY

isro-cse-2023 java non-gatecse

[Answer key](#)

30.1.6 Java: ISRO-2013-64



What is the output of the following program?

```
Class Test
{
    public static void main (String [] args)
    {
        int x = 0;
        int y = 0
        for (int z = 0; z < 5; z++)
        {
            if((++x >2)||(++y > 2))
            {
                x++;
            }
        }
        System.out.println (x+ "" + y);
    }
}
```

- A. 8 2 B. 8 5 C. 8 3 D. 5 3

isro2013 java non-gatecse

[Answer key](#)

30.1.7 Java: ISRO-2013-79



The built-in base class in java, which is used to handle all exceptions is

- A. Raise B. Exception C. Error D. Throwable

isro2013 java non-gatecse

[Answer key](#)

Answer Keys

30.1.1	D	30.1.2	B	30.1.3	D	30.1.4	B	30.1.5	C
30.1.6	A	30.1.7	D						

31.1

Audio Compression (2)

31.1.1 Audio Compression: ISRO2015-66



Consider an uncompressed stereo audio signal of CD quality which is sampled at 44.1 kHz and quantized using 16 bits. What is required storage space if a compression ratio of 0.5 is achieved for 10 seconds of this audio?

- A. 172 KB B. 430 KB C. 860 KB D. 1720 KB

isro2015 multimedia non-gatecse audio-compression

Answer key

31.1.2 Audio Compression: ISRO2015-67



What is compression ratio in a typical mp3 audio files?

- A. 4:1 B. 6:1 C. 8:1 D. 10:1

isro2015 multimedia audio-compression

Answer key

Answer Keys

31.1.1

C

31.1.2

D

32.1

Guass Seidal Iterative Method (1)

32.1.1 Guass Seidal Iterative Method: ISRO-2013-48



The Guass-Seidal iterative method can be used to solve which of the following sets?

- A. Linear algebraic equations
- B. Linear and non-linear algebraic equations
- C. Linear differential equations
- D. Linear and non-linear differential equations

isro2013 numerical-methods guass-seidal-iterative-method

[Answer key](#)

32.2

Interpolation (1)

32.2.1 Interpolation: ISRO CSE 2011 | Question: 52



Given

X: 0 10 16

Y: 6 16 28

The interpolated value X=4 using piecewise linear interpolation is

- A. 11
- B. 4
- C. 22
- D. 10

isro2011 interpolation non-gatecse

[Answer key](#)

32.3

Newton Raphson (1)

32.3.1 Newton Raphson: ISRO CSE 2017 | Question: 3



Using Newton-Raphson method, a root correct to 3 decimal places of $x^3 - 3x - 5 = 0$

- A. 2.222
- B. 2.275
- C. 2.279
- D. None of the above

isro2017 newton-raphson non-gatecse

[Answer key](#)

32.4

Numerical Methods (5)

32.4.1 Numerical Methods: GATE CSE 2006 | Question: 1, ISRO2009-57



Consider the polynomial $p(x) = a_0 + a_1x + a_2x^2 + a_3x^3$, where $a_i \neq 0, \forall i$. The minimum number of multiplications needed to evaluate p on an input x is:

- A. 3
- B. 4
- C. 6
- D. 9

gatecse-2006 numerical-methods normal isro2009

[Answer key](#)

32.4.2 Numerical Methods: ISRO CSE 2009 | Question: 44



A root α of equation $f(x) = 0$ can be computed to any degree of accuracy if a 'good' initial approximation x_0 is chosen for which

- A. $f(x_0) > 0$
- B. $f(x_0)f''(x_0) > 0$
- C. $f(x_0)f''(x_0) < 0$
- D. $f''(x_0) > 0$

Answer key**32.4.3 Numerical Methods: ISRO CSE 2009 | Question: 46**

The shift operator E is defined as $E[f(x_i)] = f(x_i + h)$ and $E'[f(x_i)] = f(x_i - h)$ then \triangle (forward difference) in terms of E is

- A. $E - 1$ B. E C. $1 - E^{-1}$ D. $1 - E$

Answer key**32.4.4 Numerical Methods: ISRO CSE 2009 | Question: 47**

The formula $\int_{x_0}^{xa} y(n)dx \simeq h/2(y_0 + 2y_1 + \dots + 2y_{n-1} + y_n) - h/12(\nabla y_n - \triangle y_0) - h/24(\nabla^2 y_n + \triangle^2 y_0) - 19h/720(\nabla^3 y_n - \triangle^3 y_0) \dots$ is called

- A. Simpson rule B. Trapezoidal rule
C. Romberg's rule D. Gregory's formula

Answer key**32.4.5 Numerical Methods: ISRO CSE 2009 | Question: 51**

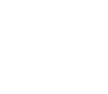
The formula $P_k = y_0 + k\nabla y_0 + \frac{k(k+1)}{2}\nabla^2 y_0 + \dots + \frac{k \dots (k+n-1)}{n!}\nabla^n y_0$ is

- A. Newton's backward formula B. Gauss forward formula
C. Gauss backward formula D. Stirling's formula

Answer key**32.5****Polynomials (1)****32.5.1 Polynomials: ISRO CSE 2009 | Question: 48**

The cubic polynomial $y(x)$ which takes the following values: $y(0) = 1, y(1) = 0, y(2) = 1$ and $y(3) = 10$ is

- A. $x^3 + 2x^2 + 1$
B. $x^3 + 3x^2 - 1$
C. $x^3 + 1$
D. $x^3 - 2x^2 + 1$

Answer key**Answer Keys**

32.1.1	A	32.2.1	D	32.3.1	C	32.4.1	A	32.4.2	A
32.4.3	A	32.4.4	B	32.4.5	A	32.5.1	D		

33.1

Copy Constructor (1)

33.1.1 Copy Constructor: ISRO-2013-75



What is the right way to declare a copy constructor of a class if the name of the class is MyClass?

- A. MyClass (constant MyClass * arg)
- C. MyClass (MyClass arg)
- B. MyClass (constant MyClass & arg)
- D. MyClass (MyClass * arg)

isro2013 copy-constructor non-gatecse

[Answer key](#)

33.2

Java (1)

33.2.1 Java: ISRO CSE 2008 | Question: 43



Consider the following code segment:

```
for (int k=0; k<20; k=k+2)
{
    if (k % 3 == 1)
        system.out.print(k+ " ");
}
```

What is printed as a result of executing the code segment?

- A. 4 16
- B. 4 10 16
- C. 0 6 12 18
- D. 1 4 7 10 13 16 19

isro2008 java

[Answer key](#)

33.3

Object Oriented Programming (7)

33.3.1 Object Oriented Programming: ISRO CSE 2009 | Question: 33



The feature in object-oriented programming that allows the same operation to be carried out differently, depending on the object, is

- A. Inheritance
- C. Overfunctioning
- B. Polymorphism
- D. Overriding

isro2009 object-oriented-programming non-gatecse

[Answer key](#)

33.3.2 Object Oriented Programming: ISRO CSE 2016 | Question: 78



If a class *C* is derived from class *B*, which is derived form class *A*, all through public inheritance, then a class *C* member function can access

- A. only protected and public data of *C* and *B*
- C. all data of *C* and private data of *A* and *B*
- B. Only protected and public data of *C*
- D. public and protected data of *A* and *B* and all data of *C*

non-gatecse object-oriented-programming isro2016

[Answer key](#)

33.3.3 Object Oriented Programming: ISRO CSE 2017 | Question: 41



What is the output of the C++ program?

```
#include <iostream>
using namespace std;

void square(int *x){
    *x = (*x)++ * (*x);
}

void square(int *x, int *y){
    *x = (*x) * --(*y);
}

int main()
{
    int number = 30;
    square(&number, &number);
    cout<<number;
    return 0;
}
```

- A. 910 B. 920 C. 870 D. 900

isro2017 object-oriented-programming

[Answer key](#)

33.3.4 Object Oriented Programming: ISRO CSE 2017 | Question: 43



Which of the following UML 2.0 diagrams capture behavioral aspects of a system?

- A. Use case diagram, Object diagram, Activity diagram and state machine diagram
- B. Use case diagram, Activity diagram and state machine diagram
- C. Object diagram, Communication Diagram, Timing diagram and Interaction diagram
- D. Object diagram, Composite structure diagram, package diagram and Deployment diagram

isro2017 object-oriented-programming non-gatecse

[Answer key](#)

33.3.5 Object Oriented Programming: ISRO CSE 2017 | Question: 44



Which of the following is associated with objects?

- A. State B. Behavior C. Identity D. All of the above

isro2017 object-oriented-programming non-gatecse

[Answer key](#)

33.3.6 Object Oriented Programming: ISRO CSE 2018 | Question: 43



Consider the following C++ program

```
int a (int m)
{return ++m;}
int b(int&m)
{return ++m;}
int{char &m}
{return ++m;}
void main()
{
    int p = 0, q=0, r = 0;
```

```

    p += a(b(p));
    q+= b(a(q));
    r+=a(c(r));
    cout<<p<<q << r;
}

```

Assuming the required header first are already included, the above program

- a. results in compilation error
- b. print 123
- c. print 111
- d. print 322

isro2018 object-oriented-programming non-gatecse

[Answer key](#)



33.3.7 Object Oriented Programming: ISRO-DEC2017-65

Which one of the following are essential features of object-oriented language?

- A. Abstraction and encapsulation
 - B. Strictly-typed
 - C. Type-safe property coupled with sub-type rule
 - D. Polymorphism in the presence of inheritance
-
- A. A and B only
 - B. A, D and B only
 - C. A and D only
 - D. A, C and D only

isrodec2017 object-oriented-programming programming-in-c is&software-engineering

[Answer key](#)

33.4

Operator Overloading (1)



33.4.1 Operator Overloading: ISRO CSE 2017 | Question: 42

Which of the following operator(s) cannot be overloaded?

- A. .(member Access or Dot operator)
- B. ?: (ternary or Conditional Operator)
- C. :: (Scope Resolution Operator)
- D. All of the above

isro2017 operator-overloading

[Answer key](#)

33.5

Virtual Function (1)



33.5.1 Virtual Function: ISRO CSE 2008 | Question: 73

We can make a class abstract by

- A. Declaring it abstract using the virtual keyword
- B. Making at least one member function as virtual function
- C. Making at least one member function as pure virtual function
- D. Making all member function const.

isro2008 non-gatecse virtual-function

[Answer key](#)

Answer Keys

33.1.1	B	33.2.1	B	33.3.1	B	33.3.2	D	33.3.3	C
33.3.4	B	33.3.5	D	33.3.6	A	33.3.7	C	33.4.1	D
33.5.1	C								

34.1

Rs232 (1)

34.1.1 Rs232: ISRO-2013-37



The voltage ranges for a logic high and a logic low in RS-232 C standard is

- A. Low is $0.0V$ to $1.8V$, High is $2.0V$ to $5.0V$
- B. Low is $-15.0V$ to $-3.0V$, High is $3.0V$ to $15.0V$
- C. Low is $3.0V$ to $15.0V$, High is $-3.0V$ to $-15.0V$
- D. Low is $2.0V$ to $5.0V$, High is $0.0V$ to $1.8V$

isro2013 rs232

Answer key

Answer Keys

34.1.1

C

35.1

Html (4)

35.1.1 Html: GATE IT 2008 | Question: 19, ISRO2016-76



Which of the following is TRUE only of XML but NOT HTML?

- A. It is derived from SGML
- B. It describes content and layout
- C. It allows user defined tags
- D. It is restricted only to be used with web browsers

gateit-2008 web-technologies html normal isro2016

[Answer key](#)

35.1.2 Html: ISRO CSE 2011 | Question: 75



In HTML, which of the following can be considered a container?

- A. <SELECT>
- B. <Value>
- C. <INPUT>
- D. <BODY>

isro2011 non-gatecse web-technologies html

[Answer key](#)

35.1.3 Html: ISRO CSE 2017 | Question: 75



Choose the most appropriate HTML tag in the following to create a numbered list

- A. <dl>
- B. <list>
- C.
- D.

isro2017 web-technologies html non-gatecse

[Answer key](#)

35.1.4 Html: ISRO2015-45



To add a background color for all <h1> elements, which of the following HTML syntax is used

- A. h1 { background-color :#FFFFFF}
- B. { background-color :#FFFFFF} . h1
- C. h1 { background-color :#FFFFFF} . h1(all)
- D. h1. all{bgcolor= #FFFFFF}

isro2015 html non-gatecse

[Answer key](#)

35.2

Javascript (1)

35.2.1 Javascript: ISRO2015-46



The correct syntax to write "Hi there" in Javascript is

- A. jscript.write ("Hi There")
- B. response.write ("Hi There")
- C. print ("Hi There")
- D. print.jscript ("Hi There")

javascript non-gatecse isro2015

[Answer key](#)

35.3

Web Technologies (3)

35.3.1 Web Technologies: ISRO CSE 2007 | Question: 72



An email contains a textual birthday greeting, a picture of a cake and a song. The order is not important. What is the content-type?

- A. Multipart/mixed
- C. Multipart/digest

isro2007 web-technologies

- B. Multipart/parallel
- D. Multipart/alternative

[Answer key](#)



35.3.2 Web Technologies: ISRO CSE 2014 | Question: 76

A web client sends a request to a web server. The web server transmits a program to that client which is executed at client. It creates a web document. What are such web documents called?

- A. Active
- B. Static
- C. Dynamic
- D. Passive

isro2014 web-technologies non-gatecse

[Answer key](#)



35.3.3 Web Technologies: ISRO CSE 2023 | Question: 38

CAPTCHA is used to provide protection from

- A. Zero day attack
- B. Buffer overflow
- C. Automated scripted attack
- D. Man in the middle attack

isro-cse-2023 non-gatecse network-security web-technologies

[Answer key](#)

35.4 Xml (2)



35.4.1 Xml: ISRO CSE 2017 | Question: 40

XPath is used to navigate through elements and attributes in

- A. XSL document
- B. XML document
- C. XHTML document
- D. XQuery document

isro2017 web-technologies xml non-gatecse

[Answer key](#)



35.4.2 Xml: ISRO2015-47

To declare the version of XML, the correct syntax is

- A. <?xml version='1.0'/?>
- B. <*xml version='1.0'/?>
- C. <?xml version="1.0"/>
- D. <xml version='1.0'/?>

isro2015 xml non-gatecse

[Answer key](#)

Answer Keys

35.1.1	C	35.1.2	D	35.1.3	D	35.1.4	A	35.2.1	X
35.3.1	B	35.3.2	A	35.3.3	C	35.4.1	B	35.4.2	C

**36.0.1 ISRO CSE 2008 | Question: 53**

Thrashing

- A. always occurs on large computers
- B. is a natural consequence of virtual memory systems
- C. can always be avoided by swapping
- D. can be caused by poor paging algorithms

isro2008 operating-system paging

Answer key**36.0.2 ISRO CSE 2008 | Question: 52**

Dynamic address translation

- A. is part of the operating system paging algorithm
- B. is useless when swapping is used
- C. is the hardware necessary to implement paging
- D. storage pages at a specific location on disk

isro2008 operating-system paging

Answer key**36.0.3 ISRO CSE 2009 | Question: 8**

The primary purpose of an operating system is

- A. To make most efficient use of the computer hardware
- B. To allow people to use the computer
- C. To keep systems programmers employed
- D. To make computers easier to use

isro2009 operating-system

Answer key**36.0.4 ISRO CSE 2007 | Question: 25**

What is the name of the technique in which the operating system of a computer executes several programs concurrently by switching back and forth between them?

- A. Partitioning
- B. Multi-tasking
- C. Windowing
- D. Paging

isro2007 operating-system paging

Answer key**36.0.5 ISRO CSE 2008 | Question: 54**

What is the name of the operating system that reads and reacts in terms of operating system?

- A. Batch system
- B. Quick response time
- C. real time system
- D. Time sharing system

Answer key**36.0.6 ISRO CSE 2008 | Question: 58**

Checkpointing a job

- A. allows it to be completed successfully
- C. prepares it for finishing
- B. allows it to continue executing later
- D. occurs only when there is an error in it

Answer key**36.0.7 ISRO CSE 2009 | Question: 11**

A page fault

- A. Occurs when a program accesses an available page on memory
- B. is an error in a specific page
- C. is a reference to a page belonging to another program
- D. occurs when a program accesses a page not currently in memory

Answer key**36.0.8 ISRO CSE 2017 | Question: 52**

Given reference to the following pages by a program

0,9,0,1,8,1,8,7,8,7,1,2,8,2,7,8,2,3,8,3

How many page faults will occur if the program has three page frames available to it and uses an optimal replacement?

- A. 7
- B. 8
- C. 9
- D. None of the above

Answer key**36.0.9 ISRO CSE 2018 | Question: 20**

Determine the number of page faults when references to pages occur in the order - 1,2,4,5,2,1,2,4. Assume that the main memory can accommodate 3 pages and the main memory already has the pages 1 and 2, with page 1 having brought earlier than page 2. (assume LRU i.e. Least-Recently-Used algorithm is applied)

- a. 3
- b. 4
- c. 5
- d. None of the above

Answer key**36.0.10 ISRO CSE 2023 | Question: 58**

In which of the virtualization techniques, hypervisor modifies the guest OS?

- A. Full virtualization
- C. Both (a) and (b)
- B. Para virtualization
- D. None of the above

[Answer key](#)

36.1

Bankers Algorithm (1)

36.1.1 Bankers Algorithm: ISRO CSE 2017 | Question: 48



What problem is solved by Dijkstra banker' algorithm?

- A. Mutual exclusion
- B. Deadlock recovery
- C. Deadlock avoidance
- D. Cache coherence

isro2017 operating-system bankers-algorithm deadlock-prevention-avoidance-detection easy

[Answer key](#)

36.2

Concurrency (1)

36.2.1 Concurrency: ISRO-2013-62



A particular parallel program computation requires 100 seconds when executed on a single CPU. If 20% of this computation is strictly sequential, then theoretically the best possible elapsed times for this program running on 2 CPUs and 4 CPUs respectively are

- A. 55 and 45 seconds
- B. 80 and 20 seconds
- C. 75 and 25 seconds
- D. 60 and 40 seconds

isro2013 operating-system concurrency

[Answer key](#)

36.3

Context Switch (1)

36.3.1 Context Switch: GATE CSE 2000 | Question: 1.20, ISRO2008-47



Which of the following need not necessarily be saved on a context switch between processes?

- A. General purpose registers
- B. Translation look-aside buffer
- C. Program counter
- D. All of the above

gatecse-2000 operating-system easy isro2008 context-switch

[Answer key](#)

36.4

Critical Section (1)

36.4.1 Critical Section: ISRO CSE 2017 | Question: 68



A critical region

- A. is a piece of code which only one process executes at a time
- B. is a region prone to deadlock
- C. is a piece of code which only a finite number of processes execute
- D. is found only in windows NT operating system

isro2017 operating-system critical-section process-synchronization

[Answer key](#)

36.5

Deadlock Prevention Avoidance Detection (4)

36.5.1 Deadlock Prevention Avoidance Detection: ISRO CSE 2009 | Question: 77



When a process is rolled back as a result of deadlock the difficulty which arises is

- A. Starvation
- B. System throughput

C. Low device utilization

D. Cycle stealing

isro2009 deadlock-prevention-avoidance-detection

Answer key 



36.5.2 Deadlock Prevention Avoidance Detection: ISRO CSE 2018 | Question: 21

Consider a system having m resources of the same type. These resources are shared by 3 processes A, B, C , which have peak time demands of 3, 4, 6 respectively. The minimum value of m that ensures that deadlock will never occur is:

a. 11

b. 12

c. 13

d. 14

isro2018 deadlock-prevention-avoidance-detection operating-system

Answer key 



36.5.3 Deadlock Prevention Avoidance Detection: ISRO CSE 2020 | Question: 29

An aid to determine the deadlock occurrence is

A. resource allocation graph
C. inversion graph

B. starvation graph
D. none of the above

isro-2020 operating-system deadlock-prevention-avoidance-detection easy

Answer key 



36.5.4 Deadlock Prevention Avoidance Detection: ISRO-DEC2017-64

Which of the following is not true with respect to deadlock prevention and deadlock avoidance schemes?

- A. In deadlock prevention, the request for resources is always granted if resulting state is safe.
- B. In deadlock avoidance, the request for resources is always granted. if the resulting state is safe.
- C. Deadlock avoidance requires knowledge of resource requirements a priori.
- D. Deadlock prevention is more restrictive than deadlock avoidance.

isrodec2017 deadlock-prevention-avoidance-detection operating-system

Answer key 

36.6

Disk (11)



36.6.1 Disk: GATE CSE 1999 | Question: 2-18, ISRO2008-46

Raid configurations of the disks are used to provide

- A. Fault-tolerance
- B. High speed
- C. High data density
- D. (A) & (B)

gate1999 operating-system disk easy isro2008

Answer key 



36.6.2 Disk: GATE CSE 2003 | Question: 25, ISRO2009-12

Using a larger block size in a fixed block size file system leads to

- A. better disk throughput but poorer disk space utilization
- B. better disk throughput and better disk space utilization
- C. poorer disk throughput but better disk space utilization
- D. poorer disk throughput and poorer disk space utilization

Answer key**36.6.3 Disk: GATE CSE 2007 | Question: 11, ISRO2009-36, ISRO2016-21**

Consider a disk pack with 16 surfaces, 128 tracks per surface and 256 sectors per track. 512 bytes of data are stored in a bit serial manner in a sector. The capacity of the disk pack and the number of bits required to specify a particular sector in the disk are respectively:

- A. 256 Mbyte, 19 bits
- B. 256 Mbyte, 28 bits
- C. 512 Mbyte, 20 bits
- D. 64 Gbyte, 28 bits

Answer key**36.6.4 Disk: GATE IT 2007 | Question: 44, ISRO2015-34**

A hard disk system has the following parameters :

- Number of tracks = 500
- Number of sectors/track = 100
- Number of bytes /sector = 500
- Time taken by the head to move from one track to adjacent track = 1 ms
- Rotation speed = 600 rpm.

What is the average time taken for transferring 250 bytes from the disk ?

- A. 300.5 ms
- B. 255.5 ms
- C. 255 ms
- D. 300 ms

Answer key**36.6.5 Disk: ISRO CSE 2007 | Question: 39**

Disk requests are received by a disk drive for cylinder 5, 25, 18, 3, 39, 8 and 35 in that order. A seek takes 5 msec per cylinder moved. How much seek time is needed to serve these requests for a Shortest Seek First (SSF) algorithm? Assume that the arm is at cylinder 20 when the last of these requests is made with none of the requests yet served

- A. 125 msec
- B. 295 msec
- C. 575 msec
- D. 750 msec

Answer key**36.6.6 Disk: ISRO CSE 2007 | Question: 56**

Which of the following RAID level provides the highest Data Transfer Rate (Read/Write)

- A. RAID 1
- B. RAID 3
- C. RAID 4
- D. RAID 5

Answer key**36.6.7 Disk: ISRO CSE 2008 | Question: 49**

The total time to prepare a disk drive mechanism for a block of data to be read from it is

- A. seek time
- B. latency
- C. latency plus seek time
- D. transmission time

Answer key**36.6.8 Disk: ISRO CSE 2009 | Question: 36**

Consider a disk pack with 16 surfaces, 128 tracks per surface and 256 sectors per track. 512 bytes of data are stores in a bit serial manner in a sector. The capacity of the disk pack and the number of bits required to specify a particular sector in the disk are respectively

- A. 256 Mbyte, 19 bits
- B. 256 Mbute, 28 bits
- C. 512 Mbyte, 20 bits
- D. 64 Gbyte, 28 bits

Answer key**36.6.9 Disk: ISRO CSE 2011 | Question: 38**

A fast wide SCSI-II disk drive spins at 7200 RPM, has a sector size of 512 bytes, and holds 160 sectors per track. Estimate the sustained transfer rate of this drive

- A. 576000 Kilobytes / sec
- B. 9600 Kilobytes / sec
- C. 4800 Kilobytes / sec
- D. 19200 Kilobytes / sec

Answer key**36.6.10 Disk: ISRO CSE 2018 | Question: 23**

Disk requests come to a disk driver for cylinders in the order 10, 22, 20, 2, 40, 6 and 38 at a time when the disk drive is reading from cylinder 20. The seek time is 6 ms/cylinder. The total seek time, if the disk arm scheduling algorithms is first-come-first-served is

- a. 360
- b. 850
- c. 900
- d. None of the above

Answer key**36.6.11 Disk: ISRO CSE 2018 | Question: 50**

A particular disk unit uses a bit string to record the occupancy or vacancy of its tracks, with 0 denoting vacant and 1 for occupied. A 32-bit segment of this string has hexadecimal value D4FE2003. The percentage of occupied tracks for the corresponding part of the disk, to the nearest percentage is:

- a. 12
- b. 25
- c. 38
- d. 44

Answer key**36.7****Disk Scheduling (3)****36.7.1 Disk Scheduling: ISRO CSE 2014 | Question: 14**

There are 200 tracks on a disc platter and the pending requests have come in the order - 36, 69, 167, 76, 42, 51, 126, 12 and 199. Assume the arm is located at the 100th track and moving towards track 200. If sequence of disc access is 126, 167, 199, 12, 36, 42, 51, 69 and 76 then which disc access scheduling policy is used?

- A. Elevator
- B. Shortest seek-time first
- C. C-SCAN
- D. First Come First Served

Answer key**36.7.2 Disk Scheduling: ISRO CSE 2017 | Question: 66**

Consider the disk system with 100 cylinders. The request to access the cylinders occur in the following sequence.

4, 37, 10, 7, 19, 73, 2, 15, 6, 20

Assuming the head is currently at cylinder 50 what is the time taken to satisfy all requests if it takes 1 ms to move from one cylinder to adjacent one and shortest seek time first algorithm is used.

- A. 95 ms B. 119 ms C. 233 ms D. 276 ms

Answer key**36.7.3 Disk Scheduling: ISRO-DEC2017-69**

Consider a disk sequence with 100 cylinders. The request to access the cylinder occur in the following sequence :

4, 34, 10, 7, 19, 73, 2, 15, 6, 20

Assuming that the head is currently at cylinder 50, what is the time taken to satisfy all requests if it takes 2 ms to move from one cylinder to adjacent one and shortest seek time first policy is used?

- A. 190 B. 238 C. 233 D. 276

Answer key**36.8****Fifo (1)****36.8.1 Fifo: ISRO-DEC2017-62**

A system uses *FIFO* policy for page replacement. It has 4 page frames with no pages loaded, to begin with. The system first accesses 50 distinct pages in some order and then accesses the same 50 pages in reverse order. How many page faults will occur?

- A. 96 B. 100 C. 97 D. 92

Answer key**36.9****File System (1)****36.9.1 File System: ISRO CSE 2014 | Question: 66**

Consider a system where each file is associated with a 16 bit number. For each file, each user should have the read and write capability. How much memory is needed to store each user's access data?

- A. 16 KB B. 32 KB C. 64 KB D. 128 KB

Answer key**36.10****Fork System Call (4)**

36.10.1 Fork System Call: ISRO CSE 2008 | Question: 63



Fork is

- A. the creation of a new job
- B. the dispatching of a task
- C. increasing the priority of a task
- D. the creation of a new process

isro2008 operating-system fork-system-call easy

[Answer key](#)

36.10.2 Fork System Call: ISRO CSE 2017 | Question: 51



What is the output of the following program?

```
main()
{
    int a = 10;
    if(fork() == 0)
        a++;
    printf("%d\n",a);
}
```

- A. 10 and 11
- B. 10
- C. 11
- D. 11 and 11

isro2017 operating-system fork-system-call

[Answer key](#)

36.10.3 Fork System Call: ISRO CSE 2018 | Question: 4



The following C program:

```
{
    fork(); fork(); printf("yes");
}
```

If we execute this core segment, how many times the string yes will be printed?

- a. Only once
- b. 2 times
- c. 4 times
- d. 8 times

isro2018 fork-system-call operating-system easy

[Answer key](#)

36.10.4 Fork System Call: ISRO2015-37



Consider the following program.

```
main()
{
    fork();
    fork();
    fork();
}
```

How many new processes will be created?

- A. 8
- B. 6
- C. 7
- D. 5

isro2015 operating-system fork-system-call easy

[Answer key](#)

36.11

Fragmentation (1)

36.11.1 Fragmentation: ISRO CSE 2018 | Question: 22



A computer has $1000K$ of main memory. The jobs arrive and finish in the following sequence.

Job 1 requiring $200K$ arrives

Job 2 requiring $350K$ arrives

Job 3 requiring $300K$ arrives

Job 1 finishes

Job 4 requiring $120K$ arrives

Job 5 requiring $150K$ arrives

Job 6 requiring $80K$ arrives

Among best fit and first fit, which performs better for this sequence?

- a. First fit
- b. Best fit
- c. Both perform the same
- d. None of the above

isro2018 memory-management fragmentation operating-system

[Answer key](#)

36.12

IO Devices (1)



36.12.1 IO Devices: ISRO-2013-51

In case of a DVD, the speed of data transfer is mentioned in multiples of?

- A. 150 KB/s
- B. 1.38 MB/s
- C. 300 KB/s
- D. 2.40 MB/s

isro2013 io-devices non-gatecse out-of-syllabus-now

[Answer key](#)

36.13

IO Handling (3)



36.13.1 IO Handling: GATE CSE 1996 | Question: 1.20, ISRO2008-56

Which of the following is an example of spooled device?

- A. A line printer used to print the output of a number of jobs
- B. A terminal used to enter input data to a running program
- C. A secondary storage device in a virtual memory system
- D. A graphic display device

gate1996 operating-system io-handling normal isro2008

[Answer key](#)

36.13.2 IO Handling: GATE IT 2004 | Question: 11, ISRO2011-33



What is the bit rate of a video terminal unit with 80 characters/line, 8 bits/character and horizontal sweep time of $100\mu s$ (including $20\mu s$ of retrace time)?

- A. 8 Mbps
- B. 6.4 Mbps
- C. 0.8 Mbps
- D. 0.64 Mbps

gateit-2004 operating-system io-handling easy isro2011

[Answer key](#)

36.13.3 IO Handling: ISRO-2013-52



Suppose we have variable logical records of lengths of 5 bytes, 10 bytes and 25 bytes while the physical block size in disk is 15 bytes. What is the maximum and minimum fragmentation seen in bytes?

- A. 25 and 5
- B. 15 and 5
- C. 15 and 0
- D. 10 and 5

isro2013 operating-system io-handling disk

[Answer key](#)

36.14

Macros (1)

36.14.1 Macros: ISRO CSE 2018 | Question: 67



In multi-programmed systems, it is advantageous if some programs such as editors and compilers can be shared by several users.

Which of the following must be true of multi-programmed systems in order that a single copy of a program can be shared by several users?

- I. The program is a macro
 - II. The program is recursive
 - III. The program is reentrant
-
- a. I only
 - b. II only
 - c. III only
 - d. I, II and III

isro2018 operating-system macros

[Answer key](#)

36.15

Memory Management (6)

36.15.1 Memory Management: ISRO CSE 2018 | Question: 61



The Operating System of a computer may periodically collect all the free memory space to form contiguous block of free space. This is called:

- a. Concatenation
- b. Garbage Collection
- c. Collision
- d. Dynamic Memory Allocation

isro2018 memory-management operating-system

[Answer key](#)

36.15.2 Memory Management: ISRO CSE 2020 | Question: 25



What is compaction refers to

- A. a technique for overcoming internal fragmentation
- B. a paging technique
- C. a technique for overcoming external fragmentation
- D. a technique for compressing the data

isro-2020 operating-system memory-management easy

[Answer key](#)

36.15.3 Memory Management: ISRO CSE 2023 | Question: 2



Which of the following heap memory *E* allocation strategies is likely to exploit spatial locality of memory accesses in a program, the most?

- A. Best Fit B. First Fit C. Next Fit D. Last Fit

isro-cse-2023 operating-system memory-management

Answer key 

36.15.4 Memory Management: ISRO CSE 2023 | Question: 76



Any attempt by a process to access memory allocated to OS or process of other user results into

- A. Trap to OS B. Context Switching
C. Page fault D. Invocation to Scheduler Despatch

isro-cse-2023 operating-system memory-management

Answer key 

36.15.5 Memory Management: ISRO-2013-56



In a 64-bit machine, with 2 GB RAM, and 8 KB page size, how many entries will be there in the page table if its is inverted?

- A. 2^{18} B. 2^{20} C. 2^{33} D. 2^{51}

isro2013 operating-system memory-management paging

Answer key 

36.15.6 Memory Management: ISRO2013-55



Consider a logical address space of 8 pages of 1024 words each, mapped onto a physical memory of 32 frames. How many bits are there in the physical address and logical address respectively?

- A. 5,3 B. 10,10 C. 15,13 D. 15,15

isro2013 operating-system memory-management

Answer key 

36.16

Multilevel Paging (1)

36.16.1 Multilevel Paging: ISRO CSE 2011 | Question: 49



Consider a 32-bit machine where four-level paging scheme is used. If the hit ratio to TLB is 98%, and it takes 20 nanosecond to search the TLB and 100 nanoseconds to access the main memory what is effective memory access time in nanoseconds?

- A. 126 B. 128 C. 122 D. 120

isro2011 operating-system multilevel-paging

Answer key 

36.17

Mutual Exclusion (2)

36.17.1 Mutual Exclusion: ISRO CSE 2017 | Question: 56



Mutual exclusion problem occurs

- A. between two disjoint processes that do not interact

- B. among processes that share resources
- C. among processes that do not use the same resource
- D. between two processes that uses different resources of different machine

isro2017 operating-system process-synchronization mutual-exclusion

Answer key 



36.17.2 Mutual Exclusion: ISRO CSE 2020 | Question: 57

The hardware implementation which provides mutual exclusion is

- A. Semaphores
- B. Test and set instructions
- C. Both options
- D. None of the options

isro-2020 operating-system semaphore mutual-exclusion normal

Answer key 

36.18

Page Replacement (13)



36.18.1 Page Replacement: GATE CSE 1997 | Question: 3.10, ISRO2008-57, ISRO2015-64

Dirty bit for a page in a page table

- A. helps avoid unnecessary writes on a paging device
- B. helps maintain LRU information
- C. allows only read on a page
- D. None of the above

gate1997 operating-system page-replacement easy isro2008 isro2015

Answer key 



36.18.2 Page Replacement: GATE CSE 2004 | Question: 21, ISRO2007-44

The minimum number of page frames that must be allocated to a running process in a virtual memory environment is determined by

- A. the instruction set architecture
- B. page size
- C. number of processes in memory
- D. physical memory size

gatecse-2004 operating-system virtual-memory page-replacement normal isro2007

Answer key 



36.18.3 Page Replacement: GATE CSE 2005 | Question: 22, ISRO2015-36

Increasing the RAM of a computer typically improves performance because:

- A. Virtual Memory increases
- B. Larger RAMs are faster
- C. Fewer page faults occur
- D. Fewer segmentation faults occur

gatecse-2005 operating-system page-replacement easy isro2015

Answer key 



36.18.4 Page Replacement: GATE CSE 2009 | Question: 9, ISRO2016-52

In which one of the following page replacement policies, Belady's anomaly may occur?

- A. FIFO
- B. Optimal
- C. LRU
- D. MRU

gatecse-2009 operating-system page-replacement normal isro2016

Answer key 

36.18.5 Page Replacement: ISRO CSE 2007 | Question: 10



The term 'aging' refers to

- A. booting up the priority of the process in multi-level of queue without feedback.
- B. gradually increasing the priority of jobs that wait in the system for a long time to remedy infinite blocking
- C. keeping track of the following a page has been in memory for the purpose of LRU replacement
- D. letting job reside in memory for a certain amount of time so that the number of pages required can be estimated accurately.

isro2007 operating-system memory-management page-replacement

[Answer key](#)

36.18.6 Page Replacement: ISRO CSE 2008 | Question: 67



The page replacement algorithm which gives the lowest page fault rate is

- A. LRU
- B. FIFO
- C. Optimal page replacement
- D. Second chance algorithm

isro2008 operating-system page-replacement

[Answer key](#)

36.18.7 Page Replacement: ISRO CSE 2011 | Question: 73



Belady's anomaly means

- A. Page fault rate is constant even on increasing the number of allocated frames
- B. Page fault rate may increase on increasing the number of allocated frames
- C. Page fault rate may increase on decreasing the number of allocated frames
- D. Page fault rate may decrease on increasing the number of allocated frames

isro2011 operating-system page-replacement page-fault

[Answer key](#)

36.18.8 Page Replacement: ISRO CSE 2016 | Question: 48



Determine the number of page faults when references to pages occur in the following order:

1, 2, 4, 5, 2, 1, 2, 4

Assume that the main memory can accommodate 3 pages and the main memory already has the pages 1 and 2, with page one having brought earlier than page 2. (LRU page replacement algorithm is used)

- A. 3
- B. 5
- C. 4
- D. None of these

page-replacement page-fault isro2016 operating-system

[Answer key](#)

36.18.9 Page Replacement: ISRO CSE 2016 | Question: 49



Working Set (t, k) at an instant of time t is

- A. the set of k future references that the OS will make
- B. the set of future references that the OS will make in next t unit of time
- C. the set of k references with high frequency
- D. the k set of pages that have been referenced in the last t time units

Answer key**36.18.10 Page Replacement: ISRO CSE 2018 | Question: 20**

Determine the number of page faults when references to pages occur in the order 1, 2, 4, 5, 2, 1, 2, 4. Assume that the main memory can accommodate 3 pages and the main memory already has the pages 1 and 2, with page 1 brought earlier than page 2. (assume LRU i.e., Least-Recently-Used algorithm is applied)

- A. 3 B. 4 C. 5 D. None of the above

Answer key**36.18.11 Page Replacement: ISRO CSE 2020 | Question: 30**

Consider the following page reference string.

1 2 3 4 2 1 5 6 2 1 2 3 7 6 3 2 1 2 3 6

What are the minimum number of frames required to get a single page fault for the above sequence assuming LRU replacement strategy?

- A. 7 B. 4 C. 6 D. 5

Answer key**36.18.12 Page Replacement: ISRO-2013-65**

Consider the list of page references in the time line as below:

9 6 2 3 4 4 4 4 3 4 4 2 5 8 6 8 5 5 3 2 3 3 9 6 2 7

What is the working set at the penultimate page reference if Δ is 5?

- A. {8, 5, 3, 2, 9, 6} B. {4, 3, 6, 2, 5}
 C. {3, 9, 6, 2, 7} D. {3, 9, 6, 2}

Answer key**36.18.13 Page Replacement: ISRO-DEC2017-58**

A virtual memory system uses *FIFO* page replacement policy and allocates a fixed number of frames to the process. Consider the following statements

M: Increasing the number of page frames allocated to a process sometimes increases the page fault rate.

N: Some programs do not exhibit locality of reference.

Which one of the following is true?

- A. Both **M** and **N** are true and **N** is the reason for **M**. Both **M** and **N** are true but **N** is not the reason for **M**.
 C. Both **M** and **N** are false. D. **M** is false, but **N** is true.

[Answer key](#)

36.19

Pipes (1)

36.19.1 Pipes: ISRO CSE 2018 | Question: 13



The difference between a named pipe and a regular file in Unix is that

- a. Unlike a regular file, named pipe is a special file
- b. The data in a pipe is transient, unlike the content of a regular file
- c. Pipes forbid random accessing, while regular files do allow this.
- d. All of the above

isro2018 operating-system pipes non-gatecse

[Answer key](#)

36.20

Process (8)

36.20.1 Process: ISRO CSE 2007 | Question: 41



A task in a blocked state

- A. is executable
- B. is running
- C. must still be placed in the run queues
- D. is waiting for some temporarily unavailable resources

isro2007 operating-system process

[Answer key](#)

36.20.2 Process: ISRO CSE 2008 | Question: 64



Which of the following need not necessarily be saved on a Context Switch between processes?

- A. General purpose registers
- B. Translation look-aside buffer
- C. Program counter
- D. Stack pointer

isro2008 operating-system process

[Answer key](#)

36.20.3 Process: ISRO CSE 2009 | Question: 75



Special software to create a job queue is called a

- A. Driver
- B. Spooler
- C. Interpreter
- D. Linkage editor

isro2009 operating-system process

[Answer key](#)

36.20.4 Process: ISRO CSE 2009 | Question: 76



Process is

- A. A program in high level language kept on disk
- B. Contents of main memory
- C. A program in execution
- D. A job in secondary memory

isro2009 operating-system process

[Answer key](#)

36.20.5 Process: ISRO CSE 2009 | Question: 9



Which is the correct definition of a valid process transition in an operating system?

- A. Wake up: ready → running
- B. Dispatch: ready → running
- C. Block: ready → running
- D. Timer runout: → ready → running

isro2009 operating-system process

[Answer key](#)

36.20.6 Process: ISRO CSE 2011 | Question: 55



There are three processes in the ready queue. When the currently running process requests for I/O how many process switches take place?

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

isro2011 operating-system process

[Answer key](#)

36.20.7 Process: ISRO-2013-60



The state of a process after it encounters an *I/O* instruction is?

- A. Ready
- B. Blocked
- C. Idle
- D. Running

isro2013 operating-system process

[Answer key](#)

36.20.8 Process: ISRO-DEC2017-60



A process executes the following code

```
for(i=0;i<n;i++)  
    fork();
```

The total number of child processes created is

- A. n^2
- B. $2^{n+1} - 1$
- C. 2^n
- D. $2^n - 1$

isrodec2017 process fork-system-call operating-system

[Answer key](#)

36.21

Process Scheduling (23)



36.21.1 Process Scheduling: GATE CSE 1996 | Question: 2.20, ISRO2008-15

Four jobs to be executed on a single processor system arrive at time 0 in the order *A, B, C, D*. Their burst CPU time requirements are 4, 1, 8, 1 time units respectively. The completion time of *A* under round robin scheduling with time slice of one time unit is

- A. 10
- B. 4
- C. 8
- D. 9

gate1996 operating-system process-scheduling normal isro2008

[Answer key](#)

36.21.2 Process Scheduling: GATE CSE 2006 | Question: 06, ISRO2009-14



Consider three CPU-intensive processes, which require 10, 20 and 30 time units and arrive at times 0, 2 and 6, respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm? Do not count the context switches at

time zero and at the end.

A. 1

B. 2

C. 3

D. 4

gatecse-2006 operating-system process-scheduling normal isro2009

Answer key 

36.21.3 Process Scheduling: ISRO CSE 2007 | Question: 11, GATE CSE 2001 | Question: 1.19

Consider a set of n tasks with known runtimes r_1, r_2, \dots, r_n to be run on a uniprocessor machine. Which of the following processor scheduling algorithms will result in the maximum throughput?

- A. Round Robin
- B. Shortest job first
- C. Highest response ratio next
- D. first come first served

isro2007 operating-system process-scheduling gatecse-2001

Answer key 



36.21.4 Process Scheduling: ISRO CSE 2007 | Question: 12

Consider a job scheduling problem with 4 jobs J_1, J_2, J_3 and J_4 with corresponding deadlines: $(d_1, d_2, d_3, d_4) = (4, 2, 4, 2)$. Which of the following is not a feasible schedule without violating any job schedule?

- A. J_2, J_4, J_1, J_3
- B. J_4, J_1, J_2, J_3
- C. J_4, J_2, J_1, J_3
- D. J_4, J_2, J_3, J_1

isro2007 operating-system process-scheduling

Answer key 



36.21.5 Process Scheduling: ISRO CSE 2007 | Question: 17

Round Robin schedule is essentially the pre-emptive version of

- A. FIFO
- B. Shortest job first
- C. Shortest remaining time
- D. Longest remaining time

isro2007 operating-system process-scheduling

Answer key 



36.21.6 Process Scheduling: ISRO CSE 2007 | Question: 43

On a system using non-preemptive scheduling, processes with expected run times of 5, 18, 9 and 12 are in the ready queue. In what order should they be run to minimize wait time?

- A. 5, 12, 9, 18
- B. 5, 9, 12, 18
- C. 12, 18, 9, 5
- D. 9, 12, 18, 5

isro2007 operating-system process-scheduling

Answer key 



36.21.7 Process Scheduling: ISRO CSE 2007 | Question: 64, ISRO CSE 2008 | Question: 50

Feedback queues

- A. are very simple to implement
- B. dispatch tasks according to execution characteristics
- C. are used to favour real time tasks
- D. require manual intervention to implement properly



isro2007 operating-system isro2008 process-scheduling

Answer key

36.21.8 Process Scheduling: ISRO CSE 2008 | Question: 51



With Round-Robin CPU scheduling in a time shared system

- A. using very large time slices (quantas) degenerates into First-Come First served (FCFS) algorithm.
- B. using extremely small time slices improves performance
- C. using very small time slices degenerates into Last-In First-Out (LIFO) algorithm.
- D. using medium sized times slices leads to shortest Request time First (SRTF) algorithm

isro2008 operating-system process-scheduling

Answer key

36.21.9 Process Scheduling: ISRO CSE 2008 | Question: 66, ISRO CSE 2009 | Question: 15



The performance of Round Robin algorithm depends heavily on

- A. size of the process
- B. the I/O bursts of the process
- C. the CPU bursts of the process
- D. the size of the time quantum

isro2008 isro2009 operating-system process-scheduling

Answer key

36.21.10 Process Scheduling: ISRO CSE 2009 | Question: 10



The correct matching of the following pairs is

A.	Disk check	i.	Round robin
B.	Batch processing	ii.	Scan
C.	Time sharing	iii.	LIFO
D.	Stack operation	iv.	FIFO

1. a-iii, b-iv, c-ii, d-i
2. a-iv, b-iii, c-ii, d-i
3. a-iii, b-iv, c-i, d-ii
4. a-ii, b-iv, c-i, d-iii

isro2009 operating-system process-scheduling

Answer key

36.21.11 Process Scheduling: ISRO CSE 2009 | Question: 17



Consider a set of 5 processes whose arrival time, CPU time needed and the priority are given below:

Process Priority	Arrival Time	CPU Time Needed (in ms)	Priority
P1	0	10	5
P2	0	5	2
P3	2	3	1
P4	5	20	4
P5	10	2	3

(smaller the number, higher the priority)

If the CPU scheduling policy is priority scheduling without pre-emption, the average waiting time will be

- A. 12.8 ms B. 11.8 ms C. 10.8 ms D. 09.8 ms

isro2009 operating-system process-scheduling

[Answer key](#)



36.21.12 Process Scheduling: ISRO CSE 2011 | Question: 4

The following table shows the processes in the ready queue and time required for each process for completing its job.

Process Time

P_1	10
P_2	5
P_3	20
P_4	8
P_5	15

If round-robin scheduling with 5 ms is used what is the average waiting time of the processes in the queue?

- A. 27 ms B. 26.2 ms C. 27.5 ms D. 27.2 ms

isro2011 operating-system process-scheduling

[Answer key](#)



36.21.13 Process Scheduling: ISRO CSE 2014 | Question: 78

Which of the following is not an optimization criterion in the design of a CPU scheduling algorithm?

- A. Minimum CPU utilization
C. Minimum turnaround time
- B. Maximum throughput
D. Minimum waiting time

isro2014 operating-system process-scheduling

[Answer key](#)



36.21.14 Process Scheduling: ISRO CSE 2016 | Question: 51

For the real time operating system, which of the following is the most suitable scheduling scheme?

- A. Round robin
C. Pre-emptive
- B. First come first serve
D. Random scheduling

isro2016 operating-system process-scheduling

[Answer key](#)



36.21.15 Process Scheduling: ISRO CSE 2020 | Question: 27

Which of the following algorithms defines time quantum?

- A. shortest job scheduling algorithm
C. priority scheduling algorithm
- B. round robin scheduling algorithm
D. multilevel queue scheduling algorithm

isro-2020 operating-system process-scheduling easy

[Answer key](#)

36.21.16 Process Scheduling: ISRO CSE 2020 | Question: 31



Three CPU-bound tasks, with execution times of 15, 12 and 5 time units respectively arrive at times 0, t and 8, respectively. If the operating system implements a shortest remaining time first scheduling algorithm, what should be the value of t to have 4 context switches? Ignore the context switches at time 0 and at the end.

- A. $0 < t < 3$ B. $t = 0$ C. $t \leq 3$ D. $3 < t < 8$

isro-2020 operating-system process-scheduling normal

[Answer key](#)

36.21.17 Process Scheduling: ISRO CSE 2023 | Question: 54



	Process Scheduler Type	Activity
(i)	Long Term Scheduler	(P) executes much faster to reduce wastage of CPU time
(ii)	Medium term scheduler	(Q) controls degree of multi programming
(iii)	Short Term scheduler	(R) is associated with swapping

with respect to Process Schedulers of an operating system mentioned above in the table, which of the following statements is correct?

- a. (i) – (R), (ii) – (P), (iii) – (Q)
b. (i) – (Q), (ii) – (R), (iii) – (P)
c. (i) – (P), (ii) – (R), (iii) – (Q)
d. (i) – (R), (ii) – (Q), (iii) – (P)

isro-cse-2023 operating-system process-scheduling

[Answer key](#)

36.21.18 Process Scheduling: ISRO-2013-50



Consider the following set of processes, with arrival times and the required CPU-burst times given in milliseconds.

Process	Arrival time	Burst Time
P1	0	4
P2	2	2
P3	3	1

What is the sequence in which the processes are completed? Assume round robin scheduling with a time quantum of 2 milliseconds?

- A. P1, P2, P3 B. P2, P1, P3 C. P3, P2, P1 D. P2, P3, P1

isro2013 process-scheduling round-robin-scheduling

[Answer key](#)

36.21.19 Process Scheduling: ISRO-2013-59



A starvation free job scheduling policy guarantees that no job indefinitely waits for a service. Which of the following job scheduling policies is starvation free?

- A. Priority queing
C. Youngest job first B. Shortest job first
D. Round robin

isro2013 operating-system process-scheduling

Answer key

36.21.20 Process Scheduling: ISRO-2013-70



Which of the following strategy is employed for overcoming the priority inversion problem?

- A. Temporarily raise the priority of lower priority level process
- B. Have a fixed priority level scheme.
- C. Implement Kernel pre-emption scheme.
- D. Allow lower priority process to complete its job.

isro2013 operating-system process-scheduling

Answer key

36.21.21 Process Scheduling: ISRO-DEC2017-61



Consider the following scheduling:

A.	Gang scheduling	s.	Guaranteed scheduling
B.	Rate monotonic scheduling	t.	Thread scheduling
C.	Fair share scheduling	u.	Real-time scheduling

Matching the table in the order *A,B,C* gives

- A. t,u,s
- B. s,t,u
- C. u,s,t
- D. u,t,s

isrodec2017 process-scheduling operating-system

Answer key

36.21.22 Process Scheduling: ISRO2015-33



Suppose a system contains n processes and system uses the round-robin algorithm for CPU scheduling then which data structure is best suited ready queue of the process

- A. stack
- B. queue
- C. circular queue
- D. tree

isro2015 operating-system process-scheduling

Answer key

36.21.23 Process Scheduling: ISRO2015-38



Suppose two jobs, each of which needs 10 minutes of CPU time, start simultaneously. Assume 50% I/O wait time. How long will it take for both to complete, if they run sequentially?

- A. 10
- B. 20
- C. 30
- D. 40

process-scheduling isro2015

Answer key

36.22

Process Synchronization (7)



36.22.1 Process Synchronization: GATE CSE 1996 | Question: 1.19, ISRO2008-61

A critical section is a program segment

- A. which should run in a certain amount of time
- B. which avoids deadlocks
- C. where shared resources are accessed
- D. which must be enclosed by a pair of semaphore operations, P and V

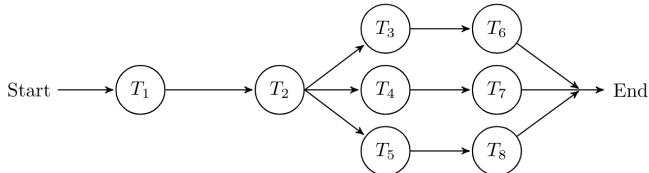
gate1996 operating-system process-synchronization easy isro2008

[Answer key](#)



36.22.2 Process Synchronization: ISRO CSE 2011 | Question: 10

Below is the precedence graph for a set of tasks to be executed on a parallel processing system S .



What is the efficiency of this precedence graph on S if each of the tasks T_1, \dots, T_8 takes the same time and the system S has five processors?

- A. 25%
- B. 40%
- C. 50%
- D. 90%

isro2011 operating-system process-synchronization

[Answer key](#)



36.22.3 Process Synchronization: ISRO CSE 2011 | Question: 77

In a system using single processor, a new process arrives at the rate of six processes per minute and each such process requires seven seconds of service time. What is the CPU utilization?

- A. 70%
- B. 30%
- C. 60%
- D. 64%

isro2011 operating-system process-synchronization

[Answer key](#)



36.22.4 Process Synchronization: ISRO CSE 2018 | Question: 67

Procedures P_1 and P_2 have a producer-consumer relationship, communicating by the use of a set of shared buffers.

P_1 : repeat

 Obtain an empty buffer

 Fill it

 Return a full buffer

forever

P_2 : repeat

 Obtain a full buffer

 Empty it

 Return an empty buffer

forever

Increasing the number of buffers is likely to do which of the following?

- I. Increase the rate at which requests are satisfied (throughput)
 - II. Decrease the likelihood of deadlock
 - III. Increase the ease of achieving a correct implementation
- a. III only b. II only c. I only d. II and III only

isro2018 process-synchronization operating-system

[Answer key](#)



36.22.5 Process Synchronization: ISRO CSE 2020 | Question: 26

The operating system and the other processes are protected from being modified by an already running process because

- A. they run at different time instants and not in parallel
- B. they are in different logical addresses
- C. they use a protection algorithm in the scheduler
- D. every address generated by the CPU is being checked against the relocation and limit parameters

isro-2020 operating-system process-synchronization easy

[Answer key](#)



36.22.6 Process Synchronization: ISRO CSE 2020 | Question: 28

Dispatch latency is defined as

- A. the speed of dispatching a process from running to the ready state
- B. the time of dispatching a process from running to ready state and keeping the CPU idle
- C. the time to stop one process and start running another one
- D. none of these

isro-2020 operating-system process-synchronization easy

[Answer key](#)



36.22.7 Process Synchronization: ISRO CSE 2023 | Question: 75

In a producer-consumer scenario also known as Bounded-Buffer Problem, what would be the most appropriate synchronization primitive to ensure that the consumer waits when the buffer is empty?

- A. Spinlock
- B. Mutex lock
- C. Semaphore
- D. Monitors

isro-cse-2023 operating-system process-synchronization

[Answer key](#)

36.23

Process and Threads (1)



36.23.1 Process and Threads: ISRO-DEC2017-63

Which of the following is false?

- A. User level threads are not scheduled by the kernel.
- B. Context switching between user-level threads is faster than context switching between kernel-level threads.

- C. When a user thread is blocked all other threads of its processes are blocked.
- D. Kernel-level threads cannot utilize multiprocessor systems by splitting threads on different processors or cores.

isrodec2017 operating-system process-and-threads threads

Answer key 

36.24

Realtime Systems (1)

36.24.1 Realtime Systems: ISRO CSE 2017 | Question: 73



Which of the following statement is true?

- A. Hard real time OS has less jitter than soft real time OS
- B. Hard real time OS has more jitter than soft real time OS
- C. Hard real time OS has equal jitter as soft real time OS
- D. None of the above

isro2017 operating-system realtime-systems

Answer key 

36.25

Resource Allocation (10)

36.25.1 Resource Allocation: ISRO CSE 2007 | Question: 40



Consider a system having 'm' resources of the same type. The resources are shared by 3 processes A, B, C, which have peak time demands of 3, 4, 6 respectively. The minimum value of 'm' that ensures that deadlock will never occur is

- A. 11
- B. 12
- C. 13
- D. 14

isro2007 operating-system resource-allocation

Answer key 

36.25.2 Resource Allocation: ISRO CSE 2008 | Question: 62



In which of the following four necessary conditions for deadlock processes claim exclusive control of the resources they require?

- A. no preemption
- B. mutual exclusion
- C. circular wait
- D. hold and wait

isro2008 operating-system resource-allocation deadlock-prevention-avoidance-detection

Answer key 

36.25.3 Resource Allocation: ISRO CSE 2009 | Question: 16



Consider a system having "n" resources of same type. These resources are shared by 3 processes, A, B, C. These have peak demands of 3, 4, and 6 respectively. For what value of "n" deadlock won't occur

- A. 15
- B. 9
- C. 10
- D. 13

isro2009 operating-system resource-allocation deadlock-prevention-avoidance-detection

Answer key 

36.25.4 Resource Allocation: ISRO CSE 2011 | Question: 60



A total of 9 units of a resource type available, and given the safe state shown below, which of the following sequence will be a safe state?

Process Used Max

	P ₁	P ₂	P ₃	P ₄
	2	7		
P ₂	1	6		
P ₃	2	5		
P ₄	1	4		

- A. $\langle P_4, P_1, P_3, P_2 \rangle$
- B. $\langle P_4, P_2, P_1, P_3 \rangle$
- C. $\langle P_4, P_2, P_3, P_1 \rangle$
- D. $\langle P_3, P_1, P_2, P_4 \rangle$

isro2011 operating-system resource-allocation

[Answer key](#)

36.25.5 Resource Allocation: ISRO CSE 2014 | Question: 68



What is the minimum number of resources required to ensure that deadlock will never occur, if there are currently three processes P_1, P_2 and P_3 running in a system whose maximum demand for the resources of same type are 3, 4, and 5 respectively.

- A. 3
- B. 7
- C. 9
- D. 10

isro2014 operating-system resource-allocation

[Answer key](#)

36.25.6 Resource Allocation: ISRO CSE 2016 | Question: 46



With single resource, deadlock occurs

- A. if there are more than two processes competing for that resources
- B. if there are only two processes competing for that resources
- C. if there is a single process competing for that resources
- D. none of these

operating-system resource-allocation isro2016

[Answer key](#)

36.25.7 Resource Allocation: ISRO CSE 2016 | Question: 47



A system has 3 processes sharing 4 resources. If each process needs a maximum of 2 units, then

- A. Deadlock can never occur
- B. Deadlock may occur
- C. Deadlock has to occur
- D. None of these

operating-system resource-allocation isro2016

[Answer key](#)

36.25.8 Resource Allocation: ISRO-2013-57



Which of the following is not a necessary condition for deadlock?

- A. Mutual exclusion
- B. Reentrancy
- C. Hold and wait
- D. No pre-emption

isro2013 operating-system resource-allocation deadlock-prevention-avoidance-detection

[Answer key](#)

36.25.9 Resource Allocation: ISRO-2013-58



Consider the following process and resource requirement of each process.

Process	Type 1		Type 2	
	Used	Max	Used	Max
P1	1	2	1	3
P2	1	3	1	2
P3	2	4	1	4

Predict the state of this system, assuming that there are a total of 5 instances of resource type 1 and 4 instances of resource type 2.

- A. Can go to safe or unsafe state based on sequence
B. Safe state
C. Unsafe state
D. Deadlock state

isro2013 operating-system resource-allocation

[Answer key](#)

36.25.10 Resource Allocation: ISRO2015-32



In a lottery scheduler with 40 tickets, how we will distribute the tickets among 4 processes P_1, P_2, P_3 and P_4 such that each process gets 10%, 5%, 60% and 25% respectively?

	P_1	P_2	P_3	P_4
A	12	4	70	30
B	7	5	20	10
C	4	2	24	10
D	8	5	30	40

isro2015 operating-system resource-allocation

[Answer key](#)

36.26

Runtime Environment (1)



36.26.1 Runtime Environment: ISRO-DEC2017-68

Consider the following table :

A.	Activation record	p.	Linking loader
B.	Location counter	q.	Garbage collection
C.	Reference counts	r.	Subroutine call
D.	Address relocation	s.	Assembler

- A. $a - p, b - q, c - r, d - s$
B. $a - q, b - r, c - s, d - p$
C. $a - r, b - s, c - q, d - p$
D. $a - r, b - s, c - p, d - q$

isrodec2017 runtime-environment compiler-design

[Answer key](#)

36.27

Segmentation (2)

36.27.1 Segmentation: ISRO CSE 2014 | Question: 18



Consider the following segment table in segmentation scheme :

Segment ID	Base	Limit
0	200	200
1	5000	1210
2	1527	498
3	2500	50

What happens if the logical address requested is – Segment Id 2 and offset 1000?

- A. Fetches the entry at the physical address 2527 for segment Id 2
- B. A trap is generated
- C. Deadlock
- D. Fetches the entry at offset 27 in Segment Id 3

segmentation operating-system isro2014

[Answer key](#)

36.27.2 Segmentation: ISRO2015-31



If there are 32 segments, each size 1 k bytes, then the logical address should have

- A. 13 bits
- B. 14 bits
- C. 15 bits
- D. 16 bits

isro2015 operating-system virtual-memory segmentation

[Answer key](#)

36.28

Semaphore (6)



36.28.1 Semaphore: GATE CSE 1992 | Question: 02,x, ISRO2015-35

At a particular time of computation, the value of a counting semaphore is 7. Then 20 *P* operations and 15 *V* operations were completed on this semaphore. The resulting value of the semaphore is :

- A. 42
- B. 2
- C. 7
- D. 12

gate1992 operating-system semaphore easy isro2015 process-synchronization

[Answer key](#)

36.28.2 Semaphore: ISRO CSE 2007 | Question: 42, UGCNET-June2010-II: 37



Semaphores

- A. synchronize critical resources to prevent deadlock
- B. synchronize critical resources to prevent contention
- C. are used to do I/O
- D. are used for memory management

isro2007 operating-system process-synchronization ugcnetcse-june2010-paper2 semaphore

[Answer key](#)

36.28.3 Semaphore: ISRO CSE 2016 | Question: 45



At a particular time of computation the value of a counting semaphore is 7. Then 20 P operations and $x V$ operations were completed on this semaphore. If the new value of semaphore is 5, x will be

- A. 18 B. 22 C. 15 D. 13

operating-system process-synchronization semaphore isro2016

[Answer key](#)

36.28.4 Semaphore: ISRO CSE 2017 | Question: 71



At a particular time the value of counting semaphore is 10. It will become 7 after:

- A. 3 V operations B. 3 P operations
C. 5 V operations and 2 P operations D. 2 V operations and 5 P operations

isro2017 operating-system semaphore

[Answer key](#)

36.28.5 Semaphore: ISRO-DEC2017-70



A counting semaphore was initialized to 7. Then 20 P (wait) operations and $x V$ (signal) operations were completed on this semaphore. If the final value of semaphore is 5, then the value x will be

- A. 0 B. 13 C. 18 D. 5

isrodec2017 semaphore easy

[Answer key](#)

36.28.6 Semaphore: ISRO2015-30



Semaphores are used to solve the problem of

- i. Race Condition
- ii. Process Synchronization
- iii. Mutual Exclusion
- iv. None of the above

- A. I and II
B. II and III
C. All of the above
D. None of the above

semaphore isro2015 process-synchronization easy

[Answer key](#)

36.29

Thrashing (1)



36.29.1 Thrashing: ISRO-2013-54

Which of the following are the likely causes of thrashing?

- A. Page size was very small.
- B. There are too many users connected to the system.
- C. Least recently used policy is used for page replacement.
- D. First in First out policy is used for page replacement.

Answer key 

36.30

Threads (3)

36.30.1 Threads: ISRO CSE 2008 | Question: 60



Overlaying

- A. requires use of a loader
- C. is most used on large computers
- B. allows larger programs, but requires more effort
- D. is transparent to the user

Answer key 

36.30.2 Threads: ISRO CSE 2023 | Question: 11



Which of the following multithreading model is followed in Linux OS?

- A. One User Thread mapping to One Kernel Thread
- B. Many User Threads mapping to One Kernel Thread
- C. One User Thread mapping to Many Kernel Threads
- D. Many User Threads mapping to Many Kernel Threads

Answer key 

36.30.3 Threads: ISRO CSE 2023 | Question: 12



Purpose of priority inheritance protocol in synchronization mechanisms is

- A. To prevent priority inversion in systems having two or lesser priorities for a resource
- B. To provide mutual exclusion between threads and prevent data corruption
- C. To prevent priority inversion and ensure fairness in resource allocation
- D. To allow multiple threads to access any resource simultaneously

Answer key 

36.31

Unix (1)

36.31.1 Unix: ISRO CSE 2017 | Question: 72



The Linux command mknod myfifo b 4 16

- A. will create a character device if user is root
- C. will create a block device if user is root
- B. will create a named pipe FIFO if user is root
- D. None of these

Answer key 

36.32

Virtual Memory (10)

36.32.1 Virtual Memory: GATE CSE 2006 | Question: 62, ISRO2016-50



A CPU generates 32-bit virtual addresses. The page size is 4 KB. The processor has a translation look-aside buffer (TLB) which can hold a total of 128 page table entries and is 4-way set associative. The minimum size of the TLB tag is:

- A. 11 bits
- B. 13 bits
- C. 15 bits
- D. 20 bits

gatecse-2006 operating-system virtual-memory normal isro2016

[Answer key](#)

36.32.2 Virtual Memory: ISRO CSE 2007 | Question: 27



Virtual memory is

- A. Part of Main Memory only used for swapping
- B. A technique to allow a program, of size more than the size of main memory, to run
- C. Part of secondary storage used in program execution
- D. None of these

isro2007 operating-system virtual-memory

[Answer key](#)

36.32.3 Virtual Memory: ISRO CSE 2008 | Question: 65



Consider a logical address space of 8 pages of 1024 words mapped into memory of 32 frames. How many bits are there in the logical address?

- A. 13 bits
- B. 15 bits
- C. 14 bits
- D. 12 bits

isro2008 operating-system virtual-memory

[Answer key](#)

36.32.4 Virtual Memory: ISRO CSE 2011 | Question: 24



If the page size in a 32-bit machine is 4K bytes then the size of page table is

- A. 1 M bytes
- B. 2 M bytes
- C. 4 M bytes
- D. 4 K bytes

isro2011 operating-system paging virtual-memory

[Answer key](#)

36.32.5 Virtual Memory: ISRO CSE 2014 | Question: 35



Using the page table shown below, translate the physical address 25 to virtual address. The address length is 16 bits and page size is 2048 words while the size of the physical memory is four frames.

Page	Present (1-In, 0-Out)	Frame
0	1	3
1	1	2
2	1	0
3	0	—

- A. 25
- B. 6169
- C. 2073
- D. 4121

Answer key**36.32.6 Virtual Memory: ISRO CSE 2014 | Question: 44**

A computer has 16 pages of virtual address space but the size of main memory is only four frames. Initially the memory is empty. A program references the virtual pages in the order 0, 2, 4, 5, 2, 4, 3, 11, 2, 10. How many page faults occur if LRU page replacement algorithm is used?

- A. 3 B. 5 C. 7 D. 8

Answer key**36.32.7 Virtual Memory: ISRO CSE 2014 | Question: 70**

Dirty bit is used to indicate which of the following?

- A. A page fault has occurred B. A page has corrupted data
 C. A page has been modified after being loaded D. An illegal access of page cache

Answer key**36.32.8 Virtual Memory: ISRO CSE 2014 | Question: 77**

What is the size of the physical address space in a paging system which has a page table containing 64 entries of 11 bit each (including valid and invalid bit) and a page size of 512 bytes?

- A. 2^{11} B. 2^{15} C. 2^{19} D. 2^{20}

Answer key**36.32.9 Virtual Memory: ISRO CSE 2016 | Question: 22**

Let the page fault service time be 10 ms in a computer with average memory access time being 20 ns. If one page fault is generated for every 10^6 memory accesses, what is the effective access time for the memory?

- A. 21.4 ns B. 29.9 ns C. 23.5 ns D. 35.1 ns

Answer key**36.32.10 Virtual Memory: ISRO CSE 2023 | Question: 57**

State whether true or false:

- i. Virtualization facilitates multiple OS simultaneously on the same hardware
 ii. In dual boot, multiple OS can run simultaneously

- A. (i) True (ii) False B. (i) False (ii) True
 C. (i) True (ii) True D. (i) False (ii) False

Answer key

Answer Keys



37.1

Bit Manipulation (1)



37.1.1 Bit Manipulation: ISRO-DEC2017-74

Consider the function

```
int func(int num)
{
    int count=0;
    while(num)
    {
        count++;
        num>>=1;
    }
    return(count);
}
```

For $func(435)$ the value returned is

- A. 9 B. 8 C. 0 D. 10

isrodec2017 programming-in-c bit-manipulation

Answer key

37.2

Output (1)



37.2.1 Output: ISRO-DEC2017-80

Consider the following C function

```
#include<stdio.h>
int main(void)
{
    char c[]="ICRBCSIT17";
    char *p=c;
    printf("%s",c+2[p]-6[p]-1);
    return 0;
}
```

The output of the program is

- A. SI B. IT C. T1 D. 17

isrodec2017 programming-in-c output

Answer key

Answer Keys

37.1.1	A	37.2.1	D
--------	---	--------	---



38.1

AVL Tree (3)



38.1.1 AVL Tree: GATE CSE 2009 | Question: 37,ISRO-DEC2017-55

What is the maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0.

- A. 2 B. 3 C. 4 D. 5

gatecse-2009 data-structures binary-search-tree normal isrodec2017 avl-tree

[Answer key](#)

38.1.2 AVL Tree: ISRO CSE 2020 | Question: 20



The minimum height of an AVL tree with n nodes is

- A. Ceil ($\log_2(n + 1)$) B. $1.44 \log_2 n$
 C. Floor ($\log_2(n + 1)$) D. $1.64 \log_2 n$

isro-2020 data-structures avl-tree normal

[Answer key](#)

38.1.3 AVL Tree: ISRO-2013-2



The number of rotations required to insert a sequence of elements 9,6,5,8,7,10 into an empty AVL tree is?

- A. 0 B. 1 C. 2 D. 3

isro2013 data-structures avl-tree

[Answer key](#)

38.2

Array (3)



38.2.1 Array: ISRO-2013-1

Let $A(1 : 8, -5 : 5, -10 : 5)$ be a three dimensional array. How many elements are there in the array A ?

- A. 1200 B. 1408 C. 33 D. 1050

isro2013 array easy

[Answer key](#)

38.2.2 Array: ISRO-2013-9



In an array of $2N$ elements that is both 2-ordered and 3-ordered, what is the maximum number of positions that an element can be from its position if the array were 1-ordered?

- A. 1 B. 2 C. $N/2$ D. $2N - 1$

isro2013 array

[Answer key](#)

38.2.3 Array: ISRO-DEC2017-46



In a compact one-dimensional array representation for lower triangular matrix (all elements

above diagonal are zero) of size $n \times n$, non zero elements of each row are stored one after another, starting from first row, the index of $(i, j)^{th}$ element in this new representation is

- A. $i + j$ B. $j + \frac{i(i-1)}{2}$ C. $i + j - 1$ D. $i + \frac{j(j-1)}{2}$

isrodec2017 array matrix

[Answer key](#)

38.3

Binary Heap (2)

38.3.1 Binary Heap: ISRO CSE 2018 | Question: 57



Given a binary-max heap. The elements are stored in an arrays as 25, 14, 16, 13, 10, 8, 12. What is the content of the array after two delete operations?

- | | |
|----------------------|----------------------|
| a. 14, 13, 8, 12, 10 | b. 14, 12, 13, 10, 8 |
| c. 14, 13, 12, 8, 10 | d. 14, 13, 12, 10, 8 |

isro2018 data-structures binary-heap

[Answer key](#)

38.3.2 Binary Heap: ISRO-DEC2017-45



Match the following and choose the correct answer in the order A, B, C

A. Heap Construction	p. $O(n \log n)$
B. Hash Table construction with linear probing	q. $O(n^2)$
C. AVL Tree Construction	r. $O(n)$

(Bounds given may or may not be asymptotically tight)

- | | |
|--------------------------|--------------------------|
| A. $a - q, b - r, c - p$ | B. $a - p, b - q, c - r$ |
| C. $a - q, b - p, c - r$ | D. $a - r, b - q, c - p$ |

isrodec2017 binary-heap data-structures

[Answer key](#)

38.4

Binary Search Tree (10)

38.4.1 Binary Search Tree: GATE CSE 2003 | Question: 19, ISRO2009-24



Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?

- | | |
|------------------------|------------------------|
| A. 7 5 1 0 3 2 4 6 8 9 | B. 0 2 4 3 1 6 5 9 8 7 |
| C. 0 1 2 3 4 5 6 7 8 9 | D. 9 8 6 4 2 3 0 1 5 7 |

gatecse-2003 binary-search-tree easy isro2009

[Answer key](#)

38.4.2 Binary Search Tree: GATE CSE 2003 | Question: 63, ISRO2009-25



A data structure is required for storing a set of integers such that each of the following operations can be done in $O(\log n)$ time, where n is the number of elements in the set.

- I. Deletion of the smallest element

II. Insertion of an element if it is not already present in the set

Which of the following data structures can be used for this purpose?

- A. A heap can be used but not a balanced binary search tree
- B. A balanced binary search tree can be used but not a heap
- C. Both balanced binary search tree and heap can be used
- D. Neither balanced search tree nor heap can be used

gatecse-2003 data-structures easy isro2009 binary-search-tree

[Answer key](#)



38.4.3 Binary Search Tree: GATE CSE 2004 | Question: 4, ISRO2009-26

The following numbers are inserted into an empty binary search tree in the given order: 10, 1, 3, 5, 15, 12, 16. What is the height of the binary search tree (the height is the maximum distance of a leaf node from the root)?

- A. 2
- B. 3
- C. 4
- D. 6

gatecse-2004 data-structures binary-search-tree easy isro2009

[Answer key](#)



38.4.4 Binary Search Tree: ISRO CSE 2011 | Question: 11

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

- A. 5
- B. 14
- C. 24
- D. 35

isro2011 data-structures binary-search-tree combinatory

[Answer key](#)



38.4.5 Binary Search Tree: ISRO CSE 2011 | Question: 62

The average depth of a binary search tree is

- A. $O(n^{0.5})$
- B. $O(n)$
- C. $O(\log n)$
- D. $O(n \log n)$

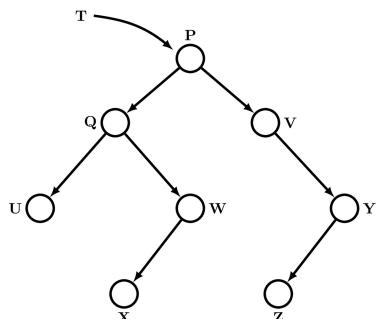
isro2011 data-structures binary-search-tree time-complexity

[Answer key](#)



38.4.6 Binary Search Tree: ISRO CSE 2014 | Question: 41

Consider the following binary search tree T given below: Which node contains the fourth smallest element in T?



A. Q

B. V

C. W

D. X

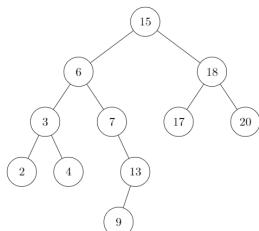
isro2014 data-structures binary-search-tree

Answer key

38.4.7 Binary Search Tree: ISRO CSE 2020 | Question: 19



What is the in-order successor of 15 in the given binary search tree?



A. 18

B. 6

C. 17

D. 20

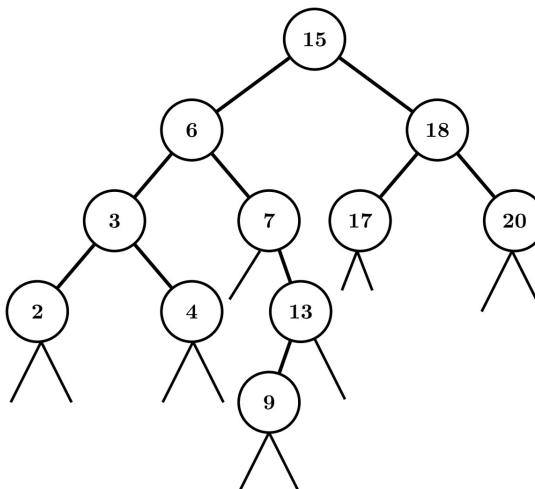
isro-2020 data-structures binary-search-tree easy

Answer key

38.4.8 Binary Search Tree: ISRO CSE 2023 | Question: 67



What is the Inorder predecessor of 15 in the Binary Search Tree shown below



A. 18

B. 7

C. 9

D. 13

isro-cse-2023 binary-search-tree data-structures

Answer key

38.4.9 Binary Search Tree: ISRO-DEC2017-49



A binary search tree is used to locate the number 43. Which one of the following probe sequence is not possible?

A. 61, 52, 14, 17, 40, 43
C. 81, 61, 52, 14, 41, 43

B. 10, 65, 31, 48, 37, 43
D. 17, 77, 27, 66, 18, 43

isrodec2017 binary-search-tree data-structures

Answer key

38.4.10 Binary Search Tree: ISRO-DEC2017-51

Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the reversal ordering on natural numbers i.e. 9 is assumed to be smallest and 0 is assumed to be largest. The *in-order* traversal of the resultant binary search tree is

- A. 9, 8, 6, 4, 2, 3, 0, 1, 5, 7
- B. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
- C. 0, 2, 4, 3, 1, 6, 5, 9, 8, 7
- D. 9, 8, 7, 6, 5, 4, 3, 2, 1, 0

isrodec2017 binary-search-tree data-structures

Answer key 

38.5

Binary Tree (8)

38.5.1 Binary Tree: ISRO CSE 2008 | Question: 75

A complete binary tree with the property that the value at each node is at least as large as the values at its children is known as

- A. binary search tree
- B. AVL tree
- C. completely balanced tree
- D. Heap

isro2008 data-structures binary-tree

Answer key 

38.5.2 Binary Tree: ISRO CSE 2009 | Question: 31

A full binary tree with n leaves contains

- A. n nodes
- B. $\log_2 n$ nodes
- C. $2n - 1$
- D. 2^n nodes

isro2009 data-structures binary-tree

Answer key 

38.5.3 Binary Tree: ISRO CSE 2016 | Question: 30

A complete binary tree with n non-leaf nodes contains

- A. $\log_2 n$ nodes
- B. $n + 1$ nodes
- C. $2n$ nodes
- D. $2n + 1$ nodes

data-structures binary-tree isro2016

Answer key 

38.5.4 Binary Tree: ISRO CSE 2023 | Question: 41

Time complexity to find the diameter of a binary tree having n nodes is

- A. $O(n^2)$
- B. $O(n)$
- C. $O(1)$
- D. $O(\log n)$

isro-cse-2023 binary-tree time-complexity data-structures

Answer key 

38.5.5 Binary Tree: ISRO-2013-32

Which of the following number of nodes can form a full binary tree?

- A. 8
- B. 15
- C. 14
- D. 13

isro2013 binary-tree easy

Answer key 

38.5.6 Binary Tree: ISRO-DEC2017-28



The number of structurally different possible binary trees with 4 nodes is

- A. 14
- B. 12
- C. 336
- D. 168

isrodec2017 binary-tree data-structures

[Answer key](#)

38.5.7 Binary Tree: ISRO-DEC2017-54



A strictly binary tree with 10 leaves

- A. cannot have more than 19 nodes
- B. has exactly 19 nodes
- C. has exactly 17 nodes
- D. has exactly 20 nodes

isrodec2017 binary-tree data-structures

[Answer key](#)

38.5.8 Binary Tree: ISRO-DEC2017-57



The *in-order* and *pre-order* traversal of a binary tree are `d b e a f c g` and `a b d e c f g` respectively. The *post-order* traversal of a binary tree is

1. `e d b g f c a`
2. `e d b f g c a`
3. `d e b f g c a`
4. `d e f g b c a`

isrodec2017 data-structures binary-tree

[Answer key](#)

38.6

Data Structures (1)



38.6.1 Data Structures: ISRO CSE 2020 | Question: 32

G is an undirected graph with vertex set $\{v_1, v_2, v_3, v_4, v_5, v_6, v_7\}$ and edge set $\{v_1v_2, v_1v_3, v_1v_4, v_2v_4, v_2v_5, v_3v_4, v_4v_5, v_4v_6, v_5v_6, v_6v_7\}$. A breadth first search of the graph is performed with v_1 as the root node. Which of the following is a tree edge?

- A. v_2v_4
- B. v_1v_4
- C. v_4v_5
- D. v_3v_4

isro-2020 data-structures breadth-first-search normal

[Answer key](#)

38.7

Expression Evaluation (1)



38.7.1 Expression Evaluation: ISRO CSE 2023 | Question: 4

In Reverse Polish notation, expression $A^* B + C^* D$ is written as

- A. AB^*CD^*+
- B. A^*BCD^*+
- C. AB^*CD+^*
- D. $A^* B^*CD+$

isro-cse-2023 data-structures stack expression-evaluation

[Answer key](#)

38.8

Infix Prefix (5)

38.8.1 Infix Prefix: GATE CSE 2004 | Question: 38, ISRO2009-27



Assume that the operators $+$, $-$, \times are left associative and $^$ is right associative. The order of precedence (from highest to lowest) is $^$, \times , $+$, $-$. The postfix expression corresponding to the infix expression $a + b \times c - d ^ e ^ f$ is

- A. $abc \times +def ^ ^ -$
- B. $abc \times +de ^ f ^ -$
- C. $ab + c \times d - e ^ f ^$
- D. $- + a \times bc ^ ^ def$

gatecse-2004 stack isro2009 infix-prefix

[Answer key](#)

38.8.2 Infix Prefix: GATE CSE 2007 | Question: 38, ISRO2016-27



The following postfix expression with single digit operands is evaluated using a stack:

$$8\ 2\ 3\ ^\ / \ 2\ 3\ * + 5\ 1\ * -$$

Note that $^$ is the exponentiation operator. The top two elements of the stack after the first $*$ is evaluated are

- A. 6, 1
- B. 5, 7
- C. 3, 2
- D. 1, 5

gatecse-2007 data-structures stack normal infix-prefix isro2016

[Answer key](#)

38.8.3 Infix Prefix: ISRO CSE 2009 | Question: 28



The infix expression $A + (B - C)^*D$ is correctly represented in prefix notation as

- A. $A + B - C^*D$
- B. $+A^* - BCD$
- C. $ABC - D^* +$
- D. $A + BC - D^*$

isro2009 data-structures stack infix-prefix

[Answer key](#)

38.8.4 Infix Prefix: ISRO CSE 2017 | Question: 69



Choose the equivalent prefix form of the following expression

$(a+(b-c))^*((d-e)/(f+g-h))$

- A. $*+a-bc/-de-+fg$
- B. $*+a-bc-/de-+fg$
- C. $*+a-bc/-ed-+fg$
- D. $*+ab-c/-de-+fg$

isro2017 data-structures infix-prefix stack

[Answer key](#)

38.8.5 Infix Prefix: ISRO CSE 2020 | Question: 4



Convert the pre-fix expression to in-fix $- * + ABC^* - DE + FG$

- A. $(A - B)^* C + (D^* E) - (F + G)$
- B. $(A + B)^* C - (D - E)^* (F + G)$
- C. $(A + B - C)^* (D - E)^* (F + G)$
- D. $(A + B)^* C - (D^* E) - (F + G)$

isro-2020 data-structures infix-prefix normal

[Answer key](#)

38.9

Linked List (9)



38.9.1 Linked List: ISRO CSE 2008 | Question: 71

The time required to search an element in a linked list of length n is

- A. $O(\log_2 n)$
- B. $O(n)$
- C. $O(1)$
- D. $O(n^2)$

isro2008 data-structures linked-list time-complexity

[Answer key](#)

38.9.2 Linked List: ISRO CSE 2008 | Question: 72



Which of the following operations is performed more efficiently by doubly linked list than by linear linked list?

- A. Deleting a node whose location is given
- B. Searching an unsorted list for a given item
- C. Inserting a node after the node with a given location
- D. Traversing the list to process each node

isro2008 data-structures linked-list

[Answer key](#)

38.9.3 Linked List: ISRO CSE 2008 | Question: 76



The minimum number of fields with each node of doubly linked list is

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

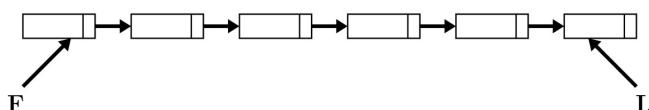
isro2008 data-structures linked-list

[Answer key](#)

38.9.4 Linked List: ISRO CSE 2014 | Question: 49



Consider a single linked list where F and L are pointers to the first and last elements respectively of the linked list. The time for performing which of the given operations depends on the length of the linked list?



- A. Delete the first element of the list
- B. Interchange the first two elements of the list
- C. Delete the last element of the list
- D. Add an element at the end of the list

Answer key**38.9.5 Linked List: ISRO CSE 2017 | Question: 16**

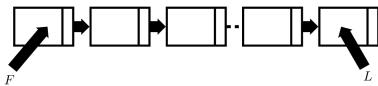
Given two statements

- I. Insertion of an element should be done at the last node of the circular list
 - II. Deletion of an element should be done at the last node of the circular list
-
- A. Both are true
 - B. Both are false
 - C. First is false and second is true
 - D. None of the above

Answer key**38.9.6 Linked List: ISRO CSE 2017 | Question: 53**

In a doubly linked list the number of pointers affected for an insertion operation will be

- A. 4
- B. 0
- C. 1
- D. Depends on the nodes of doubly linked list

Answer key**38.9.7 Linked List: ISRO CSE 2018 | Question: 63**Consider a singly linked list of the form where F is a pointer to the first element in the linked list and L is the pointer to the last element in the list. The time of which of the following operations depends on the length of the list?

- a. Delete the last element of the list
- b. Delete the first element of the list
- c. Add an element after the last element of the list
- d. Interchange the first two elements of the list

Answer key**38.9.8 Linked List: ISRO CSE 2018 | Question: 79**

A doubly linked list is declared as:

```
struct Node {
    int Value;
    struct Node *Fwd;
    struct Node *Bwd;
};
```

Where Fwd and Bwd represent forward and backward link to the adjacent elements of the list. Which of the following segment of code deletes the node pointed to by X from the doubly linked list, if it is assumed that X points to neither the first nor the last node of the list?

- a. $X \rightarrow Bwd \rightarrow Fwd = X \rightarrow Fwd; X \rightarrow Fwd \rightarrow Bwd = X \rightarrow Bwd;$
- b. $X \rightarrow Bwd.Fwd = X \rightarrow Fwd; X.Fwd \rightarrow Bwd = X \rightarrow Bwd;$

- c. $X.Bwd \rightarrow Fwd = X.Bwd$; $x \rightarrow Fwd.Bwd = X.Bwd$;
- d. $X \rightarrow Bwd \rightarrow Fwd = X \rightarrow Bwd$; $X \rightarrow Fwd \rightarrow Bwd = X \rightarrow Fwd$;

isro2018 linked-list data-structures

[Answer key](#)



38.9.9 Linked List: ISRO-2013-4

The following steps in a linked list

```
p = getnode()
info(p) = 10
next(p) = list
list = p
```

result in which type of operation?

- A. Pop operation in stack
- B. Removal of a node
- C. Inserting a node
- D. Modifying an existing node

isro2013 linked-list

[Answer key](#)



38.10

Prefix (1)

38.10.1 Prefix: ISRO CSE 2023 | Question: 46

The prefix expression is $- + abc + d^*$ ef. Evaluate the expression for $a = 10, b = 2, c = 5, d = 3, e = 4, f = 1$

- A. 3
- B. 4
- C. 10
- D. 6

isro-cse-2023 expression-evaluation prefix programming-in-c

[Answer key](#)



38.11

Priority Queue (2)

38.11.1 Priority Queue: ISRO CSE 2023 | Question: 69

In a priority queue, insertion and deletion can be done at

- A. Front
- B. Back
- C. Middle
- D. Any position

isro-cse-2023 priority-queue data-structures

[Answer key](#)



38.11.2 Priority Queue: ISRO-DEC2017-52

A priority queue is implemented as a *Max-heap*. Initially, it has 5 elements. The level order traversal of the heap is 10, 8, 5, 3, 2. Two new elements 1 and 7 are inserted into the heap in that order. The level order traversal of the heap after the insertion of the elements is

1. 10, 8, 7, 5, 3, 2, 1
2. 10, 8, 7, 2, 3, 1, 5
3. 10, 8, 7, 1, 2, 3, 5

4. 10,8,7,3,2,1,5

isrodec2017 data-structures binary-heap priority-queue

Answer key 

38.12

Queue (2)

38.12.1 Queue: ISRO CSE 2014 | Question: 36



Consider a standard Circular Queue implementation (which has the same condition for Queue Full and Queue Empty) whose size is 11 and the elements of the queue are $q[0], q[1], \dots, q[10]$.

The front and rear pointers are initialized to point at $q[2]$. In which position will the ninth element be added?

- A. $q[0]$ B. $q[1]$ C. $q[9]$ D. $q[10]$

data-structures queue isro2014

Answer key 

38.12.2 Queue: ISRO-DEC2017-53



The minimum number of stacks needed to implement a queue is

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

isrodec2017 data-structures stack queue

Answer key 

38.13

Radix Sort (1)

38.13.1 Radix Sort: ISRO CSE 2023 | Question: 48



What is the maximum number of comparisons needed to sort 6 items using radix sort, if each number is a 3-digit decimal number?

- A. 120 B. 180 C. 210 D. 360

isro-cse-2023 radix-sort data-structures

Answer key 

38.14

Stack (7)

38.14.1 Stack: ISRO CSE 2007 | Question: 16, ISRO CSE 2009 | Question: 30, ISRO CSE 2014 | Question: 43



The five items: A, B, C, D, and E are pushed in a stack, one after other starting from A. The stack is popped four items and each element is inserted in a queue. The two elements are deleted from the queue and pushed back on the stack. Now one item is popped from the stack. The popped item is

- A. A B. B C. C D. D

isro2007 stack isro2009 isro2014

Answer key 

38.14.2 Stack: ISRO CSE 2008 | Question: 70



Stack A has the entries a, b, c (with a on top). Stack B is empty. An entry popped out of stack A can be printed immediately or pushed to stack B. An entry popped out of the stack B can be only be printed. In this arrangement, which of the following permutations of a, b, c are not possible?

- A. b a c
- B. b c a
- C. c a b
- D. a b c

isro2008 data-structures stack

[Answer key](#)

38.14.3 Stack: ISRO CSE 2017 | Question: 59



The best data structure to check whether an arithmetic expression has balanced parenthesis is a:

- A. Queue
- B. Stack
- C. Tree
- D. List

isro2017 data-structures stack easy

[Answer key](#)

38.14.4 Stack: ISRO CSE 2020 | Question: 72



A stack is implemented with an array of ' $A[0...N - 1]$ ' and a variable ' pos '. The push and pop operations are defined by the following code.

```
push (x)
    A[pos] <- x
    pos <- pos + 1
end push
pop()
    pos <- pos - 1
    return A[pos]
end pop
```

Which of the following will initialize an empty stack with capacity N for the above implementation

- A. $pos \leftarrow -1$
- B. $pos \leftarrow 0$
- C. $pos \leftarrow 1$
- D. $pos \leftarrow N - 1$

isro-2020 data-structures stack normal

[Answer key](#)

38.14.5 Stack: ISRO-DEC2017-47



Which of the following permutation can be obtained in the same order using a stack assuming that

input is the sequence 5, 6, 7, 8, 9 in that order?

- A. 7, 8, 9, 5, 6
- B. 5, 9, 6, 7, 8
- C. 7, 8, 9, 6, 5
- D. 9, 8, 7, 5, 6

isrodec2017 stack data-structures

[Answer key](#)

38.14.6 Stack: ISRO2015-11



If the sequence of operations - push (1), push (2), pop, push (1), push (2), pop, pop, pop, push (2), pop are performed on a stack, the sequence of popped out values

- A. 2,2,1,1,2
- B. 2,2,1,2,2
- C. 2,1,2,2,1
- D. 2,1,2,2,2

isro2015 data-structures stack easy

[Answer key](#)

38.14.7 Stack: ISRO2015-15



The queue data structure is to be realized by using stack. The number of stacks needed would be

- A. It cannot be implemented
- B. 2 stacks
- C. 4 stacks
- D. 1 stack

isro2015 data-structures stack

[Answer key](#)

38.15

Tree (5)



38.15.1 Tree: ISRO CSE 2011 | Question: 19

If node A has three siblings and B is parent of A, what is the degree of A?

- A. 0
- B. 3
- C. 4
- D. 5

isro2011 data-structures tree

[Answer key](#)

38.15.2 Tree: ISRO CSE 2014 | Question: 73



How many different trees are there with four nodes A, B, C and D?

- A. 30
- B. 60
- C. 90
- D. 120

isro2014 data-structures tree combinatory

[Answer key](#)

38.15.3 Tree: ISRO CSE 2020 | Question: 71



Of the following, which best approximates the ratio of the number of nonterminal nodes in the total number of nodes in a complete K -ary tree of depth N ?

- A. $1/N$
- B. $N - 1/N$
- C. $1/K$
- D. $K - 1/K$

isro-2020 data-structures tree normal

[Answer key](#)

38.15.4 Tree: ISRO CSE 2023 | Question: 42



The preorder traversal of a binary search tree is $(10, 5, 1, 7, 40, 50)$. The postorder traversal is

- A. $(1, 5, 7, 10, 40, 50)$
- B. $(50, 40, 10, 7, 5, 1)$
- C. $(1, 7, 5, 10, 40, 50)$
- D. $(1, 5, 7, 50, 40, 10)$

isro-cse-2023 binary-search-tree binary-tree tree data-structures

[Answer key](#)

38.15.5 Tree: ISRO-DEC2017-56



Which one of the following property is correct for a red-black tree?

- A. Every simple path from anode to a descendant leaf contains the same number of black nodes.
- B. If a node is red, then one children is red and another is black.
- C. If a node is red, then both its children are red.

D. Every leaf node (sentinel node) is red.

isrodec2017 data-structures binary-search-tree tree

Answer key

38.16

Tree Traversal (4)

38.16.1 Tree Traversal: ISRO CSE 2011 | Question: 26



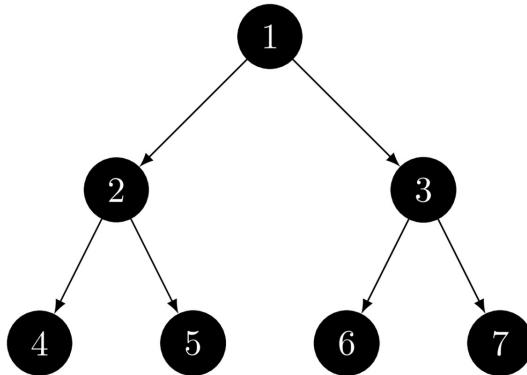
The in-order traversal of a tree resulted in FBGADCE. Then the pre-order traversal of that tree would result in

- A. FGBDECA B. ABFGCDE C. BFGCDEA D. AFGBDEC

isro2011 data-structures tree-traversal

Answer key

38.16.2 Tree Traversal: ISRO CSE 2017 | Question: 50



If the post order traversal gives ab -cd * + then the label of the nodes 1,2,3.. will be

- A. +, -, *, a,b,c,d
B. a, -,b,+c,*d
C. a,b,c,d,-,*+
D. -,a,b,+,*,c,d

isro2017 data-structures binary-tree tree-traversal

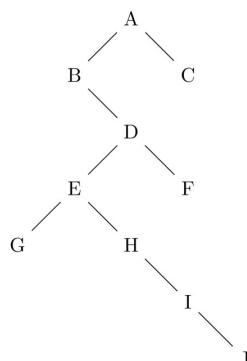
Answer key

38.16.3 Tree Traversal: ISRO CSE 2018 | Question: 80

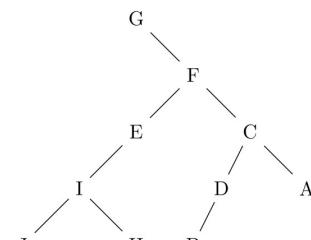


If Tree-1 and Tree-2 are the trees indicated below:

Tree - 1



Tree - 2



Which traversals of Tree-1 and Tree-2, respectively, will produce the same sequence?

- a. Preorder, postorder
- b. Postorder, inorder
- c. Postorder, preorder
- d. Inorder, preorder

isro2018 data-structures tree-traversal

[Answer key](#)



38.16.4 Tree Traversal: ISRO CSE 2020 | Question: 23

The post-order traversal of binary tree is ACEDBHIGF. The pre-order traversal is

- A. A B C D E F G H I
- B. F B A D C E G I H
- C. F A B C D E G H I
- D. A B D C E F G I H

isro-2020 data-structures binary-tree tree-traversal normal

[Answer key](#)

Answer Keys

38.1.1	B	38.1.2	C	38.1.3	D	38.2.1	B	38.2.2	A
38.2.3	B	38.3.1	C	38.3.2	D	38.4.1	C	38.4.2	B
38.4.3	B	38.4.4	B	38.4.5	C	38.4.6	C	38.4.7	C
38.4.8	D	38.4.9	D	38.4.10	D	38.5.1	D	38.5.2	C
38.5.3	D	38.5.4	B	38.5.5	B	38.5.6	A	38.5.7	B
38.5.8	C	38.6.1	B	38.7.1	A	38.8.1	A	38.8.2	A
38.8.3	B	38.8.4	A	38.8.5	B	38.9.1	B	38.9.2	A
38.9.3	C	38.9.4	C	38.9.5	B	38.9.6	X	38.9.7	A
38.9.8	A	38.9.9	C	38.10.1	X	38.11.1	D	38.11.2	D
38.12.1	A	38.12.2	C	38.13.1	B	38.14.1	D	38.14.2	C
38.14.3	B	38.14.4	D	38.14.5	C	38.14.6	A	38.14.7	B
38.15.1	X	38.15.2	D	38.15.3	C	38.15.4	X	38.15.5	A
38.16.1	B	38.16.2	A	38.16.3	X	38.16.4	B		

39.1

Activation Record (1)

39.1.1 Activation Record: ISRO CSE 2014 | Question: 51



Which of the following is NOT represented in a subroutine's activation record frame for a stack-based programming language?

- A. Values of local variables
- B. Return address
- C. Heap area
- D. Information needed to access non local variables

isro2014 programming activation-record

[Answer key](#)

39.2

Array (4)

39.2.1 Array: ISRO CSE 2008 | Question: 1



Which of the following is an illegal array definition?

- A. Type COLONGE : (LIME, PINE, MUSK, MENTHOL); var a : array [COLONGE] of REAL;
- B. var a : array [REAL] of REAL;
- C. var a : array ['A'...'Z'] of REAL;
- D. var a : array [BOOLEAN] of REAL;

isro2008 array

[Answer key](#)

39.2.2 Array: ISRO CSE 2009 | Question: 29



A one dimensional array A has indices 1....75. Each element is a string and takes up three memory words. The array is stored at location 1120 decimal. The starting address of A[49] is

- A. 1267
- B. 1164
- C. 1264
- D. 1169

isro2009 array programming

[Answer key](#)

39.2.3 Array: ISRO CSE 2020 | Question: 18



Consider a 2-dimensional array x with 10 rows and 4 columns, with each element storing a value equivalent to the product of row number and column number. The array is stored in row-major format. If the first element $x[0][0]$ occupies the memory location with address 1000 and each element occupies only one memory location, which all locations (in decimal) will be holding a value of 10?

- a. 1018, 1019
- b. 1022, 1041
- c. 1013, 1014
- d. 1000, 1399

isro-2020 programming array normal

[Answer key](#)

39.2.4 Array: ISRO CSE 2020 | Question: 61



What is the output of the code given below?

```
# include<stdio.h>
int main()
{
    char name[]="satellites";
```

```

int len;
int size;
len= strlen(name);
size = sizeof(name);
printf("%d",len*size);
return 0;
}

```

- A. 100 B. 110 C. 40 D. 44

isro-2020 programming array normal

[Answer key](#)

39.3

Array of Pointers (1)

39.3.1 Array of Pointers: ISRO CSE 2023 | Question: 68



Pointer p to an array of integers (of size 2 Bytes) is initialised to 200. What is the value of $p + 3$?

- A. 206 B. 203 C. 212 D. 204

isro-cse-2023 array-of-pointers easy

[Answer key](#)

39.4

Functions (2)

39.4.1 Functions: ISRO CSE 2020 | Question: 78



In the following procedure

```

Integer procedure P(X,Y);
Integer X,Y;
value x;
begin
  K=5;
  L=8;
  P=x+y;
end

```

X is called by value and Y is called by name. If the procedure were invoked by the following program fragment

```

K=0;
L=0;
Z=P(K,L);

```

then the value of Z will be set equal to

- A. 5 B. 8 C. 13 D. 0

isro-2020 programming functions normal

[Answer key](#)

39.4.2 Functions: ISRO2015-70



The following program

```

main()
{
  inc(); inc(); inc();
}
inc()

```

```
{
    static int x;
    printf("%d", ++x);
}
```

- A. prints 012
- B. prints 123
- C. prints 3 consecutive, but unpredictable numbers
- D. prints 111

isro2015 programming-in-c functions

[Answer key](#)

39.5

Identify Function (1)

39.5.1 Identify Function: ISRO-2013-63



Consider the following C code.

```
#include <stdio.h>
#include <math.h>
void main ()
{
    double pi = 3.1415926535;
    int a = 1;
    int i;
    for (i=0; i < 3; i++)
        if (a == cos(pi * i/2))
            printf("%d", 1);
        else printf("%d", 0);
}
```

What would the program print?

- A. 000
- B. 010
- C. 101
- D. 111

isro2013 programming-in-c identify-function output

[Answer key](#)

39.6

Loop (7)

39.6.1 Loop: ISRO CSE 2011 | Question: 63



What is the output of the following C code?

```
#include <stdio.h>

int main()
{
    int index;
    for(index=1; index<=5; index++)
    {
        printf("%d", index);
        if (index==3)
            continue;
    }
}
```

- A. 1245
- B. 12345
- C. 12245
- D. 12354

isro2011 programming-in-c loop

[Answer key](#)

39.6.2 Loop: ISRO CSE 2014 | Question: 38



How many lines of output does the following C code produce?

```
#include<stdio.h>
float i=2.0;
float j=1.0;
float sum = 0.0;
main()
{
    while (i/j > 0.001)
    {
        j+=j;
        sum=sum+(i/j);
        printf("%f\n", sum);
    }
}
```

- A. 8 B. 9 C. 10 D. 11

isro2014 programming-in-c loop output

[Answer key](#)

39.6.3 Loop: ISRO CSE 2017 | Question: 62



What will be the output of the following C code?

```
#include <stdio.h>
main()
{
    int i;
    for(i=0;i<5;i++)
    {
        int i=10;
        printf("%d", i);
        i++;
    }
    return 0;
}
```

- A. 10 11 12 13 14 B. 10 10 10 10 10
C. 0 1 2 3 4 D. Compilation error

isro2017 programming-in-c loop output

[Answer key](#)

39.6.4 Loop: ISRO CSE 2017 | Question: 63



What does the following program do when the input is unsigned 16 bit integer?

```
#include<stdio.h>
main(){
    unsigned int num;
    int i;
    scanf("%u", &num);
    for(i=0;i<16;i++){
        printf("%d", (num<<i&1<<15)?1:0);
    }
}
```

- A. It prints all even bits from num
C. It prints binary equivalent of num B. It prints all odd bits from num
D. None of above

isro2017 programming-in-c loop

[Answer key](#)

39.6.5 Loop: ISRO2015-71



Consider the following program fragment

```
i=6720; j=4;  
while (i%j)==0  
{  
    i=i/j;  
    j=j+1;  
}
```

On termination j will have the value

- A. 4 B. 8 C. 9 D. 6720

isro2015 programming-in-c loop

[Answer key](#)

39.6.6 Loop: ISRO2015-73



The output of the following program is

```
main()  
{  
    static int x[] = {1,2,3,4,5,6,7,8};  
    int i;  
    for (i=2; i<6; ++i)  
        x[x[i]]=x[i];  
    for (i=0; i<8; ++i)  
        printf("%d", x[i]);  
}
```

- A. 1 2 3 3 5 5 7 8 B. 1 2 3 4 5 6 7 8
C. 8 7 6 5 4 3 2 1 D. 1 2 3 5 4 6 7 8

isro2015 programming-in-c loop output

[Answer key](#)

39.6.7 Loop: ISRO2015-75



The for loop

```
for (i=0; i<10; ++i)  
printf("%d", i&1);
```

prints

- A. 0101010101 B. 0111111111 C. 0000000000 D. 1111111111

isro2015 programming-in-c loop

[Answer key](#)

39.7

Loop Invariants (1)



39.7.1 Loop Invariants: ISRO CSE 2007 | Question: 15

Consider the following pseudo-code

```
x:=1;  
i:=1;  
while (x <= 1000)  
begin  
    x:=2^x;  
    i:=i+1;  
end;
```

What is the value of i at the end of the pseudo-code?

- A. 4 B. 5 C. 6 D. 7

isro2007 loop-invariants

[Answer key](#)

39.8

Macros (2)

39.8.1 Macros: ISRO CSE 2014 | Question: 3



What is the output of the following C program?

```
#include<stdio.h>
#define SQR(x) (x*x)

int main()
{
    int a;
    int b=4;
    a=SQR(b+2);
    printf("%d\n",a);
    return 0;
}
```

- A. 14 B. 36 C. 18 D. 20

programming-in-c macros isro2014

[Answer key](#)

39.8.2 Macros: ISRO2015-76



Consider the following statements

```
#define hypotenuse (a, b) sqrt (a*a+b*b);
```

The macro call `hypotenuse(a+2,b+3);`

- A. Finds the hypotenuse of a triangle with sides $a + 2$ and $b + 3$
B. Finds the square root of $(a + 2)^2$ and $(b + 3)^2$
C. Is invalid
D. Find the square root of $3 * a + 4 * b + 5$

programming-in-c macros isro2015

[Answer key](#)

39.9

Output (5)

39.9.1 Output: ISRO CSE 2014 | Question: 32



What is the output of the following C program?

```
#include<stdio.h>
void main(void){
    int shifty;
    shifty=0570;
    shifty=shifty>>4;
    shifty=shifty<<6;
    printf("The value of shifty is %o \n",shifty);
}
```

- A. The value of shifty is 15c0
C. The value of shifty is 5700
B. The value of shifty is 4300
D. The value of shifty is 2700

programming-in-c isro2014 output

[Answer key](#)

39.9.2 Output: ISRO CSE 2017 | Question: 64



What is the output of the following program?

```
#include<stdio.h>
int tmp=20;
main()
{
    printf("%d", tmp);
    func();
    printf("%d", tmp);

}
func()
{
    static int tmp=10;
    printf("%d", tmp);
}
```

- A. 20 10 10 B. 20 10 20 C. 20 20 20 D. 10 10 10

isro2017 programming-in-c functions output

[Answer key](#)

39.9.3 Output: ISRO CSE 2018 | Question: 1



Consider the following program

```
{
    int x=1;
    printf("%d",(*char(char*)&x));
```

Assuming required header files are included and if the machine in which this program is executed is little endian, then the output will be

- A. 0 B. 99999999 C. 1 D. unpredictable

isro2018 programming output

[Answer key](#)

39.9.4 Output: ISRO CSE 2018 | Question: 60



What is the output of the following program?

```
main(){
    int x=2, y=5;
    if(x<y) return (x=x+y);
    else printf("z1");
    printf("z2");
}
```

- A. z2
C. Compilation error
B. z1z2
D. None of these

isro2018 programming output

[Answer key](#)

39.9.5 Output: ISRO CSE 2018 | Question: 8



A language with string manipulation facilities uses the following operations.

$\text{head}(s)$ - returns the first character of the string s

$\text{tails}(s)$ - returns all but the first character of the string s

`concat(s1, s2)`- concatenates string $s1$ with $s2$.

The output of `concat(head(s), head(tail(tail(s))))`, where s is *acbc* is:

- a. ab
- b. ba
- c. ac
- d. aa

isro2018 programming output

[Answer key](#)

39.10

Parameter Passing (1)

39.10.1 Parameter Passing: GATE CSE 2006 | Question: 56, ISRO2009-58



Consider the following code written in a pass-by-reference language like FORTRAN and these statements about the code.

```
subroutine swap(ix,iy)
    it = ix
L1 : ix = iy
L2 : iy = it
end
ia = 3
ib = 8
call swap (ia, ib+5)
print *, ia, ib
end
```

S1: The compiler will generate code to allocate a temporary nameless cell, initialize it to 13, and pass the address of the cell to swap

S2: On execution the code will generate a runtime error on line L1

S3: On execution the code will generate a runtime error on line L2

S4: The program will print 13 and 8

S5: The program will print 13 and -2

Exactly the following set of statement(s) is correct:

- A. S1 and S2
- B. S1 and S4
- C. S3
- D. S1 and S5

gatecse-2006 programming parameter-passing normal out-of-syllabus-now isro2009

[Answer key](#)

39.11

Pointers (7)

39.11.1 Pointers: GATE CSE 2005 | Question: 1, ISRO2017-55



What does the following C-statement declare?

```
int (*f) (int *);
```

- A. A function that takes an integer pointer as argument and returns an integer
- B. A function that takes an integer as argument and returns an integer pointer
- C. A pointer to a function that takes an integer pointer as argument and returns an integer
- D. A function that takes an integer pointer as argument and returns a function pointer

gatecse-2005 programming programming-in-c pointers easy isro2017

[Answer key](#)

39.11.2 Pointers: ISRO CSE 2014 | Question: 13



Which of the following is true with respect to Reference?

- A. A reference can never be NULL
- B. A reference needs an explicit dereferencing mechanism
- C. A reference can be reassigned after it is established
- D. A reference and pointer are synonymous

programming isro2014 pointers

[Answer key](#)

39.11.3 Pointers: ISRO CSE 2016 | Question: 20



What is the output of this C code?

```
#include<stdio.h>
void main()
{
    int k=5;
    int *p=&k;
    int **m=&p;
    printf("%d %d %d",k,*p,**m);
}
```

- A. 5 5 5
- B. 5 5 junk
- C. 5 junk junk
- D. compile time error

programming-in-c pointers isro2016

[Answer key](#)

39.11.4 Pointers: ISRO CSE 2016 | Question: 25



What will be output of the following program? Assume that you are running this program in little-endian processor.

```
#include<stdio.h>
int main()
{
    short a=320;
    char *ptr;
    ptr=(char *)&a;
    printf("%d",*ptr);
    return 0;
}
```

- A. 1
- B. 320
- C. 64
- D. Compilation error

programming-in-c pointers isro2016 little-endian-big-endian

[Answer key](#)

39.11.5 Pointers: ISRO CSE 2020 | Question: 62



What is output of the following 'C' code assuming it runs on a byte addressed little endian machine?

```
#include<stdio.h>
int main()
{
    int x;
    char *ptr;
    x=622,100,101;
    printf("%d",(*char *)&x)*(x%3));
```

```
    return 0;
}
```

- A. 622 B. 311 C. 22 D. 110

isro-2020 programming programming-in-c normal pointers

[Answer key](#)



39.11.6 Pointers: ISRO CSE 2020 | Question: 63

What is the output in a 32 bit machine with 32 bit compiler?

```
#include<stdio.h>
rer(int **ptr2, int **ptr1)
{
    int *ii;
    ii=*ptr2;
    *ptr2=*&ptr1;
    *ptr1=ii;
    **ptr1=**ptr2;
    **ptr2+=**ptr1;
}
void main(){
    int var1=5, var2=10;
    int *ptr1=&var1,*ptr2=&var2;
    rer(&ptr1,&ptr2);
    printf("%d %d",var2,var1);
}
```

- A. 60,70 B. 50,50 C. 50,60 D. 60,50

isro-2020 programming programming-in-c normal pointers

[Answer key](#)



39.11.7 Pointers: ISRO2015-72

Consider the following declaration:

```
int a, *b=&a, **c=&b;
```

The following program fragment

```
a=4;  **c=5;
```

- A. does not change the value of *a*
C. assigns the value of *b* to *a*
- B. assigns address of *c* to *a*
D. assigns 5 to *a*

pointers programming-in-c isro2015

[Answer key](#)

39.12

Programming In C (7)



39.12.1 Programming In C: ISRO CSE 2008 | Question: 80

In C, what is the effect of a negative number in a field width specifier?

- A. the values are displayed right justified
C. the values are displayed left justified
- B. the values are displayed centered
D. the values are displayed as negative numbers

isro2008 programming programming-in-c non-gatecse

[Answer key](#)

39.12.2 Programming In C: ISRO CSE 2014 | Question: 47



The following three 'C' language statements is equivalent to which single statement?

```
y=y+1;  
z=x+y;  
x=x+1
```

- A. $z = x + y + 2;$
- B. $z = (x++) + (++y);$
- C. $z = (x++) + (y++);$
- D. $z = (x++) + (++y) + 1;$

isro2014 programming-in-c

[Answer key](#)

39.12.3 Programming In C: ISRO CSE 2016 | Question: 79



Which one of the following is correct about the statements given below?

- I. All function calls are resolved at compile time in C lang
 - II. All function calls are resolved at compile time in C++ lang
-
- A. Only II is correct
 - B. Both I and II are correct
 - C. Only I is correct
 - D. Both I and II are incorrect

isro2016 programming-in-c

[Answer key](#)

39.12.4 Programming In C: ISRO CSE 2018 | Question: 18



Consider the following C code segment:

```
#include <stdio.h>  
main()  
{  
    int i, j, x;  
    scanf("%d", &x);  
    i=1; j=1;  
    while (i<10) {  
        j *= i;  
        i++;  
        if(i==x) break;  
    }  
}
```

For the program fragment above, which of the following statements about the variables i and j must be true after execution of this program? [!(exclamation) sign denotes factorial in the answer]

- a. $(j = (x - 1)!) \wedge (i \geq x)$
- b. $(j = 9!) \wedge (j = 10)$
- c. $((j = 10!) \wedge (i = 10)) \vee ((j = (x - 1)!) \wedge (i = x))$
- d. $(j = 9!) \wedge (i \geq 10) \vee ((j = (x - 1)!) \wedge (i = x))$

isro2018 programming-in-c programming

[Answer key](#)

39.12.5 Programming In C: ISRO CSE 2018 | Question: 70



Consider the following C program:

```
main()  
{  
    float sum= 0.0, j=1.0,i=2.0;  
    while(i/j>0.001){
```

```

j=j+1;
sum=sum+i/j;
printf("%f\n", sum);
}

```

- A. 0 - 9 lines of output
 C. 20 - 29 lines of output
 B. 10 - 19 lines of output
 D. More than 29 lines of output

isro2018 programming-in-c programming

[Answer key](#)



39.12.6 Programming In C: ISRO2015-68

Consider the following program fragment

```
if(a > b) if(b > c) s1; else s2;
```

s2 will be executed if

- A. $a \leq b$
 C. $b \geq c$ and $a \leq b$
 B. $b > c$
 D. $a > b$ and $b \leq c$

isro2015 programming programming-in-c

[Answer key](#)



39.12.7 Programming In C: ISRO2015-74

Which of the following has the compilation error in C?

- A. int n = 17;
 C. float f = (float)99.32;
 B. char c = 99;
 D. #include <stdio.h>

programming-in-c isro2015

[Answer key](#)

39.13

Recursion (3)

39.13.1 Recursion: GATE CSE 2004 | Question: 31, ISRO2008-40



Consider the following C function:

```

int f(int n)
{
    static int i = 1;
    if(n >= 5) return n;
    n = n+i;
    i++;
    return f(n);
}

```

The value returned by $f(1)$ is:

- A. 5 B. 6 C. 7 D. 8

gatecse-2004 programming programming-in-c recursion easy isro2008

[Answer key](#)



39.13.2 Recursion: ISRO CSE 2018 | Question: 69

Let P be a procedure that for some inputs calls itself (i.e. is recursive). If P is guaranteed to terminate, which of the following statement(s) must be true?

- I. P has a local variable
 - II. P has an execution path where it does not call itself
 - III. P either refers to a global variable or has at least one parameter
- a. I only b. II only c. III only d. II and III only

isro2018 programming recursion

[Answer key](#)



39.13.3 Recursion: ISRO CSE 2020 | Question: 59

Consider the following recursive C function that takes two arguments

```
unsigned int rer(unsigned int n, unsigned int r){
    if(n>0) return(n%r + rer(n/r,r));
    else return 0;
}
```

What is the return value of the function *rer* when it is called as *rer*(513, 2)?

- A. 9 B. 8 C. 5 D. 2

isro-2020 programming normal recursion

[Answer key](#)



39.14

Runtime Environment (3)

39.14.1 Runtime Environment: ISRO CSE 2007 | Question: 57

Which of the following programming language(s) provides garbage collection automatically

- A. Lisp B. C++ C. Fortan D. C

isro2007 programming runtime-environment

[Answer key](#)



39.14.2 Runtime Environment: ISRO CSE 2014 | Question: 39

If only one memory location is to be reserved for a class variable, no matter how many objects are instantiated, then the variable should be declared as

- A. extern B. static C. volatile D. const

programming isro2014 runtime-environment

[Answer key](#)



39.14.3 Runtime Environment: ISRO CSE 2017 | Question: 70

We use malloc and calloc for:

- A. Dynamic memory allocation B. Static memory allocation
 C. Both dynamic memory allocation and static memory allocation D. None of these

isro2017 programming-in-c runtime-environment

[Answer key](#)

39.15

Semantic Analysis (1)



39.15.1 Semantic Analysis: ISRO CSE 2018 | Question: 10



Which of the following comparisons between static and dynamic type checking incorrect?

- a. Dynamic type checking slows down the execution
- b. Dynamic type checking offers more flexibility to the programmers
- c. In contrast to Static type checking, dynamic type checking may cause failure in runtime due to type errors
- d. Unlike static type checking dynamic type checking is done during compilation

isro2018 programming semantic-analysis

Answer key

39.16

Structure (2)



39.16.1 Structure: ISRO CSE 2018 | Question: 2

Consider the following declaration :

```
structaddr {  
    char city[10];  
    char street[30];  
    int pin;  
};  
struct {  
    char name[30];  
    int gender;  
    struct addr locate;  
} person, *kd = &person;
```

Then $*(kd - > name + 2)$ can be used instead of:

- A. $person.name + 2$
- B. $kd - > (name + 2)$
- C. $*(*kd).name + 2$
- D. either A) or B), not C)

isro2018 programming structure

Answer key

39.16.2 Structure: ISRO CSE 2020 | Question: 74



Following declaration of an array of struct, assumes size of byte, short, int and long are 1,2,3 and 4 respectively. Alignment rule stipulates that n – byte field must be located at an address divisible by n , the fields in the struct are not rearranged, padding is used to ensure alignment. All elements of array should be of same size.

```
Struct complx  
    Short s  
    Byte b  
    Long l  
    Int i  
End Complx  
Complx C[10]
```

Assuming C is located at an address divisible by 8, what is the total size of C , in bytes?

- A. 150
- B. 160
- C. 200
- D. 240

isro-2020 programming normal structure

Answer key

39.17

Undefined Behaviour (1)



39.17.1 Undefined Behaviour: ISRO2015-69



If n has 3, then the statement a[++n]=n++;

- A. assigns 3 to a[5]
- B. assigns 4 to a[5]
- C. assigns 4 to a[4]
- D. what is assigned is compiler dependent

isro2015 programming-in-c non-gatecse undefined-behaviour

[Answer key](#)

39.18

Union (1)

39.18.1 Union: GATE CSE 2000 | Question: 1.17, ISRO2015-79



Consider the following C declaration:

```
struct {  
    short x[5];  
    union {  
        float y;  
        long z;  
    } u;  
}t;
```

Assume that the objects of the type short, float and long occupy 2 bytes, 4 bytes and 8 bytes, respectively. The memory requirement for variable t, ignoring alignment consideration, is:

- A. 22 bytes
- B. 14 bytes
- C. 18 bytes
- D. 10 bytes

gatecse-2000 programming programming-in-c easy isro2015 union

[Answer key](#)

Answer Keys

39.1.1	C	39.2.1	B	39.2.2	C	39.2.3	X	39.2.4	B
39.3.1	A	39.4.1	B	39.4.2	B	39.5.1	C	39.6.1	B
39.6.2	D	39.6.3	B	39.6.4	C	39.6.5	C	39.6.6	A
39.6.7	A	39.7.1	B	39.8.1	A	39.8.2	D	39.9.1	D
39.9.2	B	39.9.3	X	39.9.4	D	39.9.5	A	39.10.1	B
39.11.1	C	39.11.2	A	39.11.3	A	39.11.4	C	39.11.5	D
39.11.6	D	39.11.7	D	39.12.1	C	39.12.2	B	39.12.3	D
39.12.4	D	39.12.5	D	39.12.6	D	39.12.7	X	39.13.1	C
39.13.2	D	39.13.3	D	39.14.1	A	39.14.2	B	39.14.3	A
39.15.1	D	39.16.1	C	39.16.2	X	39.17.1	D	39.18.1	C



40.0.1 ISRO CSE 2023 | Question: 1



Consider the context-free grammar G below for arithmetic expressions :

$$E \rightarrow E + E | E \times E | \text{id}$$

Which of the following statements is TRUE:

- A. The string " id +id × id " has no parse tree according to G
- B. The string " id +id × id" has only one parse tree according to G
- C. The string " id +id × id " has exactly two parse trees according to G
- D. The string " id +id × id " has more than two parse trees according to G

isro-cse-2023 theory-of-computation ambiguous-grammar

[Answer key](#)

40.1

Closure Property (2)



40.1.1 Closure Property: ISRO CSE 2017 | Question: 77

If L and P are two recursively enumerable languages then they are not closed under

- | | |
|-----------------------------|----------------------------|
| A. Kleene star L^* of L | B. Intersection $L \cap P$ |
| C. Union $L \cup P$ | D. Set difference |

isro2017 set-theory theory-of-computation recursive-and-recursively-enumerable-languages closure-property

[Answer key](#)

40.1.2 Closure Property: ISRO CSE 2018 | Question: 25



CFG (Context Free Grammar) is not closed under:

- A. Union
- B. Complementation
- C. Kleene star
- D. Product

isro2018 closure-property context-free-language theory-of-computation

[Answer key](#)

40.2

Context Free Grammar (5)



40.2.1 Context Free Grammar: ISRO CSE 2018 | Question: 27

A CFG (Context Free Grammar) is said to be in Chomsky Normal Form (CNF), if all the productions are of the form $A \rightarrow BC$ or $A \rightarrow a$. Let G be a CFG in CNF . To derive a string of terminals of length x , the number of products to be used is:

- a. $2x - 1$
- b. $2x$
- c. $2x + 1$
- d. 2^x

isro2018 context-free-grammar theory-of-computation

[Answer key](#)

40.2.2 Context Free Grammar: ISRO CSE 2020 | Question: 39



The language which is generated by the grammar $S \rightarrow aSa \mid bSb \mid a \mid b$ over the alphabet of $\{a, b\}$ is the set of

- A. Strings that begin and end with the same symbol
- B. All odd and even length palindromes
- C. All odd length palindromes
- D. All even length palindromes

isro-2020 theory-of-computation context-free-grammar normal

[Answer key](#)

40.2.3 Context Free Grammar: ISRO CSE 2023 | Question: 34



Consider the context-free grammar G below. Here S is the starting non-terminal symbol, while a and b are terminal symbols.

$$\begin{aligned} S &\rightarrow aSb \mid T \\ T &\rightarrow bT \mid b \end{aligned}$$

The language generated by G is:

- A. $\{a^m b^n : 0 \leq m < n\}$
- B. $\{a^m b^n : 0 < m < n\}$
- C. $\{a^m b^n : 0 < m \leq n\}$
- D. $\{a^n b^n : n \geq 0\}$

isro-cse-2023 context-free-grammar grammar theory-of-computation

[Answer key](#)

40.2.4 Context Free Grammar: ISRO-DEC2017-22



Consider the grammar with productions

$$S \rightarrow aSb \mid SS \mid \epsilon$$

This grammar is

- A. not context-free, not linear
- B. not context-free, linear
- C. context-free, not linear
- D. context-free, linear

isrodec2017 theory-of-computation grammar context-free-grammar

[Answer key](#)

40.2.5 Context Free Grammar: ISRO-DEC2017-23



Identify the language generated by the following grammar

$$S \rightarrow AB$$

$$A \rightarrow aAb \mid \epsilon$$

$$B \rightarrow bB \mid b$$

- A. $\{a^m b^n \mid n \geq m, m > 0\}$
- B. $\{a^m b^n \mid n \geq m, m \geq 0\}$
- C. $\{a^m b^n \mid n > m, m > 0\}$
- D. $\{a^m b^m \mid n > m, m \geq 0\}$

isrodec2017 theory-of-computation context-free-grammar

[Answer key](#)

40.3

Context Free Language (4)

40.3.1 Context Free Language: GATE CSE 2009 | Question: 12, ISRO2016-37



$$S \rightarrow aSa \mid bSb \mid a \mid b$$

The language generated by the above grammar over the alphabet $\{a, b\}$ is the set of:

- A. all palindromes
- B. all odd length palindromes
- C. strings that begin and end with the same symbol
- D. all even length palindromes

gatecse-2009 theory-of-computation context-free-language easy isro2016

[Answer key](#)

40.3.2 Context Free Language: ISRO CSE 2020 | Question: 37



Context free languages are closed under

- A. union, intersection
- B. union, kleene closure
- C. intersection, complement
- D. complement, kleene closure

isro-2020 theory-of-computation context-free-language easy

[Answer key](#)

40.3.3 Context Free Language: ISRO CSE 2023 | Question: 56



Which of the following statements is FALSE?

- A. The intersection of a regular language and a context-free language is context-free
- B. The intersection of a regular language and context-free language is regular
- C. The union of two context-free languages is context-free
- D. The union of two regular languages is regular

isro-cse-2023 theory-of-computation context-free-language regular-language

[Answer key](#)

40.3.4 Context Free Language: ISRO-DEC2017-26



Which of the following are context-free?

$$\begin{aligned}A &= \{a^n b^n a^m b^m \mid m, n \geq 0\} \\B &= \{a^m b^n a^m b^n \mid m, n \geq 0\} \\C &= \{a^m b^n \mid m \neq 2n, m, n \geq 0\}\end{aligned}$$

- A. A and B only
- B. A and C only
- C. B and C only
- D. C only

isrodec2017 theory-of-computation context-free-language

[Answer key](#)

40.4

Context Sensitive (1)

40.4.1 Context Sensitive: ISRO CSE 2017 | Question: 11



Given the following statements

- S1 : Every context-sensitive language L is recursive
- S2 : There exists a recursive language that is not context-sensitive

Which statements are true?

- A. Only S1 is correct
 C. Both S1 and S2 are not correct

- B. Only S2 is correct
 D. Both S1 and S2 are correct

isro2017 theory-of-computation context-sensitive

[Answer key](#)

40.5

Finite Automata (5)

40.5.1 Finite Automata: ISRO CSE 2014 | Question: 2



The number of states required by a Finite State Machine, to simulate the behavior of a computer with a memory capable of storing ' m ' words, each of length ' n ' bits is?

- A. $m \times 2^n$ B. 2^{m+n} C. 2^{mn} D. $m + n$

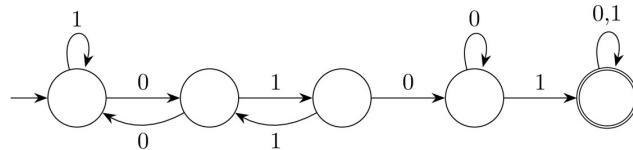
theory-of-computation finite-automata isro2014

[Answer key](#)

40.5.2 Finite Automata: ISRO CSE 2014 | Question: 79



Consider the following Deterministic Finite Automaton M .



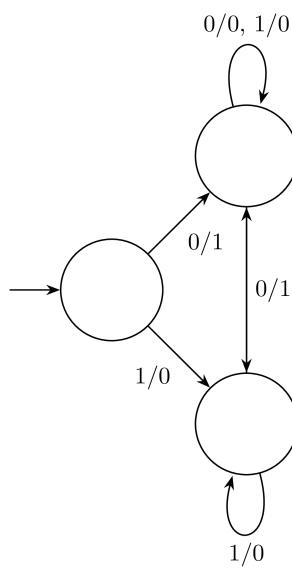
Let S denote the set of eight length bit strings whose second, third, sixth and seventh bits are 1. The number of strings in S that are accepted by M is

- A. 0 B. 1 C. 2 D. 3

isro2014 theory-of-computation finite-automata

[Answer key](#)

40.5.3 Finite Automata: ISRO CSE 2018 | Question: 26



The FSM (Finite State Machine) machine pictured in the figure above

- A. Complements a given bit pattern
 C. Increments a given bit pattern by 1
- B. Finds 2^s 's complement of a given bit pattern
 D. Changes the sign bit

isro2018 finite-automata theory-of-computation

[Answer key](#)



40.5.4 Finite Automata: ISRO CSE 2020 | Question: 41

Minimum number of states required in DFA accepting binary strings not ending in “101” is

- A. 3 B. 4 C. 5 D. 6

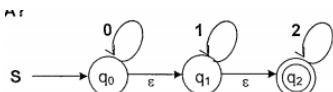
isro-2020 theory-of-computation finite-automata normal

[Answer key](#)



40.5.5 Finite Automata: ISRO-2013-73

What are the final states of the DFA generated from the following NFA?



- A. q_0, q_1, q_2
 C. $q_0, [q_1, q_2]$
- B. $[q_0, q_1], [q_0, q_2], \emptyset$
 D. $[q_0, q_1], q_2$

isro2013 theory-of-computation finite-automata

[Answer key](#)

40.6

First Order Logic (1)



40.6.1 First Order Logic: ISRO-DEC2017-7

If $T(x)$ denotes x is a trigonometric function, $P(x)$ denotes x is a periodic function and $C(x)$ denotes x is a continuous function then the statement "It is not the case that some trigonometric functions are not periodic" can be logically represented as

- A. $\neg \exists x[T(x) \wedge \neg P(x)]$
 B. $\neg \exists x[T(x) \vee \neg P(x)]$
 C. $\neg \exists x[\neg T(x) \wedge \neg P(x)]$
 D. $\neg \exists x[T(x) \wedge P(x)]$

isrodec2017 propositional-logic first-order-logic logical-reasoning

[Answer key](#)

40.7

Grammar (3)



40.7.1 Grammar: ISRO CSE 2008 | Question: 7

Consider the grammar

- $S \rightarrow ABCc \mid bc$
- $BA \rightarrow AB$
- $Bb \rightarrow bb$
- $Ab \rightarrow ab$

- $Aa \rightarrow aa$

Which of the following sentences can be derived by this grammar?

- A. abc B. aab C. abcc D. abbc

isro2008 theory-of-computation context-free-language grammar

[Answer key](#)



40.7.2 Grammar: ISRO CSE 2011 | Question: 68

Which of the following sentences can be generated by

$$S \rightarrow aS \mid bA$$

$$A \rightarrow d \mid cA$$

- A. bccdd B. abbcca C. abcabc D. abcd

isro2011 theory-of-computation context-free-language grammar

[Answer key](#)



40.7.3 Grammar: ISRO CSE 2023 | Question: 77

Consider the context-free grammar G below. There S is the starting non terminal symbol, while a and b are terminal symbols.

$$S \rightarrow aaSb|T$$

$$T \rightarrow Tb|a$$

Which of the following statements is true about the language $L(G)$ generated by G ?

- A. $aabbbaabb$ belongs to $L(G)$ but $aabb$ does not
 B. $aaaaabbb$ belongs to $L(G)$ but $aaaabb$ does not
 C. $aaaabb$ belongs to $L(G)$ but $aabbbaabb$ does not
 D. $aaabb$ belongs to $L(G)$ but $aaaaabbb$ does not

isro-cse-2023 theory-of-computation grammar

[Answer key](#)



40.8 Identify Class Language (3)

40.8.1 Identify Class Language: ISRO CSE 2016 | Question: 38

What is the highest type number that can be assigned to the following grammar?

$$S \rightarrow Aa, A \rightarrow Ba, B \rightarrow abc$$

- A. Type 0 B. Type 1 C. Type 2 D. Type 3

theory-of-computation identify-class-language isro2016

[Answer key](#)



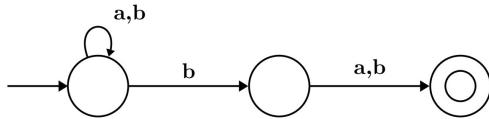
40.8.2 Identify Class Language: ISRO CSE 2020 | Question: 40

Which of the following classes of languages can validate an IPv4 address in dotted decimal format? It is to be ensured that the decimal values lie between 0 and 255.

- A. RE and higher B. CFG and higher
 C. CSG and higher D. Recursively enumerable language

Answer key**40.8.3 Identify Class Language: ISRO CSE 2023 | Question: 33**

Consider the Nondeterministic Finite State Automaton (NFA) below. State with a small incoming arrow are initial states while a double circle state denotes a final state.



The number of states in the **MINIMAL** Deterministic Finite-State Automaton (DFA) for this language is:

- A. 2 B. 4 C. 6 D. 8

Answer key**40.9****Minimal State Automata (1)****40.9.1 Minimal State Automata: ISRO CSE 2014 | Question: 12**

How many states are there in a minimum state deterministic finite automaton accepting the language $L = \{w \mid w \in \{0,1\}^*, \text{ number of } 0's \text{ is divisible by } 2 \text{ and number of } 1's \text{ is divisible by } 5, \text{ respectively }\}$?

- A. 7 B. 9 C. 10 D. 11

Answer key**40.10****Pushdown Automata (1)****40.10.1 Pushdown Automata: GATE CSE 2009 | Question: 16, ISRO2017-12**

Which one of the following is FALSE?

- A. There is a unique minimal DFA for every regular language
- B. Every NFA can be converted to an equivalent PDA.
- C. Complement of every context-free language is recursive.
- D. Every nondeterministic PDA can be converted to an equivalent deterministic PDA.

Answer key**40.11****Recursive and Recursively Enumerable Languages (3)****40.11.1 Recursive and Recursively Enumerable Languages: GATE CSE 2008 | Question: 13, ISRO2016-36**

If L and \bar{L} are recursively enumerable then L is

- A. regular B. context-free

C. context-sensitive

D. recursive

gatecse-2008 theory-of-computation easy isro2016 recursive-and-recursively-enumerable-languages

Answer key 

40.11.2 Recursive and Recursively Enumerable Languages: ISRO CSE 2011 | Question: 79

A problem whose language is recursion is called?

- A. Unified problem
- C. Recursive problem

- B. Boolean function
- D. Decidable

isro2011 theory-of-computation recursive-and-recursively-enumerable-languages

Answer key 

40.11.3 Recursive and Recursively Enumerable Languages: ISRO CSE 2023 | Question: 55

Which of the following statements is NOT true?

- A. If a language is recursive its complement is recursive
- B. If a language is recursive its complement is recursively enumerable
- C. If a language and its complement are recursively enumerable it is recursive
- D. If a language is recursively enumerable its complement is also recursively enumerable

isro-cse-2023 theory-of-computation decidability recursive-and-recursively-enumerable-languages

Answer key 

40.12 Recursively Enumerable Languages (1)

40.12.1 Recursively Enumerable Languages: ISRO-DEC2017-24

Let L_1 be regular language, L_2 be a deterministic context free language and L_3 a **recursively enumerable language**, but not recursive. Which one of the following statements is false ?

- A. $L_3 \cap L_1$ is recursive
- C. $L_1 \cup L_2$ is context free

- B. $L_1 \cap L_2 \cap L_3$ is recursively enumerable
- D. $L_1 \cap L_2$ is context free

isrodec2017 theory-of-computation regular-language context-free-language recursively-enumerable-languages

Answer key 

40.13 Regular Expression (5)

40.13.1 Regular Expression: GATE CSE 1995 | Question: 1.9 , ISRO2017-13

In some programming language, an identifier is permitted to be a letter followed by any number of letters or digits. If L and D denote the sets of letters and digits respectively, which of the following expressions defines an identifier?

- A. $(L + D)^+$
- B. $(L.D)^*$
- C. $L(L + D)^*$
- D. $L(L.D)^*$

gate1995 theory-of-computation regular-expression easy isro2017

Answer key 

40.13.2 Regular Expression: ISRO CSE 2016 | Question: 33

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

- A. $(0^*10^*1)^*$
C. $0^*(10^*1^*)^*0^*$

- B. $0^*(10^*10^*)^*$
D. $0^*1(10^*1)^*10^*$

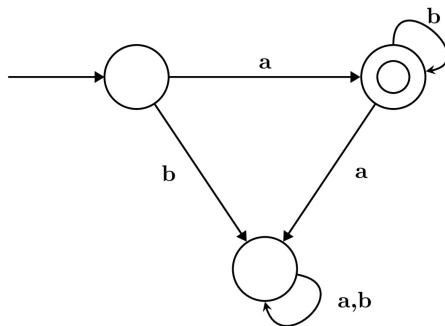
theory-of-computation regular-expression isro2016

Answer key

40.13.3 Regular Expression: ISRO CSE 2023 | Question: 13



Consider the deterministic finite-state automaton (DFA) below. The alphabet is $\{a, b\}$. The state with a small incoming arrow is the initial state, while the double circle state denotes a final state.



Which of the following regular expressions defines the language accepted by the DFA?

- A. ab^* B. a^*b^* C. $(ab)^*$ D. a^*b

isro-cse-2023 theory-of-computation regular-expression

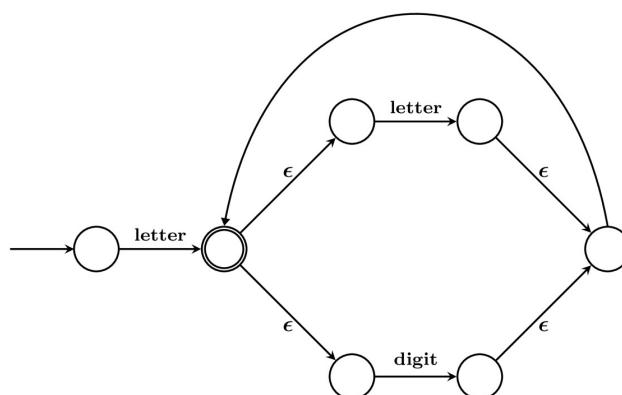
Answer key

40.13.4 Regular Expression: ISRO CSE 2023 | Question: 64



Consider the NFA with epsilon-transitions below, which is meant to accept strings corresponding to a lexical token id. Here the token digit corresponds to the extended regular expression [0-9] and letter corresponds to [a – zA – Z]. In the diagram, a small incoming edge indicates a start state while a double circle indicates a final state.

Which of the following extended regular expressions corresponds to the token id?



- A. letter (letter | digit)*
C. (letter | digit)*
- B. (letter | digit)* letter
D. letter (letter* | digit*)

Answer key**40.13.5 Regular Expression: ISRO-DEC2017-21**

For $\Sigma = \{a, b\}$ the regular expression $r = (aa)^*(bb)^*b$ denotes

- A. Set of strings with 2 a' s and 2 b' s
- B. Set of strings with 2 a' s 2 b' s followed by b
- C. Set of strings with 2 a' s followed by b' s which is a multiple of 3
- D. Set of strings with even number of a' s followed by odd number of b' s

Answer key**40.14****Regular Language (3)****40.14.1 Regular Language: ISRO CSE 2018 | Question: 24**

Choose the correct statement -

- a. $A = \{a^n b^n \mid n = 1, 2, 3, \dots\}$ is a regular language
- b. The set B , consisting of all strings made up of only a' s and b' s having equal number of a' s and b' s defines a regular language
- c. $L(A^*B) \cap B$ gives the set A
- d. None of the above

Answer key**40.14.2 Regular Language: ISRO CSE 2020 | Question: 38**

Which of the following is true?

- A. Every subset of a regular set is regular
- B. Every finite subset of non-regular set is regular
- C. The union of two non regular set is not regular
- D. Infinite union of finite set is regular

Answer key**40.14.3 Regular Language: ISRO2015-43**

Let R_1 and R_2 be regular sets defined over the alphabet, then

- | | |
|----------------------------------|----------------------------------|
| A. $R_1 \cap R_2$ is not regular | B. $R_1 \cup R_2$ is not regular |
| C. $\Sigma^* - R_1$ is regular | D. R_1^* is not regular |

Answer key**40.15****Strings (1)**

40.15.1 Strings: ISRO CSE 2023 | Question: 73

From a character string of length m , the number of sub-strings of all lengths that can be formed are:

- A. m^2
- B. m
- C. $m(m + 1)/2$
- D. $m(\log m)$

isro-cse-2023 counting strings

Answer key 

40.16

Turing Machine (3)

40.16.1 Turing Machine: ISRO CSE 2014 | Question: 59

Which of the following is FALSE with respect to possible outcomes of executing a Turing Machine over a given input?

- A. it may halt and accept the input
- B. it may halt by changing the input
- C. it may halt and reject the input
- D. it may never halt

isro2014 theory-of-computation turing-machine

Answer key 

40.16.2 Turing Machine: ISRO CSE 2016 | Question: 32

AN FSM(finite state machine) can be considered to be a turing machine of finite tape length

- A. without rewinding capability and unidirectional tape movement
- B. rewinding capability and unidirectional tape movement
- C. without rewinding capability and bidirectional tape movement
- D. rewinding capability and bidirectional tape movement

theory-of-computation isro2016 turing-machine

Answer key 

40.16.3 Turing Machine: ISRO-DEC2017-25

Let $L = \{a^p \mid p \text{ is a prime}\}$. Then which of the following is true

- A. It is not accepted by a Turing Machine
- B. It is regular but not context-free
- C. It is context-free but not regular
- D. It is neither regular nor context-free, but accepted by a Turing Machine

isrodec2017 theory-of-computation regular-language context-free-language turing-machine

Answer key 

Answer Keys

40.0.1	C	40.1.1	D	40.1.2	B	40.2.1	A	40.2.2	C
40.2.3	A	40.2.4	C	40.2.5	X	40.3.1	B	40.3.2	B
40.3.3	B	40.3.4	B	40.4.1	D	40.5.1	C	40.5.2	C

40.5.3	X	40.5.4	B	40.5.5	A	40.6.1	A	40.7.1	X
40.7.2	D	40.7.3	B	40.8.1	D	40.8.2	A	40.8.3	B
40.9.1	C	40.10.1	D	40.11.1	D	40.11.2	D	40.11.3	D
40.12.1	A	40.13.1	C	40.13.2	B	40.13.3	A	40.13.4	A
40.13.5	D	40.14.1	D	40.14.2	B	40.14.3	C	40.15.1	C
40.16.1	B	40.16.2	A	40.16.3	D				