Text Areas : PlainText

Possible Answers :

60

PDSA

Section Id :	64065338408
Section Number :	11
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	29
Number of Questions to be attempted :	29
Section Marks :	100
Display Number Panel :	Yes
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065380979
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 292 Question Id : 640653566272 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : PROGRAMMING, DATA STRUCTURES AND ALGORITHMS USING PYTHON (COMPUTER BASED EXAM)"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?

CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

(IF IT IS NOT THE CORRECT SUBJECT, PLS CHECK THE SECTION AT THE TOP FOR THE SUBJECTS REGISTERED BY YOU)

Options :

6406531892555. ✔ YES

6406531892556. ✷ NO

Sub-Section Number :	2
Sub-Section Id :	64065380980
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 293 Question Id : 640653566273 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

$$f1(n) = \log(n!)$$

$$f2(n) = (\log n)^2$$

$$f3(n) = \log(\log n)$$

$$f4(n) = 2^{10} \log n$$

Arrange the above functions in increasing order of asymptotic complexity.

Options :

6406531892557. ✔ $f3(n), f4(n), f2(n), f1(n)$

6406531892558. ✷ $f3(n), f2(n), f1(n), f4(n)$

6406531892559. ✖ $f4(n), f3(n), f2(n), f1(n)$

6406531892560. ✖ $f2(n), f3(n), f1(n), f4(n)$

Question Number : 294 Question Id : 640653566275 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

```
1  def fun(n):
2      (i,s) = (1,1)
3      while s <= n:
4          i = i+2
5          s = s+i
```

What is the time complexity of the given function ?

Options :

6406531892565. ✖ $O(n)$

6406531892566. ✖ $O(\log n)$

6406531892567. ✖ $O(n \log n)$
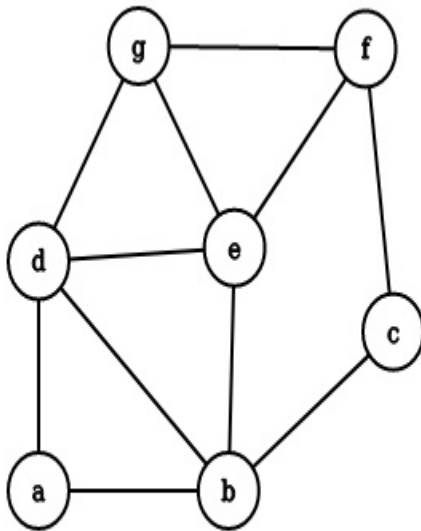
6406531892568. ✔ $O(\sqrt{n})$

Question Number : 295 Question Id : 640653566280 Question Type : MCQ Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following graph:

BFS traversal is started from node a on the given graph. The nodes are listed in the order they are visited. Which of the following is possible output ?

Note: When multiple eligible nodes are present, BFS picks the nodes which is alphabetically prior.

Options :

6406531892583. ✖ a b d e g c f

6406531892584. ✖ a b c f g e d

6406531892585. ✖ a b d e g f c

6406531892586. ✔ a b d c e g f

Question Number : 296 Question Id : 640653566281 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following statements:

1. Cross edges cannot occur in the DFS of an undirected graph

2. DFS of a directed graph always produces the same number of tree edges independent of the node selected as the source.

3. If at least one topological order exists for a directed graph, then the DFS of that graph will not produce any back edges.

Which of the given statement(s) is/are **true**?

Options :

6406531892587. ✶ Statement 1 and Statement 2

6406531892588. ✶ Statement 2 and Statement 3

6406531892589. ✔ Statement 1 and Statement 3

6406531892590. ✶ All three statements are true

Question Number : 297 Question Id : 640653566287 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

A binary search tree in which every node has either 0 or 2 children is referred as strictly binary tree. Such a tree with 25 leaves _____.

Options :

6406531892608. ✶ has exactly total 50 nodes

6406531892609. ✶ has exactly total 48 nodes

6406531892610. ✔ has exactly total 49 nodes

6406531892611. ✶ has exactly total 51 nodes

Question Number : 298 Question Id : 640653566299 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

Given a flow network (G, s, t, c) and a flow f, how will you determine if f is maximum flow?

Options :

6406531892644. ✖ If there is any edge that is not saturated to full capacity, then we can conclude that f is not a maximum flow.

6406531892645. ✔ If the residual graph does not have any augmenting paths then f is a maximum flow.

6406531892646. ✖ If the value of the flow f is not the sum of the capacities of the edges coming out of the source s then f is not a maximum flow.

6406531892647. ✖ If the value of the flow f is not the sum of the capacities of the edges coming into the sink t then f is not a maximum flow.
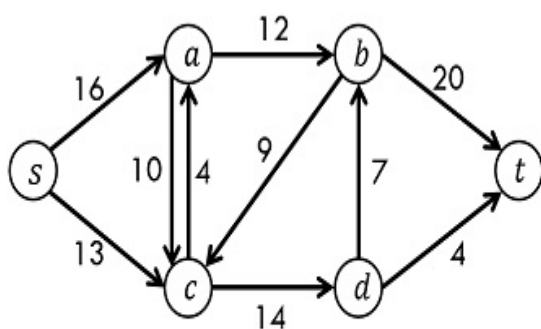
Question Number : 299 Question Id : 640653566300 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following flow network

Consider the network given above with source s and sink t, with the numbers on the edges denoting maximum capacity across a particular edge. Which of the following edges form a **valid min cut** in the given network?

Options :

Sub-Section Number :	3
Sub-Section Id :	64065380981
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 300 Question Id : 640653566277 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Which of the following functions can be used to detect a loop in a linked list, where each node of linked list is an object of class Node?

In the below options, `head` is the first node in the linked list. Assume that the `flag` for every node in the linked list is set to `False` before calling `detect_loop(head)`.

```
1  class Node:
2      def __init__(self, value):
3          self.value = value
4          self.next = None
5          self.flag = False
```

Options :

6406531892570. ✖

```
1  def detect_loop(head):
2      temp = head
3      while (temp == None):
4          if (temp.flag == True):
5              return True
6          temp.flag = True
7          temp = temp.next
8      return False
```

```
1  def detect_loop(head):
2      temp = head
3      while (temp != None):
4          if (temp.flag == True):
5              return False
6          temp.flag = True
7          temp = temp.next
8      return True
```
6406531892571. ✖

```
1  def detect_loop(head):
2      temp = head
3      while (temp != None):
4          if (temp.flag == True):
5              return True
6          temp.flag = True
7          temp = temp.next
8      return False
```
6406531892572. ✔

```
1  def detect_loop(head):
2      temp = head
3      while (temp != None):
4          if (temp.flag == True):
5              return True
6          temp.flag = True
7      return False
```
6406531892573. ✖

Question Number : 301 Question Id : 640653566278 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Linear probing is an open addressing scheme in computer programming for resolving hash collisions in hash tables. Linear probing operates by taking the original hash index and adding successive values linearly until a free slot is found.

A hash table contains 6 buckets indexed from 0 to 5 and uses linear probing to resolve collisions. The key values are integers and the hash function used is `key mod 6`. The values 47, 63, 38, 16 are inserted into the table.

What is the **probability** that the 0th index will be occupied by the next element to be inserted ?

Note: Assume that the numbers/keys are selected uniformly at random over the set of positive integers.

Options :

6406531892574. ✷ 0.5

6406531892575. ✷ 1

6406531892576. ✔ 0.83

6406531892577. ✷ 0.33

6406531892578. ✷ Can't be decided because the probability depends upon the key's value

Question Number : 302 Question Id : 640653566279 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

An undirected graph G has 34 vertices. The sum of degrees of all the vertices in G is a . The number of vertices of odd degree in G is b . Which of the values are possible for a and b ?

Options :

6406531892579. ✔ a = 122 , b = 16

6406531892580. ✱ a = 121, b = 16
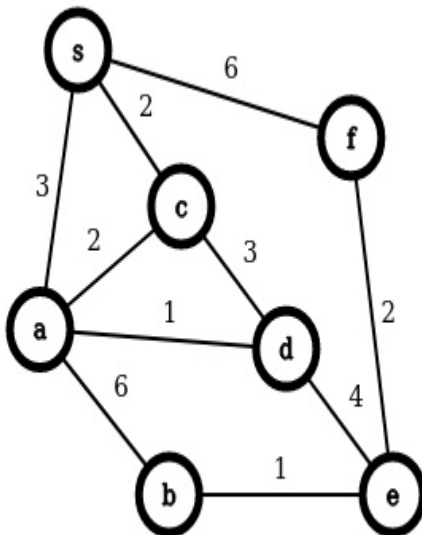
6406531892581. ✱ a = 121, b = 17

6406531892582. ✱ a = 122, b = 17

Question Number : 303 Question Id : 640653566285 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the following graph

Which of the following is/are the correct sequence of edges added to the minimum spanning tree when **prim's algorithm** is applied on this graph with a as the source vertex ?

Options :

6406531892600. ✱ (a,d), (a,c), (a,s), (d,e), (a,b), (s,f)

6406531892601. ✱ (a,d), (b,e), (a,c), (s,c), (f,e), (d,e)

6406531892602. ✱ (a,d), (b,e), (a,c), (s,c), (f,e), (a,b)

6406531892603. ✔ (a,d), (a,c), (s,c), (d,e), (b,e), (f,e)

Question Number : 304 Question Id : 640653566286 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Consider a min-heap represented as the following list: [6, 11, 24, 19, 46, 40, 74, 32, 21]

What are the leaf nodes of this min-heap after the following operations are done on it ?

1. Insertion of value 22
2. deleteMin

Options :

6406531892604. ✔ 32, 46, 22, 40, 74

6406531892605. ✖ 32, 21, 46, 40, 74

6406531892606. ✖ 32, 19, 46, 40, 74

6406531892607. ✖ 32, 46, 40, 74

Question Number : 305 Question Id : 640653566290 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the characters **e, f, s, m, p** have probability of occurrence 1/2, 1/4, 1/8, 1/16, 1/32 respectively in a text. If **Huffman encoding** is used to compress the text, then what will be the

average number of bits required per character in the compressed text ?

Options :

6406531892617. ✻ 2.5

6406531892618. ✻ 3.5

6406531892619. ✻ 2.75

6406531892620. ✔ 1.75

Question Number : 306 Question Id : 640653566292 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the following strategy to solve a problem of input size n.

Divide the problem into 4 sub-problems, each of size $\frac{n}{2}$. Number of steps required to combine these 4 solutions is n. We apply this strategy recursively till the sub-problems can not be further divided into sub-problems.

What will be the nearest upper bound for the above algorithm?

Options :

6406531892622. ✔ $O(n^2)$

6406531892623. ✻ $O(n^4)$

6406531892624. ✻ $O(n \log n)$

6406531892625. ✻ $O(n)$

Question Number : 307 Question Id : 640653566295 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

L is an unsorted list composed of random positive and negative numbers. We wish to compute the sum of the maximum sum sub list within the list.

Consider the following incomplete dynamic programming code:

```python
def fun(L):
    ml = [float('-inf') for i in range(0,len(L))]
    for i in range(1,len(L)):
        # LINE - 1

    val = ml[0]
    for j in ml:
        if j > val:
            val = j
    print(val)
```

What should be written in **LINE - 1** ?

Options :

6406531892631. ✔ $ml[i] = max(ml[i-1] + l[i], l[i])$

6406531892632. ✘ $ml[i] = max(ml[i-1], l[i])$

6406531892633. ✘ $ml[i] = max(ml[i-1] + l[i-1], l[i])$

6406531892634. ✘ None of these

Question Number : 308 Question Id : 640653566296 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Which of the following combination of input text T and pattern P will exhibit the worst case running time behavior for **Boyer-Moore skipping heuristic**?

Options :

6406531892635. ✖ T = baabaabaabaabaa and P = abb

6406531892636. ✖ T = aaaaaaaaaaaaaaa and P = abb

6406531892637. ✔ T = aaaaaaaaaaaaaaa and P = baa

6406531892638. ✖ T = aaaaaaaaaaaaaaa and P = bbb

Sub-Section Number :	4
Sub-Section Id :	64065380982
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 309 Question Id : 640653566274 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Selectable Option : 0

Question Label : Multiple Select Question

Which of the following sorting algorithm will have the same time complexity irrespective of the sequence of elements they are sorting?

Options :

6406531892561. ✔ Selection Sort

6406531892562. ✔ Merge Sort

6406531892563. ✱ Quick Sort

6406531892564. ✱ Insertion Sort

Question Number : 310 Question Id : 640653566284 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Selectable Option : 0

Question Label : Multiple Select Question

Which of the following statement(s) is/are **true**?

Options :

6406531892596. ✱ The shortest path between two vertices u and v in a graph G always remains unaltered when all the edges of G are incremented by an equal amount.

6406531892597. ✔ A graph where all edge weights are distinct can have more than one shortest path between two vertices

6406531892598. ✱ If a graph has negative weighted cycle then Bellman Ford algorithm will be able to compute the shortest path length between every pair of vertices.

6406531892599. ✔ The shortest path between two vertices u and v in a graph G always remains unaltered when all the edges of G are multiplied by a positive integer.

Question Number : 311 Question Id : 640653566289 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Selectable Option : 0

Question Label : Multiple Select Question

Which of the following is/are true about **AVL Tree**? Assume that the height of the empty tree is 0.

Options :

6406531892613. ✖ In AVL tree, the absolute difference between the number of nodes in the left subtree and the number of nodes in the right subtree of any node can't be more than 1.

6406531892614. ✔ The complexity of searching in an AVL tree is $O(log\ n)$.

6406531892615. ✖ The complexity of both insertion and deletion in AVL tree is $O(n)$.

6406531892616. ✔ If the height of an AVL tree is h, the maximum number of nodes will be $2^h - 1$.

Question Number : 312 Question Id : 640653566293 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Selectable Option : 0

Question Label : Multiple Select Question

Consider the following statements and choose the correct ones.

Options :

6406531892626. ✖ The worst case running time of Quick select algorithm to find the kth largest number is $O(n)$

6406531892627. ✔ The time taken to find median in an unsorted list using median of medians(MoM) algorithm is $O(n)$

6406531892628. ✔ Quick select algorithm is a divide and conquer approach of solving problems

6406531892629. ✖ The recurrence relation for finding median of medians(MoM) with a subarray size of 5 is $T(n) = T(n/5) + O(1)$

Question Number : 313 Question Id : 640653566283 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Selectable Option : 0

Question Label : Multiple Select Question

Consider the following graph
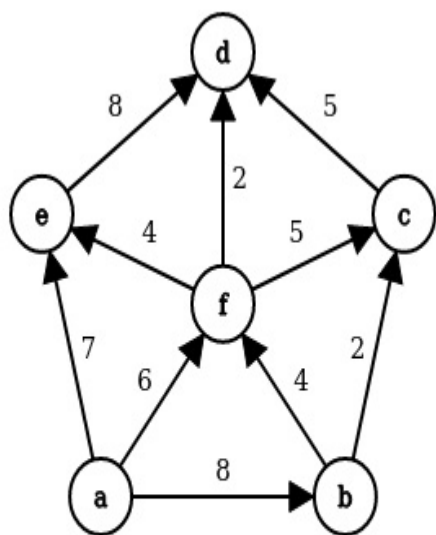
In the given graph, if we try to find the shortest path from node a to all other nodes using **Dijkstra's algorithm**, in what order/(s) do the nodes get included in the visited set?

Note: When multiple nodes are available with the same minimum distance, Dijkstra's algorithm can select any of them to visit next.

Options :

6406531892592. ✔ a f e d b c

6406531892593. ✔ a f e b d c

6406531892594. ✖ a f e c d b

Question Number : 314 Question Id : 640653566298 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Selectable Option : 0

Question Label : Multiple Select Question

Consider the following problem statement.

There are 45 saree printing machines in a printing press company. Each machine produces 150 sarees and consumes electricity worth Rs 8000 every month. A machine can be overloaded to print more sarees but it should not be loaded more than 20% of its usual production capacity. Demand of saree for the ith month is represented with variables d_i, $1 \leq i \leq 12$. In order to balance demand and production to optimise profit, the company can switch off a machine for a month, but during that month a maintenance charge of Rs 100 is required for that machine. Similarly in order to switch on a machine which was switched off previously a startup cost of Rs 30 is required for that machine. The press might produce surplus sarees, the cost to store these surplus sarees is Rs 10 per saree.

Assume we use the following notations for representing the variables required to model this into a LPP problem:

1. m_i : machines running in month i
2. s_i : sarees made in month i
3. o_i : sarees made in overloaded state in month i
4. n_i : machines started in the start of month i
5. x_i : machines switched off in the start of month i
6. g_i : number of surplus sarees at the end of month i
7. d_i : demand of saree for month i

Identify the correct constraints pertinent to the above problem exclusively from the below options.

Options :

6406531892640. ✔ $s_i = 150m_i + o_i$

6406531892641. ✖ $m_i = n_{i-1} - x_i$

6406531892642. ✔ $g_i = s_i - d_i + g_{i-1}$

6406531892643. ✖ $o_i <= 20m_i$

Sub-Section Number :   6

Sub-Section Id :   64065380984

Question Shuffling Allowed :   Yes

Is Section Default? :   null

Question Number : 315 Question Id : 640653566276 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Short Answer Question

Consider the given list L = [9, 14, 17, 37, 57, 62, 82, 92, 97] . After applying the **Quick-sort partition** algorithm once, the list is modified to : [14, 9, 17, 37, 62, 57, 82, 97, 92] .

The number of elements that could have been chosen as a pivot in the first round is ___ ?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Sub-Section Number :   7

Sub-Section Id :   64065380985

Question Shuffling Allowed :   Yes

Is Section Default? :   null

Question Number : 316 Question Id : 640653566282 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

A king's summer house is being rewired. The house has 11 rooms. To avoid wires getting entangled and creating short circuits, the electricians have been asked to observe the following rules.

- Room 1 must be rewired before rooms 3 and 4.
- Room 2 must be rewired before room 6.
- Room 3 must be rewired before room 5.
- Room 5 must be rewired before rooms 8 and 9.
- Room 6 must be rewired before room 7.
- Room 7 must be rewired before room 5.
- Room 8 must be rewired before room 10.
- Room 9 must be rewired before room 11.

It takes one full day to rewire a room. There are enough electricians to rewire as many rooms as can be rewired in parallel, keeping in mind the constraints above. What is the minimum number of days required to complete the job?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

6

Question Number : 317 Question Id : 640653566288 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

Consider the following tree traversal orders for a binary tree T.

In-order = 86, 47, 95, 32, 63, 16, 53, 9, 64

Post-order = 86, 95, 32, 47, 53, 64, 9, 16, 63

What would be the sum of all the leaf node values of T ?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

298

Question Number : 318 Question Id : 640653566291 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

Given a set of events (E1 to E11) with their start and end time. A journalist has to attend as many events as possible. If any event finishes at time T, then the journalist can attend other events starting at time T or afterwards.

	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11
start	3	5	2	7	5	7	8	10	10	4	14
end	6	7	8	9	10	11	12	13	14	15	16

What is the maximum number of events that journalist can attend ?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

Question Number : 319 Question Id : 640653566294 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

Consider the following two strings:

x = abbababa
y = babaabaab

The length of the longest common subsequence for x and y is __ .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

Question Number : 320 Question Id : 640653566297 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

Consider the **Rabin-Karp algorithm** using modulo arithmetic to match the pattern in base 10 .
Taking modulo q = 11, how many false positives matches does the Rabin-Karp matcher
encounter while searching pattern 26 in the text 3141592653589793 ?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

DBMS

Section Id :	64065338409
Section Number :	12
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	24
Number of Questions to be attempted :	24
Section Marks :	50
Display Number Panel :	Yes
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065380986
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 321 Question Id : 640653566301 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : DATABASE MANAGEMENT SYSTEMS (COMPUTER BASED EXAM)"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?