6406532041236. ✖ The clustering solution has well-defined and distinct clusters.

6406532041237. ✖ The silhouette score indicates a random distribution of data points across clusters.

6406532041238. ✖ The data points are equally spaced across clusters.

6406532041239. ✔ The clustering solution is flawed and the data points might be assigned to incorrect clusters.

PDSA

Section Id :	64065341314
Section Number :	11
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	27
Number of Questions to be attempted :	27
Section Marks :	100
Display Number Panel :	Yes
Section Negative Marks :	0
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 :	64065388087
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 282 Question Id : 640653611203 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 :

6406532041260. ✔ YES

6406532041261. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	64065388088
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 283 Question Id : 640653611204 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

Let $g(n) = 12n^3 + 102n$ and $f(n) = 6n^3 \log n + 306n$. Which of the following is **true**?

Options :

6406532041262. ✖ $g(n)$ is $O(f(n))$ and $f(n)$ is $O(g(n))$

6406532041263. ✖ $f(n)$ is $O(g(n))$ but $g(n)$ is not $O(f(n))$

6406532041264. ✔ $g(n)$ is $O(f(n))$ but $f(n)$ is not $O(g(n))$

6406532041265. ✖ $g(n)$ is not $O(f(n))$ and $f(n)$ is not $O(g(n))$

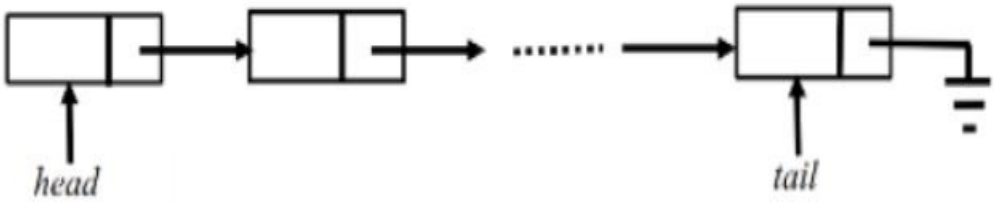
Question Number : 284 Question Id : 640653611207 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

```
1  class Node:
2      def __init__(self,data):
3          self.data = data
4          self.next = None
```

You are given a linked list where each node of the linked list is an object of class `Node`. The linked list has a `head` pointer that points to the first node of the linked list and a `tail` pointer that points to the last element of the linked list, as shown in the figure.



Suppose you want to implement `Push` and `Pop` operations of Stack in O(1) time using given linked list.

Which of the following option is correct to achieve both operation in O(1) time?

Options :

6406532041274. ✔ Both operation `Push` and `Pop` must be implemented from `head` side.

6406532041275. ✖ Both operation `Push` and `Pop` must be implemented from `tail` side.

6406532041276. ✖ Both operation `Push` and `Pop` can be implemented from any one side.

6406532041277. ✖ Can't achieve O(1) time for both operation from any one side

Question Number : 285 Question Id : 640653611211 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

There are 11 courses offered in a program. Few courses require other courses to be completed as a prerequisite. The below table gives the prerequisite of all courses. All prerequisites of a course must be completed before opting for that course in any semester. There is no constraint on how many courses a student can take in a semester.

Course	Prerequisite
Course 1	Course 8
Course 2	Course 8
Course 3	Course 1, Course 2, Course 11
Course 4	Course 1, Course 3
Course 5	Course 9
Course 6	Course 7
Course 7	Course 4, Course 2
Course 8	None
Course 9	Course 4
Course 10	None
Course 11	Course 10

Select the order of courses that can be opted by a student if he/she wishes to complete all 11

courses in minimum number of semester. Parenthesis represents all courses opted in the same semester.

Options :

6406532041287. ✖ $(8, 10) \rightarrow (9, 1, 2) \rightarrow (11, 3) \rightarrow (4) \rightarrow (7, 5, 6)$

6406532041288. ✖ $(8) \rightarrow (1, 2) \rightarrow (3) \rightarrow (10, 4) \rightarrow (9, 7, 11) \rightarrow (5, 6)$

6406532041289. ✔ $(8, 10) \rightarrow (1, 2, 11) \rightarrow (3) \rightarrow (4) \rightarrow (9, 7) \rightarrow (5, 6)$

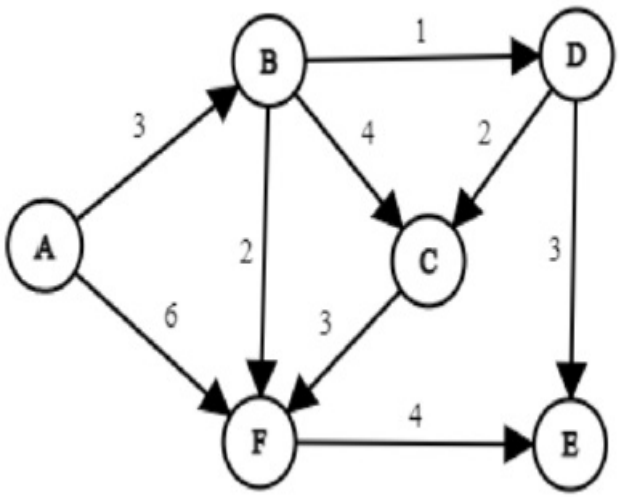
6406532041290. ✖ $(8) \rightarrow (10, 1, 2) \rightarrow (11) \rightarrow (3) \rightarrow (4) \rightarrow (9, 7) \rightarrow (5, 6)$

Question Number : 286 Question Id : 640653611213 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 directed weighted graph on which the Dijkstra algorithm is run with vertex A as the source vertex.



Which of the following is 5th visited marked vertex by Dijkstra's algorithm? Consider that A is 1st visited marked vertex by Dijkstra's algorithm.

Options :

6406532041292. ✖ B

6406532041293. ✔ C

6406532041294. ✖ D

6406532041295. ✖ E

6406532041296. ✖ F

Question Number : 287 Question Id : 640653611216 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

The pre-order traversal of a binary search tree with integer values produces the following sequence: 15, 10, 5, 7, 12, 14, 25, 18, 20. What is the value of the right child of the root of the tree?

Options :

6406532041303. ✖ 10

6406532041304. ✖ 14

6406532041305. ✖ 18

6406532041306. ✖ 20

6406532041307. ✔ 25

Question Number : 288 Question Id : 640653611220 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

In a list `L`, two elements `L[i]` and `L[j]` form a inversion if `L[i] > L[j]` and `i < j`. The number of inversions in the list `L = [1, 5, 4, 2, 6, 3]` is __.

Options :

6406532041311. ✖ 3

6406532041312. ✖ 4

6406532041313. ✖ 5

6406532041314. ✔ 6

Question Number : 289 Question Id : 640653611221 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 recurrence relation for an algorithm:-

$$T(n) = 4T(n/2) + O(n)$$

Base Case:- $T(1) = 1$

The complexity of this algorithm is__ .

Options :

6406532041315. ✖ $O(n)$

6406532041316. ✖ $O(\log^2 n)$

6406532041317. ✖ $O(n \log n)$

6406532041318. ✔ $O(n^2)$

Question Number : 290 Question Id : 640653611223 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

Let M_1, M_2, M_3, M_4 be 4 matrices of dimensions $10 \times 100, 100 \times 20, 20 \times 5, 5 \times 80$ respectively.

Which of the following order gives minimum number of scalar multiplications to multiply M_1, M_2, M_3, M_4 using basic matrix multiplication ?

Options :

6406532041320. ✖ $M_1(M_2(M_3M_4))$

6406532041321. ✖ $M_1((M_2M_3)M_4)$

6406532041322. ✔ $(M_1(M_2M_3))M_4$

6406532041323. ✖ $((M_1M_2)M_3)M_4$

6406532041324. ✖ $(M_1M_2)(M_3M_4)$

Question Number : 291 Question Id : 640653611224 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

What can be the maximum depth of the Trie data structure with n strings and m as the maximum string length among all strings? Consider that root is at depth 1 and ignore terminate node `$` for depth.

Options :

6406532041325. ✖ $log\ n$

6406532041326. ✖ $log\ m$

6406532041327. ✖ n

6406532041328. ✔ m

Question Number : 292 Question Id : 640653611225 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 option represents the fail function (or prefix function) for pattern '**onion**' in the Knuth-Morris-Pratt (KMP) algorithm?

Options :

6406532041329. ✔ [0, 0, 0, 1, 2]

6406532041330. ✖ [0, 0, 0, 0, 1]

6406532041331. ✖ [0, 0, 0, 1, 1]

6406532041332. ✖ [0, 0, 1, 1, 2]

Sub-Section Number :	3
Sub-Section Id :	64065388089
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 293 Question Id : 640653611205 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following sorting algorithms will have the same time complexity irrespective of the sequence of elements in the input?

Options :

6406532041266. ✔ Selection Sort

6406532041267. ✔ Merge Sort

6406532041268. ✖ Quick Sort

6406532041269. ✖ Insertion Sort

Sub-Section Number :	4
Sub-Section Id :	64065388090
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 294 Question Id : 640653611206 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

```
1  def insertionsort(L):
2      n = len(L)
3      if n < 1:
4          return(L)
5      for i in range(n):
6          j = i
7          while(j > 0 and L[j] < L[j - 1]):
8              (L[j], L[j - 1]) = (L[j - 1], L[j])
9              j = j - 1
10     return(L)
```

Which of the following statement(s) is/are correct with regard to the given insertion sort?

Options :

6406532041270.

✖ It is stable and it does not sort in-place

6406532041271. ✖ It is unstable and it sorts in-place

6406532041272. ✔ It is stable and it sorts in-place

6406532041273. ✔ After `m` iterations of the for-loop, the first `m` elements in the list are in sorted order

Question Number : 295 Question Id : 640653611208 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

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

Index	Data
0	
1	
2	72
3	23
4	12
5	54
6	36
7	83
8	
9	

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

Options :

6406532041278. ✔ 23, 36, 72, 12, 54, 83

6406532041279. ✖ 36, 72, 23, 54, 12, 83

6406532041280. ✖ 36, 23, 72, 12, 83, 54

6406532041281. ✔ 36, 23, 72, 12, 54, 83

Question Number : 296 Question Id : 640653611214 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the max-heap [40, 20, 30, 15, 18, 25, 14, 10, 12, 11, 13] built by repeatedly inserting values into an empty heap. Which of the following could not have been the last element inserted

into this heap?

Options :

6406532041297. ✖ 40

6406532041298. ✖ 18

6406532041299. ✔ 14

6406532041300. ✖ 20

6406532041301. ✔ 15

Sub-Section Number : 5

Sub-Section Id : 64065388091

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 297 Question Id : 640653611209 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

Select the most appropriate data structure for the following applications.

Application	Data Structure
1. To implement ticket reservation waiting list.	a. Array
2. Matrix operations	b. Graph
3. Evaluating an expression	c. Stack
4. Google map's algorithm to find a route between locations A and B	d. Queue

Options :

6406532041282. ✖ 1-c, 2-a, 3-d, 4-b

6406532041283. ✖ 1-d, 2-b, 3-c, 4-a

6406532041284. ✖ 1-d, 2-a, 3-b, 4-c

6406532041285. ✔ 1-d, 2-a, 3-c, 4-b

Question Number : 298 Question Id : 640653611229 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

Let α be an NP-Complete problem, β and γ be two other problems. β is polynomial time reducible to α and α is polynomial time reducible to γ.
On the basis of the above information only, what can be inferred ?

Options :

6406532041336. ✖ β belongs to NP hard class

6406532041337. ✖ β belongs to NP complete class

6406532041338. ✔ γ belongs to NP hard class

6406532041339. ✖ γ belongs to NP complete class

Sub-Section Number :	6
Sub-Section Id :	64065388092
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 299 Question Id : 640653611210 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 a **undirected connected graph** *G* with 27 edges. What is the minimum number of vertices in graph *G*?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

8

Question Number : 300 Question Id : 640653611212 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 a complete undirected graph with vertex set {0, 1, 2, 3, 4}. Every entry `w[i][j]` where `i` ≠ `j` in the matrix `w` below is the weight of the edge from vertex `i` to vertex `j`.

$$W = \begin{bmatrix} 0 & 6 & 8 & 3 & 4 \\ 6 & 0 & 12 & 4 & 2 \\ 8 & 12 & 0 & 1 & 3 \\ 3 & 4 & 1 & 0 & 2 \\ 4 & 2 & 3 & 2 & 0 \end{bmatrix}$$

What is the minimum possible weight of a spanning tree `T` in this graph?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

8

Question Number : 301 Question Id : 640653611215 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

In a binary tree T, if the number of nodes with two child nodes are 16, then the number of leaf nodes are ___

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

17

Question Number : 302 Question Id : 640653611217 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

If the number of nodes in an AVL tree is 72, what will be the minimum height of the AVL tree?
Assume that the height of a single node AVL tree is 1.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

7

Question Number : 303 Question Id : 640653611218 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

Let you have a single positive integer `x`, which is initially equal to 1. You are given a positive integer `n` where `n > x`.

In each step, you can either increment `x` by 1 or double `x`. Your goal is to produce a target value `n` in minimum number of steps. For example, you can produce the integer n = 10 in four steps as follows:

$$1(+1) \rightarrow 2(*2) \rightarrow 4(+1) \rightarrow 5(*2) \rightarrow 10$$

What is the minimum number of steps required if n = 1025 ?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

11

Question Number : 304 Question Id : 640653611219 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

For an activity X, X_s is the starting time and X_e is the ending time. The following are the starting time and ending time of activities A, B, C, D, E, F, G and H given in chronological order.

$$A_s,\ B_s,\ C_s,\ A_e,\ D_s,\ E_s,\ C_e,\ B_e,\ F_s,\ D_e,\ G_s,\ E_e,\ H_s,\ F_e,\ G_e,\ H_e$$

What is the minimum number of rooms required to schedule the activities in a set of rooms such that there are no conflicts?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Question Number : 305 Question Id : 640653611222 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

Let s1 = `pqrqspq` and s2 = `qsrpqp` be two sequences. The longest common subsequence of s1 and s2 is of length ___

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Question Number : 306 Question Id : 640653611226 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 `36` in the text `3147591653589363` ?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

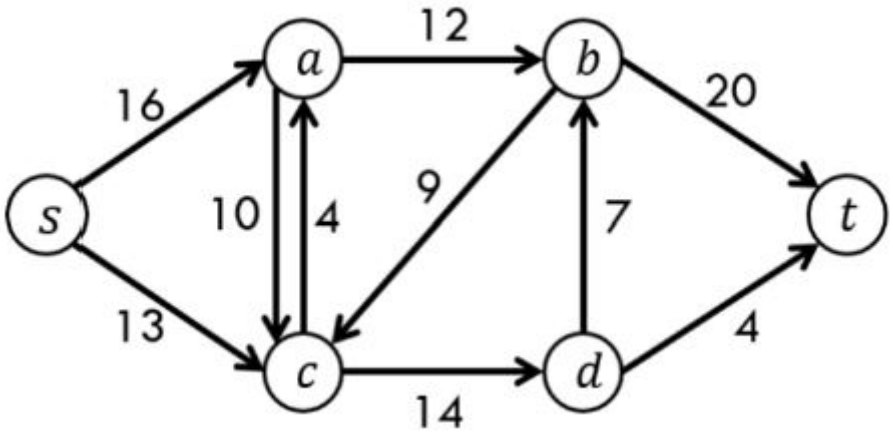
Question Number : 307 Question Id : 640653611227 Question Type : SA Calculator : None

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

Correct Marks : 4

Question Label : Short Answer Question

Consider the following 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. The value of the maximum flow in the given network is__.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

23

Sub-Section Number :	7
Sub-Section Id :	64065388093
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 308 Question Id : 640653611228 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

Let G be a simple graph. The size of the minimum vertex cover of G is 12 and the size of the maximum independent set of G is 16. What are the number of vertices in graph G?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

28

DBMS

Section Id :	64065341315
Section Number :	12
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1