

# Indian Institute of Technology, Madras - Centre for Continuing Education

## Notations :

- 1.Options shown in **green** color and with ✓ icon are correct.
- 2.Options shown in **red** color and with ✗ icon are incorrect.

**Question Paper Name :**

IIT M FOUNDATION DIPLOMA ENDTERM  
QPB2 07 Aug 2022 IBA

**Subject Name :**

2022 Aug: IIT M FOUNDATION DIPLOMA  
ENDTERM QPB2

**Creation Date :**

2022-08-03 15:32:50

**Duration :**

180

**Total Marks :**

991

**Display Marks:**

Yes

**Share Answer Key With Delivery Engine :**

Yes

**Actual Answer Key :**

Yes

**Calculator :**

Scientific

**Magnifying Glass Required? :**

No

**Ruler Required? :**

No

**Eraser Required? :**

No

**Scratch Pad Required? :**

No

**Rough Sketch/Notepad Required? :**

No

**Protractor Required? :**

No

**Show Watermark on Console? :**

Yes

**Highlighter :**

No

**Auto Save on Console?**

Yes

**Change Font Color :**

No

<b>Change Background Color :</b>	No
<b>Change Theme :</b>	No
<b>Help Button :</b>	No
<b>Show Reports :</b>	No
<b>Show Progress Bar :</b>	No

## **Group I**

<b>Group Number :</b>	1
<b>Group Id :</b>	6406538834
<b>Group Maximum Duration :</b>	0
<b>Group Minimum Duration :</b>	90
<b>Show Attended Group? :</b>	No
<b>Edit Attended Group? :</b>	No
<b>Break time :</b>	0
<b>Group Marks :</b>	991
<b>Is this Group for Examiner? :</b>	No
<b>Examiner permission :</b>	Cant View
<b>Show Progress Bar? :</b>	No
<b>Revisit allowed for group Instructions? :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Minimum Instruction Time :</b>	0
<b>Group Time In :</b>	Minutes
<b>Navigate To Group Summary From Last Question? :</b>	No
<b>Disable Submit Button During Assessment? :</b>	No

## **Sem1 CT**

<b>Section Id :</b>	64065322357
---------------------	-------------

<b>Section Number :</b>	1
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	21
<b>Number of Questions to be attempted :</b>	21
<b>Section Marks :</b>	100
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065351908
<b>Question Shuffling Allowed :</b>	No

**Question Number : 1 Question Id : 640653357627 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 "FOUNDATION LEVEL: SEMESTER 1/DIRECT ENTRY DIPLOMA : COMPUTATIONAL THINKING"

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 :**

6406531185440. ✓ Yes

6406531185441. ✗ No

**Question Number : 2 Question Id : 640653357628 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

## Scores

SeqNo	Name	Gender	DateOfBirth	TownCity	Mathematics	Physics	Chemistry	Total
0	Bhuvanesh	M	7 Nov	Erode	68	64	78	210
					■ ■ ■			
29	Naveen	M	13 Oct	Vellore	72	66	81	219

## Words

SeqNo	Word	PartOfSpeech	LetterCount
0	It	Pronoun	2
			■ ■ ■
64	cane.	Noun	4

## Library

SeqNo	Name	Author	Genre	Language	Pages	Publisher	Year
0	Igniting Minds	Kalam	Nonfiction	English	178	Penguin	2002
					■ ■ ■		
29	Malgudi Days	Narayan	Fiction	English	150	Indian Thought	1943

# Olympics

SeqNo	Name	Gender	Nationality	Host country	Year	Sport	Medal
0	Karnam Malleswari	F	Indian	Australia	2000	Weightlifting	Bronze
- - -							
49	Michael Phelps	M	American	China	2008	Swimming	Gold

## Three sample cards out of 30 for Shopping Bills dataset

Item List



SV Stores		Srivatsan		1
Item	Category	Qty	Price	Cost
Carrots	Vegetables/Food	1.5	50	75
Soap	Toiletries	4	32	128
Tomatoes	Vegetables/Food	2	40	80
Bananas	Vegetables/Food	8	8	64
Socks	Footwear/Apparel	3	56	168
Curd	Dairy/Food	0.5	32	16
Milk	Dairy/Food	1.5	24	36
				547

Sun General		Vignesh		14
Item	Category	Qty	Price	Cost
Phone Charger	Utilities	1	230	230
Razor Blades	Grooming	1	12	12
Razor	Grooming	1	45	45
Shaving Lotion	Grooming	0.8	180	144
Earphones	Electronics	1	210	210
Pencils	Stationery	3	5	15
				456

Big Bazaar		Sudeep		2
Item	Category	Qty	Price	Cost
Baked Beans	Canned/Food	1	125	125
Chicken Wings	Meat/Food	0.5	600	300
Cocoa powder	Canned/Food	1	160	160
Capsicum	Vegetables/Food	0.8	180	144
Tie	Apparel	2	390	780
Clips	Household	0.5	32	16
				1525

Options :

6406531185442. ✓ Useful Data has been mentioned above.

6406531185443. ❌ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number : 2

Sub-Section Id : 64065351909

Question Shuffling Allowed : Yes

Question Number : 3 Question Id : 640653357629 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

The following pseudocode is executed using the "Scores" table.

```
1 count = 0
2 while(Table 1 has more rows){
3     flag1 = False, flag2 = False
4     Read the first row X in Table 1
5     if(X.Gender == 'M'){
6         flag1 = True
7     }
8     if(X.CityTown == "Chennai"){
9         flag2 = True
10    }
11    if(flag1 == flag2){
12        count = count + 1
13    }
14    Move X to Table 2
15 }
```

## Statement

Consider the following variables which stores the following data.

A = Number of male students from Chennai

B = Number of female students from Chennai

C = Number of male students not from Chennai

D = Number of female students not from Chennai

Based on the above statements what will **count** represent at the end of the execution of the above pseudocode?

**Options :**

6406531185444. ✘ A

6406531185445. ✘ A + B

6406531185446. ✘ A + C

6406531185447. ✓ A + D

**Question Number : 4 Question Id : 640653357630 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**

The following pseudocode is executed using the "Library" dataset. What will **B** represent at the end of the execution?

```
1 A = 0, B = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     if(X.Language == "English"){
5         A = A + 1
6     }
7     else{
8         if(X.Language == "English" or X.Genre == "Fiction"){
9             B = B + 1
10        }
11    }
12    Move X to Table 2
13 }
```

**Options :**

6406531185448. ❌ Number of fictional books

6406531185449. ✓ Number of fictional books written in other than English

6406531185450. ❌ Number of books written in English + Number of fictional books

6406531185451. ❌ Number of books written in English + Number of fictional books written in other than English

6406531185452. ❌ Number of fictional books + Number of non-fictional books written in English

**Sub-Section Number :** 3

**Sub-Section Id :** 64065351910

**Question Shuffling Allowed :** Yes

**Question Number : 5 Question Id : 640653357631 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 following pseudocode is executed using the "Words" dataset. The variable **count** counts the words with part of speech noun or letter count at least 5, but not both. Choose the correct code fragment to complete the pseudocode.

```
1  count = 0
2  while(Table 1 has more rows){
3      Read the first row X in Table 1
4      if(checkSomething(X)){
5          count = count + 1
6      }
7      Move X to Table 2
8  }
9
10 Procedure checkSomething(Y)
11     A = False, B = False
12     if(X.PartOfSpeech == "Noun"){
13         A = True
14     }
15     if(X.LetterCount >= 5){
16         B = True
17     }
18     *****
19     *** Fill the code ***
20     *****
21 End checkSomething
```

### Options :

```
1  if(A and B){
2      return(True)
3  }
4  else{
5      return(False)
6  }
```

6406531185453. \*

```
1  if(A or B){
2      return(True)
3  }
4  else{
5      return(False)
6  }
```

6406531185454. \*

6406531185455. \*

```
1 if(not(A and B) or (A or B)){
2     return(True)
3 }
4 else{
5     return(False)
6 }
```

```
1 if(not(A and B) and (A or B)){
2     return(True)
3 }
4 else{
5     return(False)
6 }
```

6406531185456. ✓

**Question Number : 6 Question Id : 640653357635 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 following pseudocode is executed using the "Scores" dataset. What does L store at the end of the execution?

```
1 D = []
2 L = []
3 while(Table 1 has more rows){
4     Read the first row X in Table 1
5     if(isKey(D, X.TownCity)){
6         if(not member(D[X.TownCity], X.Gender)){
7             D[X.TownCity] = D[X.TownCity] ++ [X.Gender]
8         }
9     }
10    else{
11        D[X.TownCity] = [X.Gender]
12    }
13    Move X to Table 2
14 }
15 foreach i in keys(D){
16     if(length(D[i]) > 1){
17         L = L ++ [i]
18     }
19 }
```

**Options :**

6406531185465. ✘ List of cities that have more than one student

6406531185466. ✓ List of cities that have at least one boy and at least one girl

6406531185467. ✘ List of cities that have either boys or girls, but not both

6406531185468. ✘ List of cities that have exactly one boy or exactly one girl

**Question Number : 7 Question Id : 640653357637 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 following pseudocode is executed using the "Scores" dataset. What will  $\text{first}(D[i]) - \text{last}(D[i])$  represent for a given key  $i$ ?

```
1 D = []
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     if(isKey(D, X.Towncity)){
5         if(first(D[X.Towncity]) < X.Mathematics){
6             D[X.TownCity] = [X.Mathematics, last(D[X.TownCity])]
7         }
8         if(last(D[X.Towncity]) > X.Mathematics){
9             D[X.TownCity] = [first(D[X.TownCity]), X.Mathematics]
10        }
11    }
12    else{
13        D[X.TownCity] = [X.Mathematics, X.Mathematics]
14    }
15    Move X to Table 2
16 }
```

**Options :**

6406531185473. ✓ The difference between highest and lowest Mathematics marks of the city **i**
6406531185474. ✗ The difference between overall highest and lowest Mathematics marks of the dataset
6406531185475. ✗ The difference between highest and second highset Mathematics marks of the city **i**
6406531185476. ✗ It will be always 0.

**Question Number : 8 Question Id : 640653357645 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 following pseudocode is executed using the "Words" dataset. What will **wList** represent at the end of execution?

```
1 A = 0
2 wList = [], L = []
3 while(Table 1 has more rows){
4     Read the first row X in Table 1
5     L = findSomething(L, X)
6     if(length(L) == A){
7         wList = wList ++ [X.Word]
8     }
9     if(length(L) > A){
10        A = length(L)
11        wList = [X.Word]
12    }
13    L = []
14    Move X to Table 2
15 }
16
17 Procedure findSomething(M, Y)
18     i = 1, t = ''
19     while(i <= Y.LetterCount){
20         t = ith letter of Y.Word
21         if(not member(M, t)){
22             M = M ++ [t]
23         }
24         i = i + 1
25     }
26     return(M)
27 End findSomething
```

### Options :

6406531185499. ❌ List of words which have maximum number of letters

6406531185500. ✓ List of words which have maximum number of distinct letters

6406531185501. ❌ List of words which have maximum number of duplicate letters

6406531185502. ❌ List of words which have minimum number of letters

**Sub-Section Number :** 4

**Sub-Section Id :** 64065351911

**Question Shuffling Allowed :** Yes

**Question Number : 9 Question Id : 640653357636 Question Type : MCQ Is Question**

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

**Time : 0**

## Correct Marks : 5

### Question Label : Multiple Choice Question

The following pseudocode is executed using the "Olympics" dataset. What will **N** and **count** represent at the end of the execution?

```
1 A = 1, N = 0, count = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     Move X to Table 2
5     while(Table 1 has more rows) {
6         Read the first row Y in Table 1
7         if(X.Name == Y.Name){
8             A = A + 1
9             Move Y to Table 2
10        }
11        else{
12            Move Y to Table 3
13        }
14    }
15    if(A > N){
16        N = A
17    }
18    A = 1
19    count = count + 1
20    Move all rows from Table 3 to Table 1
21 }
```

### Options :

6406531185469. ✓ **N** = Maximum number of medals won by a player

**count** = Number of distinct players

6406531185470. ✗ **N** = Maximum number of medals won by a player

**count** = Total number of medals

6406531185471. ✗ **N** = Maximum number of players who won the same medal

**count** = Total number of medals

6406531185472. ✗ **N** = Maximum number of players who won the same medal

**count** = Number of distinct players

**Question Number : 10 Question Id : 640653357644 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

## Question Label : Multiple Choice Question

The following pseudocode is executed using the "Words" dataset. What will **wordCount** represent at the end of the execution?

```
1 wordCount = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     if(checkSomething(X) == 0){
5         wordCount = wordCount + 1
6     }
7     Move X to Table 2
8 }
9
10 Procedure checkSomething(Y)
11     i = 1, C = 0
12     A = False, B = False
13     while(i <= Y.LetterCount){
14         if(ith letter of Y.Word is vowel){
15             if(A and not B){
16                 C = 1
17             }
18             A = True, B = False
19         }
20         else{
21             if(not A and B){
22                 C = 1
23             }
24             A = False, B = True
25         }
26         i = i + 1
27     }
28     return(C)
29 End checkSomething
```

### Options :

6406531185495. ❌ Number of words in which vowels occur consecutively

6406531185496. ❌ Number of words in which no two vowels occur consecutively

6406531185497. ❌ Number of words in which vowels and consonants occur consecutivley

6406531185498. ✓ Number of words in which no two vowels and no two consonants occur consecutivley

**Question Number : 11 Question Id : 640653357648 Question Type : MCQ Is Question**

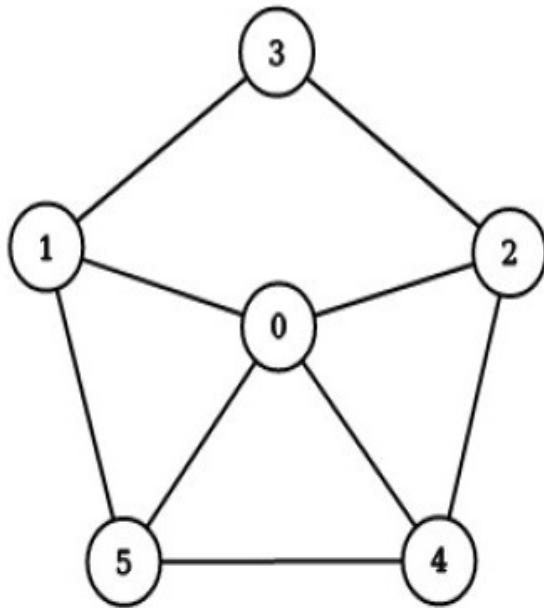
**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction**

**Time : 0**

## Correct Marks : 5

### Question Label : Multiple Choice Question

Consider the following graph with six nodes.  $M$  is the  $6 \times 6$  adjacency matrix corresponding to this below graph. Assume that  $M$  has already been computed.



What will the value of  $L$  be after executing the following pseudocode?

```
1 D = []
2 L = []
3 D[0] = -1
4 D, L = searchPath(M, D, L, 0)
5
6 Procedure searchPath(graph, P, S, i)
7     S = S ++ [i]
8     foreach j in columns(graph){
9         if(graph[i][j] == 1 and not (isKey(P, j))){
10             P[j] = i
11             P, S = searchPath(graph, P, S, j)
12         }
13     }
14     return(P, S)
15 End searchPath
```

### Options :

6406531185509. ✘  $L = [0, 1, 2, 3, 4, 5]$

6406531185510. ✓  $L = [0, 1, 3, 2, 4, 5]$

6406531185511. ✘  $L = [0, 1, 3, 4, 5, 2]$

6406531185512. ✘  $L = [0, 1, 3, 2, 5, 4]$

**Question Number : 12 Question Id : 640653357649 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 5**

**Question Label : Multiple Choice Question**

Consider the procedure given below.

```
1 Procedure doSomething(A, B)
2     L = []
3     i = 1, j = 1, p = '', q = ''
4     while(i <= A.LetterCount){
5         p = ith letter of A.Word
6         while(j <= B.LetterCount){
7             q = jth letter of B.Word
8             if((p == q) and not(member(L, q))){
9                 L = L ++ [q]
10            exitloop
11        }
12        j = j + 1
13    }
14    j = 1
15    i = i + 1
16 }
17 return(L)
18 End doSomething
```

Let **X** and **Y** be two rows in "Words" Table and **X.Word** = "computational" and **Y.Word** = "thinking", then, what will **doSomething(X, Y)** return?

**Options :**

6406531185513. ❌ ['t', 't', 'i', 'n']

6406531185514. ✓ ['t', 'i', 'n']

6406531185515. ❌ ['t', 'i', 'i', 'n']

6406531185516. ❌ ['t', 'i', 'n', 'i']

**Question Number : 13 Question Id : 640653357650 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 5**

**Question Label : Multiple Choice Question**

The following pseudocode is executing using the "Shopping bills" dataset. There are **n** customers in the dataset and every customer is assigned an index from 0 to **n-1**. Let **custShops** be a dictionary with index as key mapped to the list of shops visited by the customer.

For  $r \neq c$ , what does the value  $M[r][c]$  represent at the end of the execution?

```
1 M = createMatrix(n, n)
2 foreach r in keys(custShops){
3     foreach c in keys(custShops){
4         if(r != c){
5             M[r][c] = doSomething(custShops[r], custShops[c])
6         }
7     }
8 }
9
10 Procedure doSomething(L1, L2)
11     L = []
12     Flag = True
13     foreach i in L1{
14         foreach j in L2{
15             if(i == j){
16                 Flag = False
17                 exitloop
18             }
19         }
20         if(Flag){
21             L = L ++ [i]
22         }
23         Flag = True
24     }
25     return(L)
26 End doSomething
```

### Options :

6406531185517. ✘ List of shops visited by customer **c** but not by **r**

6406531185518. ✘ List of shops visited by customers either **r** or **c**, but not both

6406531185519. ✘ List of shops visited by both customers **r** and **c**

6406531185520. ✓ List of shops visited by customer **r** but not by **c**

**Sub-Section Number :** 5

**Sub-Section Id :** 64065351912

**Question Shuffling Allowed :** Yes

**Question Number : 14 Question Id : 640653357646 Question Type : MSQ Is Question**

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

Time : 0

Correct Marks : 5

Question Label : Multiple Select Question

The following pseudocode is executed using the "Shopping Bills" dataset. At the end of the execution, **L** stores the list of distinct shops from which only one category of items have been bought. But the pseudocode may have mistakes. Identify all such mistakes (if any). Assume that all statements not listed in the options below are free of errors. It is a Multiple Select Question (MSQ).

```
1 A = {}
2 L = []
3 while(Pile 1 has more cards){
4     Read the top card X from Pile 1
5     if(not isKey(A, X.ShopName)){
6         A = updateDict(A, X)
7     }
8     else{
9         A[X.ShopName] = []
10        A = updateDict(A, X)
11    }
12    Move X to Pile 2
13 }
14 foreach k in keys(A){
15     if(length(A[k]) == 1){
16         L = L ++ [k]
17     }
18 }
19 Procedure updateDict(D, Y)
20     foreach Z in Y.ItemList{
21         if(not member(D, Z.Category)){
22             D[Y.ShopName] = D[Y.ShopName] ++ [Z.Category]
23         }
24     }
25     return(D)
26 End updateDict
```

Options :

6406531185503. ❌ Line 1: Incorrect initialization of **A**

6406531185504. ✓ Line 5: Incorrect conditional statement

6406531185505. ❌ Line 16: Incorrect updating of **L**

6406531185506. ✓ Line 21: Incorrect conditional statement

6406531185507. ❌ Line 22: Incorrect updation of dictionary **D**

Sub-Section Number :

6

**Sub-Section Id :**

64065351913

**Question Shuffling Allowed :**

Yes

**Question Number : 15 Question Id : 640653357647 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**

**What will the value of **sum** be at the end of the execution of following pseudocode?**

```
1 sum = 0
2 L1 = [3, 0, 2]
3 L2 = [1, -4, 5]
4 sum = addSomething(L1, L2) + addSomething(L2, L1)
5
6 Procedure addSomething(X, Y)
7     s = 0
8     foreach a in X{
9         foreach b in Y{
10            s = s + (a - b)
11        }
12    }
13    return(s)
14 End addSomething
```

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

**0**

**Sub-Section Number :**

7

**Sub-Section Id :**

64065351914

**Question Shuffling Allowed :**

No

**Question Id : 640653357651 Question Type : COMPREHENSION Sub Question Shuffling**

**Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A**

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

**Question Numbers : (16 to 17)**

Question Label : Comprehension

Consider the procedure **evaluate** given below, where **P** and **Q** are the lists of same length.

If **L1** = [2, 0, 4, 3] and **L2** = [0, 2, 3, 5] then answer the given subquestions.

```
1 Procedure evaluate(P, Q)
2     if(P == []){
3         return([])
4     }
5     else{
6         c = first(P) * first(Q)
7         return([c] ++ evaluate(rest(P), rest(Q)))
8     }
9 End evaluate
```

**Sub questions**

**Question Number : 16 Question Id : 640653357652 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

What will **evaluate(L1, L2)** return?

**Options :**

6406531185521. ✓ [0, 0, 12, 15]

6406531185522. ✗ [2, 2, 12, 15]

6406531185523. ✗ [0, 0 , 15, 12]

6406531185524. ✗ [2, 2, 7, 8]

**Question Number : 17 Question Id : 640653357653 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

How many times will the procedure **evaluate** be called, excluding the main call?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Sub-Section Number :** 8

**Sub-Section Id :** 64065351915

**Question Shuffling Allowed :** No

**Question Id :** 640653357632 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Calculator :** None **Response Time :** N.A

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

**Question Numbers :** (18 to 19)

Question Label : Comprehension

The following pseudocode is executed using the "Scores" dataset

```
1 A = 0, B = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     Flag = False
5     if(X.Gender == 'M' or X.Physics > 90){
6         Flag = True
7     }
8     if(not Flag){
9         A = A + 1
10        if(X.Gender == 'F'){
11            B = B + 1
12        }
13    }
14    Move X to Table 2
15 }
```

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 18 Question Id : 640653357633 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

What will **A** represent at the end of the execution?

**Options :**

6406531185457. ❌ Number of students whose Physics marks are at most 90

6406531185458. ❌ Number of female students whose Physics marks are at least 90

6406531185459. ✓ Number of female students whose Physics marks are at most 90

6406531185460. ❌ Number of male students whose Physics marks are at most 90

**Question Number : 19 Question Id : 640653357634 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

What will **B** represent at the end of the execution?

**Options :**

6406531185461. ❌ Number of students whose Physics marks are at most 90

6406531185462. ❌ Number of students whose Physics marks are at least 90

6406531185463. ❌ Number of female students whose Physics marks are at least 90

6406531185464. ✓ Number of female students whose Physics marks are at most 90

**Sub-Section Number :** 9

**Sub-Section Id :** 64065351916

**Question Shuffling Allowed :** No

**Question Id : 640653357638 Question Type : COMPREHENSION Sub Question Shuffling**

**Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A**

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

## Question Numbers : (20 to 21)

### Question Label : Comprehension

The following pseudocode is executed using the "Shopping Bills" dataset.

```
1 itemD = {}, costD = {}
2 while(Pile 1 has more cards){
3     Read the top card X in Pile 1
4     itemD = updateDict(itemD, X)
5     Move X to Pile 2
6 }
7
8 foreach i in keys(itemD){
9     B = 0, items = []
10    foreach j in keys(itemD[i]){
11        if(itemD[i][j] == B){
12            items = items ++ [j]
13        }
14        if(itemD[i][j] > B){
15            B = itemD[i][j]
16            items = [j]
17        }
18    }
19    costD[i] = items
20 }
21
22 Procedure updateDict(D, Y)
23     if(not isKey(D, Y.ShopName)){
24         D[Y.ShopName] = {}
25     }
26     foreach A in Y.ItemList{
27         if(isKey(D[Y.ShopName], A.Item)){
28             D[Y.ShopName][A.Item] = D[Y.ShopName][A.Item] + A.Cost
29         }
30         else{
31             D[Y.ShopName][A.Item] = A.Cost
32         }
33     }
34     return(D)
35 End updateDict
```

Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 20 Question Id : 640653357639 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 will **itemD[i][j]** represent?

**Options :**

6406531185477. ✓ Revenue generated by item **j** for shop **i**

6406531185478. ✗ Revenue generated by item **i** for shop **j**

6406531185479. ✗ Cost of item **i** in shop **j**

6406531185480. ✗ Cost of item **j** in shop **i**

**Question Number : 21 Question Id : 640653357640 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 will **costD[i]** represent at the end of the execution?

**Options :**

6406531185481. ✓ List of item(s) which generated highest revenue for shop **i**

6406531185482. ✗ List of item(s) which generated lowest revenue for shop **i**

6406531185483. ✗ List of cost of most sold item(s) in shop **i**

6406531185484. ✗ List of cost of least sold item(s) in shop **i**

**Question Id : 640653357654 Question Type : COMPREHENSION Sub Question Shuffling**

**Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A**

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

**Question Numbers : (22 to 23)**

Question Label : Comprehension

The following pseudocode constructs a graph G using the "Scores" dataset, represented by the adjacency matrix **B**. Let **A** be a dictionary with sequence numbers of students as keys mapped to their total marks.

```
1 n = length(keys(A))
2 B = createMatrix(n, n)
3
4 foreach i in keys(A){
5     foreach j in keys(A){
6         if(A[i] > A[j]){
7             B[i][j] = 1
8         }
9     }
10 }
```

Based on the above data, answer the given subquestions

### Sub questions

**Question Number : 22 Question Id : 640653357655 Question Type : MSQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Select Question

Choose the correct option(s) with respect to the graph G. It is a Multiple Select Question.

#### Options :

6406531185526. ❌ The in-degree and out-degree for each node in G is the same.

6406531185527. ✓ G is always acyclic.

6406531185528. ❌ If  $B[i][j] = 1$  then  $B[j][i] = 1$ , for any  $i, j$

6406531185529. ✓ If  $B[i][j] = 1$  then  $B[j][i] = 0$ , for any  $i, j$

6406531185530. ❌ If  $B[i][j] = 0$  then  $B[j][i] = 1$ , for any  $i, j$

**Question Number : 23 Question Id : 640653357656 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

When will the procedure **checkSomething(B, i)** return True?

```
1 Procedure checkSomething(B, i)
2     foreach j in columns(B){
3         if((i != j) and (B[i][j] == 0)){
4             return(False)
5         }
6     }
7     return (True)
8 End checkSomething
```

**Options :**

6406531185531. ❌ If student **i** has scored greater total marks than at least one student

6406531185532. ❌ If student **i** has scored less total marks than at least one student

6406531185533. ❌ If student **i** has scored lowest total marks among all students

6406531185534. ✓ If student **i** has scored highest total marks among all students

**Question Id : 640653357657 Question Type : COMPREHENSION Sub Question Shuffling**

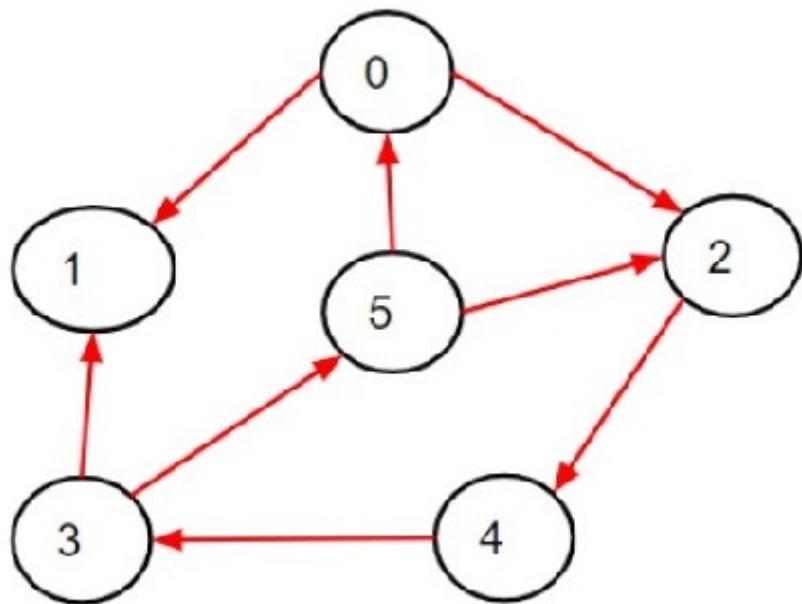
**Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A**

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

**Question Numbers : (24 to 25)**

Question Label : Comprehension

Let  $M$  be the adjacency matrix of the graph  $G$  given below.



```
1 Procedure updateMatrix(M)
2     tempMat = M
3     foreach i in rows(M){
4         foreach k in columns(M){
5             if(M[i][k] == 1){
6                 foreach j in columns(M){
7                     if(M[k][j] == 1){
8                         tempMat[i][j] = 1
9                     }
10                }
11            }
12        }
13    }
14    return(tempMat)
15 End updateMatrix
```

Based on above information, answer the given subquestions.

### Sub questions

**Question Number : 24 Question Id : 640653357658 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**

What will be the value of  $B$  at the end of the execution of the pseudocode given below?

```
1 newMatrix = updateMatrix(M)
2 B = newMatrix[0][3]
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0

**Question Number :** 25 **Question Id :** 640653357659 **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

What will be the value of **B** at the end of execution of pseudocode given below?

```
1 newMatrix = updateMatrix(M)
2 newMatrix2 = updateMatrix(newMatrix)
3 B = newMatrix2[0][3]
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Sub-Section Number :** 10

**Sub-Section Id :** 64065351917

**Question Shuffling Allowed :** No

**Question Id :** 640653357641 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Calculator :** None **Response Time :** N.A

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

## Question Numbers : (26 to 27)

### Question Label : Comprehension

The following pseudocode constructs a matrix **M** from the "Shopping Bills" dataset. Two bills are said to be similar if the difference of their total bill amount is at most 100. Procedure **abs(a)** returns absolute value of input integer **a**. For example: **abs(5) = 5, abs(-5) = 5.**

```
1 D = {}
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     D[X.SeqNo] = [X.Name, X.Total]
5     Move X to Table 2
6 }
7
8 n = length(keys(D))
9 M = createMatrix(n, n)
10 foreach i in keys(D){
11     foreach j in keys(D){
12         if(i != j and abs(last(D[i]) - last(D[j])) <= 100){
13             M[i][j] = 1
14             if(first(D[i]) == first(D[j])){
15                 M[i][j] = M[i][j] + 1
16             }
17         }
18     }
19 }
```

Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 26 Question Id : 640653357642 Question Type : MSQ Is Question**

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

**Correct Marks : 5**

### Question Label : Multiple Select Question

Let **i** and **j** be the sequence numbers of two similar bills, where **i ≠ j**. Which of the following statement(s) is/are true about **M[i][j]**?

It is a Multiple Select Question.

### Options :

6406531185485. ✓ The maximum value of **M[i][j]** will be 2.

6406531185486. ✘ If  $M[i][j] = 1$ , then both the bills have same customer names

6406531185487. ✓ If  $M[i][j] = 1$ , then both the bills have different customer names

6406531185488. ✓ If  $M[i][j] = 2$ , then both the bills have same customer names

6406531185489. ✘  $M[i][j]$  can be more than 2 if both the bills have same customer names

**Question Number : 27 Question Id : 640653357643 Question Type : MSQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Select Question

Choose the correct statement(s) based on given pseudocode. It is a Multiple Select Question

**Options :**

6406531185490. ✘ For  $i \neq j$ , if  $M[i][j] = 0$  then  $M[j][i] = 1$

6406531185491. ✓ For  $i \neq j$ , if  $M[i][j] = 1$  then  $M[j][i] = 1$

6406531185492. ✘ For  $i \neq j$ , if  $M[i][j] = 1$  then  $M[j][i] = 0$

6406531185493. ✓ For  $i \neq j$ , if  $M[i][j] = 0$  then  $M[j][i] = 0$

6406531185494. ✓ For  $i \neq j$ , if  $M[i][j] = 2$  then  $M[j][i] = 2$

## Sem1 Maths1

**Section Id :** 64065322358

**Section Number :** 2

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 16

<b>Number of Questions to be attempted :</b>	16
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065351918
<b>Question Shuffling Allowed :</b>	No

**Question Number : 28 Question Id : 640653357660 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 "FOUNDATION LEVEL: SEMESTER 1/DIRECT ENTRY DIPLOMA : MATHEMATICS FOR DATA SCIENCE 1"

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 :**

6406531185537. ✓ Yes

6406531185538. ✗ No

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	64065351919
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 29 Question Id : 640653357662 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

An IT convention is being organized in a fancy hotel. Many parallel sessions are planned. Each session has to take place in a separate hall. Sessions that do not overlap can share a hall. The organizer of the convention would like to know the minimum number of halls to reserve at the hotel to fit in all the sessions without any clashes.

The organizer decides to model this as a graph where the nodes are the sessions and edges represent pairs of sessions with overlapping timings. In this setting, the graph theoretic question to be answered is:

**Options :**

6406531185540. ✘ Find a spanning tree with maximum number of edges.

6406531185541. ✘ Find a maximum size independent set.

6406531185542. ✘ Find a minimum size vertex cover.

6406531185543. ✓ Find a minimal colouring.

**Sub-Section Number :** 3

**Sub-Section Id :** 64065351920

**Question Shuffling Allowed :** Yes

**Question Number : 30 Question Id : 640653357667 Question Type : MSQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Select Question

Choose the correct options from the following.

**Options :**

The function  $f : \mathbb{R} \rightarrow \mathbb{R}$  defined as  $f(x) = 2\sin(x) + 3\cos(x)$  is a bounded function.

Consider two real sequences  $\{a_n\}$  and  $\{b_n\}$  such that at least one of the limits  $\lim_{n \rightarrow \infty} a_n$  or  $\lim_{n \rightarrow \infty} b_n$  does not exist. Then the limit  $\lim_{n \rightarrow \infty} a_n + b_n$  also does not exist.

6406531185551. ✘

6406531185552. ✓ Limit of the sequence  $a_n = (-1)^n \cos(n\pi)$  is 1.

6406531185553. ✗ If the derivative of two functions  $f : \mathbb{R} \rightarrow \mathbb{R}$  and  $g : \mathbb{R} \rightarrow \mathbb{R}$  are same at all points then  $f(x) = g(x)$  for all  $x \in \mathbb{R}$ .

**Question Number : 31 Question Id : 640653357674 Question Type : MSQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Select Question

A constructor is asked to construct a new road which is at a distance of  $2\sqrt{2}$  km from the municipality office and perpendicular to a road which can be defined by the equation of the straight line  $x - y = 8$  (considering the municipality office to be the origin). Choose the correct option(s) representing the possible equations of the straight lines to represent the new road to be constructed.

**Options :**

6406531185559. ✗  $x - y - 4 = 0$

6406531185560. ✓  $x + y + 4 = 0$

6406531185561. ✗  $x - y + 4 = 0$

6406531185562. ✓  $x + y - 4 = 0$

**Sub-Section Number :** 4

**Sub-Section Id :** 64065351921

**Question Shuffling Allowed :** Yes

**Question Number : 32 Question Id : 640653357676 Question Type : MSQ Is Question**

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

**Correct Marks : 4**

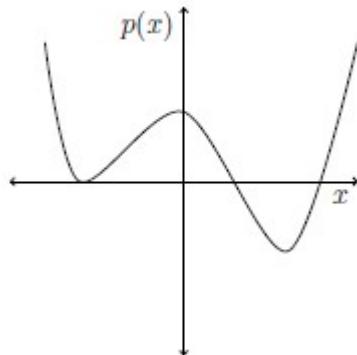
Question Label : Multiple Select Question

The polynomial  $p(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_0$  has the following properties:

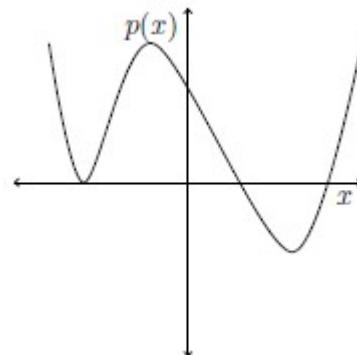
- $p(x)$  is an even degree polynomial.
- $p(x)$  has at least one positive real root and at least one negative real root.
- Either  $(x + 3)$  or  $(x + 3)^2$  is a factor of  $p(x)$ .
- $p(0) \neq 0$

From the options given, choose the possible representations of  $p(x)$ .

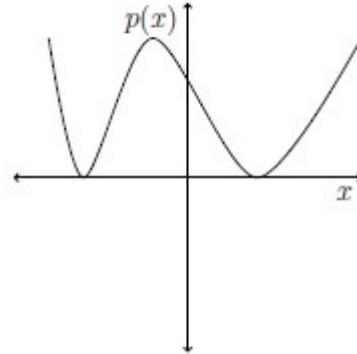
**Options :**



6406531185564. ✓

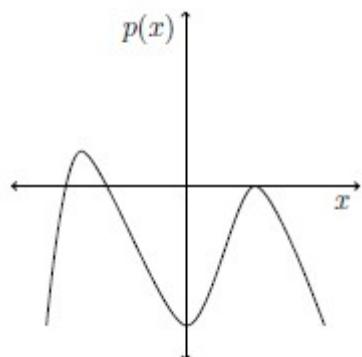
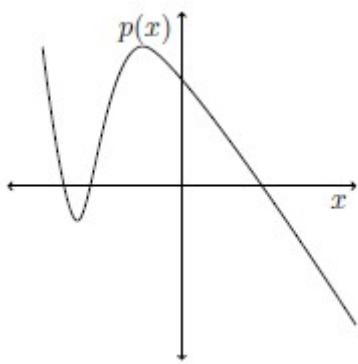


6406531185565. ✓

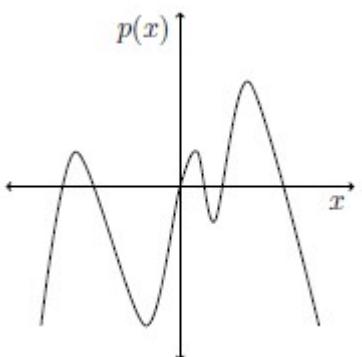


6406531185566. ✓

6406531185567. ❌



6406531185568. ✓



6406531185569. \*

**Sub-Section Number :**

5

**Sub-Section Id :**

64065351922

**Question Shuffling Allowed :**

Yes

**Question Number : 33 Question Id : 640653357681 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

**Question Label : Multiple Select Question**

Suppose  $x$  and  $y$  are positive real numbers. If  $\log_x(4) + \log_y(16) = 0$ , then which of the following options can be true for  $x$  and  $y$ .

**Options :**6406531185576. ✓  $x = 2, y = \frac{1}{4}$ 6406531185577. ✗  $x^3y^2 = 1$ 6406531185578. ✓  $x^2y = 1$ 6406531185579. ✗  $x = 2, y = \frac{1}{2\sqrt{2}}$ **Sub-Section Number :** 6**Sub-Section Id :** 64065351923**Question Shuffling Allowed :** Yes**Question Number : 34 Question Id : 640653357668 Question Type : SA Calculator : None****Response Time : N.A Think Time : N.A Minimum Instruction Time : 0****Correct Marks : 2**

Question Label : Short Answer Question

If the piecewise function

$$f(x) = \begin{cases} mx & x < 3 \\ n & x = 3 \\ -2x + 9 & x > 3 \end{cases}$$

is continuous, then the value of  $m + n$  is**Response Type :** Numeric**Evaluation Required For SA :** Yes**Show Word Count :** Yes**Answers Type :** Equal**Text Areas :** PlainText**Possible Answers :**

4

**Question Number : 35 Question Id : 640653357677 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

Rohit and his friend are playing a number-guessing game. The game consists of one player choosing a number and performing the following operations on it :

- Add 4 to the number.
- Square the resulting number.
- Multiply the result by 3.
- Divide the result by 2.

and then announcing the finally obtained number. The other player wins if they correctly guess the original number.

Rohit's friend chooses a number and announces the result of the above operations as 600.

Determine the original number and help Rohit win the game.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

**16**

**Sub-Section Number :** 7

**Sub-Section Id :** 64065351924

**Question Shuffling Allowed :** Yes

**Question Number : 36 Question Id : 640653357661 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

Suppose a tree has two vertices of degree 4, two vertices of degree 3, and three vertices of degree

2. If all the other vertices have degree 1, then how many vertices are there in the graph?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

15

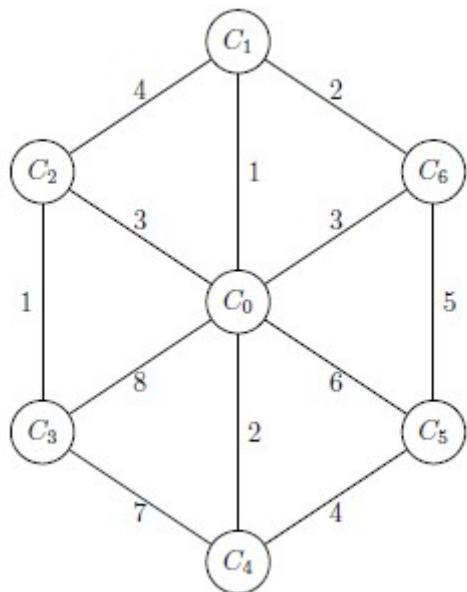
**Question Number :** 37 **Question Id :** 640653357666 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 3

**Question Label :** Short Answer Question

What is the weight of a minimum cost spanning tree of the graph given below?



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

**Question Number : 38 Question Id : 640653357673 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

If the estimated area  $A$  of the region bounded by the graph of the function  $f(x) = x^2 + 1$  above the interval  $[1, 4]$  using the trapezoidal Riemann sum, by taking 3 subintervals of equal length. Find the value of  $2A$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

49

**Sub-Section Number : 8**

**Sub-Section Id : 64065351925**

**Question Shuffling Allowed : Yes**

**Question Number : 39 Question Id : 640653357669 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  $(a, b)$  denote the point on the line  $y = 2x + 3$  which is at a minimum distance from the origin  $(0, 0)$ . The value of  $|3a| + |4b|$  is

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

6

**Question Number : 40 Question Id : 640653357675 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  $A$  be the set of all points on the curve defined by the function  $f_1(x) = x^2 - x - 20$  and let  $B$  be the set of all points on the curve  $f_2$  defined by the reflection of the curve  $f_1$  with respect to  $X$ - axis. If  $C$  is the set of all points on the axes(i.e.,  $x$  and  $y$  axis) then find the cardinality of set  $D$  where  $D = (A \cap B) \cup (A \cap C) \cup (B \cap C)$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

4

**Sub-Section Number :** 9

**Sub-Section Id :** 64065351926

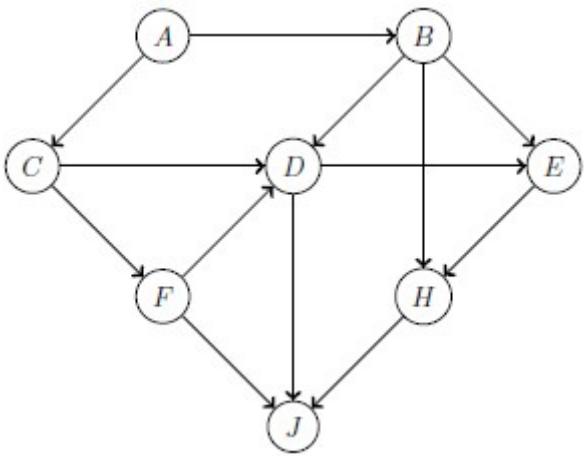
**Question Shuffling Allowed :** No

**Question Id : 640653357663 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (41 to 42)**

**Question Label : Comprehension**

Consider the following directed graph  $G$ .



Suppose DFS of this graph is performed from node A, such that when we visit a vertex, we explore its unvisited neighbors in alphabetical order.

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 41 Question Id : 640653357664 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

Find the number of cross edges in the DFS tree.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3

**Question Number : 42 Question Id : 640653357665 Question Type : MSQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Select Question

Which of the following statements are correct?

**Options :**

6406531185545. ❌ The number of backward edges in the DFS tree is one.

6406531185546. ✓ The graph  $G$  is an acyclic graph.

6406531185547. ✓ The graph  $G$  is a planar graph.

6406531185548. ❌ The graph  $G$  has no possible topological orderings.

**Sub-Section Number :** 10

**Sub-Section Id :** 64065351927

**Question Shuffling Allowed :** No

**Question Id : 640653357670 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (43 to 44)**

Question Label : Comprehension

Find the values of given definite integrals in the given subquestions.

**Sub questions**

**Question Number : 43 Question Id : 640653357671 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

$$\int_{-\pi}^{\pi} x + \sin(\pi x) dx$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0

**Question Number : 44 Question Id : 640653357672 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

$$\int_0^{\frac{1}{2}} 8xe^{2x} dx$$

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

2

**Sub-Section Number : 11**

**Sub-Section Id : 64065351928**

**Question Shuffling Allowed : No**

**Question Id : 640653357678 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (45 to 46)**

Question Label : Comprehension

Suppose the relation  $R = \{(Fish, Cat), (Dragon, Dragon), (Lion, Cat), (Fish, Lion)\}$  is defined on the set  $S = \{Fish, Lion, Dragon, Cat\}$ .

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 45 Question Id : 640653357679 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

The relation  $R$  on the set  $S$  is(are)

**Options :**

6406531185571. ❌ Reflexive

6406531185572. ❌ Symmetric

6406531185573. ✓ Transitive

6406531185574. ❌ Identity

**Question Number : 46 Question Id : 640653357680 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

What is the minimum number of elements of the Cartesian product  $S \times S$  that need to be added to  $R$  such that the relation becomes symmetric?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

3

## Sem2 Intro to Python

**Section Id :** 64065322359

**Section Number :** 3

**Section type :** Online

<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	17
<b>Number of Questions to be attempted :</b>	17
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065351929
<b>Question Shuffling Allowed :</b>	No

**Question Number : 47 Question Id : 640653357682 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 "FOUNDATION LEVEL: SEMESTER 2/DIRECT ENTRY DIPLOMA : INTRODUCTION TO PYTHON"

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 :**

6406531185580. ✓ Yes

6406531185581. ✗ No

**Question Number : 48 Question Id : 640653357683 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

# Useful Data

## Presentation

There are two types of blocks that you would see in all the questions:

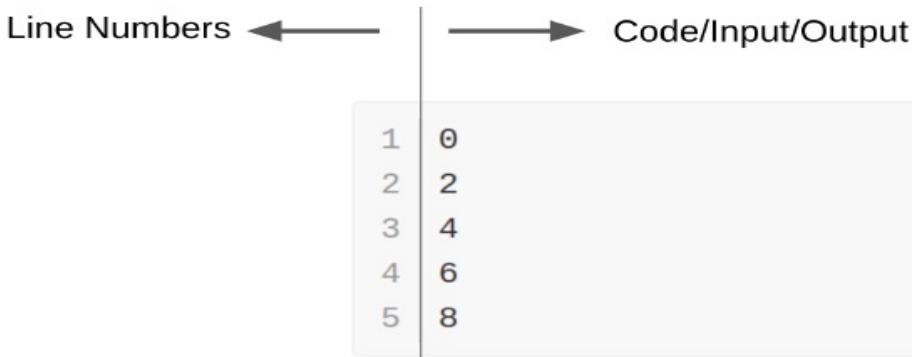
### Code

```
1 | for i in range(10):  
2 |     if i % 2 == 0:  
3 |         print(i)
```

### Input or Output

```
1 | 0  
2 | 2  
3 | 4  
4 | 6  
5 | 8
```

In both the blocks, please note that the region to the left of the thin vertical line — | — corresponds to line-numbers. Do not confuse the line numbers with the content of the code or the input-output. Just to be clear:



## Useful information

### range

Sample behaviour of the `range` function:

- `range(5)` corresponds to the sequence 0, 1, 2, 3, 4
- `range(1, 5)` corresponds to the sequence 1, 2, 3, 4
- `range(1, 1)` is the empty sequence

### // operator

`//` is the floor division operator. `5 // 2` is 2 and *not* 2.5

### NAT → integer

For all NAT questions in this exam, the answer will always be an integer and not a float value. If the answer to a question is 18, then just enter that value. Do *not* enter 18.0

## Options :

6406531185582. ✓ Useful Data has been mentioned above.

6406531185583. ❌ This data attachment is just for a reference & not for an evaluation.

**Sub-Section Number :**

2

**Sub-Section Id :**

64065351930

**Question Shuffling Allowed :**

Yes

**Question Number : 49 Question Id : 640653357697 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What should be the input to the following code-block for its output to be common?

```
1 char = input()
2 words = ['fray', 'than', 'plank', 'black',
3           'flask', 'snack', 'grand', 'place']
4
5 count = 0
6 for word in words:
7     if char in word:
8         count += 1
9
10 if count == len(words):
11     print('common')
12 else:
13     print('not common')
```

**Options :**

6406531185614. ✓ a

6406531185615. ✗ k

6406531185616. ✗ n

6406531185617. ✗ f

**Question Number : 50 Question Id : 640653357700 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the output of the following snippet of code?

```
1 for i in range(1, 6):
2     for j in range(i):
3         # there is no space between the quotes for the end argument
4         print('*', end = '')
5     print()
```

**Options :**

1	*
2	**
3	***
4	****
5	*****

6406531185623. ✓

1	*
2	**
3	***
4	****

6406531185624. ✗

1	*
2	**
3	***
4	****
5	*****

6406531185625. ✗

1	*
2	**
3	***
4	****
5	*****
6	*****

6406531185626. ✗

**Sub-Section Number :**

3

**Sub-Section Id :**

64065351931

**Question Shuffling Allowed :**

Yes

**Question Number : 51 Question Id : 640653357689 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

If  $n$  is a positive integer, what is the output of the following snippet of code?

```
1 P = [x for x in range(1, 2 * n + 1)]
2 Q = [P[i] + P[-i - 1] for i in range(0, n)]
3 print(sum(Q))
```

**Options :**

6406531185594. ✘ Sum of the first  $n$  positive integers

6406531185595. ✘ Sum of the first  $n$  positive, even integers

6406531185596. ✘ Sum of the first  $2n$  positive, even integers

6406531185597. ✓ Sum of the first  $2n$  positive integers

6406531185598. ✘ Sum of the first  $2n$  positive, odd integers

**Question Number : 52 Question Id : 640653357694 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

Two lists are equal if and only if they satisfy both the conditions given below:

(1) They have the same number of elements. Call this the `size` of the list.

(2) The  $i^{th}$  element in the first list is the same as the  $i^{th}$  element in the second list for  $0 \leq i < \text{size}$ . We are using zero-indexing here.

If both lists are empty, then they are assumed to be equal.

`equality` is a function that accepts two lists `P` and `Q` as arguments and returns `True` if the lists are equal and `False` otherwise. Consider the following possible implementations of this function:

#### Code-1

```
1 def equality(P, Q):
2     if len(P) != len(Q):
3         return False
4     if len(P) == 0:
5         return True
6     if P[0] != Q[0]:
7         return False
8     return equality(P[1:], Q[1:])
```

#### Code-2

```
1 def equality(P, Q):
2     if len(P) != len(Q):
3         return False
4     for elem in P:
5         if elem not in Q:
6             return False
7     return True
```

Which of these two implementations is correct?

#### Options :

6406531185605. ✓ Only code-1 is a correct implementation.

6406531185606. ✗ Only code-2 is a correct implementation.

6406531185607. ✗ Both code-1 and code-2 are correct implementations.

6406531185608. ✗ Both code-1 and code-2 are **not** correct implementations.

**Question Number : 53 Question Id : 640653357695 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

What is the output of the following snippet of code? Select the most appropriate option.

```
1 def merge(D1, D2, priority):
2     if priority == 'second':
3         return merge(D2, D1, 'first')
4     D = dict()
5
6     for key in D1:
7         value = D1[key]
8         D[key] = value
9
10    for key in D2:
11        value = D2[key]
12        if key not in D:
13            D[key] = value
14
15    return D
16
17 out = merge({'a': 1, 'b': 2, 'd': 4},
18             {'a': 10, 'c': 3, 'b': 5},
19             'second')
20 print(out)
```

### Options :

1 | {'a': 10, 'c': 3, 'b': 5, 'd': 4}

6406531185609. ✓

1 | {'a': 1, 'c': 3, 'b': 2, 'd': 4}

6406531185610. ✗

1 | {'a': 10, 'c': 3, 'b': 2, 'd': 4}

6406531185611. ✗

1 | {'a': 1, 'c': 3, 'b': 5, 'd': 4}

6406531185612. ✗

Question Number : 54 Question Id : 640653357698 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

What is the output of the following snippet of code?

```
1 def do_something(A, x):
2     m, n = len(A), len(x)
3     out = []
4     for i in range(m):
5         val = 0
6         for j in range(n):
7             val += A[i][j] * x[j]
8         out.append(val)
9     return out
10
11 A = [[1, 0, 1, 1],
12      [2, 1, 0, 1],
13      [1, 0, 1, 0],
14      [0, 1, 2, 1]]
15
16 x = [1, 4, 2, 1]
17
18 print(do_something(A, x))
```

Options :

1 | [4, 7, 3, 9]

6406531185618. ✓

1 | [4, 7, 3, 1]

6406531185619. ✗

1 | [9, 3, 7, 4]

6406531185620. ✗

1 | 23

6406531185621. ✗

Question Number : 55 Question Id : 640653357701 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

What is the output of the following snippet of code?

```
1 | L = [x // 2 if x % 2 == 0 else x * 2 for x in range(1, 10)]
2 | print(L)
```

**Options :**

```
1 | [2, 1, 6, 2, 10, 3, 14, 4, 18]
```

6406531185627. ✓

```
1 | [0, 4, 1, 8, 2, 12, 3, 16, 4]
```

6406531185628. ✗

```
1 | [1, 2, 3, 4, 5, 6, 7, 8, 9]
```

6406531185629. ✗

```
1 | [2, 4, 6, 8, 10, 12, 14, 16, 18]
```

6406531185630. ✗

**Question Number : 56 Question Id : 640653357703 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

What are the contents of the file `greek.txt` created by the following snippet of code?

```
1 | f = open('greek.txt', 'w')
2 | f.write('alpha')
3 | f.write('beta')
4 | f.write('gamma')
5 | f.write('delta')
6 | f.write('theta')
7 | f.close()
```

**Options :**

1	alpha
2	beta
3	gamma
4	delta
5	theta

6406531185635. ✘

1	alphabetagammadeltatheta
---	--------------------------

6406531185636. ✓

1	alpha
2	
3	beta
4	
5	gamma
6	
7	delta
8	
9	theta

6406531185637. ✘

1	alpha beta gamma delta theta
---	------------------------------

6406531185638. ✘

**Sub-Section Number :**

4

**Sub-Section Id :**

64065351932

**Question Shuffling Allowed :**

Yes

**Question Number : 57 Question Id : 640653357702 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

Consider the following snippets of code:

**Code-1**

```
1 | T = (1, 2, 3)
2 | T.append(4)
```

**Code-2**

```
1 | S = set()
2 | S.add(1)
3 | S.add(2)
4 | print(S[0])
```

**Code-3**

```
1 | D = { }
2 | D[0] = 'zero'
3 | D[0] = 'error'
```

Select all true statements.

**Options :**

6406531185631. ✓ Code-1 will throw an error in line-2

6406531185632. ✓ Code-2 will throw an error in line-4

6406531185633. ✗ Code-3 will throw an error in line-3

6406531185634. ✓ Code-3 will run without any error

**Sub-Section Number :** 5

**Sub-Section Id :** 64065351933

**Question Shuffling Allowed :** Yes

**Question Number : 58 Question Id : 640653357684 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 following text file `names.txt`:

```
1 atul
2 bhaskar
3 dhannya
4 omkar
5 ram
6 karthik
7 subhajit
8 mayur
9 nitin
10 nikita
```

What is the output of the following snippet of code?

```
1 fh = open('names.txt', 'r')
2
3 count = 0
4 for line in fh:
5     name = line.strip()
6     if len(name) < 6:
7         count += 1
8
9 fh.close()
10 print(count)
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

5

**Question Number :** 59 **Question Id :** 640653357690 **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

What is the output of the following snippet of code?

```
1 def some_fun(x):
2     if x < 3:
3         return 0
4     return 1 + some_fun(x // 3)
5
6 print(some_fun(59049))
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

10

**Question Number :** 60 **Question Id :** 640653357696 **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

What is the output of the following snippet of code? Each entry in the matrix `board` has one of these two characters: '`X`' or '`0`'. Your answer should be an integer.

```
1 def status(M):
2     n = len(M)
3     for i in range(n):
4         index = i
5         for j in range(n):
6             if M[i][j] != M[i][0]:
7                 index = -1
8                 break
9             if index >= 0:
10                break
11     return index
12
13 board = [[['X', 'X', '0', 'X', '0', 'X'],
14           ['0', 'X', '0', '0', 'X', 'X'],
15           ['0', 'X', '0', '0', '0', 'X'],
16           ['0', '0', '0', '0', '0', '0'],
17           ['X', '0', '0', 'X', 'X', 'X'],
18           ['X', 'X', '0', 'X', '0', '0']]]
19 print(status(board))
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3

**Question Number :** 61 **Question Id :** 640653357699 **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

What is the output of the following snippet of code?

```
1 n = 1203040
2
3 x = 0
4 while n > 0:
5     if n % 10 == 0:
6         n = n // 10
7         continue
8     x = x * 10 + (n % 10)
9     n = n // 10
10
11 print(x)
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4321

**Sub-Section Number :** 6

**Sub-Section Id :** 64065351934

**Question Shuffling Allowed :** No

**Question Id :** 640653357685 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Calculator :** None **Response Time :** N.A

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

**Question Numbers :** (62 to 64)

**Question Label :** Comprehension

Consider the following csv file named `capitals.csv`. Note that the file has exactly 11 lines and the entire file is given below for your reference.

```
1 continent,country,capital
2 asia,india,delhi
3 europe,uk,london
4 asia,china,beijing
5 europe,portugal,lisbon
6 africa,egypt,cairo
7 asia,pakistan,islamabad
8 europe,germany,berlin
9 europe,france,paris
10 africa,kenya,nairobi
11 europe,spain,madrid
```

Execute the following code given below and answer the subquestions:

```
1 fh = open('capitals.csv', 'r')
2
3 fh.readline() # read the header
4 D = dict()
5 for line in fh:
6     line = line.strip().split(',')
7     continent, country, capital = line
8     if continent not in D:
9         D[continent] = dict()
10    D[continent][country] = capital
11
12 fh.close()
```

## Sub questions

**Question Number : 62 Question Id : 640653357686 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

What is the output of the following snippet of code?

```
1 | try:  
2 |     print(D['north america'])  
3 | except ValueError:  
4 |     print('Value Error')  
5 | except KeyError:  
6 |     print('Key Error')
```

**Options :**

6406531185585. ✘ 1 | {'usa': 'washington dc', 'mexico': 'mexico city'}

6406531185586. ✘ 1 | Value Error

6406531185587. ✓ 1 | Key Error

The code will execute without throwing any error but will not print any output to the console

6406531185588. ✘

**Question Number : 63 Question Id : 640653357687 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

What is the output of the following snippet of code?

```
1 | print(len(D['asia'].keys()))
```

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

3

**Question Number : 64 Question Id : 640653357688 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

What is the output of the following snippet of code?

```
1 P = dict()
2
3 for country in D['europe']:
4     capital = D['europe'][country]
5     P[capital] = country
6
7 print(P)
```

**Options :**

1 | {'london': 'uk', 'lisbon': 'portugal', 'berlin': 'germany', 'paris': 'france', 'madrid': 'spain'}

6406531185590. ✓

1 | {'delhi': 'india', 'beijing': 'china', 'islamabad': 'pakistan'}

6406531185591. ✗

1 | {'london': 'uk', 'lisbon': 'portugal', 'berlin': 'germany', 'paris': 'france', 'madrid': 'spain', 'delhi': 'india', 'beijing': 'china', 'islamabad': 'pakistan'}

6406531185592. ✗

1 | {'uk': 'london', 'portugal': 'lisbon', 'germany': 'berlin', 'france': 'paris', 'spain': 'madrid'}

6406531185593. ✗

**Sub-Section Id :**

64065351935

**Question Shuffling Allowed :**

No

**Question Id : 640653357691 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (65 to 66)**

Question Label : Comprehension

Consider a class named `Book` that has the following attributes:

- `year` : year of publication
- `pages` : number of pages
- `num_sold` : number of copies sold as of 2022

The attribute `best_seller` will be defined in the subquestions .

```
1 class Book:  
2  
3     def __init__(self, year, pages, num_sold):  
4         self.year = year  
5         self.pages = pages  
6         self.num_sold = num_sold  
7         self.best_seller = None
```

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 65 Question Id : 640653357692 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

`update_status` is a method of the class `Book` that updates the attribute `best_seller` to the Boolean literal `True` if the book has sold at least 1,000,000 copies and `False` otherwise.

Select the correct implementation of this method.

**Options :**

```
1 def update_status(self):
2     if self.num_sold >= 1000000:
3         self.best_seller = True
4     else:
5         self.best_seller = False
```

6406531185600. ✓

```
1 def update_status():
2     if self.num_sold >= 1000000:
3         self.best_seller = True
4     else:
5         self.best_seller = False
```

6406531185601. ✗

```
1 def update_status(self):
2     if self.num_sold >= 1000000:
3         best_seller = True
4     else:
5         best_seller = False
```

6406531185602. ✗

```
1 def update_status(self):
2     if num_sold >= 1000000:
3         self.best_seller = True
4     else:
5         self.best_seller = False
```

6406531185603. ✗

**Question Number : 66 Question Id : 640653357693 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

**What is the output of the following snippet of code?**

```
1 books = [Book(1972, 345, 12345), Book(1987, 400, 1234567),  
2     Book(2001, 531, 1000002), Book(2011, 150, 2000000),  
3     Book(2013, 345, 3000214), Book(1943, 501, 5000134)]  
4  
5 count = 0  
6 for book in books:  
7     book.update_status()  
8     if book.best_seller and book.pages <= 500:  
9         count += 1  
10  
11 print(count)
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3

## Sem2 Maths2

**Section Id :** 64065322360

**Section Number :** 4

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 15

**Number of Questions to be attempted :** 15

**Section Marks :** 50

**Display Number Panel :** Yes

**Group All Questions :** No

**Enable Mark as Answered Mark for Review and**

Yes

**Clear Response :**

**Maximum Instruction Time :**

0

**Sub-Section Number :**

1

**Sub-Section Id :**

64065351936

**Question Shuffling Allowed :**

No

**Question Number : 67 Question Id : 640653357704 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 "FOUNDATION LEVEL: SEMESTER 2/DIRECT ENTRY DIPLOMA : MATHEMATICS FOR DATA SCIENCE 2"

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 :**

6406531185639. ✓ Yes

6406531185640. ✗ No

**Sub-Section Number :**

2

**Sub-Section Id :**

64065351937

**Question Shuffling Allowed :**

No

**Question Id : 640653357705 Question Type : COMPREHENSION Sub Question Shuffling**

**Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A**

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

**Question Numbers : (68 to 69)**

Question Label : Comprehension

Consider a matrix  $A = \begin{bmatrix} a & b \\ b & a \end{bmatrix}$  and a function  $f : \mathbb{R}^2 \rightarrow \mathbb{R}$  such that  $f(a, b) = \det(A)$ . Answer the given subquestions:

## Sub questions

**Question Number : 68 Question Id : 640653357706 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

Find the number of critical points of the function  $f(a, b)$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

1

**Question Number : 69 Question Id : 640653357707 Question Type : MSQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Select Question

Which of the following options is/are true?

**Options :**

6406531185642. ❌  $A$  is not a symmetric matrix for all  $a, b \in \mathbb{R}$ .

6406531185643. ✓  $A^2$  is a symmetric matrix for all  $a, b \in \mathbb{R}$ .

If  $(\beta, \gamma)$  is a critical point of  $f(a, b)$ , then the matrix

$$A = \begin{bmatrix} \beta & \gamma \\ \gamma & \beta \end{bmatrix} \text{ satisfies that, } A^2 = A.$$

6406531185644. ✓

If  $(\beta, \gamma)$  is a critical point of  $f(a, b)$ , then the matrix  $A = \begin{bmatrix} \beta & \gamma \\ \gamma & \beta \end{bmatrix}$ ,  
6406531185645. ✳  $\text{rank}(A) = 1$ .

**Sub-Section Number :** 3

**Sub-Section Id :** 64065351938

**Question Shuffling Allowed :** No

**Question Id : 640653357708 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (70 to 72)**

Question Label : Comprehension

Consider the matrix  $A = \begin{bmatrix} x & -1 & 2 \\ y & 1 & 2 \\ z & 3 & 4 \end{bmatrix}$ . Answer the given subquestions:

**Sub questions**

**Question Number : 70 Question Id : 640653357709 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Let  $T : \mathbb{R}^3 \rightarrow \mathbb{R}$  be a linear transformation such that  $T(x, y, z) = \det(A)$ . Then which of following options is/are true?

**Options :**

6406531185646. ✳  $T$  is injective.

6406531185647. ✓  $T$  is surjective.

6406531185648. ✳  $T$  is an isomorphism.

6406531185649. \*  $T$  is neither injective nor surjective.

**Question Number : 71 Question Id : 640653357710 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

Let  $W$  be a subspace of  $\mathbb{R}^3$

(with inner product as the dot product) such that

$W = \{(x, y, z) \mid \det(A) = 0\}$ . If  $\beta$  is an orthonormal basis of  $W$ , then find the cardinality of the set  $\beta$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

2

**Question Number : 72 Question Id : 640653357711 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

Let  $T : \mathbb{R}^3 \rightarrow \mathbb{R}$  be a linear transformation such that

$T(x, y, z) = \det(A)$ . Let  $B$  be the matrix representation of  $T$  with respect to some ordered bases for the domain and the codomain. Let  $m \times n$  be the order of the matrix  $B$  and  $r$  be the nullity of  $B$ . Then find the value of  $m + n + r$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

6

**Sub-Section Number :** 4

**Sub-Section Id :** 64065351939

**Question Shuffling Allowed :** No

**Question Id :** 640653357712 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Calculator :** None **Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Question Numbers :** (73 to 75)

Question Label : Comprehension

Let  $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$  be the linear transformation defined by  
 $T(x, y, z) = (x + 2y, z - 3y, x - y + z).$

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number :** 73 **Question Id :** 640653357713 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 2

Question Label : Short Answer Question

Find the nullity of  $T$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Question Number :** 74 **Question Id :** 640653357714 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 1

Question Label : Short Answer Question

Find the rank of  $T$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number :** 75 **Question Id :** 640653357715 **Question Type :** MSQ **Is Question**

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

**Correct Marks :** 2

Question Label : Multiple Select Question

Choose the correct option(s).

**Options :**

6406531185654. ✓  $\{(-4, 2, 6)\}$  is a basis for the kernel of  $T$ .

6406531185655. ✗  $\{(0, 1, 3), (-2, 1, 0)\}$  is a basis for the kernel of  $T$ .

6406531185656. ✓ There exists an isomorphism from the range of  $T$  to  $\mathbb{R}^2$ .

6406531185657. ❖ There exists an isomorphism from the range of  $T$  to  $\mathbb{R}$ .

**Sub-Section Number :** 5

**Sub-Section Id :** 64065351940

**Question Shuffling Allowed :** Yes

**Question Number : 76 Question Id : 640653357716 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

An inner product on a vector space  $V$  is a function  $\langle \cdot, \cdot \rangle : V \times V \rightarrow \mathbb{R}$  satisfying the following conditions:

Condition 1:  $\langle v, v \rangle > 0$  for all  $v \in V \setminus \{0\}$ ;  $\langle v, v \rangle = 0$  if and only if  $v = 0$ .

Condition 2:  $\langle v_1 + v_2, v_3 \rangle = \langle v_1, v_3 \rangle + \langle v_2, v_3 \rangle$ .

Condition 3:  $\langle v_1, v_2 \rangle = \langle v_2, v_1 \rangle$ .

Condition 4:  $\langle cv_1, v_2 \rangle = c\langle v_1, v_2 \rangle$

Let  $V = \mathbb{R}^2$  and consider the function defined as:

$$\begin{aligned}\langle \cdot, \cdot \rangle : V \times V &\rightarrow \mathbb{R} \\ \langle (x_1, x_2), (y_1, y_2) \rangle &= x_1 y_1 - 4x_2 y_2.\end{aligned}$$

Which of the following are satisfied by the above function?

**Options :**

6406531185658. ❖ Condition 1 is satisfied.

6406531185659. ✓ Condition 2 is satisfied.

6406531185660. ✓ Condition 3 is satisfied.

6406531185661. ✓ Condition 4 is satisfied.

**Question Number : 77 Question Id : 640653357723 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following options is/are true?

$$f(x, y) = \frac{xy^3}{x^2 + y^6}$$

**Options :**

6406531185667. ❌  $\lim_{(x,y) \rightarrow (0,0)} f(x, y) = 0$

6406531185668. ❌  $\lim_{(x,y) \rightarrow (0,0)} f(x, y) = \frac{1}{2}$

6406531185669. ❌  $\lim_{(x,y) \rightarrow (0,0)} f(x, y) = 1$

6406531185670. ✓  $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$  does not exist.

6406531185671. ✓  $f(x, y)$  is not continuous at  $(0, 0)$ .

6406531185672. ❌  $f(x, y)$  is continuous at  $(0, 0)$ .

**Question Number : 78 Question Id : 640653357735 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

Let  $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 2 \\ -1 & 1 & 1 \end{pmatrix}$  and  $B = \begin{pmatrix} -1 & 3 & 4 \\ 0 & 2 & 1 \\ -1 & 1 & 3 \end{pmatrix}$ . Choose the correct option(s).

**Options :**

6406531185694. ✘  $A$  is not equivalent to  $B$ .

6406531185695. ✓  $A$  is equivalent to  $B$ .

6406531185696. ✘  $A$  is similar to  $B$ .

6406531185697. ✓  $A$  is not similar to  $B$ .

**Sub-Section Number :**

6

**Sub-Section Id :**

64065351941

**Question Shuffling Allowed :**

Yes

**Question Number : 79 Question Id : 640653357717 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

**Question Label : Short Answer Question**

If  $a$ ,  $b$  and  $c$  are three positive numbers which satisfy the following two properties:

- The sum of  $a$ ,  $b$  and  $c$  is 27.
- The sum of the squares of  $a$ ,  $b$ ,  $c$  is minimum among the sum of squares of any such positive numbers which sum up to 27.

Find the value of  $a - b + c$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

9

**Sub-Section Number :**

7

**Sub-Section Id :**

64065351942

**Question Shuffling Allowed :**

No

**Question Id : 640653357718 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (80 to 83)**

Question Label : Comprehension

Consider the function  $f(x, y) = 2x^3 + 6xy^2 - 3y^3 - 150x$ .  
Answer the given subquestions:

**Sub questions**

**Question Number : 80 Question Id : 640653357719 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

Find the number of local maxima using the Hessian test.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

1

**Question Number : 81 Question Id : 640653357720 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

Find the number of local minima using the Hessian test.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Question Number :** 82 **Question Id :** 640653357721 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 2

Question Label : Short Answer Question

Find the number of saddle points using the Hessian test.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number :** 83 **Question Id :** 640653357722 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 1

Question Label : Short Answer Question

Find the number of points at which the Hessian test is indeterminate.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

**Question Id : 640653357736 Question Type : COMPREHENSION Sub Question Shuffling  
Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A  
Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (84 to 86)**

Question Label : Comprehension

The price of a product ( $f(x, y)$ ) depends on the price ( $x$ ) of the raw materials and the price ( $y$ ) of transportation of the product to the market according to

$$f : \mathbb{R}^2 \rightarrow \mathbb{R}$$

$$f(x, y) = \begin{cases} x^3 - xy^2 & \text{if } x \neq y \\ x + y & \text{otherwise} \end{cases}$$

Answer the given subquestions using the information above.

### **Sub questions**

**Question Number : 84 Question Id : 640653357737 Question Type : MCQ Is Question  
Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What will be the ratio of the price of the raw materials and the price of the transportation ( $x : y$ ) when  $y > x$ , if the rate of change of the price of the product with respect to the price of the raw materials is 0?

(In this context  $x$  and  $y$  both are always positive).

**Options :**

6406531185698. \* 1 : 1

6406531185700. ✓ 1 :  $\sqrt{3}$ 

The ratio cannot be determined

6406531185701. ✘ using the given information.

**Question Number : 85 Question Id : 640653357738 Question Type : MSQ Is Question****Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0****Correct Marks : 3**

Question Label : Multiple Select Question

Which of the following statements are true?

**Options :**6406531185702. ✘  $f(x, y)$  is a linear function in its domain.

$f(cx, cy) = c^3 f(x, y)$  for

6406531185703. ✓ any real number  $c$ , if  $x \neq y$ .6406531185704. ✓  $f(x, y)$  is continuous at  $(0, 0)$ .

If the price of raw material and transportation of the product approaches 3 and 2 respectively, then the price of the product

6406531185705. ✓ approaches 15.

6406531185706. ✘

If the price of raw material and transportation of the product approaches 3 and 2 respectively, then the price of the product approaches 5.

**Question Number : 86 Question Id : 640653357739 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

If the rate of change of the price of the product along the direction of the vector  $(1, 1)$  is  $\frac{1}{\sqrt{2}}[ka^2 + lab + mb^2]$ , when the price of raw material is  $a$  and the price of transportation of the product to the market is  $b$  (where  $a \neq b$ ), then find the value of  $k - l + m$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

4

**Sub-Section Number :** 8

**Sub-Section Id :** 64065351943

**Question Shuffling Allowed :** Yes

**Question Number : 87 Question Id : 640653357724 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is true for the function:

$$f(x, y) = \frac{x^3 + y^3}{x + y}$$

**Options :**

6406531185673. ❌  $\lim_{(x,y) \rightarrow (1,-1)} f(x, y) = 0$

6406531185674. ✓  $\lim_{(x,y) \rightarrow (1,-1)} f(x, y) = 3$

6406531185675. ❌  $\lim_{(x,y) \rightarrow (1,-1)} f(x, y) = 2$

6406531185676. ❌  $\lim_{(x,y) \rightarrow (1,-1)} f(x, y)$  does not exist.

**Question Number : 88 Question Id : 640653357725 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the function  $f(x, y) = x^2 + y^2$ . Which of the following affine subspaces represent the tangent line at the point  $(1, 2)$  in the direction of the vector  $(1, 1)$  ?

**Options :**

6406531185677. ❌  $\{(x, y, z) \in \mathbb{R}^3 \mid \frac{x - 1}{\frac{1}{\sqrt{2}}} = \frac{y - 2}{\frac{1}{\sqrt{2}}}\}$

6406531185678. ❌  $\{(x, y, z) \in \mathbb{R}^3 \mid \frac{x - 1}{\frac{1}{\sqrt{2}}} = \frac{y - 2}{\frac{1}{\sqrt{2}}} = \frac{z - 5}{\frac{1}{\sqrt{2}}}\}$

$$\{(x, y, z) \in \mathbb{R}^3 \mid \frac{x-1}{\frac{1}{\sqrt{2}}} = \frac{y-2}{\frac{1}{\sqrt{2}}} = \frac{z-5}{\frac{6}{\sqrt{2}}}\}$$

6406531185679. ✓

$$\{(x, y, z) \in \mathbb{R}^3 \mid \frac{x}{\frac{1}{\sqrt{2}}} = \frac{y}{\frac{1}{\sqrt{2}}} = \frac{z}{\frac{6}{\sqrt{2}}}\}$$

6406531185680. ✗

**Question Number : 89 Question Id : 640653357731 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following option is/are true?

**Options :**

If  $L$  and  $L'$  are two affine subspaces of  $\mathbb{R}^3$ , then  $L \cap L'$  is an affine

6406531185685. ✓ subspace of  $\mathbb{R}^3$ .

Let  $Ax = b$  be a system of linear equations with infinitely many solutions and let  $P$  be an invertible matrix such that product  $PA$  is well defined. Then the system of linear equations  $PAx = b$  has infinitely many solutions.

6406531185686. ✗

Let  $A$  and  $B$  be two matrices such that reduced echelon form of  $A$  and  $B$  are the same. Then  $\text{rank}(A) > \text{rank}(B)$ .

6406531185687. ✗

Let  $Ax = 0$  be a system of linear equations such that reduced echelon form of the coefficient matrix  $A$  is the identity matrix. Then the system  $Ax = 0$  has infinitely many solutions.

6406531185688. ✗

**Sub-Section Number :**

9

**Sub-Section Id :**

64065351944

**Question Shuffling Allowed :**

No

**Question Id : 640653357726 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (90 to 93)**

Question Label : Comprehension

Consider  $V = \mathbb{R}^3$  with the inner product as the dot product and  $W = \{(x, y, z) \mid x = 0, y = z\}$  is a subspace of  $V$ . Let  $P_W: V \rightarrow W$  be a projection on  $W$ . Answer the given subquestions:

**Sub questions**

**Question Number : 90 Question Id : 640653357727 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

Find the dimension of the image space  $P_W$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

1

**Question Number : 91 Question Id : 640653357728 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

Find the dimension of the null space of  $P_W$ .

**Response Type : Numeric**

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number :** 92 **Question Id :** 640653357729 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 1

Question Label : Short Answer Question

If  $v \in W$  is such that  $\|v\| = 2$ , then  
find  $\|P_W(v)\|$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number :** 93 **Question Id :** 640653357730 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 1

Question Label : Short Answer Question

Let  $A$  be the matrix representation  
of  $P_W$  with respect to some  
orthonormal bases  $\beta$  and  $\gamma$  for  
 $V$  and  $W$ , respectively. Then find  
the dimension of the null space  $A^2$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Sub-Section Number :** 10

**Sub-Section Id :** 64065351945

**Question Shuffling Allowed :** No

**Question Id :** 640653357732 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Calculator :** None **Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Question Numbers :** (94 to 95)

Question Label : Comprehension

Let  $A = \begin{pmatrix} 1 & 0 & 1 \\ -2 & 1 & 2 \\ 1 & 4 & -1 \end{pmatrix}$ . Let  $B$  be the matrix whose rows are obtained by normalizing the rows of  $A$ . Answer the given subquestions about matrix  $B$ .

**Sub questions**

**Question Number :** 94 **Question Id :** 640653357733 **Question Type :** MSQ Is Question

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

**Correct Marks :** 2

Question Label : Multiple Select Question

Choose the correct options about the matrix  $B$ .

**Options :**

6406531185689. ✓ A and  $B$  have the same reduced row echelon form.

6406531185690. ✖  $BB^T x = 0$  has infinitely many solutions.

6406531185691. ✓  $B$  is an orthogonal matrix.

6406531185692. ✖ The columns of  $B$  are not orthonormal.

**Question Number : 95 Question Id : 640653357734 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

What is  $z_2 + 2z_3$ , where  $z = (z_1, z_2, z_3)^T$   
is the solution of  $Bz = (1, -2, 1)^T$   
obtained using the Cramer's rule?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

0

## BDM

**Section Id :** 64065322361

**Section Number :** 5

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 29

<b>Number of Questions to be attempted :</b>	29
<b>Section Marks :</b>	40
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065351946
<b>Question Shuffling Allowed :</b>	No

**Question Number : 96 Question Id : 640653357740 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: BUSINESS DATA MANAGEMENT"**

**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 :**

6406531185708. ✓ Yes

6406531185709. ✗ No

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	64065351947
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 97 Question Id : 640653357745 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

A good with a horizontal demand curve has a demand

**Options :**

6406531185719. ❌ With an income elasticity of demand as 0

6406531185720. ✓ With a price elasticity of demand as infinity

6406531185721. ❌ For which there are no substitute

6406531185722. ❌ With a price elasticity of demand as 0

**Question Number : 98 Question Id : 640653357746 Question Type : MCQ Is Question**

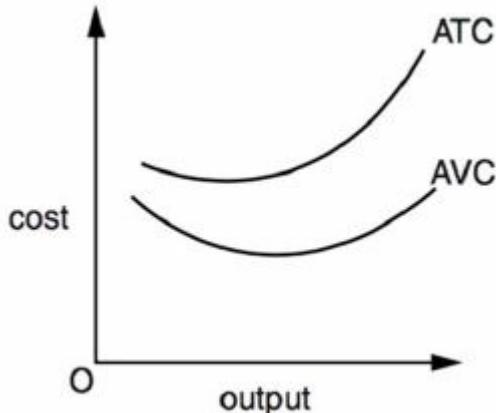
**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

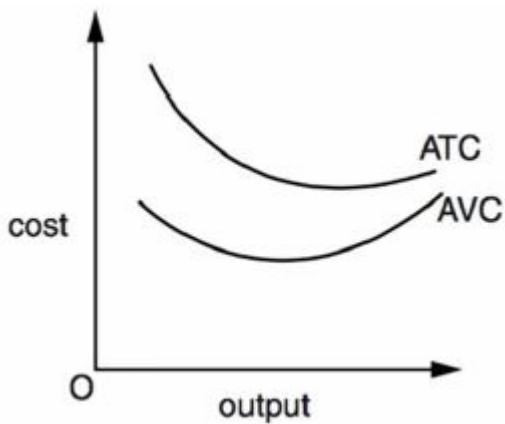
Question Label : Multiple Choice Question

Which of the following graphs shows the correct relationship between a firm's average total cost and average variable cost curves?

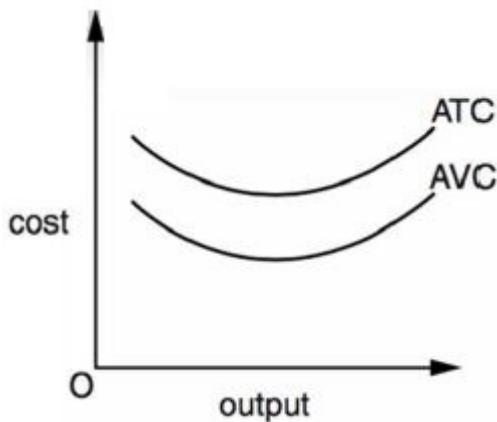
**Options :**



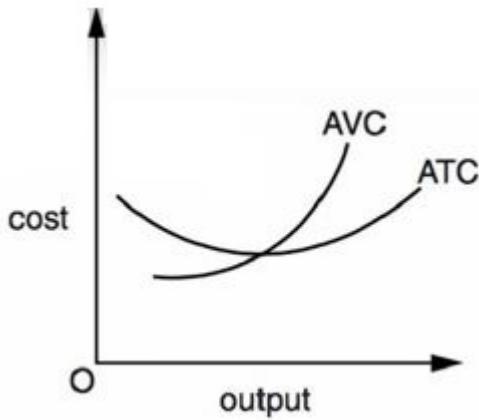
6406531185723. ❌



6406531185724. ✓



6406531185725. ✗



6406531185726. ✗

**Question Number : 99 Question Id : 640653357756 Question Type : MCQ Is Question**

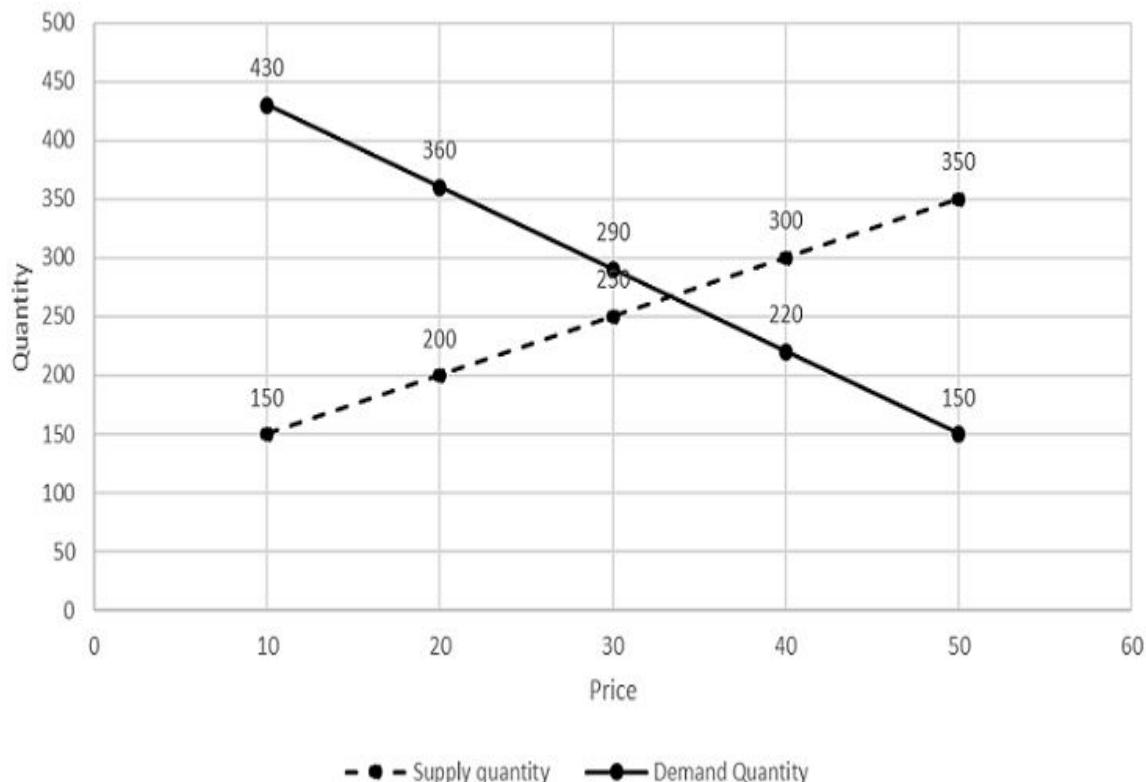
**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction**

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Given the below figure on the relationship between price, supply and demand, what are the equilibrium price, surplus price and shortage price respectively?



**Options :**

6406531185743. ✓ Rs. 33, Rs. 40 and Rs. 50

6406531185744. ✗ Rs. 33, Rs. 50 and Rs. 40

6406531185745. ✗ Rs. 280, Rs. 300 and Rs. 200

6406531185746. ✗ Rs. 280, Rs. 200 and Rs. 300

**Question Number : 100 Question Id : 640653357757 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

With the following data, figure out which SKU has the maximum Average Days of Inventory

Stock Keeping Unit	Open Stock in Warehouse	Avg Daily Sales
F01	34.2	14.0
F02	24.1	5.8
F03	19.9	5.1
F04	19.6	3.9

**Options :**

6406531185747. ✘ F01

6406531185748. ✘ F02

6406531185749. ✘ F03

6406531185750. ✓ F04

**Question Number : 101 Question Id : 640653357758 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

From the table, calculate the revenue growth on 8th July 2022 with respect to 7th July 2022 and select the closest option given below.

Date	Revenue Generated
01-07-2022	₹ 6,03,880
02-07-2022	₹ 5,72,620
03-07-2022	₹ 5,96,220
04-07-2022	₹ 6,21,660
05-07-2022	₹ 6,39,420
06-07-2022	₹ 6,17,920
07-07-2022	₹ 5,79,140
08-07-2022	₹ 5,80,380
09-07-2022	₹ 6,14,380
10-07-2022	₹ 5,91,360
11-07-2022	₹ 6,20,220
12-07-2022	₹ 5,64,220
13-07-2022	₹ 5,97,820
14-07-2022	₹ 6,05,160
15-07-2022	₹ 5,80,020
<b>Grand Total</b>	<b>₹ 89,84,420</b>

**Options :**

6406531185751. ✘ 3%

6406531185752. ✘ -3%

6406531185753. ✘ 1%

6406531185754. ✓ 0%

**Question Number : 102 Question Id : 640653357759 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Pareto chart does not identify \_\_\_\_\_.

**Options :**

6406531185755. ✘ The Products which contribute to all of the company's revenue and sales volumes

6406531185756. ✘ The Products which do not contribute at all towards the revenue and sales

6406531185757. ✘ Company's best performing Products

6406531185758. ✓ Future Trends

**Question Number : 103 Question Id : 640653357760 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Match the following.

1	Pareto Principle	a	Current Assets - Current Liabilities
2	Working Capital	b	With the available Open Stock, how many days of demand can be met?
3	Average Days of Inventory Cover	c	80:20 Analysis
4	Backorder	d	Accepting an order that is temporarily out of stock

**Options :**

6406531185759. ✓ 1: c; 2: a; 3: b; 4: d

6406531185760. ✗ 1: c; 2: b; 3: a; 4: d

6406531185761. ✗ 1: a; 2: c; 3: b; 4: d

6406531185762. ✗ 1: d; 2: a; 3: c; 4: b

**Question Number : 104 Question Id : 640653357768 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

When arranging the type of plans in ascending order, their duration of the plan (in terms of Time), Which of the following sequence is more appropriate for low technology and quick set up factory operation?

**Options :**

6406531185788. ✗ Strategic Plan – Capacity Requirement Plan – Purchase Plan – Production Plan – Shift Operation Plan

6406531185789. ✓ Shift Operation Plan – Production Plan – Purchase Plan – Capacity Requirement

## Plan – Strategic Plan

6406531185790. ✘ Shift Operation Plan – Production Plan – Purchase Plan – Strategic Plan - Capacity Requirement Plan

6406531185791. ✘ Shift Operation Plan – Purchase Plan – Production Plan – Capacity Requirement Plan – Strategic Plan

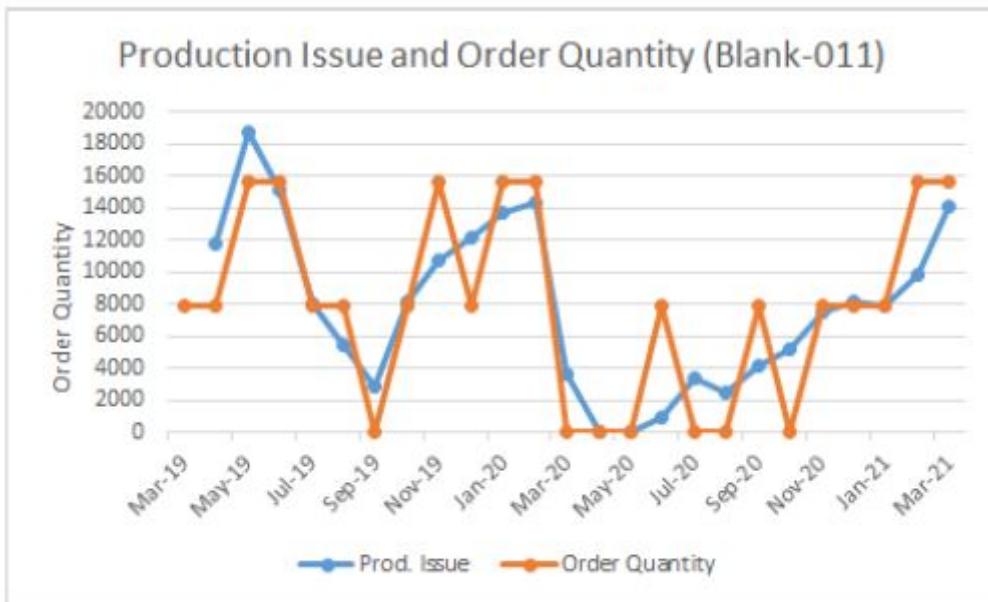
**Question Number : 105 Question Id : 640653357769 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

The graph below indicates which of the following



**Options :**

6406531185792. ✘ Order Quantity is constant between Mar-19 and Jan-20

6406531185793. ✘ Order Quantity follows production issues

6406531185794. ✓ Order Quantity is likely to be influenced by existing inventory

6406531185795. ✘ No meaningful conclusion can be arrived from the graph

**Question Number : 106 Question Id : 640653357770 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Internal Pool Sourcing is\_\_\_\_\_

**Options :**

6406531185796. ✘ pooling employees together to form a team

6406531185797. ✓ filling a vacant position from within the organisation

6406531185798. ✘ transferring an employee to the bench once the project is completed

6406531185799. ✘ firing an employee from the project

**Question Number : 107 Question Id : 640653357773 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following is typically not a component of the “job description”?

**Options :**

6406531185808. ✘ Skills required for the job

6406531185809. ✘ Key responsibilities

6406531185810. ✘ job performance indicators

6406531185811. ✓ recruitment process

**Question Number : 108 Question Id : 640653357774 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following is not true?

**Options :**

6406531185812. ✓ appraisal of the candidate is a mandatory input during the recruitment process

6406531185813. ✖ appraisal is the process of evaluating an employee's current and/or past performance against certain predetermined standards

6406531185814. ✖ All organisations have formal or informal means of appraising their employees' performance.

6406531185815. ✖ The performance appraisal process will include defining the job, appraising performance and providing feedback.

**Question Number : 109 Question Id : 640653357775 Question Type : MCQ Is Question**

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

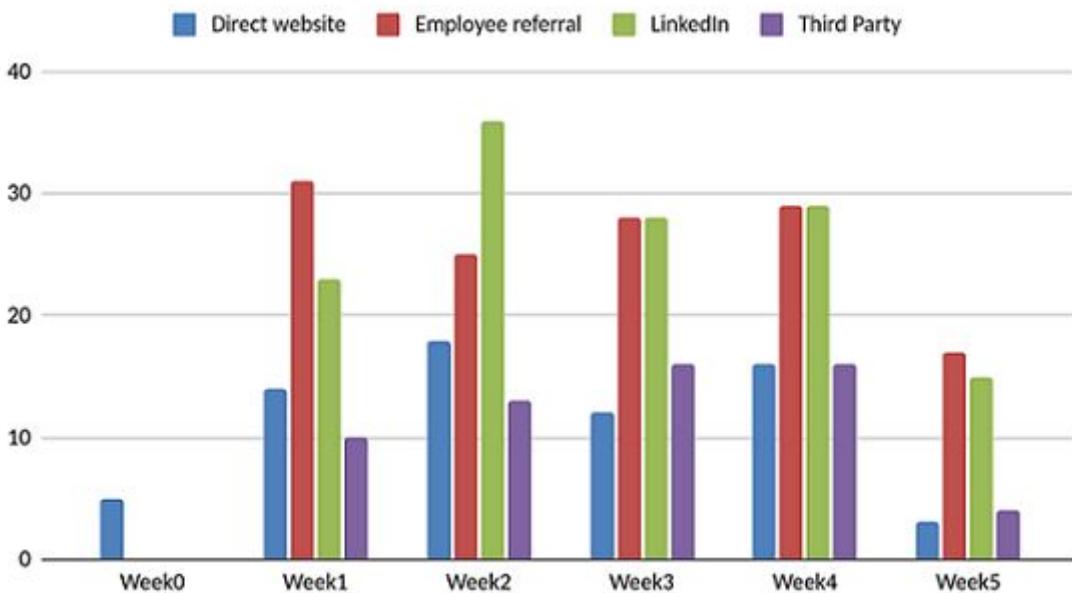
**Correct Marks : 1**

Question Label : Multiple Choice Question

The graph below indicates which of the following.

This graph is based on the HR manager's analysis of various job application channels. Please answer based on the graph only.

Weekly application count



**Options :**

6406531185816. ✖ Third Party and Direct Website Advertisements contribute to the least application receipt per unit cost.

6406531185817. ✖ Employee Referral is the most preferred channel of application receipt

6406531185818. ✘ The likelihood of a candidate getting selected is higher when he applies through Linkedin rather than the employer's Direct Website

6406531185819. ✓ Linkedin fares better than Third Party Sources in application receipt

**Question Number : 110 Question Id : 640653357780 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following is not an actionable inference from A/B Testing?

**Options :**

6406531185832. ✘ Understanding Purchase Behaviors of Customers

6406531185833. ✘ Promoting specific products

6406531185834. ✓ Deciding Stock Keeping Limits of Warehouses

6406531185835. ✘ Making UI/UX changes in the website

**Question Number : 111 Question Id : 640653357782 Question Type : MCQ Is Question**

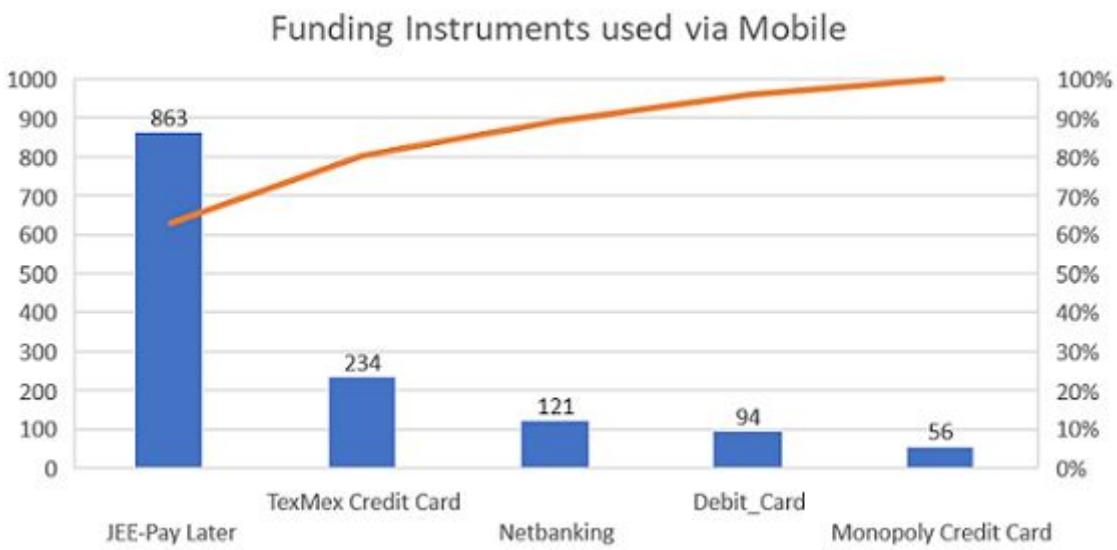
**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

The following graph shows the distribution of Funding Instruments used on Mobile Devices by users for various purchases. State whether the following statement is True or False

**Statement :** *The chart follows the Pareto Principle.*



**Options :**

6406531185840. ✘ TRUE

6406531185841. ✓ FALSE

**Question Number : 112 Question Id : 640653357783 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Point out the drawback of BNPL (Buy Now Pay Later) for companies.

**Options :**

6406531185842. ✘ It increases the level of engagement of customers

6406531185843. ✓ Increases prospects of defaulting by customer

6406531185844. ✘ Enables Cash-Strapped millennials to make purchases

6406531185845. ✘ Shift's user's loyalty away from the competition

**Question Number : 113 Question Id : 640653357784 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

If a FinTech company wants to cut down losses, which of the following should they do?

**Options :**

6406531185846. ✓ Increase approval cutoff of credit score

6406531185847. ✗ Decrease approval cutoff of credit score

6406531185848. ✗ Increase approval limit for loans

6406531185849. ✗ Give more loans

**Sub-Section Number :** 3

**Sub-Section Id :** 64065351948

**Question Shuffling Allowed :** Yes

**Question Number : 114 Question Id : 640653357761 Question Type : MSQ Is Question**

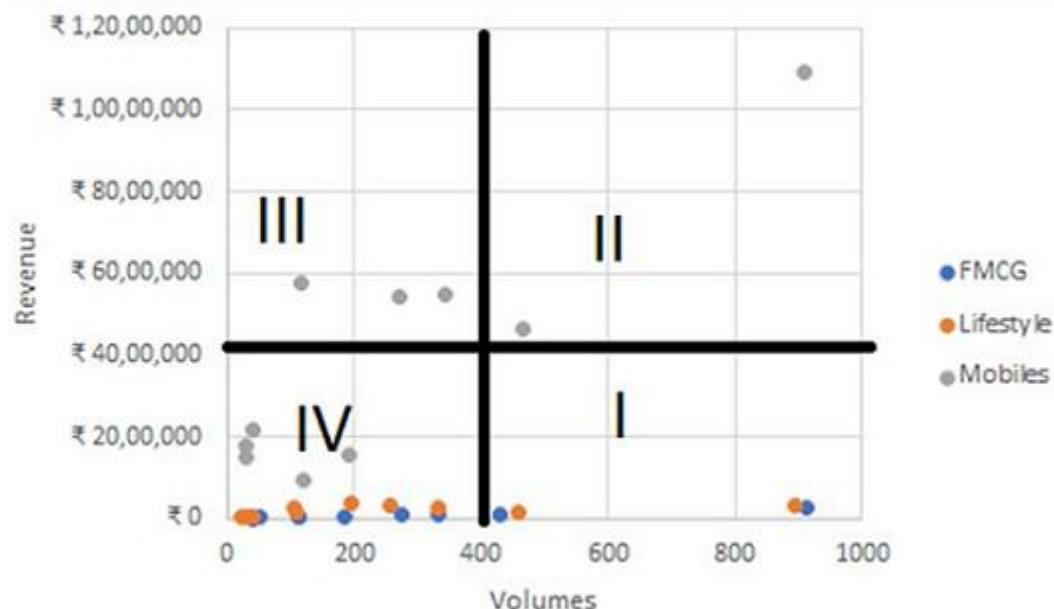
**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Select Question

From the following Figure and options, which quadrant products will be placed in the secure area?

- Select all that apply

**Options :**

6406531185763. ✗ I

6406531185764. ✓ II

6406531185765. ✓ III

**Question Number : 115 Question Id : 640653357762 Question Type : MSQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Select Question

Increase in which of the following items reduces the Net Margin? Choose all that apply

**Options :**

6406531185767. ✎ Revenue

6406531185768. ✓ Direct Material Cost

6406531185769. ✓ Direct Labour Cost

6406531185770. ✓ Shipping Cost

6406531185771. ✓ Tax on the Manufactured Product

**Question Number : 116 Question Id : 640653357763 Question Type : MSQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Select Question

Enterprise Resource Planning (ERP) enables the integration of which of the following domains.

Choose all that apply

**Options :**

6406531185772. ✓ Sales and Marketing

6406531185773. ✓ Operations

6406531185774. ✓ Human Resources

6406531185775. ✓ Logistics

**Question Number : 117 Question Id : 640653357771 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Select Question

In which recruiting process(es) would an HR manager be dealing with qualitative (subjective) data?

Choose all that apply

**Options :**

6406531185800. ✓ resume shortlisting

6406531185801. ✓ job planning

6406531185802. ✗ interview scheduling

6406531185803. ✓ interview

**Question Number : 118 Question Id : 640653357772 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Select Question

Which parameters would be useful during a typical “Resume Shortlisting” exercise? Choose all that apply

**Options :**

6406531185804. ✓ Last drawn Salary

6406531185805. ✓ Skill set of the Employee

6406531185806. ✓ Years of Work Experience

6406531185807. ✗ Hobbies of the Employee

**Question Number : 119 Question Id : 640653357781 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Select Question

From a Credit approver’s perspective, who among the following would be allowed to draw a credit for purchases?

**Options :**

6406531185836. ✗ Person A with low credit score with low engagement with the platform
6406531185837. ✓ Person B with High credit score, with low engagement with the platform
6406531185838. ✓ Person C with Average Credit Score, with High Engagement with the platform
6406531185839. ✗ Person D with maximum number of credit cards with no credit score

**Sub-Section Number :** 4

**Sub-Section Id :** 64065351949

**Question Shuffling Allowed :** No

**Question Id : 640653357741 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (120 to 122)**

Question Label : Comprehension

A shift in the price of LPG from Rs. 760 per cylinder to Rs.840 per cylinder has reduced the quantity demanded from 41 thousand cylinders per day to 39 thousand cylinders per day. Then answer the given subquestions.

**Sub questions**

**Question Number : 120 Question Id : 640653357742 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Short Answer Question

Then what is the price elasticity of the LPG cylinder demand (round your answer to two decimal places?)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.35 to 0.38

**Question Number : 121 Question Id : 640653357743 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Based on the price elasticity of LPG cylinder demand, it can be said that

**Options :**

- 6406531185711. ✘ LPG cylinders are normal goods
- 6406531185712. ✘ LPG cylinders are inferior goods
- 6406531185713. ✘ LPG cylinders are necessity goods
- 6406531185714. ✓ None of these

**Question Number : 122 Question Id : 640653357744 Question Type : MSQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Select Question

Suppose, as the price of LPG increased, the demand for kerosene has changed from 400 litres per day to 500 litres per day. Then, which of the following statements are correct

**Options :**

- 6406531185715. ✘ LPG cylinder and Kerosene are complements to each other
- 6406531185716. ✓ Kerosene is a substitute for LPG cylinder
- 6406531185717. ✘ Both are items have no relation to each other
- 6406531185718. ✘ Cannot say, insufficient data

**Question Id : 640653357747 Question Type : COMPREHENSION Sub Question Shuffling**

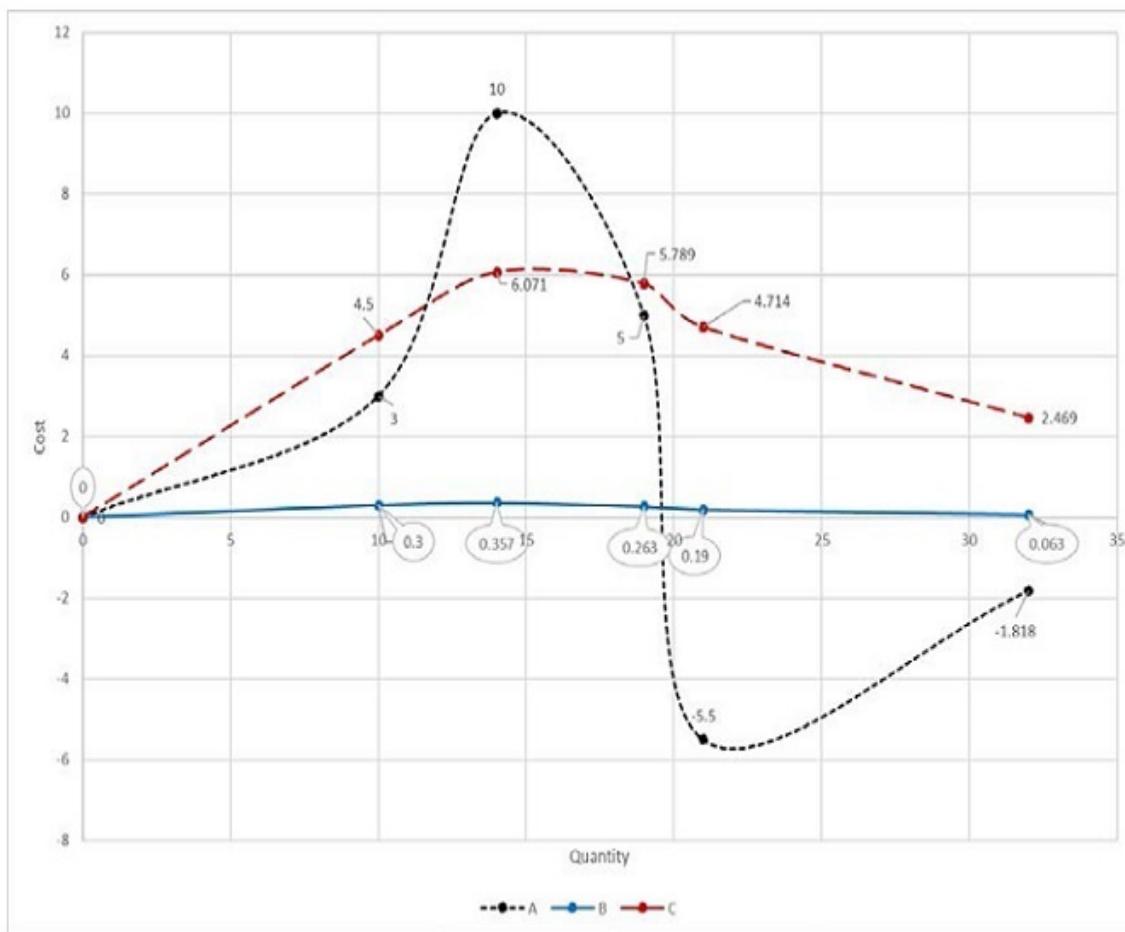
**Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (123 to 125)**

### Question Label : Comprehension

The data for producing a product is provided in the Table below. Using this information, match the curves given in the Figure to their respective representation in the subquestions

Total Fixed cost (Rs.)	Variable cost per unit (Rs./ unit)	Number of units produced (units)
15	0	0
15	3	10
15	5	14
15	5	19
15	4	21
15	2	32



### Sub questions

**Question Number : 123 Question Id : 640653357748 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Curve-A represents

**Options :**

6406531185727. ✘ Average Total cost  
6406531185728. ✘ Average variable cost  
6406531185729. ✓ Marginal cost  
6406531185730. ✘ None of these

**Question Number : 124 Question Id : 640653357749 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Curve-B represents

**Options :**

6406531185731. ✓ Average Total cost  
6406531185732. ✘ Average variable cost  
6406531185733. ✘ Marginal cost  
6406531185734. ✘ None of these

**Question Number : 125 Question Id : 640653357750 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Curve-C represents

**Options :**

6406531185735. ✘ Average Total cost  
6406531185736. ✓ Average variable cost  
6406531185737. ✘ Marginal cost  
6406531185738. ✘ None of these

**Question Id : 640653357776 Question Type : COMPREHENSION Sub Question Shuffling**

**Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A**

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

**Question Numbers : (126 to 128)**

**Question Label : Comprehension**

Company HiringSoft wants to recruit Software Engineers for its new project. The hiring manager was tasked with choosing the appropriate hiring channel. The manager collected previous hiring data (provided in the table below) to help narrow down the appropriate channel. All channels advertised for the vacant positions on the same day.

Recruitment Channels	Application Received in 14 days	Application Shortlisted	No. of Candidates appeared	No. of Candidates Selected	Cost of Advertisement for 14 Days (INR)
			for Interview		
Employee Referrals	40	32	24	12	120000
Direct Company Website	60	12	8	2	5000
Social and Professional Media	260	36	16	4	20000
Hiring Portals	220	90	30	6	100000
Print Ads	20	10	8	1	50000

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 126 Question Id : 640653357777 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

**Question Label : Multiple Choice Question**

Which channel has the best shortlist success rate? The Shortlist success rate is defined as the shortlisted applications to applications received.

**Options :**

6406531185820. ✘ Hiring Portals

6406531185821. ✘ Social and Professional Media

6406531185822. ✘ Print Ads

6406531185823. ✓ Employee Referrals

**Question Number : 127 Question Id : 640653357778 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

If the hiring manager has to go only with the parameter, cost per candidates selected, which would be the most appropriate channel?

**Options :**

6406531185824. ✓ Direct Company Website

6406531185825. ✘ Print Ads

6406531185826. ✘ Employee Referrals

6406531185827. ✘ Social and Professional Media

**Question Number : 128 Question Id : 640653357779 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which channel has the worst selection success rate? The Selection success rate is defined as the no. of candidates selected to the no. of applications shortlisted.

**Options :**

6406531185828. ✓ Hiring Portals

6406531185829. ✘ Social and Professional Media

6406531185830. ✘ Print Ads

6406531185831. ✘ Employee Referrals

**Sub-Section Number :** 5

**Sub-Section Id :** 64065351950

**Question Shuffling Allowed :** No

**Question Id : 640653357751 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (129 to 132)**

Question Label : Comprehension

The below table provides the consolidated values of a company-X's financial performance (ignore all other non-mentioned financial parameters). Using this, answer the given subquestions.

Particular	Rs.
Current assets	40000
Current liabilities	28000
Total value of inventory	12000
Fixed expenses	113000
Gross profit earned	200000
Total sales achieved	500000

**Sub questions**

**Question Number : 129 Question Id : 640653357752 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Short Answer Question

What is the gross profit margin (in %) for company-X (round to two decimal places)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

**39 to 41**

**Question Number : 130 Question Id : 640653357753 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Short Answer Question

What is the net profit for company-X?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

87000

**Question Number : 131 Question Id : 640653357754 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

What is the current ratio for company-X (round to two decimal places)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

1.3 to 1.5

**Question Number : 132 Question Id : 640653357755 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

What is the quick ratio for company-X (round to two decimal places)

**Response Type :** Numeric

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

**1.00**

**Question Id : 640653357764 Question Type : COMPREHENSION Sub Question Shuffling**

**Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A**

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

**Question Numbers : (133 to 135)**

Question Label : Comprehension

Please answer the given subquestions on the Overall Equipment Effectiveness of fasteners manufacturing.

**Hint:**

Just in case you forgot the formula

Availability = Run Time / Planned Production Time

Run Time = Planned Production Time – Lost Time

Performance = (Total Count / Run Time) / Ideal Run Rate

Quality = Good Count / Total Count

OEE = Availability × Performance × Quality

**Sub questions**

**Question Number : 133 Question Id : 640653357765 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

In a factory that manufactures fasteners, the bolt manufacturing process went out of control only in terms of the number of scraps produced. Which factor(s) of Overall Equipment Effectiveness

(OEE) will be affected?

a) availability, b) performance, c) quality

**Options :**

6406531185776. ✘ only b

6406531185777. ✓ only c

6406531185778. ✘ b and c

6406531185779. ✘ only a

**Question Number : 134 Question Id : 640653357766 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Calculate the OEE of the Bolt Manufacturing Equipment

Parameters	Week 1
Planned Production Hours (PPH)	100
Lost Time (LOT)	16
Designed Gear Output Speed from Equipment (DO) per Hour	60
Total Product Output	4650
Scrap (S)	143

Hint: Choose the closest Answer

**Options :**

6406531185780. ✘ 0.83

6406531185781. ✓ 0.75

6406531185782. ✘ 0.90

6406531185783. ✘ Insufficient Information

**Question Number : 135 Question Id : 640653357767 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

An 8-hour no downtime shift has an OEE of 0.90 performing at its designed speed and produces a total scrap of 90 units. What is the total number of units produced in the shift?

**Options :**

6406531185784. ✘ 810

6406531185785. ✘ 9000

6406531185786. ✓ 900

6406531185787. ✘ Insufficient Information

## Business Analytics

**Section Id :** 64065322362

**Section Number :** 6

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 19

**Number of Questions to be attempted :** 19

**Section Marks :** 55

**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 :** 64065351951

**Question Shuffling Allowed :**

No

**Question Number : 136 Question Id : 640653357785 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: BUSINESS ANALYTICS"**

**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 :**

6406531185850. ✓ Yes

6406531185851. ✗ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065351952

**Question Shuffling Allowed :** Yes

**Question Number : 137 Question Id : 640653357810 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

A leading European two-wheeler manufacturer is trying to build an ideal scooter for the Indian market. Which of the following tools will help him understand: how important the attributes such as Engine Capacity, LED Lights, Fuel Efficiency, and Smart Connect Technology are to the customers?

**Options :**

6406531185900. ✗ Data Envelopment Analysis

6406531185901. ✓ Conjoint Analysis

6406531185902. ✗ Chi-Square test

**Question Number : 138 Question Id : 640653357814 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

The objective function of the linear programming model using pair-wise judgments:

**Options :**

6406531185917. ✘ Maximize the distance from the ideal point

6406531185918. ✘ Minimize the distance from the ideal point

6406531185919. ✓ Minimize the poorness of fit

6406531185920. ✘ Both Maximize the distance from the ideal point & Minimize the poorness of fit

6406531185921. ✘ Both Minimize the distance from the ideal point & Minimize the poorness of fit

**Sub-Section Number :** 3

**Sub-Section Id :** 64065351953

**Question Shuffling Allowed :** Yes

**Question Number : 139 Question Id : 640653357815 Question Type : MSQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Select Question

What is the format of data needed for performing the conjoint analysis using the Statistical or Linear Regression Approach?

**Options :**

6406531185922. ✓ Consumer Choice Data is Ratings

6406531185923. ✘ Consumer Choice Data is Pairwise Comparison

6406531185924. ✘ Value of the attributes are continuous

6406531185925. ✓ Value of the product attributes are categorical

**Sub-Section Number :**

4

**Sub-Section Id :**

64065351954

**Question Shuffling Allowed :**

Yes

**Question Number : 140 Question Id : 640653357801 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Suppose you conduct a chi-squared test of independence on the categorical variables cities and brand preferences at the significance level 0.1. You obtain a p-value of 0.12. What will you conclude?

**Options :**

6406531185879. ❌ Reject the null hypothesis and conclude that the categorical variables are independent

6406531185880. ❌ Reject the null hypothesis and conclude that the categorical variables are not independent

6406531185881. ✓ Fail to reject the null hypothesis and conclude that the categorical variables are independent

6406531185882. ❌ Fail to reject the null hypothesis and conclude that the categorical variables are not independent

**Question Number : 141 Question Id : 640653357812 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is not a form of conjoint analysis?

**Options :**

6406531185908. ❌ Choice based

6406531185909. ❌ Adaptive based

6406531185910. ✘ Full profile

6406531185911. ✓ Selective attribute type

6406531185912. ✘ Menu-based

**Question Number : 142 Question Id : 640653357813 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

In a conjoint problem with 4 products and 2 attributes, how many pair-wise preferences are possible?

**Options :**

6406531185913. ✘ 8

6406531185914. ✓ 6

6406531185915. ✘ 16

6406531185916. ✘ 12

**Sub-Section Number :** 5

**Sub-Section Id :** 64065351955

**Question Shuffling Allowed :** Yes

**Question Number : 143 Question Id : 640653357792 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Select Question

Say a data is distributed as “Normal” with a right tail. If it is compared with an “Symmetric Normal” distribution, then which of the following states is/ are true (choose all that is applicable)

**Options :**

6406531185867. ✘ In a “P-P plot”, the data will fall on a line which is indicate at 45-degree to the X-axis

6406531185868. ✓ In a “Q-Q plot”, the data will fall on a line which is indicate at 45-degree to the

## X-axis

6406531185869. ✓ In a “P-P plot”, the data will not entirely fall on a line which is indicate at 45-degree to the X-axis

6406531185870. ✗ In a “Q-Q plot”, the data will not entirely fall on a line which is indicate at 45-degree to the X-axis

6406531185871. ✗ Cannot use P-P plot or Q-Q plot as the assumed distribution is discrete

**Question Number : 144 Question Id : 640653357803 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

There are 7 business units and you are using the DEA to compare them. You solve the LP for business unit 5. You find from the constraint expression that the business unit 3 has obtained an efficiency of 1 and the business unit 7 has obtained an efficiency of 1 with the optimal weights of business unit 5. Which of the following statements are correct?

**Options :**

6406531185884. ✗ Business unit 3 may be inefficient

6406531185885. ✓ Business unit 3 will be efficient

6406531185886. ✗ Business unit 7 may be inefficient

6406531185887. ✓ Business unit 7 will be efficient

**Question Number : 145 Question Id : 640653357807 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

There are 4 business units. Using the DEA, you solve the LP for all the four business units and find the efficiencies for these units. The efficiency is denoted by E. For these units,  $E_1 = 1$ ,  $E_2 = 1$ ,  $E_3 = 1$ ,  $E_4 = 0.91$ . Which of these units are efficient?

**Options :**

6406531185891. ✓ 1

6406531185892. ✓ 2

6406531185893. ✓ 3

6406531185894. ✗ 4

**Question Number : 146 Question Id : 640653357811 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

What is the format of data needed for performing the conjoint analysis using the Linear Programming Approach?

**Options :**

6406531185904. ✗ Consumer Choice Data is Ratings

6406531185905. ✓ Consumer Choice Data is Pairwise Comparison

6406531185906. ✓ Values of the attributes are continuous

6406531185907. ✗ Values of the product attributes are categorical

**Sub-Section Number :** 6

**Sub-Section Id :** 64065351956

**Question Shuffling Allowed :** Yes

**Question Number : 147 Question Id : 640653357802 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

You have estimated the demand to follow the following relationship:  $D(p)=100-10*p$ . Now, you intend to maximize the revenue  $R(p)=D(p)*p$ . You find the first derivative of  $R(p)$  with respect to  $p$ , equate it to 0 and find  $p^*$ . What is the value of  $p^*$ ?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

4.9 to 5.1

**Sub-Section Number :** 7

**Sub-Section Id :** 64065351957

**Question Shuffling Allowed :** Yes

**Question Number :** 148 **Question Id :** 640653357805 **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

In a multiple linear regression with 3 explanatory variables, you find that R-squared value is 0.6.

The number of observations is 25. What is the value of adjusted R-squared?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.5 to 0.6

**Question Number :** 149 **Question Id :** 640653357809 **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

You are conducting a multiple linear regression with sales as the dependent variable. Price, quantity and rating score are the independent variables. In the multiple linear regression, you find that the direct effect of price on sales is 0.4, the direct effect of quantity on sales is 0.2 and the direct effect of rating score on sales is 0.4. And, you also know that the effect of price on quantity

is 0.2 and the effect of price on rating score is 0.1. What is the total effect of price on sales?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.46 to 0.50

**Sub-Section Number :** 8

**Sub-Section Id :** 64065351958

**Question Shuffling Allowed :** Yes

**Question Number :** 150 **Question Id :** 640653357808 **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

You solve the primal of a linear program with maximization objective, three decision variables and two constraints of the less than or equal to type. Non-negativity restrictions apply on the decision variables. After solving the linear program, you find that the first constraint is binding ( $\text{lhs} = \text{rhs}$ ) and the second constraint is binding ( $\text{lhs} = \text{rhs}$ ). Which of the following statements are correct?

**Options :**

6406531185895. ❌ There are three decision variables in the dual

6406531185896. ✓ The dual variable corresponding to the first constraint is non-zero

6406531185897. ❌ There are four decision variables in the dual

6406531185898. ❌ The dual variable corresponding to the second constraint is zero

**Sub-Section Number :** 9

**Sub-Section Id :** 64065351959

**Question Shuffling Allowed :** Yes

**Question Number : 151 Question Id : 640653357804 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

There are 6 business units. There are two outputs and one input under consideration. You are solving the optimization problem for business unit 3 and find that the efficiency is 0.7. You find that the dual variables corresponding to the constraints of business units 4 and 5 are non-zero and the dual variables corresponding to the constraints of other units are zero. The dual variables corresponding to the constraints of business units 4 and 5 are 0.3 and 0.4 respectively. You are given the following table where sales and number of leads are the two outputs.

	Sales	Number of leads
Business unit 4	8500	10
Business unit 5	8000	12

What is the sales in HCU 3?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

8210 to 8220

**Question Number : 152 Question Id : 640653357806 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

You are conducting a multiple linear regression with sales as the dependent variable. Price, quantity and rating score are the independent variables. In order to calculate the VIF for the variable quantity, you implement a linear regression with quantity as the dependent variable and other variables as independent variables and obtain R-squared of 0.4. What is the VIF for the

variable quantity?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

1.6 to 1.7

**Sub-Section Number :** 10

**Sub-Section Id :** 64065351960

**Question Shuffling Allowed :** No

**Question Id : 640653357786 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (153 to 157)**

Question Label : Comprehension

Ms. X is working is with the data given in Table-1 below. Using this information answer the given subquestions.

Product	Sales of a Product in a City for a given Year								
	City-1 (1990)	City- 2 (1990)	City- 3 (1990)	City-1 (1991)	City- 2 (1991)	City- 3 (1991)	City-1 (1992)	City- 2 (1992)	City- 3 (1992)
A	100	90	250	120	50	120	140	20	500
B	145	300	500	175	250	250	195	230	1000
C	90	180	30	100	110	15	110	95	58
D	130	220	132	140	200	61	150	180	270

Table-1

**Sub questions**

**Question Number : 153 Question Id : 640653357787 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

If the message that X wants to convey is focused on the market share of each product in the year 1992 in each city, then which visualization will be most appropriate?

**Options :**

- 6406531185852. ❌ Line graph for each product's sales in the year 1992 for each city
- 6406531185853. ❌ Line graph for each city's sale in the year 1992 for each product
- 6406531185854. ❌ Bar graph for each product's sale in the year 1992 for each city
- 6406531185855. ❌ Bar graph for each city's sales in the year 1992 for each product
- 6406531185856. ❌ Pie chart for each product's sales in the year 1992 for each city
- 6406531185857. ✓ Pie chart for each city's sales in the year 1992
- 6406531185858. ❌ The table with only sales of the year 1992 for the three cities for each product

**Question Number : 154 Question Id : 640653357788 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

If Ms. X has created the below visualization (Figure-1) for the data of product-A in Table-1. **What is the primary message** that is conveyed through this?

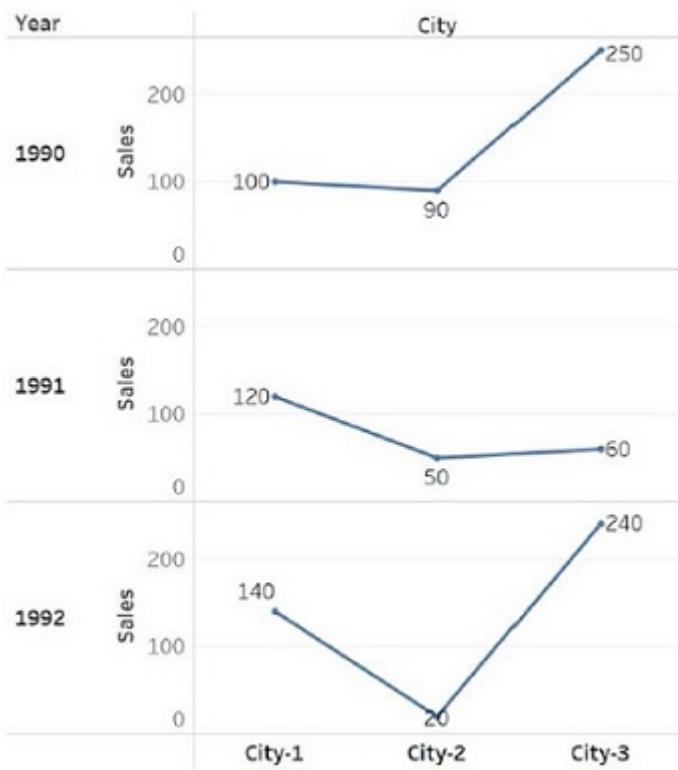


Figure-1

**Options :**

- 6406531185859. ❌ City-3 has the highest sales for the product-A in the current year
- 6406531185860. ❌ The sales trend of Product-A is constantly fluctuating over the years
- 6406531185861. ✓ The sales trend of Product-A is drastically different across cities in any given year
- 6406531185862. ❌ The sales trend of product-A in city-2 is lowest among all the cities in any given year
- 6406531185863. ❌ None of these

**Question Number : 155 Question Id : 640653357789 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

Say you want to see if the distribution of sales of Product-D in the Table-1 follows a uniform distribution within the range of 0 to 300 when split into bins as specified in Table-2. Then what is the expected frequency in any given bin (round your answer to two decimal places)?

<b>Bin Number</b>	<b>Bin Range</b>
Bin-1	Sales value less than or equal to 50
Bin-2	Sales value greater than 50 but less than or equal to 100
Bin-3	Sales value greater than 100 but less than or equal to 150
Bin-4	Sales value greater than 150 but less than or equal to 200
Bin-5	Sales value greater than 200 but less than or equal to 250
Bin-6	Sales value greater than 250 but less than or equal to 300

Table-2

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1.5

**Question Number : 156 Question Id : 640653357790 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

If a Chi-Square Goodness-Of-Fit Test to check if the data for Product-D in Table-1 follows a Uniform Distribution with bins as specified in Table-2, then what is the value of the Test statistic (round your answer to two decimal places)?

$$\{ \text{Hint: Chi-square} = \sum_k \frac{(observed_k - Expected_k)^2}{Expected_k} \}$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

6.20 to 6.40

**Question Number : 157 Question Id : 640653357791 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

**Question Label : Short Answer Question**

A Chi-squared Goodness-Of-Fit test with the bins as specified in Table-2 is going to be carried out to check if the data on sales (whole data in Table-1) is normal or not. Then what is the degrees of freedom for the test?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

3

**Question Id : 640653357793 Question Type : COMPREHENSION Sub Question Shuffling**

**Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A**

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

**Question Numbers : (158 to 164)**

**Question Label : Comprehension**

A logistic model has been fit for a data set with the goal to predict the positive class (Y=1). The confusion matrix obtained for this model on the test dataset is provided in Table-3.Using this, answer the given subquestions.

	Predictions	
	1	0
Actual	1	23
	0	11

Table-3

### Sub questions

**Question Number : 158 Question Id : 640653357794 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

How many “True Positives” is the model predicting?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

23

**Question Number : 159 Question Id : 640653357795 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

How many “False Positives” is the model predicting?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

45

**Question Number : 160 Question Id : 640653357796 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

How many “True Negatives” is the model predicting?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

11

**Question Number : 161 Question Id : 640653357797 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

How many “False Negatives” is the model predicting?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

77

**Question Number : 162 Question Id : 640653357798 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

What is the accuracy for the model (enter only the numerical value in percentage, without the "%" symbol and round it to two decimal places)?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

21.00 to 22.00

**Question Number : 163 Question Id : 640653357799 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

What is the recall for the model when predicting the positive class (enter only the numerical value in percentage, without the "%" symbol and round it to two decimal places)?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

22.00 to 23.00

**Question Number : 164 Question Id : 640653357800 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

What is the precision for the model when predicting the negative class (enter only the numerical value in percentage, without the “%” symbol and round it to two decimal places)?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

12.0 to 12.80

## DBMS

**Section Id :** 64065322363

**Section Number :** 7

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 26

**Number of Questions to be attempted :** 26

**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 :** 64065351961

**Question Shuffling Allowed :** No

**Question Number :** 165 **Question Id :** 640653357816 **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"**

**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 :**

6406531185926. ✓ Yes

6406531185927. ✗ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065351962

**Question Shuffling Allowed :** Yes

**Question Number : 166 Question Id : 640653357820 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Consider the relation  $R(A, B, C, D, E)$  and the functional dependencies set

$F = \{AD \rightarrow E, B \rightarrow D, BC \rightarrow A, E \rightarrow A, AB \rightarrow C, AC \rightarrow B\}$ .

Let  $R1(A, B, C, D)$  be the one of the decomposed relation. Find out the number of candidate keys applicable to  $R1(A, B, C, D)$ .

**Options :**

6406531185941. ✗ 1

6406531185942. ✗ 2

6406531185943. ✓ 3

6406531185944. ✗ 4

**Question Number : 167 Question Id : 640653357828 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Consider a relational schema **student**(*roll\_no, name, class*).

In order to change the data type of *roll\_no*, which of the following category of SQL command is used for this purpose?

**Options :**

6406531185971. ❌ DML

6406531185972. ❌ TCL

6406531185973. ✓ DDL

6406531185974. ❌ DCL

**Question Number : 168 Question Id : 640653357837 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

A role **Department\_Lead** has the privilege of select, insert and delete on all the tables of the database. A new role **Employee1** is created, and the following statement is executed.

grant Department\_Lead to Employee1

What privileges will be inherited by **Employee1**?

**Options :**

6406531186004. ✓ All privileges - select, insert and delete

6406531186005. ❌ Only update

6406531186006. ❌ Only select and insert

6406531186007. ❌ Only delete and update

**Question Number : 169 Question Id : 640653357838 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Consider the following statements:

**Statement 1:** System Buffer blocks are those blocks residing on the disk.

**Statement 2:** Physical blocks are the blocks residing temporarily in main memory.

**Statement 3:** Immediate modification scheme allows updates of an uncommitted transaction to be made to the buffer/disk only at the time of the transaction commit.

**Statement 4:** Deferred modification scheme allows updates of an uncommitted transaction to be made to the buffer/disk only at the time of the transaction commit.

Which among the given statements is/are incorrect?

**Options :**

6406531186008. ❌ Statement 1 & 4

6406531186009. ✓ Statement 1, 2 & 3

6406531186010. ❌ Statement 2 & 4

6406531186011. ❌ Only statement 3

**Sub-Section Number :** 3

**Sub-Section Id :** 64065351963

**Question Shuffling Allowed :** Yes

**Question Number : 170 Question Id : 640653357822 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the relation **students**(*roll\_no, name, course, section, department*) having functional dependencies  $\mathcal{F} = \{roll\_no \rightarrow name, roll\_no \rightarrow section, department, course \rightarrow department\}$

If the relation **students** is decomposed into **student\_dept**(*roll\_no, course, department*) and **student\_info**(*roll\_no, name, section, department*)

Then, choose the appropriate SQL query to create **student\_dept** and **student\_info** tables.

**Options :**

CREATE TABLE student\_dept (roll\_no varchar(10) primary key, course varchar(10), department varchar(10),)

6406531185950. ✘ CREATE TABLE student\_info(roll\_no varchar(10) primary key, name varchar(10), section varchar(10), department varchar(10))

CREATE TABLE student\_dept (roll\_no varchar(10), course varchar(10), department varchar(10), primary key (roll\_no, course))

6406531185951. ✓ CREATE TABLE student\_info(roll\_no varchar(10) primary key, name varchar(10), section varchar(10), department varchar(10))

CREATE TABLE student\_dept (roll\_no varchar(10), course varchar(10), department varchar(10), primary key (course))

6406531185952. ✘ CREATE TABLE student\_info(roll\_no varchar(10) primary key, name varchar(10), section varchar(10), department varchar(10))

CREATE TABLE student\_dept (roll\_no varchar(10), course varchar(10), department varchar(10), primary key (roll\_no, course))

CREATE TABLE student\_info(roll\_no varchar(10), name varchar(10), section varchar(10), department varchar(10), primary key (roll\_no, section))

6406531185953. ✘

**Question Number : 171 Question Id : 640653357823 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

**Question Label : Multiple Choice Question**

Consider the relation **players**(Name, Team, Coach, Runs) with the data:

Name	Team	Coach	Runs
Sharma	CSK	Steven	99
Sharma	MI	Mahela	50
Sharma	MI	Mahela	99
Sharma	CSK	Steven	50

Table 1: players

Check whether the relation **players** is in 4NF or not. If not, then decomposed it into 4NF.

Choose the correct option.

#### Options :

6406531185954. ✘ The relation players is in 4NF.

Name	Runs
Sharma	99
Sharma	50

Table 2: players1

Name	Team	Coach
Sharma	CSK	Steven
Sharma	MI	Mahela

Table 3: players2

6406531185955. ✓

Name	Team	Runs
Sharma	CSK	99
Sharma	MI	50

Table 4: players1

Team	Coach
CSK	Steven
MI	Mahela

Table 5: players2

6406531185956. ✘

Name	Team	Runs
Sharma	CSK	99
Sharma	MI	50

Table 6: players1

Name	Coach	Runs
Sharma	Steven	99
Sharma	Mahela	50

Table 7: players2

6406531185957. ✘

**Question Number : 172 Question Id : 640653357827 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the following schedule **S** with four transactions T1, T2, T3, T4:

**S: R3(A);W2(A);R1(A);W1(A);R3(B);W4(B);**

Where, Ri(A) denotes a read operation by transaction Ti on a data item A, Wi(A) denotes a write operation by transaction Ti on a data item A.

What is the possible number of conflict serializable schedule of the above schedule S.

**Options :**

6406531185967. ✘ 4

6406531185968. ✓ 3

6406531185969. ✘ 1

6406531185970. ✘ 0

**Question Number : 173 Question Id : 640653357829 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the given relations:

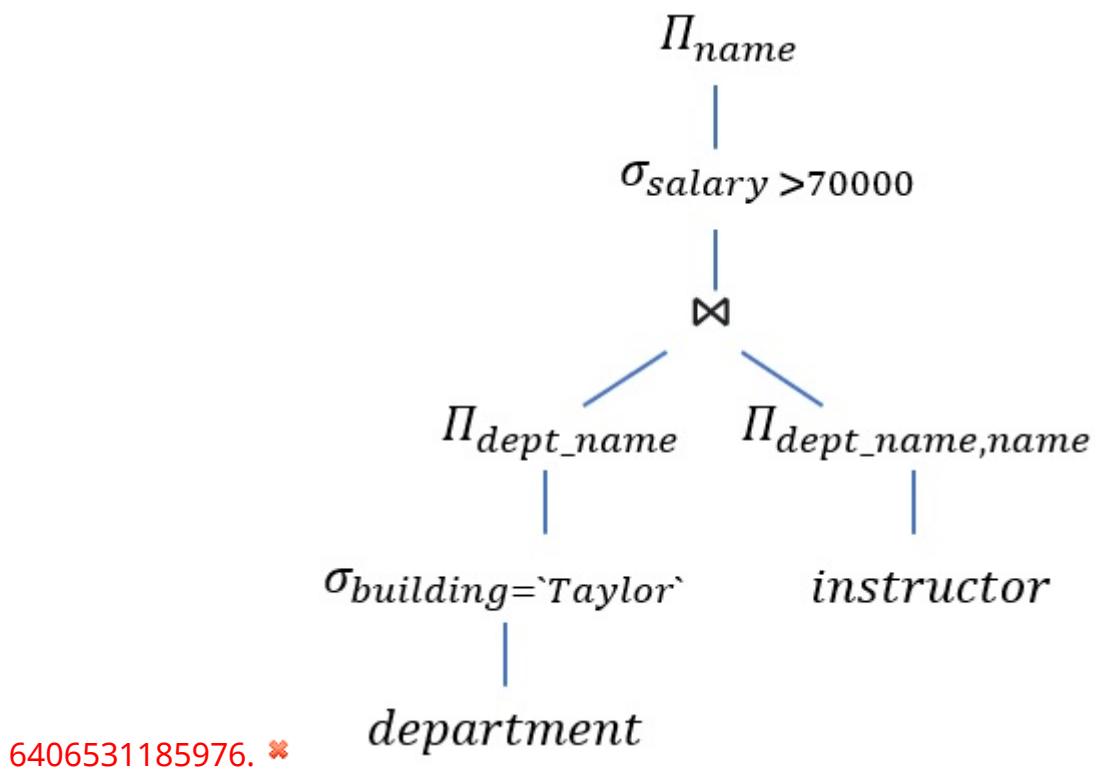
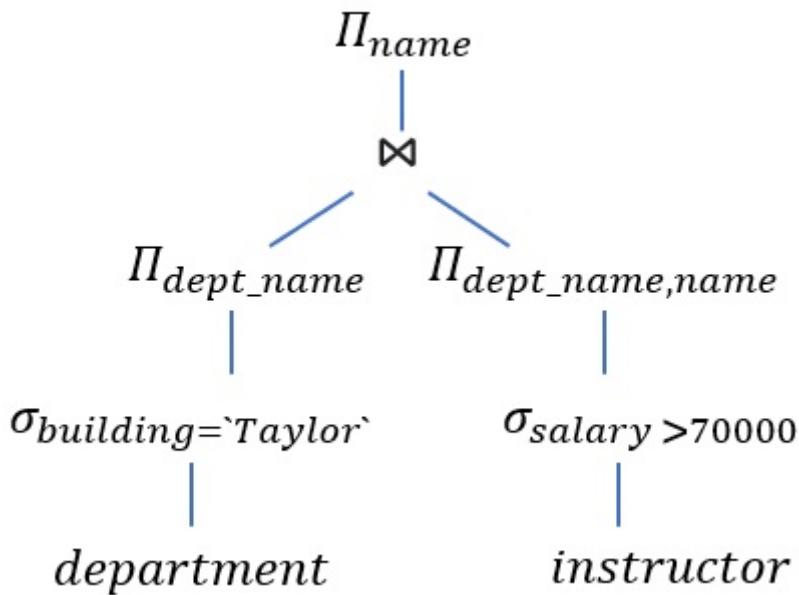
**instructor(ID, name, dept\_name, salary)**

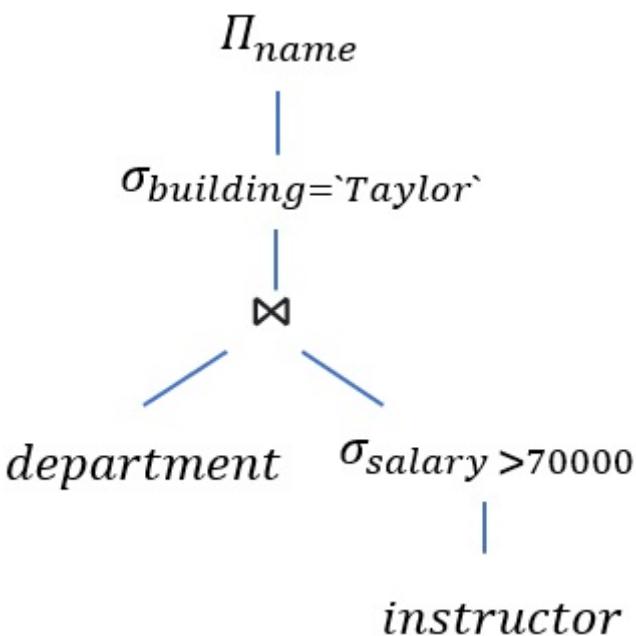
**department(dept\_name, building, budget)**

Identify the most optimized expression tree from the given options that find the name of instructor whose salary is greater than 70000 and department building is 'Taylor'.

**Options :**

6406531185975. ✓





6406531185978. ❌ All of these expression trees are same

**Question Number : 174 Question Id : 640653357832 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the relation **election**(*voter\_id*, *voter\_name*, *age*, *candidate\_vote\_for*). The number of tuples in the **election** relation is 1024. The attribute *candidate\_vote\_for* has 7 different values and the attribute *age* has four different values(i.e., below 25 years, 25 to below 45, 45 to below 60 and 60 to above). Construct a bitmap index for relation **election** on the attribute *candidate\_vote\_for*. What is the size of the bitmap index file?

**Options :**

6406531185987. ❌ 7168 bytes

6406531185988. ❌ 4096 bytes

6406531185989. ✓ 896 bytes

6406531185990. ❌ 11264 bytes

**Question Number : 175 Question Id : 640653357833 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the **smartphone** relation as shown below:

**smartphone**(*IMEI*, *brand*, *color*, *price*)

(Note: IMEI is the unique number of each smartphone.)

Construct a B+ tree indexing of order 8 using search key as IMEI. If the size of the block is 1024 bytes. IMEI attribute is of varchar datatype and size is 64 bytes. What is the size of the tree pointer of the B+ tree?

**Options :**

6406531185991. ✘ 64 bytes

6406531185992. ✓ 72 bytes

6406531185993. ✘ 82 bytes

6406531185994. ✘ 128 bytes

**Question Number : 176 Question Id : 640653357835 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider a multilevel index with four levels L1, L2, L3, L4. L4 is the innermost level and L1 is the outermost level. The disk block size is 1024 bytes. The size of one entry in the index file is 16 bytes. The number of entries in the L4 is  $2^{24}$ . Then, find the total number of blocks in the L2 and L3 levels in the multilevel index.

**Options :**

6406531185996. ✘ 64

6406531185997. ✘ 4096

6406531185998. ✓ 4160

6406531185999. ✘ 8256

**Question Number : 177 Question Id : 640653357836 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the given **grocery** table which represents the items purchased while grocery shopping.

Grocery			
grocery_item	quantity	value	discount
Cereal	3	400	10
Chips	4	200	5
Milk	2	300	0
Banana	10	350	5
Tomato	5	200	5

Figure 2: grocery

Which among the following query will fetch the output given below?

grocery_item	quantity
Milk	2
Banana	10
Cereal	3

**Options :**

SELECT grocery\_item, quantity  
FROM grocery  
WHERE value>=300 ORDER BY discount DESC, quantity DESC

6406531186000. \*

SELECT grocery\_item, quantity  
FROM grocery  
WHERE value>=300 ORDER BY discount DESC, quantity

6406531186001. \*

```
SELECT grocery_item, quantity
FROM grocery
WHERE value>=300 ORDER BY discount ASC, quantity DESC
```

6406531186002. ✓

```
SELECT grocery_item, quantity
FROM grocery
WHERE value>=300 ORDER BY quantity DESC, discount DESC
```

6406531186003. ✗

**Sub-Section Number :** 4

**Sub-Section Id :** 64065351964

**Question Shuffling Allowed :** Yes

**Question Number : 178 Question Id : 640653357817 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

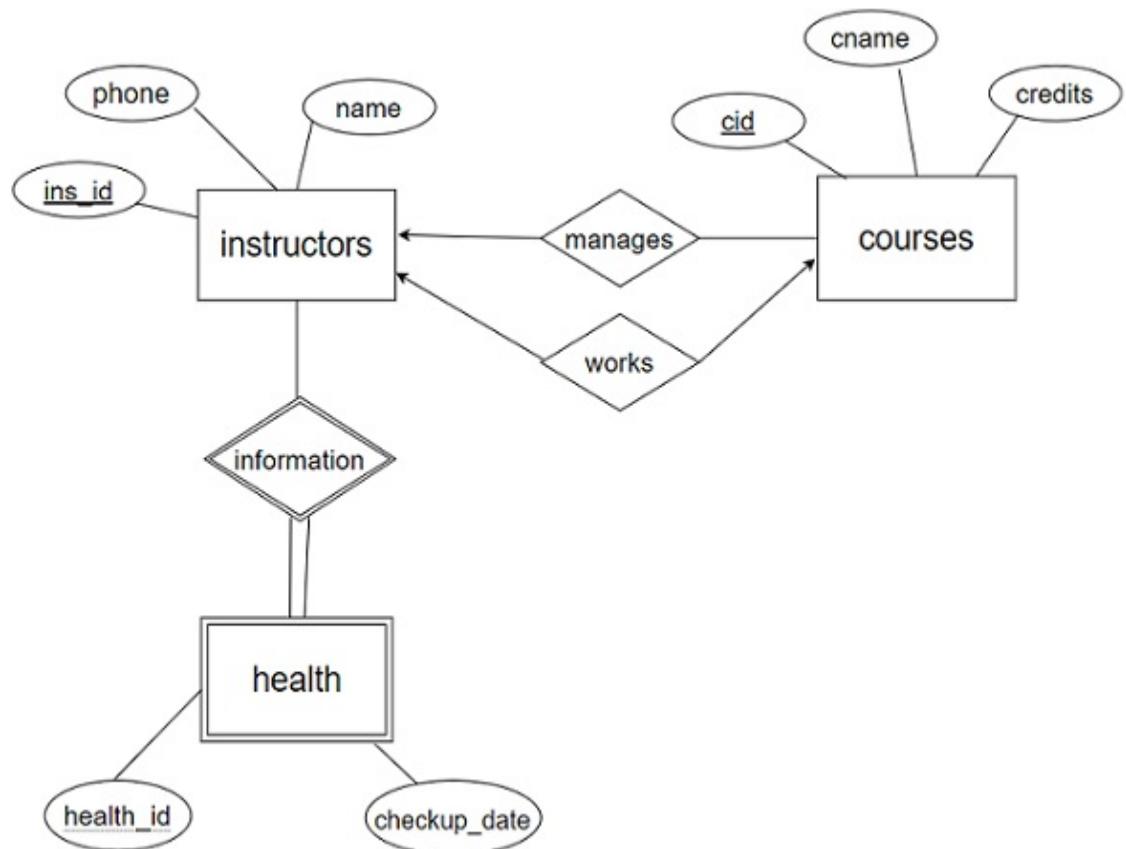
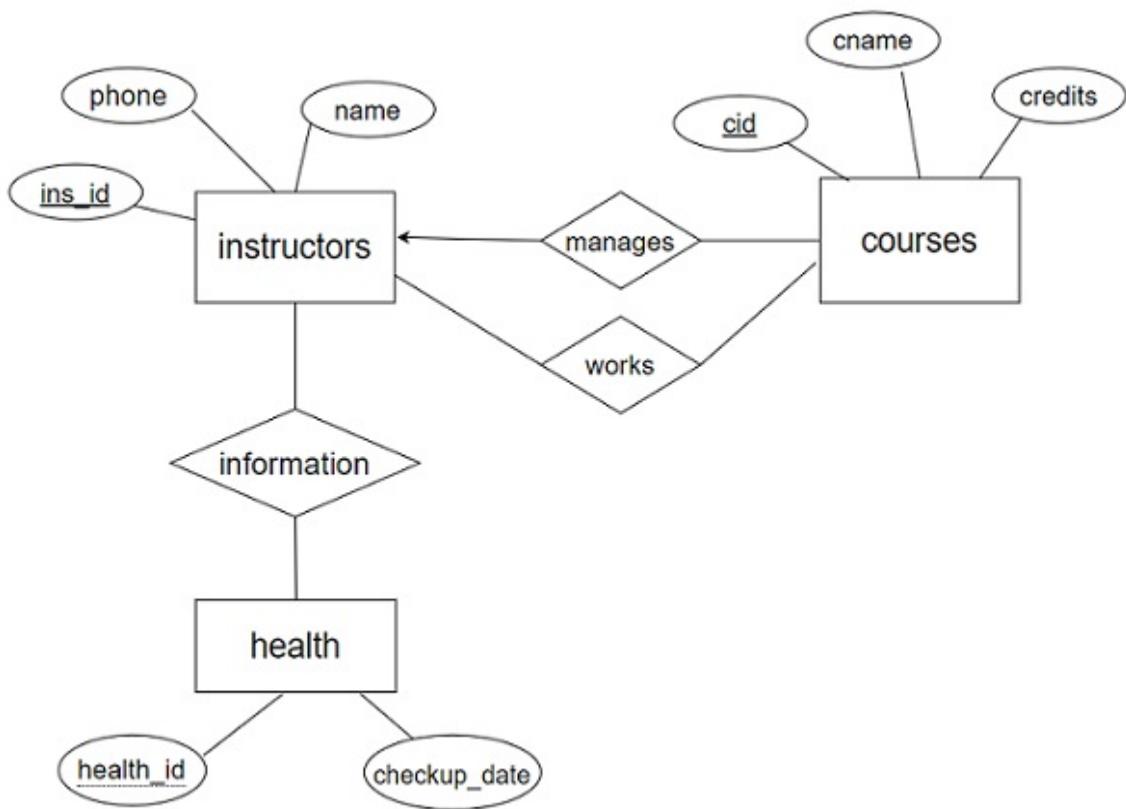
Consider the following case study:

An IITM Online Degree Project needs a database to store information about instructors (identified by ins\_id, name and phone as attributes), courses (identified by cid, cname and credits as attributes), and health information (identified by health\_id and checkup\_date as attributes). The instructor can work in various courses and courses can have more than one instructor; each course is managed by an instructor and an instructor can manage more than one courses. A health information must be identified uniquely by health\_id when the instructor is known. We are not interested in information about a health record once the instructor leaves the organization.

Choose the correct ER-Diagram based on the given information.

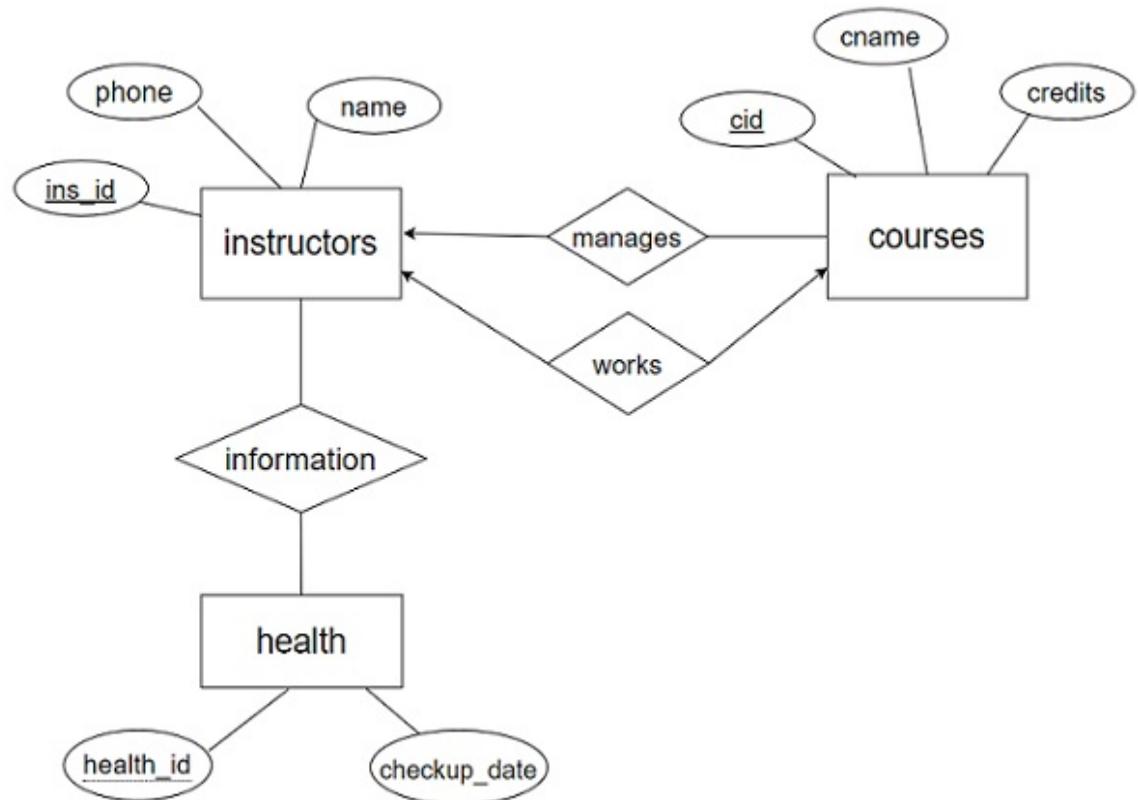
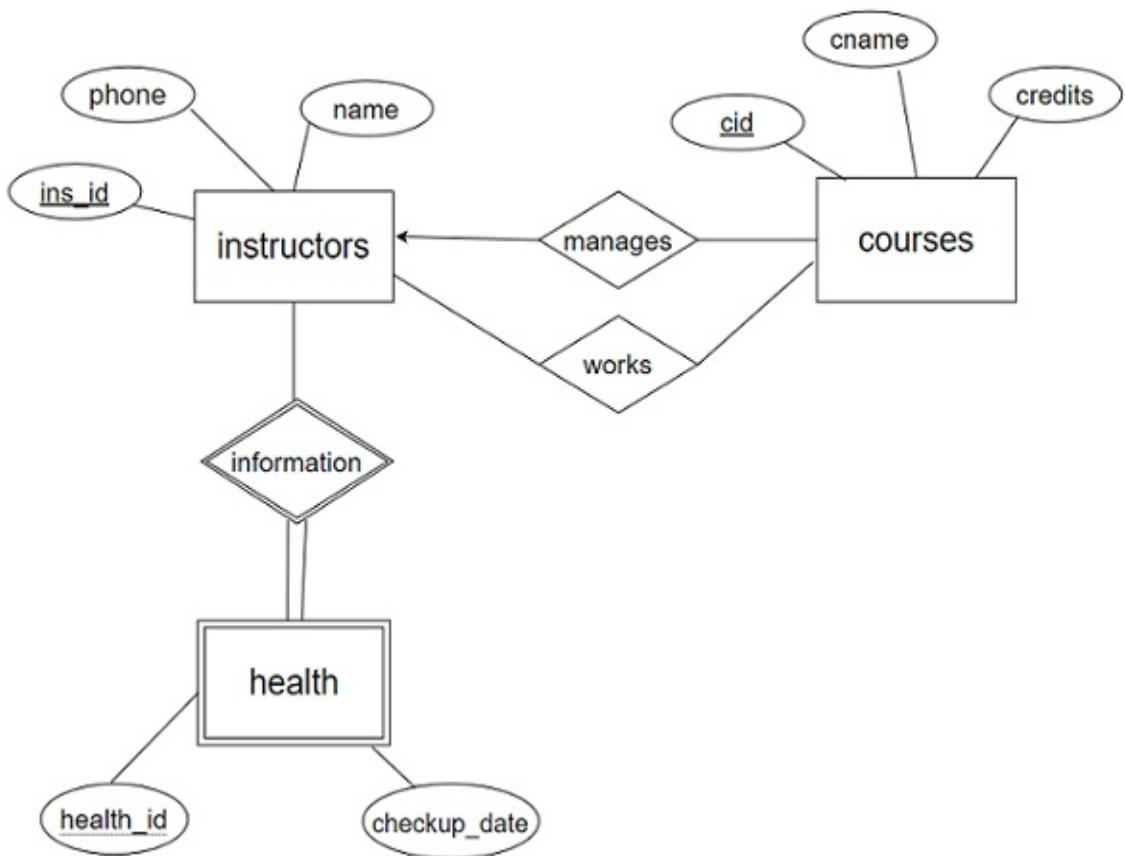
**Options :**

6406531185928. ✗



6406531185929. \*

6406531185930. ✓



6406531185931. \*

**Question Number : 179 Question Id : 640653357824 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 given schedules **S1** and **S2** which performs independent tasks.

T1	T2
	Lock-X(A)
	Write-(A)
	Lock-S(B)
Lock-S(B)	Read-(B)
Read-(B)	Unlock-(B)
	Commit
	Unlock-(A)
Lock-X(A)	
Write-(A)	
Commit	
Unlock-(A)	
Unlock-(B)	

Table 8: Schedule S1

T1	T2
	Lock-S(A)
	Read-(A)
Lock-X(B)	
Read-(B)	
Write-(B)	
Unlock-(B)	
commit	
	Unlock-(A)
	commit

Table 9: Schedule S2

Which among of the following statement is correct?

**Options :**

6406531185958. ✘ Both S1 and S2 follow the rigorous two-phase locking protocol.
6406531185959. ✘ Both S1 and S2 follow the Strict two-phase locking protocol.
6406531185960. ✘ Only S2 follows Strict two-phase locking protocol.
6406531185961. ✓ Only S1 follows Strict two-phase locking protocol.

**Question Number : 180 Question Id : 640653357830 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 relation as shown in the table :

<i>customer_name</i>
Akash
Akshay
A
A.K.
Aksh
Ak
Ak.S.
Aks

Table 11: customer

What is the output of the below SQL query?

```
SELECT customer_name  
FROM customer  
WHERE customer_name LIKE 'Ak_%'  
ORDER BY customer_name DESC  
FETCH FIRST 3 ROWS ONLY
```

**Options :**

<i>customer_name</i>
Ak.S.
Akash
Aks

6406531185979. \*

<i>customer_name</i>
Akash
Aks
Aksh

6406531185980. \*

6406531185981. ✓

customer_name
Akshay
Aksh
Aks

customer_name
Aks
Aksh
Akshay

6406531185982. \*

**Question Number : 181 Question Id : 640653357840 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 a RAID-4 system with 5 disks which stores the following data shown in Figure 4:

Disk-1	Disk-2	Disk-3	Disk-4	Disk-5	
0100	1000	---	0001	1001	Block A
0100	1101	---	1101	0000	Block B
0100	0101	---	0010	0110	Block C

Figure 4: RAID-4 data

According to the figure, Disk-3 has crashed. Identify the correct data present in the three blocks of Disk-3. Also, assuming that the binary values represent 8 bit ASCII code, identify the correct data word present inside the RAID-4 storage system. Consider the following statements and identify the correct statements.

1. Block A: 0100, Block B: 0100, Block C: 0101
2. Block A: 1011, Block B: 1011, Block C: 1010
3. Block A: 0100, Block B: 1011, Block C: 1010

4. The word is: 'HAMMER'

5. The word is : 'hammer'

**Note:**

- Assuming block size is 4 bits.
- Disk-5 is the parity disk.
- The ASCII value of 'A' is 65 and 'a' is 97.

**Options :**

6406531186016. ✘ Statements 2 & 4

6406531186017. ✘ Only statement 3

6406531186018. ✓ Statements 1 & 4

6406531186019. ✘ Statements 3 & 5

**Sub-Section Number :** 5

**Sub-Section Id :** 64065351965

**Question Shuffling Allowed :** Yes

**Question Number : 182 Question Id : 640653357818 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

Consider the following relations:

*players(pid, name, age, jersey\_no)*

*teams(team\_name, matches, points, pid)*

Choose the correct TRC or DRC expression which is equivalent to the below SQL query.

```
SELECT p.name, t.points  
FROM players p,teams t  
WHERE p.jersey_no = 7 and p.pid = t.pid
```

**Options :**

{ $x \mid \exists p \in \text{players} \exists t \in \text{teams}(p.pid = t.pid \wedge p.jersey\_no = 7 \wedge x.name = p.name \wedge x.points = t.points)$ }

6406531185933. ✘

$\{x \mid \exists p \in players \exists t \in teams(p.jersey\_no = 7 \wedge x.name = p.name \wedge x.points = t.points\}$

6406531185934. ✘  $\{x \mid \exists p \in players \exists t \in teams(p.pid = t.pid \wedge p.jersey\_no = 7 \wedge x.name \wedge x.points\}$

6406531185935. ✓  $\{\langle b, o \rangle \mid \exists a, b, c, d (\langle a, b, c, d \rangle \in players \wedge d = 7) \wedge \exists m, n, o, p (\langle m, n, o, p \rangle \in teams \wedge a = p)\}$

6406531185936. ✘  $\{\langle b, o \rangle \mid \exists a, b, c, d (\langle a, b, c, d \rangle \in players \wedge d = 7) \wedge \exists m, n, o, p (\langle m, n, o, p \rangle \in teams)\}$

**Question Number : 183 Question Id : 640653357819 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

Choose the correct sets of functional dependencies for the relation  $R(A,B,C,D)$  under which  $R$  is in 2NF but not in 3NF.

**Options :**

6406531185937. ✘  $\{AB \rightarrow CD\}$

6406531185938. ✘  $\{AB \rightarrow CD, A \rightarrow D\}$

6406531185939. ✘  $\{AB \rightarrow C, B \rightarrow D, C \rightarrow D\}$

6406531185940. ✓  $\{AB \rightarrow C, C \rightarrow D, AB \rightarrow D\}$

**Question Number : 184 Question Id : 640653357821 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

Consider the relation  $R(A, B, C, D, E, G)$  having the following functional dependencies:

$$\mathcal{F} = \{AB \rightarrow C, AC \rightarrow B, AD \rightarrow E, B \rightarrow D, BC \rightarrow A, E \rightarrow G\}$$

Let decompose the relation  $R$  into  $R1(BC)$ ,  $R2(ABDE)$  and  $R3(EG)$ . Check whether the decomposition is lossless or lossy, and if it is lossy, then by adding which of the following functional dependencies, the decomposition will become lossless.

**Options :**

6406531185945. ✗ The decomposition is lossless

6406531185946. ✓  $B \rightarrow C$

6406531185947. ✓  $B \rightarrow A$

6406531185948. ✓  $D \rightarrow C$

6406531185949. ✓  $D \rightarrow A$

**Question Number : 185 Question Id : 640653357825 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

Consider the following schedule  $S$  with three transactions  $T1$ ,  $T2$  and  $T3$ :

$S: R2(A); W2(A); C2; R3(A); W3(A); C3; R1(B); W1(B); C1;$

Where  $R_i(A)$  denotes a read operation by transaction  $T_i$  on a data item  $X$ ,  $W_i(A)$  denotes a write operation by transaction  $T_i$  on a data item  $A$ ,  $C_i$  denotes a commit by  $T_i$ .

Which among of the following statement(s) is/are correct?

**Options :**

6406531185962. ✓  $S$  is a recoverable schedule.

6406531185963. ✗  $S$  is a non recoverable schedule.

6406531185964. ❌ S is a cascading rollback

6406531185965. ✓ S is a cascadeless schedule

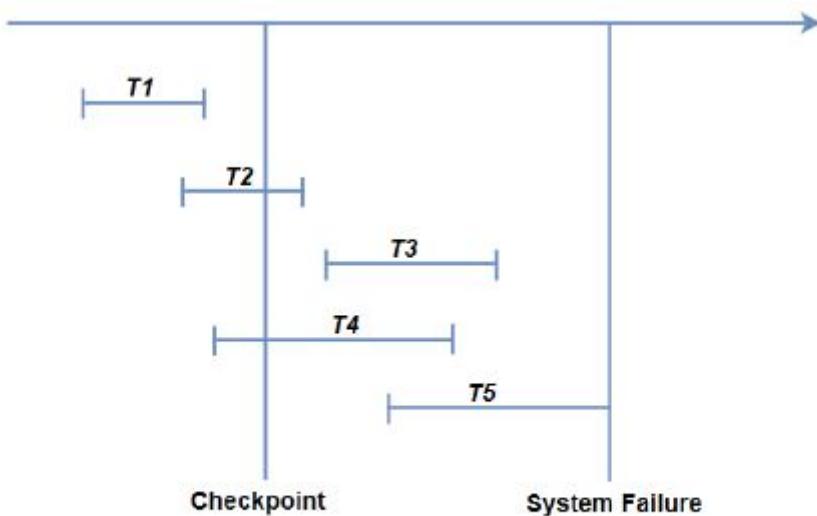
**Question Number : 186 Question Id : 640653357839 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

Consider a state of transactions as shown in Figure 3.



**Figure 3: State of Transactions**

According to the above figure, which among the following statement(s) is/are correct?

**Options :**

6406531186012. ❌ The transactions T1 and T2 can be ignored.

6406531186013. ✓ The transactions T3 and T4 needs to be redone

6406531186014. ❌ The only transaction that needs to be undone are T4 and T5.

6406531186015. ✓ The only transaction that needs to be undone is T5.

**Sub-Section Number :** 6

**Sub-Section Id :** 64065351966

**Question Shuffling Allowed :** Yes

**Question Number : 187 Question Id : 640653357831 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Select Question

Consider the following relations:

`music(music_id, music_name, duration, genre, producer)`

`singer(singer_id, singer_name, city, country)`

`music_playback_singer(music_id, singer_id)`

Write an SQL query to find names of the music which were produced by producer name 'G.K. Production House' or the songs which were sung by singer 'P.K.' or both.

**Options :**

6406531185983. ✓ `SELECT music.music_name  
FROM music NATURAL JOIN music_playback_singer  
NATURAL JOIN singer  
WHERE music.producer = 'G.K. Production House'  
OR singer.singer_name = 'P.K.'`

6406531185984. ✗ `SELECT music.music_name  
FROM music NATURAL JOIN music_playback_singer  
NATURAL JOIN singer  
WHERE music.producer = 'G.K. Production House'  
| singer.singer_name = 'P.K.'`

6406531185985. ✗ `SELECT music.music_name  
FROM music NATURAL JOIN music_playback_singer  
NATURAL JOIN singer  
WHERE music.producer = 'G.K. Production House'  
AND singer.singer_name = 'P.K.'`

6406531185986. ✓

```

SELECT music.music_name
FROM music
WHERE music.producer = 'G.K. Production House'
UNION
SELECT music.music_name
FROM music, music_playback_singer, singer
WHERE music.music_id = music_playback_singer.music_id
AND music_playback_singer.singer_id = singer.singer_id
AND singer.singer_name = 'P.K.'

```

**Question Number : 188 Question Id : 640653357841 Question Type : MSQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Select Question

Consider two logs of transaction as shown below, where immediate database modification scheme is used in **Table 1** and deferred database modification scheme is used in **Table 2**.

Steps	Details of log
1	$\langle T_0, \text{start} \rangle$
2	$\langle T_0, P, 700, 500 \rangle$
3	$\langle T_1, \text{start} \rangle$
4	$\langle T_1, Q, 1300, 1000 \rangle$
5	$\langle \text{checkpoint } \{T_0, T_1\} \rangle$
6	$\langle T_0, \text{commit} \rangle$

**Table 1: Immediate Database Modification Scheme**

Steps	Details of log
1	$\langle T_2, \text{start} \rangle$
2	$\langle T_2, A, 1700, 1600 \rangle$
3	$\langle T_2, \text{commit} \rangle$
4	$\langle T_3, \text{start} \rangle$
5	$\langle T_3, B, 3000, 2500 \rangle$

**Table 2: Deferred Database Modification Scheme**

In Table 1 & Table 2, if a system crash occurs after step 6 and step 5 respectively and the recovery of the system is successfully completed, identify the correct actions from the above diagram.

**Options :**

6406531186020. ✓ After completion of recovery in deferred database modification scheme, the value of A and B in the buffer will be 1600 and 3000 respectively.

6406531186021. ✘ In Table 1,  $\{T_0\}$  needs to be undone and  $\{T_1\}$  needs to be redone.

6406531186022. ✘ After completion of recovery in deferred database modification scheme, the value of A and B in the buffer will be 1700 and 2500 respectively.

6406531186023. ✓ In Table 1,  $\{T_0\}$  needs to be redone and  $\{T_1\}$  needs to be undone.

**Sub-Section Number :** 7

**Sub-Section Id :** 64065351967

**Question Shuffling Allowed :** Yes

**Question Number : 189 Question Id : 640653357826 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

Consider the following schedule **S** with three transactions T1, T2 and T3:

**S:** R2(B);R1(B);R1(A);W1(A);R3(C);W3(C);

The number of serial schedule for given schedule **S** is\_\_\_\_\_

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

6

**Question Number : 190 Question Id : 640653357834 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

Construct a binary search tree by inserting the following values in the following order 15, 14, 20, 10, 23, 17, 16, 2, 1, 6. What is the sum of all leaf nodes of the constructed binary search tree?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

46

## Java

**Section Id :** 64065322364

**Section Number :** 8

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 23

**Number of Questions to be attempted :** 23

**Section Marks :** 100

**Display Number Panel :** Yes

**Group All Questions :** No

**Enable Mark as Answered Mark for Review and** Yes

**Clear Response :**

**Maximum Instruction Time :** 0

**Sub-Section Number :** 1

**Sub-Section Id :** 64065351968

**Question Shuffling Allowed :** No

**Question Number :** 191 **Question Id :** 640653357842 **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 CONCEPTS USING JAVA"

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 :**

6406531186024. ✓ Yes

6406531186025. ✘ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065351969

**Question Shuffling Allowed :** Yes

**Question Number : 192 Question Id : 640653357844 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 Java code given below.

```

class Student{
    private String name;
    public Student(String n){
        this.name = n;
    }
    public Student(Student s){
        this.name = s.name;
    }
    public void setName(String n){
        name = n;
    }
    public String getName(){
        return name;
    }
}
public class Test{
    public static void main(String[] args){
        Student s1 = new Student("Ram");
        Student s2 = s1;
        Student s3 = new Student(s1);
        s1.setName("Rahul");
        System.out.println("s2.name : " + s2.getName());
        System.out.println("s3.name : " + s3.getName());
    }
}

```

What will the output be?

**Options :**

s2.name : Ram  
6406531186030. ✘ s3.name : Ram

s2.name : Rahul  
6406531186031. ✘ s3.name : Rahul

s2.name : Ram  
6406531186032. ✘ s3.name : Rahul

s2.name : Rahul  
6406531186033. ✓ s3.name : Ram

**Question Number : 193 Question Id : 640653357848 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**

Assume that the file “data.txt” contains the following two lines of text.

india is my country  
india is my country

Consider the code given below.

```
import java.io.*;
import java.util.*;
public class FileTest {
    public static void main(String[] args) {
        try {
            var in = new FileInputStream("data.txt");
            var sc = new Scanner(in);
            var data = new TreeSet<String>();
            while(sc.hasNext()) {
                data.add(sc.next()+" ");
            }
            for(String str:data)
                System.out.print(str);
        }
        catch (FileNotFoundException e) {
            System.out.println("File does not exist.");
        }
        catch (IOException e) {
            System.out.println("Error in writing a file.");
        }
    }
}
```

What will the output be?

**Options :**

6406531186047. ❌ india is my country india is my country

6406531186048. ✓ country india is my

6406531186049. ❌

india  
is  
my  
country

country  
india  
is  
6406531186050. ✘ my

**Question Number : 194 Question Id : 640653357860 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 java code

```
import java.util.stream.*;  
public class Main{  
    public static void main(String[] args){  
        Integer[] a = {10, 8, 22, 13, 7};  
        Stream.of(a).map((i) -> i - 10)  
            .filter((i) -> i% 2 == 0)  
            .forEach((x) -> System.out.println(x));  
    }  
}
```

What will the output be?

**Options :**

10  
8  
6406531186095. ✘ 22

0  
6406531186096. ✘ 12

6406531186097. ✘ 12

0  
-2  
12

6406531186098. ✓ 12

**Sub-Section Number :** 3

**Sub-Section Id :** 64065351970

**Question Shuffling Allowed :** Yes

**Question Number : 195 Question Id : 640653357843 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 Java code given below.

```
import java.util.*;
class Country{
    public String capital(String name){
        String answer;
        switch(name){
            case "India":   answer = "New Delhi";
                            break;
            case "England": answer = "London";
                            break;
            default:       answer = null;
                            break;
        }
        return answer;
    }
}
class Test{
    public static void main(String[] args){
        Optional<String> op = Optional.ofNullable(new Country().capital("abc"));
        op.ifPresent(n->System.out.println(n.toUpperCase()));
    }
}
```

Choose the correct option.

**Options :**

6406531186026. ✘ This program generates a NullPointerException.

6406531186027. ✘ This program generates the output:  
NULL

6406531186028. ✘ This program generates the output:  
ABC

6406531186029. ✓ This program does not generate any output.

**Question Number : 196 Question Id : 640653357845 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 Java code given below.

```

interface Deliverable{
    default double amount(User u) {
        if(u.price<499) return u.price+50;
        else return u.price;
    }
    double deliver();
}

class Order implements Deliverable{
    User usr;
    //Constructor to initialize the instance variable

    public double deliver() {
        return amount(usr);
    }
}

class FastOrder extends Order{
    public FastOrder(User u) {
        super(u);
    }
    public double amount(User u) {
        if(u.price<499) return u.price+50+150;
        else return u.price+150;
    }
    public double deliver() {
        return amount(usr);
    }
}

public class User {
    String product;
    double price;
    //Constructor to initialize the instance variables

    public static void main(String[] args) {
        User u1 = new User("mobile",8799);
        User u2 = new User("watch",5999);
        Deliverable d1 = new Order(u1);
        Deliverable d2 = new FastOrder(u2);
        System.out.print("Final price of "+u1.product+" = ");
        System.out.println(d1.deliver());
        System.out.print("Final price of "+u2.product+" = ");
        System.out.println(d2.deliver());
    }
}

```

What will the output be?

#### Options :

Final price of mobile = 8799.0  
 6406531186034. ✓ Final price of watch = 6149.0

Final price of watch = 6149.0  
 6406531186035. ✗ Final price of mobile = 8799.0

Final price of watch = 5999.0  
6406531186036. \* Final price of mobile = 8999.0

Final price of mobile = 8999.0  
6406531186037. \* Final price of watch = 5999.0

**Question Number : 197 Question Id : 640653357849 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 Java code given below.

```
import java.io.*;
class ATMCards implements Serializable{
    private String cardNo = null;
    private transient int pin = 1000;
    private String exp = null;
    public ATMCards(String cno, int p, String e) {
        cardNo = cno;
        pin = p;
        exp = e;
    }
    public String toString() {
        return "cardNo = " + cardNo + ", pin = " + pin + ", exp = " + exp;
    }
}
public class SerialTest{
    public static void main(String[] args) throws Exception{
        var fos = new FileOutputStream("Atm.txt");
        var os = new ObjectOutputStream(fos);
        os.writeObject(new ATMCards("4688171329130605", 9999, "03/23"));

        var fis = new FileInputStream("Atm.txt");
        var ois = new ObjectInputStream(fis);
        ATMCards card = (ATMCards)ois.readObject();
        System.out.println(card);
    }
}
```

What will the output be?

**Options :**

6406531186051. ✘ cardNo = 4688171329130605, pin = 9999, exp = 03/23

6406531186052. ✘ cardNo = 4688171329130605, pin = 1000, exp = 03/23

6406531186053. ✓ cardNo = 4688171329130605, pin = 0, exp = 03/23

6406531186054. ✘ cardNo = null, pin = 1000, exp = null

**Question Number : 198 Question Id : 640653357862 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 java code

```

public class Test{
    public static double compute(int a, int b){
        int c = 0;
        assert a > 0: "a must be > 0";      //assert-1
        assert b < a: "b must be < a";      //assert-2
        c = a - b;
        assert c >= 0: c;                  //assert-3
        return Math.sqrt(c);
    }
    public static void main(String[] args){
        int a = 10;
        int b = 15;
        assert b != 0: "b == 0";           //assert-4
        compute(a, b);
    }
}

```

Identify the first assert statement that throws the `AssertionError` when the class is executed as:

`java -ea Test`

**Options :**

6406531186103. ✘ assert-1

6406531186104. ✓ assert-2

6406531186105. ✘ assert-3

6406531186106. ✘ assert-4

**Sub-Section Number :** 4

**Sub-Section Id :** 64065351971

**Question Shuffling Allowed :** Yes

**Question Number : 199 Question Id : 640653357846 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

**Question Label : Multiple Choice Question**

Consider the Java code given below.

```
import java.util.*;
public class MapEx {
    public static void main(String args[]) {

        Map<Integer, String> map1, map2, map3;
        String month[]={"JAN", "FEB", "MAR", "APR", "MAY", "JUN"};

        map1 = new HashMap<Integer, String>(); // LINE-1
        for(int i=0; i<6; i++)
            map1.put(i, month[i]);

        map2=new TreeMap<Integer, String>(map1); // LINE-2
        System.out.println(map1.keySet()); // LINE-3
        System.out.println(map1.values()); // LINE-4

        map3=new LinkedHashMap<Integer, String>();
        for(Map.Entry<Integer, String> entry:map2.entrySet() )
            map3.put(entry.getKey(), entry.getValue()); // LINE-5
        System.out.println(map3.keySet()); // LINE-6
        System.out.println(map3.values()); // LINE-7
    }
}
```

Choose the correct option.

**Options :**

6406531186038. ❌ Compilation error at LINE-1

6406531186039. ❌ Compilation error at LINE-2

Both LINE-3 and LINE-6 generate the same output.

6406531186040. ✓ Both LINE-4 and LINE-7 generate the same output.

Both LINE-3 and LINE-6 generate different outputs.

6406531186041. ❌ Both LINE-4 and LINE-7 generate different outputs.

6406531186042. ❌ Compilation error at LINE-5

**Question Number : 200 Question Id : 640653357847 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.util.*;
import java.util.stream.*;
public class CollectRes {
    public static void main(String[] args) {
        var list=new ArrayList<String>();
        list.add("PROGRAMMING");
        list.add("PROGRAMMING");
        list.add("IITM");
        list.add(null);
        list.add("Java");
        list.add("Java");
        list.add(null);
        Stream<String> stream=list.stream();
        //CODE BLOCK
        System.out.println(obj);
    }
}
```

Choose the correct option(s) to fill in place of CODE BLOCK so that the output is:

[IITM, Java, PROGRAMMING]

**Options :**

6406531186043. ❌  
var obj = list.stream()
 .filter(str -> str != null)
 .limit(3)
 .collect(Collectors.toList());

6406531186044. ❌  
var obj = list.stream()
 .filter(str -> str != null)
 .collect(Collectors.toCollection(LinkedHashSet::new));

6406531186045. ✓

```
var obj = list.stream()
    .filter(str -> str != null)
    .collect(Collectors.toCollection(TreeSet::new));
```

```
var obj = list.stream()
    .filter(str -> str != null)
    .limit(3)
    .collect(Collectors.toSet());
```

6406531186046. \*

**Question Number : 201 Question Id : 640653357850 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the Java code given below.

```

interface A{
    public abstract void show();
}

abstract class B implements A {           //LINE-1
    public abstract void display();
    public void f1() {
        System.out.println("f1() from B");
    }
}

class C extends B{
    public void show() {
        System.out.println("Show() from C");
    }
    public void display() {
        System.out.println("Display from C");
    }
}

public class AbstractEx {
    public static void main(String[] args) {
        A oa = new C();                      //LINE-2
        oa.show();
        C oc=new C();
        oc.f1(); //LINE-3
    }
}

```

Choose the correct option.

**Options :**

6406531186055. ❌ Compilation error at LINE-1, because method `show()` should be overridden in class B

6406531186056. ❌ Compilation error at LINE-2, because reference variable `oa` should not be initialized by an object of class C

6406531186057. ❌ Runtime error, because method `f1()` cannot be invoked directly by an object of class C (See LINE-3)

This program generates the output:

Show() from C

f1() from B

6406531186058. ✓

**Question Number : 202 Question Id : 640653357851 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.util.*;
public class QueueTest{
    public static void main(String[] args) {
        ArrayDeque<String> queue1 = new ArrayDeque<String>();
        queue1.add("England");
        queue1.addFirst("India");
        queue1.add("Scotland");
        queue1.addFirst("Australia");
        queue1.add("Australia");
        System.out.println(queue1);

        TreeSet<String> set = new TreeSet<String>(queue1);
        System.out.println(set);
    }
}
```

What will the output be?

**Options :**

[Australia, India, England, Scotland, Australia]

6406531186059. ✓ [Australia, England, India, Scotland]

[Australia, England, India, Scotland]

6406531186060. ✗ [Australia, India, England, Scotland, Australia]

[Australia, England, India, Scotland]

6406531186061. ✗ [Australia, England, India, Scotland]

[Australia, India, England, Scotland, Australia]

6406531186062. ✗ [Australia, India, England, Scotland, Australia]

**Question Number : 203 Question Id : 640653357852 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the Java code given below.

```

interface Iterable{
    public boolean has_next();
    public Object get_next();
}
class DataList{
    private String[] arr = {"A","B","C","D","E","F"};
    public Iterable getIterable(int i) {
        return new IterableImpl(i);
    }
    private class IterableImpl implements Iterable{
        private int indx;
        public IterableImpl(int i) {
            indx = i;
        }
        public boolean has_next() {
            if (indx+2 <= arr.length - 1)
                return true;
            return false;
        }
        public String get_next() {
            indx+=2;
            return arr[indx];
        }
    }
}
public class IteratorTest{
    public static void main(String[] args) {
        DataList list;
        Iterable it;

        list = new DataList();
        it=_____ //LINE 1;
        while(it.has_next())
            System.out.println(it.get_next());

        System.out.println("=====");
        list = new DataList();
        it=_____ //LINE 2;
        while(it.has_next())
            System.out.println(it.get_next());
    }
}

```

Choose the correct option to fill in the blank at LINE 1 and LINE 2 so that the output is:

A  
 C  
 E  
 ======  
 B  
 D  
 F

### Options :

LINE 1 : list.getIterable(0);  
 6406531186063. ❌ LINE 2 : list.getIterable(-1);

LINE 1 : list.getIterable(-2);  
 6406531186064. ✓ LINE 2 : list.getIterable(-1);

LINE 1 : list.getIterable(-1);

6406531186065. ❌ LINE 2 : list.getIterable(0)

LINE 1 : list.getIterable(0);

6406531186066. ❌ LINE 2 : list.getIterable(-2);

**Question Number : 204 Question Id : 640653357857 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following java code

```
import java.util.*;
class ArrayManipulationException extends Exception{
    public String toString(){
        return "last element of the array cannot be updated";
    }
}
public class Test{
    public static void update(int[] a, int i) throws ArrayManipulationException{
        if(i == a.length - 1){
            throw new ArrayManipulationException();
        }
        a[i] = a[i] + a[i];
    }
    public static void main(String[] args) {
        int[] arr = {1, 2, 3, 4};
        try{
            for(int i = 0; i < arr.length; i++){
                update(arr, i);
            }
        }
        catch(ArrayManipulationException e){
            System.out.println(e);
        }
        for(int i = 0; i < arr.length; i++){
            System.out.print(arr[i] + " ");
        }
    }
}
```

What will the output be?

**Options :**

last element of the array cannot be updated  
6406531186083. ✓ 2 4 6 4

last element of the array cannot be updated  
6406531186084. ✗ 2 4 6 8

6406531186085. ✗ last element of the array cannot be updated

6406531186086. ✗ 2 4 6 8

**Question Number : 205 Question Id : 640653357858 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following java code

```

class Faculty implements Cloneable{
    String fname;
    public Faculty(String n){
        fname = n;
    }
    public Faculty clone() throws CloneNotSupportedException{
        return (Faculty)super.clone();
    }
}
class Department implements Cloneable{
    String dname;
    Faculty[] fac;
    public Department(String dn, Faculty[] f){
        dname = dn;
        fac = f;
    }
    public Department(Department dept){
        this.dname = dept.dname;
        this.fac = dept.fac;
    }
    public Department clone() throws CloneNotSupportedException{
        Department dept = (Department)super.clone();
        dept.fac = fac.clone();
        return dept;
    }
}
public class Test{
    public static void main(String[] args){
        Faculty[] fac = {new Faculty("Vinod"), new Faculty("Prachi")};
        Department d1 = new Department("CSE", fac);
        try{
            Department d2 = d1.clone();
            d2.fac[1] = new Faculty("Kavitha");
            System.out.println(d1.fac[1].fname + " " + d2.fac[1].fname);

            Department d3 = new Department(d1);
            d3.fac[1] = new Faculty("Varsha");
            System.out.println(d1.fac[1].fname + " " + d3.fac[1].fname);
        }
        catch(CloneNotSupportedException e) {
            System.out.println("clone() not supported");
        }
    }
}

```

What will the output be?

#### Options :

- Kavitha Kavitha
- Kavitha Varsha

6406531186087. \*

- Prachi Kavitha
- Prachi Varsha

6406531186088. \*

Kavitha Kavitha  
6406531186089. ✶ Varsha Varsha

Prachi Kavitha  
6406531186090. ✓ Varsha Varsha

**Question Number : 206 Question Id : 640653357859 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following java code

```
import java.util.*;
public class Expenses{
    public static void main(String[] args){
        Map<String, Integer> exp1= new TreeMap<String, Integer>();
        exp1.put("Education", 3000);
        exp1.put("Medical", 1200);
        exp1.put("Food", 2000);
        exp1.put("Transport", 1000);

        Map<String, Integer> exp2 = new TreeMap<String, Integer>();
        exp2.put("Education", 5000);
        exp2.put("Food", 3000);
        exp2.put("Rent", 4000);
        exp2.put("Transport", 1500);

        Map<String, Integer> totalexp = new TreeMap<String, Integer>();

        for(Map.Entry<String, Integer> e : exp1.entrySet())
            totalexp.put(e.getKey(), e.getValue());

        for(Map.Entry<String, Integer> e : exp2.entrySet())
            totalexp.merge(e.getKey(), e.getValue(), (x, y) -> y + x); // LINE 1

        System.out.println(totalexp);
    }
}
```

Choose the correct option

**Options :**

6406531186091. ❌ Compile time error at LINE 1 because of invalid key

This program generates the output:

6406531186092. ❌ {Education=8000, Medical=1200, Food=5000, Transport=2500, Rent=4000}

This program generates the output:

6406531186093. ✓ {Education=8000, Food=5000, Medical=1200, Rent=4000, Transport=2500}

This program generates the output:

6406531186094. ❌ {Education=8000, Food=5000, Transport=2500}

**Sub-Section Number :** 5

**Sub-Section Id :** 64065351972

**Question Shuffling Allowed :** Yes

**Question Number : 207 Question Id : 640653357854 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 4**

Question Label : Multiple Select Question

Consider the three Java files given below.

Test1.java:

```
package pack1;
public class Test1 {
    void f1() {
        System.out.println("I am from Test1");
    }
}
```

Test2.java:

```
package pack2;
public class Test2 extends pack1.Test1{      //LINE-1
    public void getf1() {
        super.f1();                      //LINE-2
    }
    protected void f2() {
        System.out.println("I am from Test2");
    }
}
```

Test3.java:

```
public class Test3 {
    public void getf2() {
        pack2.Test2 obj = new pack2.Test2();
        obj.getf1();                      //LINE-3
        obj.f2();                         //LINE-4
    }
}
```

Choose the correct option.

**Options :**

LINE-1 generates a compilation error because of incorrect way of importing the package.  
**6406531186071.** ❌

**6406531186072.** ✓ LINE-2 generates a compilation error because of illegal access to **f1()**.

**6406531186073.** ❌ LINE-3 generates a compilation error because of illegal access to **getf1()**.

**6406531186074.** ✓ LINE-4 generates a compilation error because of illegal access to **f2()**.

**Question Number : 208 Question Id : 640653357855 Question Type : MSQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Select Question

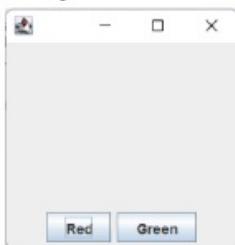
Consider the Java program given below.

```

import javax.swing.*;
import java.awt.event.*;
public class ButtonEvents extends JFrame implements ActionListener{
    private JButton b1, b2;
    private JLabel l1;
    JPanel panel1, panel2;
    public ButtonEvents() {
        b1=new JButton("Red");
        b2=new JButton("Green");
        panel1=new JPanel();
        panel1.add(b1);
        panel1.add(b2);
        add(panel1,"South");
        l1=new JLabel("");
        panel2=new JPanel();
        panel2.add(l1);
        add(panel2,"North");
        setVisible(true);
        setSize(400,400);
        b1.setActionCommand("RED");
        b2.setActionCommand("GREEN");
        b1.addActionListener(this);
        b2.addActionListener(this);
    }
    public void actionPerformed(ActionEvent e) {
        //CODE BLOCK
    }
    public static void main(String[] args) {
        new ButtonEvents();
    }
}

```

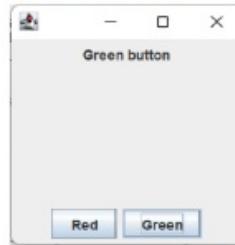
GUI 1: Before clicking on any of the buttons



GUI 2: After clicking on Red button



GUI 3: After clicking on Green button



Choose the correct code segment inside method `actionPerformed()` such that whenever either of the two buttons (Red/Green) is clicked on panel1, the label text of panel2 will change accordingly.

### Options :

```

if(e.getSource().equals(b1))
    l1.setText("Red button");
else if(e.getSource().equals(b2))
    l1.setText("Green button");

```

6406531186075. ✓

6406531186076. ❌

```
if(e.getActionCommand().equals(b1))
    l1.setText("Red button");
else if(e.getActionCommand().equals(b2))
    l1.setText("Green button");

        if(e.getActionCommand().equals("RED"))
            l1.setText("Red button");
        else if(e.getActionCommand().equals("GREEN"))
            l1.setText("Green button");
6406531186077. ✓
```

```
if(e.getSource().equals("RED"))
    l1.setText("Red button");
else if(e.getSource().equals("GREEN"))
    l1.setText("Green button");
6406531186078. ✗
```

**Question Number : 209 Question Id : 640653357856 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 4**

Question Label : Multiple Select Question

Consider the following code

```

import java.util.*;
interface Sortable{
    public Map<String, Integer> sort();
}
class ShoppingBill implements Sortable{
    Map<String, Integer> bill; // bill number mapped to bill amount
    public ShoppingBill(Map<String, Integer> b){
        bill = b;
    }
    public Map<String, Integer> sort(){
        // returns a new bill map object sorted on increasing order of bill amount
    }
}
class Employee implements Sortable{
    Map<String, Integer> emp; // employee id mapped to salary
    public Employee(Map<String, Integer> e){
        emp = e;
    }
    public Map<String, Integer> sort(){
        // returns a new bill map object sorted on increasing order of salary
    }
}
class Test {
    //----- FUNCTION HEADER -----
    Map<String, Integer> m1 = obj.sort();
    // prints the key that has the maximum value in map m1
}
public static void main(String[] args) {
    Map<String, Integer> m = new HashMap<>();
    m.put("1001", 100);
    m.put("1002", 230);
    ShoppingBill b = new ShoppingBill(m);
    Employee e = new Employee(m);
    findMax(b);
    findMax(e);
}
}

```

Identify the appropriate option(s) to fill in place of FUNCTION HEADER such that the code generates the following output:

1002  
1002

### Options :

6406531186079. ✘ public static <T> void findMax(T obj){

6406531186080. ✘ public static void findMax(<?> obj){

6406531186081. ✓ public static void findMax(Sortable obj){

6406531186082. ✓ public static <T extends Sortable> void findMax(T obj){

**Sub-Section Number :** 6

**Sub-Section Id :** 64065351973

**Question Shuffling Allowed :** Yes

**Question Number : 210 Question Id : 640653357864 Question Type : MSQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Select Question

Consider the following code

```

import java.util.*;
class Operations extends Thread{
    private Map<String, Integer> m;
    public Operations(Map<String, Integer> m1){
        this.m = m1;
    }
    public void update(){
        m.put("ravi", 40);
    }
    public void display(){
        System.out.println(m);
    }
    public void run(){
        update();
        display();
    }
}
public class Test{
    public static void main (String[] args){
        Map<String, Integer> m = new LinkedHashMap<String, Integer>();
        m.put("ram", 23);
        Operations o1 = new Operations(m);
        Operations o2 = new Operations(m);
        o2.start();
        o1.start();
    }
}

```

Which of the following is/are NOT possible output(s)?

**Options :**

6406531186111. ✘ {ram=23, ravi=40}  
 6406531186112. ✓ {ram=23, ravi=40}

6406531186112. ✓ {ram=23, ravi=40}

6406531186113. ✘ The code may generate ConcurrentModificationException

6406531186114. ✓ {ravi=40, ram=23}  
 {ram=23, ravi=40}

**Sub-Section Id :**

64065351974

**Question Shuffling Allowed :**

Yes

**Question Number : 211 Question Id : 640653357853 Question Type : MSQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Select Question

Consider the Java code given below.

```
interface Connectable{
    void connect();
}

interface Supportable extends Connectable{
    void support();
}

class WebServer{
    public Supportable getWebContainer(){
        return new WebContainer();
    }

    private class WebContainer implements Supportable {
        public void support() {
            System.out.println("Life cycle support to a web application");
        }

        public void connect() {
            System.out.println("Communication support to a web application");
        }
    }
}

public class PrivateTest {
    public static void main(String[] args) {
        WebServer server = new WebServer();
        //CODE BLOCK
    }
}
```

Choose the correct option(s) to fill in place of CODE BLOCK so that the output is:

Life cycle support to a web application  
Communication support to a web application

**Options :**

6406531186067. ✓

```
Supportable s = server.getWebContainer();
s.support();
s.connect();
```

```
Connectable c = server.getWebContainer();
c.support();
c.connect();
```

6406531186068. ✘

```
Supportable s=server.getWebContainer();
s.support();
((Connectable)(s)).connect();
```

6406531186069. ✓

```
Connectable c = server.getWebContainer();
Supportable s = c;
s.support();
c.connect();
```

6406531186070. ✘

**Question Number : 212 Question Id : 640653357861 Question Type : MSQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Select Question

Consider the following java code

```

import java.util.*;
abstract class Order{
    private int nitems;
    private double p_pitm;
    public Order(int n, double p){
        nitems = n;
        p_pitm = p;
    }
    //Accessor Methods getNItems() and getPPItm()
    public abstract double orderPrice();
}
class Zmto extends Order{
    private final int deliveryCharges = 50;
    public Zmto(int n, double p){
        super(n,p);
    }
    public double orderPrice(){
        return (getNItems() * getPPItm())+deliveryCharges;
    }
}
class Siggy extends Order{
    private final int deliveryCharges = 60;
    public Siggy(int n, double p){
        super(n,p);
    }
    public double orderPrice(){
        return (getNItems() * getPPItm())+deliveryCharges;
    }
}
public class Test{
    // ----- FUNCTION HEADER -----
    double total = 0;
    for(Order o : ord){
        total = total + o.orderPrice();
    }
    return total;
}
public static void main(String[] args){
    Zmto z1 = new Zmto(2, 300);
    Zmto z2 = new Zmto(3,100);
    List<Zmto> zList = new ArrayList<Zmto>();
    zList.add(z1);
    zList.add(z2);
    Siggy s1 = new Siggy(1, 250);
    Siggy s2 = new Siggy(2, 120);
    List<Siggy> sList = new ArrayList<Siggy>();
    sList.add(s1);
    sList.add(s2);
    double zTotal = getTotalPrice(zList);
    double sTotal = getTotalPrice(sList);
    System.out.println("Zmto: " + zTotal + ", " + "Siggy: " + sTotal);
}
}

```

Identify the correct option to be filled in place of FUNCTION HEADER to generate the output

Zmto: 1000.0, Siggy: 610.0.

### Options :

6406531186099. ❌ public static double getTotalPrice(List<Order> ord){

6406531186100. ✓ public static double getTotalPrice(List<? extends Order> ord){

6406531186101. ❌ public static double getTotalPrice(List<?> ord){

6406531186102. ✓ public static <T extends Order> double getTotalPrice(List<T> ord){

**Question Number : 213 Question Id : 640653357863 Question Type : MSQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Select Question

Consider the following code

```

class Enquiry{
    int available = 1;
    public synchronized void request(int n, String name){
        if(available >= n){
            available = available - n;
            System.out.println(name + " booked " + n + " ticket");
        }
        else{
            System.out.println(name + " cannot book " + n + " ticket");
        }
    }
}

class TicketBooking implements Runnable{
    Enquiry e;
    String name;
    int n_tickets;
    public TicketBooking(Enquiry e1, String n, int t){
        // constructor to initialize the instance variables
    }
    public void run(){
        e.request(n_tickets, name);
    }
}

public class Test {
    public static void main(String[] args) {
        Enquiry obj = new Enquiry();
        TicketBooking tb1 = new TicketBooking(obj, "Ram", 1);
        TicketBooking tb2 = new TicketBooking(obj, "Ravi", 1);
        Thread t1 = new Thread(tb1);
        Thread t2 = new Thread(tb2);
        t1.start();
        t2.start();
    }
}

```

Which of the following is/are NOT possible outputs?

**Options :**

Ram booked 1 ticket  
 6406531186107. ❌ Ravi cannot book 1 ticket

Ravi booked 1 ticket  
 6406531186108. ❌ Ram cannot book 1 ticket

Ram booked 1 ticket  
6406531186109. ✓ Ravi booked 1 ticket

Ram cannot book 1 ticket  
6406531186110. ✓ Ravi booked 1 ticket

## MLF

<b>Section Id :</b>	64065322365
<b>Section Number :</b>	9
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	17
<b>Number of Questions to be attempted :</b>	17
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065351975
<b>Question Shuffling Allowed :</b>	No

**Question Number : 214 Question Id : 640653357865 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**

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 :**

6406531186115. ✓ Yes

6406531186116. ✗ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065351976

**Question Shuffling Allowed :** Yes

**Question Number : 215 Question Id : 640653357871 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

Suppose that eigenvalues of matrix A are 1, 0.5, 0.25. The determinant of  $(A^{-1})^T$  is

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

8

**Question Number : 216 Question Id : 640653357886 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

Let  $X$  and  $Y$  be two random variables of an experiment such that  $Y = 8X + 4$ .  
If  $E[Y] = 44$ . What is the value of  $E[7X + 10]$ .

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

45

**Sub-Section Number :** 3

**Sub-Section Id :** 64065351977

**Question Shuffling Allowed :** No

**Question Id :** 640653357867 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Calculator :** None **Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Question Numbers :** (217 to 219)

Question Label : Comprehension

Consider the function  $f(x, y) = \sqrt{41 - 4x^2 - y^2}$ .

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number :** 217 **Question Id :** 640653357868 **Question Type :** SA **Calculator :** None  
**Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Correct Marks :** 1

Question Label : Short Answer Question

Compute the equation of the function's linear approximation at point (2,3). If the equation of the

linear approximation is  $L = ax + by + c$ , then provide the value of **a**.

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

-2

**Question Number :** 218 **Question Id :** 640653357869 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 1

**Question Label :** Short Answer Question

Compute the equation of the function's linear approximation at point (2,3). If the equation of the linear approximation is  $L = ax + by + c$ , then provide the value of **b**.

**NOTE:** Enter your answer upto two decimal.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

-0.8 to -0.7

**Question Number :** 219 **Question Id :** 640653357870 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 1

**Question Label :** Short Answer Question

Compute the equation of the function's linear approximation at point (2,3). If the equation of the linear approximation is  $L = ax + by + c$ , then provide the value of **c**.

**NOTE:** Enter your answer upto two decimal.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

10.0 to 10.5

**Question Id : 640653357883 Question Type : COMPREHENSION Sub Question Shuffling**

**Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A**

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

**Question Numbers : (220 to 221)**

Question Label : Comprehension

Probability density function of a random variable  $X$  is given by

$$f(x) = \begin{cases} a|x| & \text{if } |x| \leq 2 \\ 0 & \text{otherwise} \end{cases}$$

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 220 Question Id : 640653357884 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

Calculate the value of  $a$

**NOTE:** Enter your answer upto two decimal.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.23 to 0.27

**Question Number :** 221 **Question Id :** 640653357885 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 2

**Question Label :** Short Answer Question

Find the  $P(X \geq \frac{1}{2})$ .

**NOTE:** Enter your answer upto two decimal.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.42 to 0.48

**Sub-Section Number :** 4

**Sub-Section Id :** 64065351978

**Question Shuffling Allowed :** Yes

**Question Number :** 222 **Question Id :** 640653357872 **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

If two complex vectors  $v_1$  and  $v_2$  have lengths  $l_1$  and  $l_2$  and  $v_1 \cdot v_2 = l_1 l_2$ , then which of the following statements is/are true?

**Options :**

6406531186122. ✓  $v_1$  and  $v_2$  vectors are parallel to each other.

6406531186123. ✗  $v_1$  and  $v_2$  vectors are conjugate to each other.

6406531186124. ✗  $v_1$  and  $v_2$  vectors are perpendicular to each other.

6406531186125. ✗  $v_1$  and  $v_2$  can be any two vectors.

**Question Number : 223 Question Id : 640653357879 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

Compute the Hessian matrix at the point  $(0,1,\pi)$  of the following 3 variable function:  $f(x,y,z) = e^{-x} \cdot \cos(yz)$

**Options :**

$$\begin{bmatrix} 0 & \pi & 1 \\ \pi & 0 & -1 \\ 1 & 0 & 1 \end{bmatrix}$$

6406531186144. ✗

$$\begin{bmatrix} 1 & \pi & 1 \\ \pi & 0 & -1 \\ 1 & -1 & 0 \end{bmatrix}$$

6406531186145. ✗

$$\begin{bmatrix} 0 & \pi & 1 \\ \pi & 0 & -1 \\ 1 & -1 & 0 \end{bmatrix}$$

6406531186146. ✗

$$\begin{bmatrix} -1 & 0 & 0 \\ 0 & \pi^2 & \pi \\ 0 & \pi & 1 \end{bmatrix}$$

6406531186147. ✓

6406531186148. ✘ None of these

**Question Number : 224 Question Id : 640653357882 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

Each set of a 3-set badminton match between P.V.Sindhu and Tai Tzu Ying is won with equal probability by either player. Let  $A$  be the event that all the three sets are won by one player. Let  $C$  be the event that at least two sets are won by Tai Tzu Ying, and let  $B$  denote the event that at most two sets are won by Tai Tzu Ying. Which of the two events are independent?

**Options :**

6406531186151. ✘  $A$  and  $B$  are independent.

6406531186152. ✓  $A$  and  $C$  are independent.

6406531186153. ✘  $B$  and  $C$  are independent.

6406531186154. ✘  $A$ ,  $B$  and  $C$  are independent to each other.

**Sub-Section Number :** 5

**Sub-Section Id :** 64065351979

**Question Shuffling Allowed :** Yes

**Question Number : 225 Question Id : 640653357873 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

The matrix  $A = \begin{bmatrix} 4 & 1 & -1 \\ 1 & 2 & 1 \\ -1 & 1 & 2 \end{bmatrix}$  is

**Options :**

6406531186126. ✓ positive definite

6406531186127. ✗ positive semi-definite

6406531186128. ✗ negative definite

6406531186129. ✗ negative semi-definite

6406531186130. ✗ None of these

**Sub-Section Number :** 6

**Sub-Section Id :** 64065351980

**Question Shuffling Allowed :** Yes

**Question Number : 226 Question Id : 640653357874 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Select Question

Consider the following matrix

$$A = \begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 1 \\ 2 & 1 & 1 \end{bmatrix}$$

Which of the following are the eigenvector of this matrix ?

**Options :**

6406531186131. ✓  $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$

6406531186132. ✓  $\begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix}$

6406531186133. ✓

$$\begin{bmatrix} -1 \\ 0 \\ 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$$

6406531186134. \*

**Sub-Section Number :** 7

**Sub-Section Id :** 64065351981

**Question Shuffling Allowed :** No

**Question Id : 640653357875 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (227 to 228)**

Question Label : Comprehension

A manufacturing company makes two types of television sets; one is smart led and the other is normal led. The company has resources to make at most 300 sets a week. It takes Rs 1800 to make a smart led set and Rs 2700 to make a normal led set. The company can spend not more than Rs 648000 a week to make television sets. If it makes a profit of Rs 510 per smart led and Rs 675 per normal led.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 227 Question Id : 640653357876 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The objective function to maximise the profit for the given problem is

**Options :**

6406531186135. ✓  $510x + 675y$

6406531186136. ✗  $410x + 675y$

6406531186137. ✗  $510x + 575y$

6406531186138. ✗  $102x + 135y$

**Question Number : 228 Question Id : 640653357877 Question Type : MSQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Select Question

The constraints for the given problem is

**Options :**

6406531186139. ✓  $x + y \leq 300$

6406531186140. ✓  $2x + 3y \leq 720$

6406531186141. ✗  $x + 3y \leq 120$

6406531186142. ✓  $x \geq 0, y \geq 0$

**Sub-Section Number :** 8

**Sub-Section Id :** 64065351982

**Question Shuffling Allowed :** Yes

**Question Number : 229 Question Id : 640653357866 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 following regression problem with one dimensional feature where the data is really generated according to the following rules (but the learning algorithm does not know these rules).

$$X \sim Normal(5, 5)$$

$$Y = X + 5$$

Using  $n$  data points, your learning algorithm outputs a learned model  $f(x) = X + 3$ . What is the MSE (mean squared error) of the output model?

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Question Number :** 230 **Question Id :** 640653357878 **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

Equation of plane  $r \cdot n = d$ , Here  $n$  is the unit vector  $\frac{6i + 4j - 2k}{\sqrt{56}}$  and  $d$  is

the distance of the plane from origin i.e  $\frac{40}{\sqrt{56}}$  here. Then the Minimum distance of the plane  $r \cdot n = d$  from point  $(1, 2, 1)$  is \_\_\_\_.

**NOTE:** Enter your answer in one decimal place.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

3.5 to 4.0

**Question Number :** 231 **Question Id :** 640653357880 **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

While solving for the optimal weight vector ( $w$ ) for a linear regression problem

using gradient descent, we have  $y = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$  and  $X = \begin{bmatrix} 0 & 1 \\ 1 & 1 \\ 1 & 2 \end{bmatrix}$ .  $w^t = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$  after  $t$  iterations.

If the value of  $w^{t+1} = \begin{bmatrix} i \\ j \end{bmatrix}$  in next iteration using gradient descent method, then what is the absolute value of  $|i + j|$ ? Assume  $\eta = 1$ .

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 7

**Question Number :** 232 **Question Id :** 640653357881 **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

What is the maximum value possible for the function  $f(x, y) = e^{2xy}$  subject to the conditions  $x \geq 0, y \geq 0$ , and  $x^2 + y^2 = 2$

**NOTE:** Enter your answer upto one decimal.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

## 7.1 to 7.7

**Question Number : 233 Question Id : 640653357887 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**

Suppose that the lifetime of light bulbs is modeled by an exponential distribution with unknown parameter  $\lambda$ . We test 5 bulbs and find that they have lifetimes of 3, 4, 2, 5 and 6 years, respectively. What is the Maximum likelihood estimate for  $\lambda$ ? Write your answer correct to two decimal places.

**NOTE:** Enter your answer upto two decimal

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.23 to 0.27

**Sub-Section Number :** 9

**Sub-Section Id :** 64065351983

**Question Shuffling Allowed :** No

**Question Id : 640653357888 Question Type : COMPREHENSION Sub Question Shuffling**

**Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A**

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

**Question Numbers : (234 to 235)**

**Question Label : Comprehension**

The pdf of the variables  $X$  and  $Y$  is

$$f(x, y) = \begin{cases} \frac{1}{2}xe^{-y} & \text{if } 0 < x < 2, y > 0 \\ 0 & \text{otherwise} \end{cases}$$

Consider the transformation  $U = X + Y$  and  $V = X$

Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 234 Question Id : 640653357889 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

Calculate the  $|J|$ , ( $J$  represents the Jacobian of the transform  $U, V \mapsto X, Y$ )

**Options :**

6406531186159. ✓ 1

6406531186160. ✗  $\frac{1}{2}$

6406531186161. ✗  $u$

6406531186162. ✗  $v$

**Question Number : 235 Question Id : 640653357890 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

Find the joint distribution of  $U$  and  $V$

**Options :**

$$g(u, v) = \begin{cases} \frac{1}{2}ve^{-(u-v)} & \text{if } 0 < v < 2, u > v \\ 0 & \text{otherwise} \end{cases}$$

6406531186163. ✓

$$g(u, v) = \begin{cases} \frac{1}{2}ve^{-(u+v)} & \text{if } 0 < v < 2, u > v \\ 0 & \text{otherwise} \end{cases}$$

6406531186164. ✗

$$g(u, v) = \begin{cases} \frac{1}{2}ve^{-(u-v)} & \text{if } 0 < v < 2, v > u \\ 0 & \text{otherwise} \end{cases}$$

6406531186165. ✗

$$g(u, v) = \begin{cases} \frac{1}{2}ve^{-(u-v)} & \text{if } 0 < x < 2, u > v \\ 0 & \text{otherwise} \end{cases}$$

6406531186166. ✗

## MLP

<b>Section Id :</b>	64065322366
<b>Section Number :</b>	10
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	38
<b>Number of Questions to be attempted :</b>	38
<b>Section Marks :</b>	100
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and</b>	Yes

**Clear Response :**

**Maximum Instruction Time :** 0  
**Sub-Section Number :** 1  
**Sub-Section Id :** 64065351984  
**Question Shuffling Allowed :** No

**Question Number : 236 Question Id : 640653357891 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: MACHINE LEARNING PRACTICE"

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 :**

6406531186167. ✓ Yes

6406531186168. ✗ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065351985

**Question Shuffling Allowed :** Yes

**Question Number : 237 Question Id : 640653357892 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

The similarity between loaders and fetchers of sklearn is -

**Options :**

6406531186169. ✗ Both loaders and fetchers generate controlled synthetic datasets

6406531186170. ✓ Both loaders and fetchers return a Bunch object, which is a dictionary with two keys

6406531186171. ✗ Both techniques load small standard datasets

6406531186172. ✗ None of these options are correct

**Question Number : 238 Question Id : 640653357893 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options represent the main purpose of using the FeatureUnion?

**Options :**

6406531186173. ✗ Enables different transformations on various columns of data based on their types

6406531186174. ✓ Combines output from several transformer objects by creating a new transformer from them

6406531186175. ✗ To chain multiple estimators to execute a fixed sequence of steps in data preprocessing and modeling

6406531186176. ✗ None of these

**Question Number : 239 Question Id : 640653357894 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

What will be the output of the following block of code?

```
from sklearn.datasets import make_blobs
X, y = make_blobs(n_samples=10,
                    centers=3,
                    n_features=2,
                    random_state=0)
print(X.shape)
```

**Options :**

6406531186177. ✓ (10, 2)

6406531186178. ✗ (2, 10)

6406531186179. ✗ (10, 3)

6406531186180. ✗ (3, 10)

**Question Number : 240 Question Id : 640653357896 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options is the correct method to load the wine dataset and print its shape?

**Options :**

```
import load_wine  
data = load_wine()  
6406531186185. ✗ print(data.data.shape())
```

```
from sklearn.datasets import load_wine  
data = load_wine()  
6406531186186. ✗ print(data.shape())
```

```
from sklearn.datasets import load_wine  
data = load_wine()  
6406531186187. ✗ print(data.data.shape())
```

```
from sklearn.datasets import load_wine  
data = load_wine()  
6406531186188. ✓ print(data.data.shape)
```

**Question Number : 241 Question Id : 640653357897 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the output of the following block of code?

```
import numpy as np
from sklearn.preprocessing import MaxAbsScaler
X = [[ 1., -1.,  2.],
      [ 2.,  0.,  0.],
      [ 0.,  1., -1.]]
transformer = MaxAbsScaler().fit(X)
transformer.transform(X)
```

**Options :**

6406531186189. ✓   
 array([[ 0.5, -1. , 1. ],
 [ 1. , 0. , 0. ],
 [ 0. , 1. , -0.5]])

6406531186190. ✗   
 array([[[-0.5, -1. , -1. ],
 [ 1. , 0. , 0. ],
 [ 0. , 1. , -0.5]])

6406531186191. ✗   
 array([[[-0.5, -1. , -1. ],
 [-1. , 0. , 0. ],
 [ 0. , -1. , -0.5]])

6406531186192. ✗   
 array([[[-0.5, -0.5, -1. ],
 [-1. , -1. , 0. ],
 [ 0. , -0.5, -0.5]])

**Question Number : 242 Question Id : 640653357898 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the output of the following code snippet?

```
from sklearn.preprocessing import StandardScaler
data = [[0, 0], [0, 0], [1, 1], [1, 2]]
scaler = StandardScaler()
scaler.fit(data)
print(scaler.mean_)
```

**Options :**

6406531186193. ✘ [0.75 0.5]

6406531186194. ✘ [0.25 0.5]

6406531186195. ✓ [0.5 0.75]

6406531186196. ✘ [0.5 0.5]

**Question Number : 243 Question Id : 640653357899 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the options will be the correct output for the following code snippet?

```
import numpy as np
x = np.array(
    [[5, 4],
     [3, 8],
     [2, 0],
     [9, 6]])
from sklearn.preprocessing import add_dummy_feature
x_new = add_dummy_feature(x)
print(x_new)
```

**Options :**

[ [5, 4 ]

[3, 8 ]

[2, 0 ]

6406531186197. ✘ [9, 6 ]]

6406531186198. ✘

[[5. 1. 4.]  
[3. 1. 8.]  
[2. 1. 0.]  
[9. 1. 6.]]

[[ 5. 4. 1.]  
[3. 8. 1.]  
[ 2. 0. 1.]  
[ 9. 6. 1.]]

6406531186199. \*

[[1. 5. 4.]  
[1. 3. 8.]  
[1. 2. 0.]  
[1. 9. 6.]]

6406531186200. ✓

**Question Number : 244 Question Id : 640653357900 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the options will be the correct output for the following code snippet?

```
from sklearn.preprocessing import MultiLabelBinarizer  
mlb = MultiLabelBinarizer()  
mlb.fit_transform([(1, 2), (3,)])
```

**Options :**

array([[1, 1, 0, 0],  
 [0, 0, 1, 1]])

6406531186201. \*

array([[1, 1, 0, 0],  
 [0, 1, 1, 1]])

6406531186202. \*

array([[1, 1, 0],  
6406531186203. ✘ [1, 0, 1]])

array([[1, 1, 0],  
6406531186204. ✓ [0, 0, 1]])

**Question Number : 245 Question Id : 640653357901 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options is correct explained variance score for the following code snippet applying PCA technique.

```
import numpy as np
from sklearn.decomposition import PCA
X = np.array([[1, 1], [2, 2]])
pca = PCA(n_components=2)
pca.fit(X)
print(pca.explained_variance_ratio_)
```

**Options :**

6406531186205. ✘ [1. 1.]

6406531186206. ✓ [1. 0.]

6406531186207. ✘ [0. 1.]

6406531186208. ✘ [0. 0.]

**Question Number : 246 Question Id : 640653357904 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options is the correct output of the following block of code?

```
from sklearn.model_selection import LeaveOneOut
X = [1, 2, 3, 4]
loo = LeaveOneOut()
split = 1
for train, test in loo.split(X):
    print(f"split# {split}, {train} {test}")
    split += 1
```

**Options :**

6406531186214. ✓  
split# 1, [1 2 3] [0]  
split# 2, [0 2 3] [1]  
split# 3, [0 1 3] [2]  
split# 4, [0 1 2] [3]

6406531186215. ✗  
split# 1, [1 2 3] [4]  
split# 2, [4 2 3] [1]  
split# 3, [4 1 3] [2]  
split# 4, [4 1 2] [3]

6406531186216. ✗  
split# 1, [1 2 3] [4]  
split# 2, [4 2 3] [1]  
split# 3, [4 1 3] [2]

6406531186217. ✗  
split# 1, [1 2 3] [0]  
split# 2, [0 2 3] [1]  
split# 3, [0 1 3] [2]

**Question Number : 247 Question Id : 640653357905 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options is the correct method to shuffle training data after each epoch in SGDRegressor?

**Options :**

6406531186218. ✓ 

```
from sklearn.linear_model import SGDRegressor
linear_regressor = SGDRegressor(shuffle=True)
```

6406531186219. ✗ 

```
from sklearn.preprocessing import SGDRegressor
linear_regressor = SGDRegressor(shuffle=True)
```

6406531186220. ✗ 

```
from sklearn.SGDRegressor import linear_model
linear_regressor = SGDRegressor(learning_rate='constant', eta0=1e-2)
```

6406531186221. ✗ None of these

**Question Number : 248 Question Id : 640653357907 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options represent the correct output of the following block of code?

```
import numpy as np
from sklearn.linear_model import LinearRegression
X = np.array([[0,0], [1, 1], [2, 2], [3, 3]])
y = np.dot(X, np.array([1, 1]))-1
reg = LinearRegression().fit(X, y)
reg.predict(np.array([[5, 6]]))
```

**Options :**

6406531186226. ✗ array([9.])

6406531186227. ✓ array([10.])

6406531186228. ✗ array([11.])

6406531186229. ✗ SyntaxError: unexpected EOF while parsing

**Question Number : 249 Question Id : 640653357908 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options represent the set of transformed features of  $[x_1, x_2]$  after execution of the following code?

```
from sklearn.preprocessing import PolynomialFeatures  
poly_transform = PolynomialFeatures(degree=2, interaction_only=True)
```

**Options :**

6406531186230. ✖  $[1, x_1, x_2, x_1^2, x_2^2]$

6406531186231. ✖  $[1, x_1^2, x_2^2]$

6406531186232. ✓  $[1, x_1, x_2, x_1x_2]$

6406531186233. ✖  $[1, x_1, x_2, x_1^2, x_2^2, x_1x_2]$

**Question Number : 250 Question Id : 640653357909 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options is the possible output for the following block of code?

```
from sklearn.datasets import load_digits  
from sklearn.linear_model import Perceptron  
X, y = load_digits(return_X_y=True)  
clf = Perceptron(tol=1e-3, random_state=0)  
clf.fit(X, y)  
clf.score(X, y)
```

**Options :**

6406531186234. ✓ 0.94

6406531186235. ✘ 1.25

6406531186236. ✘ 1.94

6406531186237. ✘ -2.64

**Question Number : 251 Question Id : 640653357911 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What operation does the following code implement?

```
from sklearn.linear_model import LogisticRegression  
logreg = LogisticRegression()  
logreg.fit(X,y)
```

where  $X$  and  $y$  are the training data.

**Options :**

6406531186242. ✘ It will perform linear regression on the given data.

6406531186243. ✘ It will generate synthetic regression data.

6406531186244. ✘ It will generate synthetic classification data.

6406531186245. ✓ It will perform classification on the given data.

**Question Number : 252 Question Id : 640653357914 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options represent the recall value for the **class 2** in the confusion matrix shown in Figure 1 if  $y_{true} = [0, 1, 2, 2, 2]$ ,  $y_{pred} = [0, 0, 2, 2, 1]$  ?

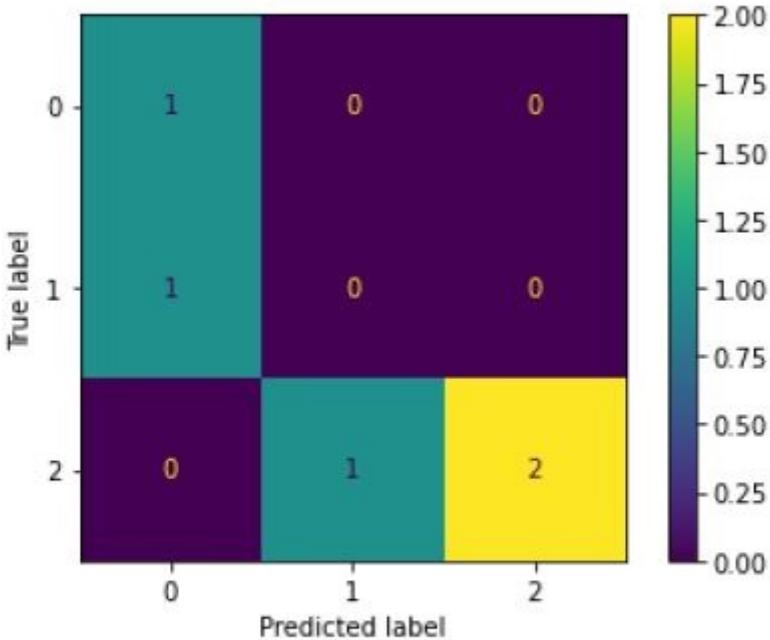


Figure 1

**Options :**

6406531186254. ✓ 0.67

6406531186255. ✗ 1.00

6406531186256. ✗ 0.50

6406531186257. ✗ 0.25

**Question Number : 253 Question Id : 640653357926 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the following code block and mark the correct output.

```
from sklearn.cluster import KMeans
import numpy as np
X = np.array([[2, 4], [4, 2], [8, 10], [10, 12], [20, 21], [17, 19]])
kmeans = KMeans(n_clusters=3, random_state=5).fit(X)
print(kmeans.labels_)
```

**Options :**

6406531186292. ✗ [0 0 0 1 1 1]

6406531186293. ✓ [2 2 0 0 1 1]

6406531186294. ✘ [0 1 2 0 1 2]

6406531186295. ✘ [0 1 0 1 0 1]

**Question Number : 254 Question Id : 640653357928 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider  $X$  and  $y$  as the training dataset. What will be the output of the following code?

```
from sklearn.datasets import load_iris
X,y = load_iris(as_frame = True, return_X_y = True)
from sklearn.neural_network import MLPClassifier
rs = MLPClassifier(activation= 'logistic', random_state=12)
rs.fit(X, y)
print(rs.out_activation_)
```

**Options :**

6406531186297. ✘ logistic

6406531186298. ✘ relu

6406531186299. ✘ identity

6406531186300. ✓ softmax

**Sub-Section Number :** 3

**Sub-Section Id :** 64065351986

**Question Shuffling Allowed :** Yes

**Question Number : 255 Question Id : 640653357895 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following options represent the design philosophy of the sklearn API?

**Options :**

6406531186181. ✓ Nonproliferation of classes

6406531186182. ✗ Execution of all codes within 99.9 ms.

6406531186183. ✓ Sensible defaults

6406531186184. ✓ Direct accessibility of hyperparameters of all estimators

**Question Number : 256 Question Id : 640653357906 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following options represent(s) the correct method(s) to search for the best regularization parameter for ridge regression?

**Options :**

6406531186222. ✓ Search for the best regularization rate with built-in cross validation in RidgeCV estimator

6406531186223. ✗ Step 1: Instantiate object of Ridge estimator.

Step 2: Set parameter alpha to the maximum regularization rate.

6406531186224. ✓ Use cross validation with Ridge to search for best regularization.

6406531186225. ✓ Apply cross validation with SGDRegressor for searching the best regularization parameter.

**Question Number : 257 Question Id : 640653357934 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Select Question

Consider the following block of code and mark all possible correct options.

```

from sklearn.linear_model import LogisticRegression
from sklearn.ensemble import RandomForestClassifier, VotingClassifier
clf1 = LogisticRegression()
clf2 = RandomForestClassifier()
vote=VotingClassifier(estimators=[('lr', clf1), ('rf', clf2)],
                      weights=None,
                      n_jobs= 1,
                      flatten_transform=True,
                      verbose=False,
                      voting='hard')
vote = vote.fit(X, y)
print(vote.predict(X))

```

**Options :**

6406531186314. ✓ Given model uses majority voting rule to predict class labels.
6406531186315. ✗ Given model predicts the class labels based on the argmax of the sums of the predicted probabilities.
6406531186316. ✓ Setting flatten\_transform =True with voting='soft' will flatten the output shape of transform.
6406531186317. ✗ None of these are correct

**Sub-Section Number :** 4

**Sub-Section Id :** 64065351987

**Question Shuffling Allowed :** Yes

**Question Number : 258 Question Id : 640653357902 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**

**What will be the output of the following code block:**

```

from sklearn.preprocessing import PolynomialFeatures
import numpy as np
X = np.arange(6).reshape(3, 2)
poly = PolynomialFeatures(degree=2)
print (poly.fit_transform(X))

```

**Options :**

```
[[ 1.  0.  1.  0.  0.  1.]  
[ 1.  2.  3.  4.  6.  9.]  
[ 1.  4.  5.  16. 20. 25.]]
```

6406531186209. ✓

```
[[ 1.  0.  1.  0.  0.  1.]  
[ 1.  2.  3.  4.  6.  9.]  
[ 1.  4.  5.  16. 20. 25.]  
[ 1.  6.  7.  36. 42. 49.]]
```

6406531186210. ✗

```
array([[1, 1, 0, 6, 8],  
       [1, 0, 1, 6, 10]])
```

6406531186211. ✗

```
[[ 1.  0.  2.  1.  1.  1.]  
[ 1.  1.  3.  6.  6.  9.]  
[ 1.  4.  5.  16. 26. 25.]]
```

6406531186212. ✗

**Question Number : 259 Question Id : 640653357910 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

Which of the following options represent the output of the following block of code?

```
from sklearn.metrics import confusion_matrix  
y_true = ["cat", "ant", "cat", "cat", "ant"]  
y_pred = ["ant", "ant", "cat", "cat", "ant"]  
confusion_matrix(y_true, y_pred, labels=["ant", "cat"])
```

**Options :**

```
array([[2, 0],  
       [1, 2]])
```

6406531186238. ✓

```
array([[2, 1],  
       [0, 2]])
```

6406531186239. ✗

array([[2, 2],  
6406531186240. ✘ [1, 0]])

array([[2, 2],  
6406531186241. ✘ [0, 2]])

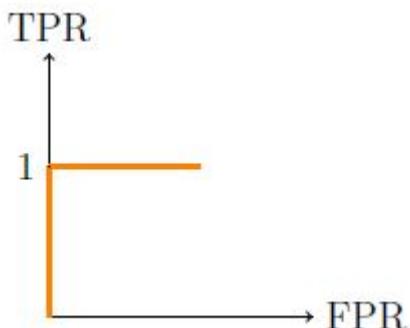
**Question Number : 260 Question Id : 640653357912 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following statements will be true based on the following diagram?



**Options :**

6406531186246. ✘ The classifier will predict all positive classes as negatives and all negative classes as positives.

6406531186247. ✓ The classifier will perfectly distinguish between the positive and negative classes.

6406531186248. ✘ There is a good probability that the classifier can properly identify the classes.

6406531186249. ✘ We can not comment on the classifier performance based on the given figure

**Question Number : 261 Question Id : 640653357913 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

Which of the following options is the correct output of the following block of code?

```
import numpy as np
from sklearn.dummy import DummyRegressor
X = np.array([1.0, 1.5, 2.0])
y = np.array([1.0, 2.0, 3.0])
dummy_regr = DummyRegressor(strategy="mean")
dummy_regr.fit(X, y)
dummy_regr.predict(X)
```

**Options :**

6406531186250. ❌ array([2.25, 2.25, 2.25])

6406531186251. ❌ array([1., 1., 1.])

6406531186252. ✓ array([2., 2., 2.])

6406531186253. ❌ DummyRegressor()

**Question Number : 262 Question Id : 640653357918 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

Which of the following is likely to be the correct output of the code given below?

```
X = [[0], [5], [7], [10]]
y = [0, 0, 1, 1]
from sklearn.neighbors import KNeighborsClassifier
neigh = KNeighborsClassifier(n_neighbors=3)
neigh.fit(X, y)
A = neigh.kneighbors_graph(X)
A.toarray()
```

**Options :**

6406531186266. ❌ array([[1., 1., 1., 0.], [1., 1., 1., 0.], [0., 1., 0., 1.], [0., 1., 1., 1.]])

6406531186267. ✘ array([[1., 1., 1., 0.], [1., 1., 1., 0.], [0., 1., 0., 1.], [0., 1., 0., 1.]])

6406531186268. ✘ array([[1., 1., 0., 1.], [0., 1., 1., 0.], [0., 1., 1., 0.], [1., 0., 1., 1.]])

6406531186269. ✓ array([[1., 1., 1., 0.], [1., 1., 1., 0.], [0., 1., 1., 1.], [0., 1., 1., 1.]])

**Question Number : 263 Question Id : 640653357922 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

For the following block of code, we get the output as 0.9875. How would the output change if we decrease max depth value ?:

```
from sklearn.datasets import load_wine
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
X,y = load_wine(as_frame = True, return_X_y = True)

X_train,X_test,y_train,y_test = train_test_split(X,
                                                y,
                                                test_size = 0.10,
                                                random_state = 12)

clf = DecisionTreeClassifier(max_depth = 6,
                             min_samples_split = 2,
                             min_samples_leaf=3,
                             random_state = 81)

clf.fit(X_train, y_train)
print(clf.score(X_train, y_train))
```

**Options :**

6406531186278. ✘ Output score will definitely increase.

6406531186279. ✘ Output score will definitely decrease.

6406531186280. ✓ Output score may decrease or remain the same.

6406531186281. ✘ Code will throw an error because max\_depth can't be less than 6.

**Question Number : 264 Question Id : 640653357923 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 block of code and mark the correct option.

```
from sklearn.datasets import load_breast_cancer
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
X,y = load_breast_cancer(as_frame = True,
                         return_X_y = True)
X_train,X_test,y_train,y_test = train_test_split(X,
                                                 y,
                                                 test_size = 0.2,
                                                 random_state = 1)
clf = DecisionTreeClassifier(min_samples_split = 5,
                             random_state = 5)
clf.fit(X_train, y_train)
print(clf.score(X_test, y_test))
```

**Options :**

6406531186282. ❌ The minimum number of samples required to split a leaf node is 5.

6406531186283. ❌ The minimum number of samples required to split an internal node is 6.

6406531186284. ❌ The minimum number of samples required to be at a leaf node is 4.

6406531186285. ✓ The minimum number of samples required to split an internal node is 5.

**Question Number : 265 Question Id : 640653357925 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 code snippet. What value should we fill at the blank place, so that given code block creates graph as shown below:

```

from sklearn.datasets import make_blobs
from sklearn.cluster import KMeans
X, y = make_blobs(n_samples=1000,
                   n_features=9,
                   centers=.....,
                   random_state=42)

wcss = [ ]
for i in range(1, 11):
    km = KMeans(n_clusters = i, random_state = 10)
    km.fit(X)
    wcss.append(km.inertia_)

plt.plot(range(1, 11), wcss)
plt.title('The Elbow Method', fontsize = 12)
plt.xlabel('No. of Clusters')
plt.ylabel('wcss')
plt.show()

```

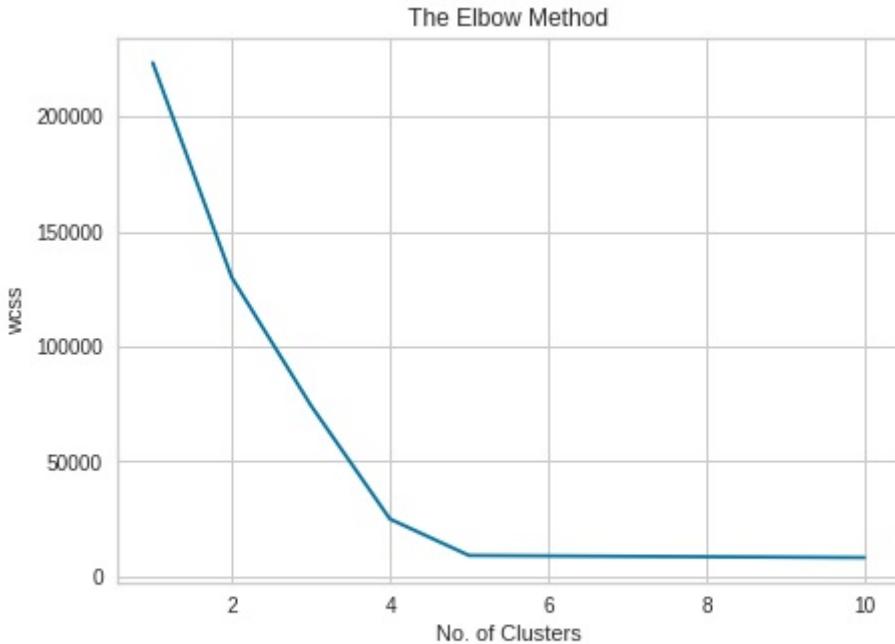


Figure 2: Elbow chart

### Options :

6406531186287. ✘ 2

6406531186288. ✘ 4

6406531186289. ✓ 5

6406531186290. ✘ 6

6406531186291. ✘ 10

<b>Sub-Section Number :</b>	5
<b>Sub-Section Id :</b>	64065351988

**Question Shuffling Allowed :**

Yes

**Question Number : 266 Question Id : 640653357903 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

Calculate the coefficient of determination ( $R^2$ ) [up to 1 decimal point] based on the following block of code.

```
from sklearn.metrics import r2_score
y_true = [2, 5, 2, 7]
y_pred = [3, 9, 2, 8]
print(r2_score(y_true, y_pred))
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

-0.05 to 0.05

**Question Number : 267 Question Id : 640653357924 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

In the given block of code, the Iris dataset having shape (150,4) has been loaded for model training. What do you think will be the output of the code given below?

```
from sklearn.datasets import load_iris
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
X,y = load_iris(as_frame = True, return_X_y = True)

X_train,X_test,y_train,y_test = train_test_split(X,
                                                y,
                                                test_size=0.2,
                                                random_state=1)

clf = DecisionTreeClassifier(max_features=2,
                             max_depth = 6,
                             min_samples_split = 2,
                             min_samples_leaf = 3,
                             random_state = 81 )

clf.fit(X_train, y_train)
print(clf.n_features_in_)
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Question Number :** 268 **Question Id :** 640653357927 **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

Code snippet written below plots a graph for some dataset X as shown below.

```

import scipy.cluster.hierarchy as shc
plt.figure(figsize=(5, 7))
plt.title("Dendograms")
dend = shc.dendrogram(shc.linkage(X, method='ward'))

```

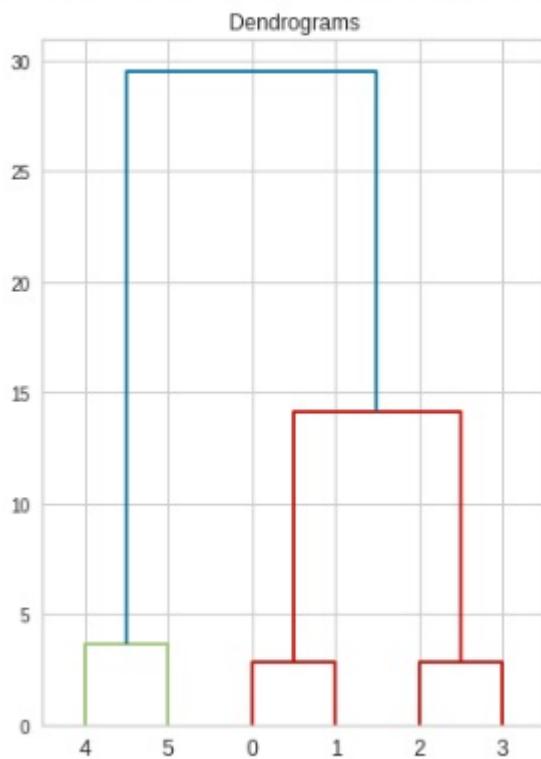


Figure 3: Elbow chart

In the given dendrogram which sample is most similar to the sample having label as 1 ?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0

**Sub-Section Number :** 6

**Sub-Section Id :** 64065351989

**Question Shuffling Allowed :** No

**Question Id :** 640653357915 **Question Type :** COMPREHENSION **Sub Question Shuffling**

**Allowed :** No **Group Comprehension Questions :** No **Calculator :** None **Response Time :** N.A

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

## Question Numbers : (269 to 270)

Question Label : Comprehension

Go through the code snippet given below and answer the subquestions.

```
X = [[0,1],[3,4], [4,5],[1,2],[2,3], [5,6]]  
y = [0, 1, 1,0,0,1]  
from sklearn.neighbors import RadiusNeighborsClassifier  
neigh = RadiusNeighborsClassifier(radius=1.0, P=1)  
neigh.fit(X, y)  
print(neigh.predict([[2.8,3.8]]))
```

### Sub questions

**Question Number : 269 Question Id : 640653357916 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

Which of the following is likely to be the correct output of the given code ?

**Options :**

6406531186258. ✘ [2]

6406531186259. ✘ [0]

6406531186260. ✓ [1]

6406531186261. ✘ [3]

**Question Number : 270 Question Id : 640653357917 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following distance metrics is used in the given code.

**Options :**

6406531186262. ✓ Euclidean\_distance

6406531186263. ✘ Manhattan\_distance

6406531186264. ✘ Hamming Distance

6406531186265. ✘ None of these

**Question Id : 640653357929 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (271 to 272)**

Question Label : Comprehension

Consider the following code snippet:

```
from sklearn.datasets import fetch_california_housing
from sklearn.neural_network import MLPRegressor

X,y = fetch_california_housing(as_frame = True,
                                return_X_y = True)
rs = MLPRegressor(activation='logistic',
                  hidden_layer_sizes=(12,15,13,11,12,8),
                  random_state=12)
rs.fit(X, y)
```

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 271 Question Id : 640653357930 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

What will be the output of the following code?

```
print(rs.n_layers_)
```

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

8

**Question Number : 272 Question Id : 640653357931 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

What will be the output of the following code?

```
print(rs.coefs_[5].shape)
```

**Options :**

6406531186302. ✘ (5, 12)

6406531186303. ✘ (6, 11)

6406531186304. ✘ (8, 15)

6406531186305. ✓ (12, 8)

**Sub-Section Number :** 7

**Sub-Section Id :** 64065351990

**Question Shuffling Allowed :** No

**Question Id : 640653357919 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (273 to 274)**

Question Label : Comprehension

Go through the code snippet given below and answer the subquestions.

```
import numpy as np
from sklearn.pipeline import make_pipeline
from sklearn.preprocessing import StandardScaler
X = np.array([[-8, -3], [3, 3], [5, 3], [-4, -3],])
y = np.array([-3, 3, 3, -3])
from sklearn.svm import SVC
clf = SVC(gamma='auto', kernel="linear")
clf.fit(X, y)
print(clf.predict([-4, -3]))
```

### Sub questions

**Question Number : 273 Question Id : 640653357920 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

Which of the following is likely to be the correct output of the given code ?

**Options :**

6406531186270. ✘ [3]

6406531186271. ✘ [-1]

6406531186272. ✘ [1]

6406531186273. ✓ [-3]

**Question Number : 274 Question Id : 640653357921 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

Which of the following is likely to be the correct output:

```
print(clf.support_vectors_)
```

**Options :**

6406531186274. ✘ array([[-8., -3.], [ 3., 3.]])

6406531186275. ✓ array([[-4., -3.], [ 3., 3.]])

6406531186276. ✘ array([[-4., -3.], [ 5., 3.]])

6406531186277. ✘ array([[-8., -3.], [ 5., 3.]])

**Sub-Section Number :** 8

**Sub-Section Id :** 64065351991

**Question Shuffling Allowed :** Yes

**Question Number : 275 Question Id : 640653357932 Question Type : MSQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Select Question

Which of the following is/are true about the following block of the code?

```
from sklearn.neural_network import MLPClassifier
X = [[0., 0.], [1., 1.], [2., 3.], [5., 4.]]
y = [0, 0, 1, 1]
rs = MLPClassifier(solver='adam',
                    alpha=0.0001,
                    batch_size="auto",
                    hidden_layer_sizes=(8,12),
                    random_state=12)
rs.fit(X,y)
rs.score(X,y)
```

**Options :**

6406531186306. ✓ Given dataset belongs to binary classification.

6406531186307. ✓ Number of neurons in the 1<sup>st</sup> hidden layer is 8.

6406531186308. ✘ Strength of the L1 regularization term is 0.0001

6406531186309. ✓ The activation function for the output layer in the given code is the '*logistic*' function.

**Sub-Section Number :** 9

**Sub-Section Id :** 64065351992

**Question Shuffling Allowed :** Yes

**Question Number : 276 Question Id : 640653357933 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 5**

Question Label : Multiple Select Question

Which of the following code blocks will throw an error ?

**Options :**

```
from sklearn.svm import SVC
from sklearn.ensemble import BaggingClassifier
from sklearn.model_selection import GridSearchCV
from sklearn.datasets import make_classification
X, y = make_classification(n_samples=100,
                           n_features=22,
                           n_informative=2,
                           n_redundant=0,
                           random_state=0,
                           shuffle=False)
param_grid = [{}'n_estimators':range(10,50,12)}]
clf = BaggingClassifier(base_estimator=SVC(),
                        n_estimators=10,
                        random_state=0)
est= GridSearchCV(clf,
                  param_grid,
                  cv = 5,
                  return_train_score=True)
est.fit(X, y)
6406531186310. ✘ est.best_score_
```

6406531186311. ✓

```
from sklearn.svm import SVC
from sklearn.ensemble import BaggingClassifier
from sklearn.model_selection import GridSearchCV
from sklearn.datasets import make_classification
X, y = make_classification(n_samples=100,
                           n_features=22,
                           n_informative=2,
                           n_redundant=0,
                           random_state=0,
                           shuffle=False)
param_grid = [{n_estimators:range(10,50,12)}]
clf = BaggingClassifier(base_estimator=SVC(),
                        n_estimators=10, random_state=0)
est= GridSearchCV(clf, param_grid, cv = 1,return_train_score=True)
est.fit(X, y)
est.cv_results_
```

```
from sklearn.svm import SVC
from sklearn.ensemble import BaggingClassifier
from sklearn.model_selection import GridSearchCV
from sklearn.datasets import make_classification
X, y = make_classification(n_samples=100,
                           n_features=22,
                           n_informative=2,
                           n_redundant=0,
                           random_state=0,
                           shuffle=False)
param_grid = [{n_estimators:range(10,50,12)}]
clf = BaggingClassifier(base_estimator=SVC(),
                        n_estimators=10,
                        random_state=0)
est= GridSearchCV(clf,
                  param_grid,
                  return_train_score=True)
est.fit(X, y)
est.score()
6406531186312. ✓
```

6406531186313. ✘ None of these

<b>Section Id :</b>	64065322367
<b>Section Number :</b>	11
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	33
<b>Number of Questions to be attempted :</b>	33
<b>Section Marks :</b>	100
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065351993
<b>Question Shuffling Allowed :</b>	No

**Question Number : 277 Question Id : 640653357935 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: MACHINE LEARNING TECHNIQUES"**

**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 :**

6406531186318. ✓ Yes

6406531186319. ✗ No

**Question Number : 278 Question Id : 640653357936 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

**Note:**

Do not write your answer as percentage. Always enter fractions as they are. e.g. if your answer is 0.245, enter the same, do not enter 24.5 %.

**Options :**

6406531186320. ✓ Useful Data has been mentioned above.

6406531186321. ✗ This data attachment is just for a reference & not for an evaluation.

**Sub-Section Number :** 2

**Sub-Section Id :** 64065351994

**Question Shuffling Allowed :** Yes

**Question Number : 279 Question Id : 640653357947 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

During classification of linearly separable data-set using perceptron algorithm, as the value of learning rate  $\alpha$  is increased,

**Options :**

6406531186352. ✗ The number of steps required for convergence increases.

6406531186353. ✗ The number of steps required for convergence decreases.

6406531186354. ✓ The number of steps required for convergence is independent of the learning rate.

6406531186355. ✗ The perceptron algorithm may not converge.

**Question Number : 280 Question Id : 640653357951 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

A knn algorithm with  $k = 10$  gives low training error and high validation error. What value of  $k$  should we choose to get the better performance of the algorithm?

**Options :**

6406531186363. ❌ Less than 10

6406531186364. ✓ Greater than 10

**Question Number : 281 Question Id : 640653357957 Question Type : MCQ Is Question**

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

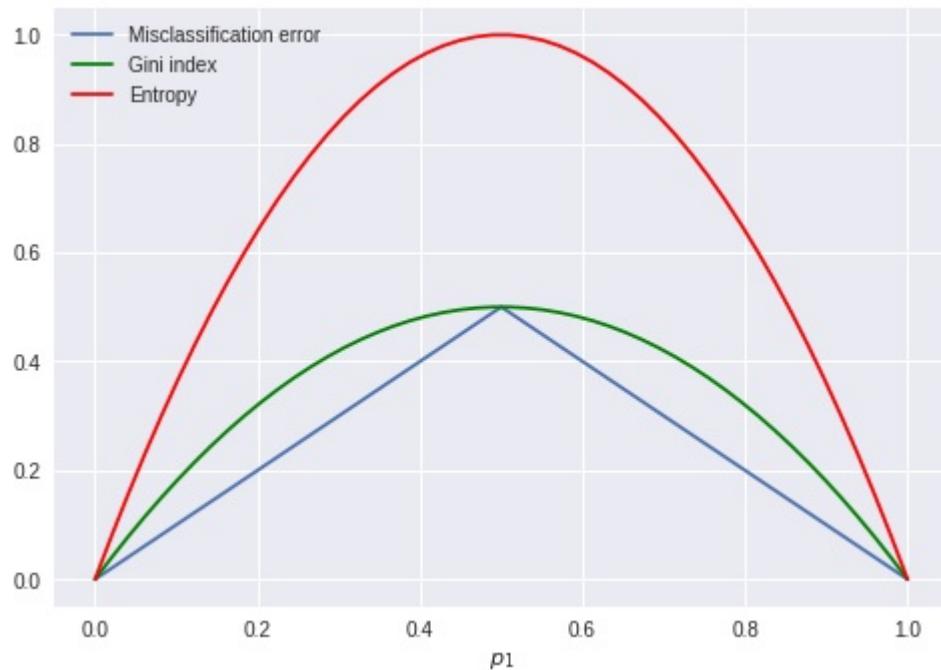
**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

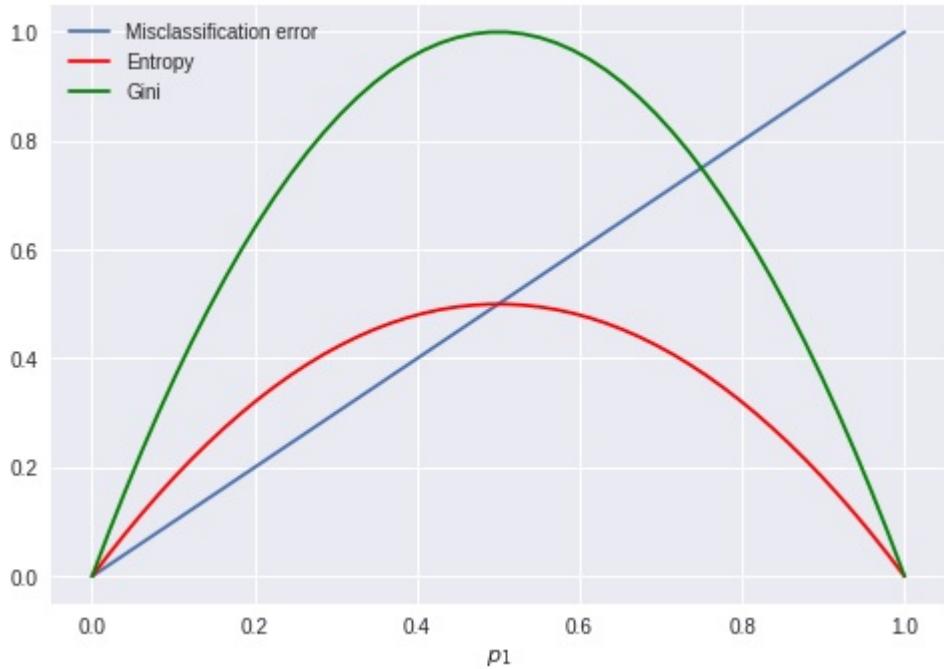
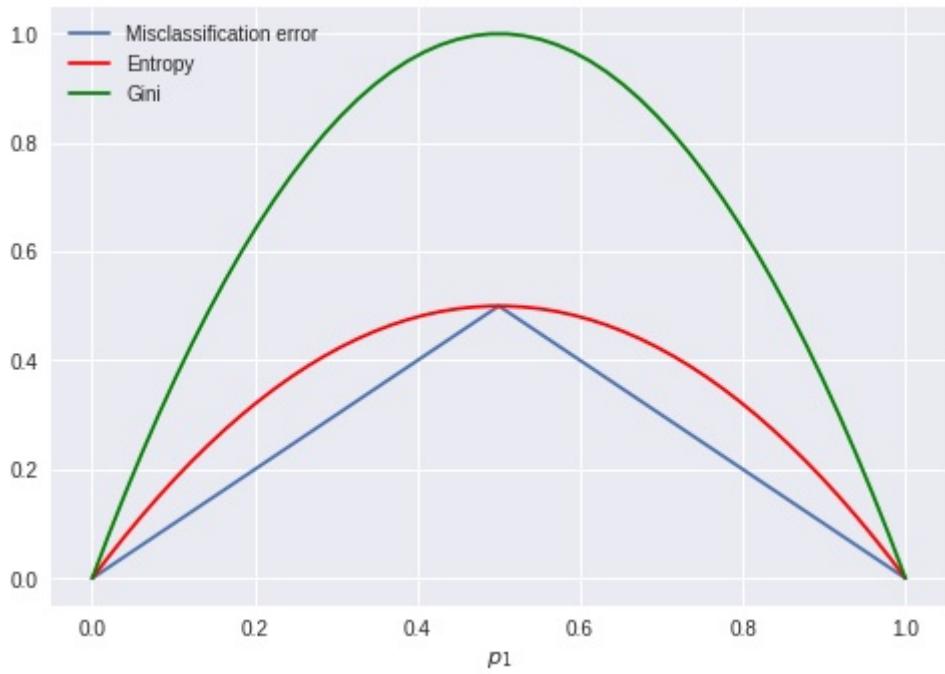
Consider a binary classification problem. Let  $p_1$  denote the proportion of class 0 examples in a particular node. Which of the following graphs shows correct curves for the Gini-index, Entropy and misclassification error of that node?

**Options :**



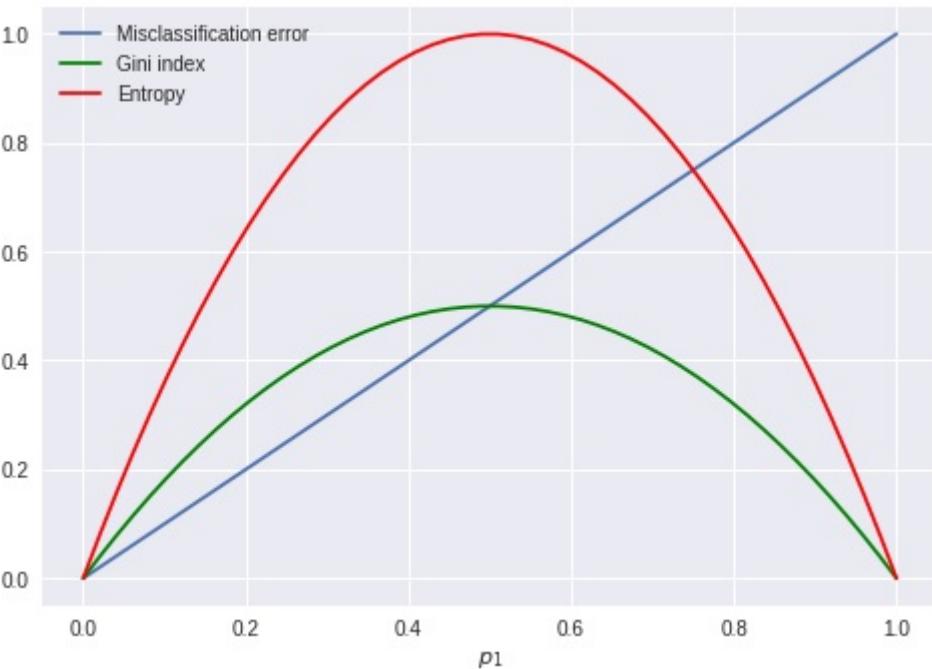
6406531186369. ✓

6406531186370. ❌



6406531186371. ✎

6406531186372. ✎



**Question Number : 282 Question Id : 640653357968 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The following is the activation vector output by some hidden layer in a neural network when some input vector is given to it:

$$\begin{bmatrix} -0.2 \\ 0.8 \\ -0.9 \\ 0.1 \\ 0 \\ -0.3 \end{bmatrix}$$

Which of the following could be the activation function used in this layer?

**Options :**

6406531186395. ✘ Softmax

6406531186396. ✘ Sigmoid

6406531186397. ✘ ReLU

6406531186398. ✓ Tanh

**Sub-Section Number :**

3

**Sub-Section Id :**

64065351995

**Question Shuffling Allowed :**

Yes

**Question Number : 283 Question Id : 640653357937 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following are multi label problems? For each option, assume suitable features are available.

**Options :**

- 6406531186322. ❌ Predicted number of runs the Indian Cricket team will score in their next ODI.
- 6406531186323. ✓ Amount of money that Amitabh Bachchan's next three movies each will make.
- 6406531186324. ✓ Predicting number of goals Ronaldo will score in next 10 matches each.
- 6406531186325. ❌ Predicting blood group of a person.
- 6406531186326. ✓ Predicting blood sugar level of a person for next 15 days each.

**Question Number : 284 Question Id : 640653357961 Question Type : MSQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Select Question

In a random forest model let  $p < m$  be the number of randomly selected features that are used to identify the best split at any node of a tree. Which of the following are true? ( $m$  is the original number of features)

**Options :**

- 6406531186375. ❌ Increasing  $p$  reduces the correlation between any two trees in the forest.
- 6406531186376. ✓ Decreasing  $p$  reduces the correlation between any two trees in the forest.
- 6406531186377. ✓ Increasing  $p$  increases the performance of individual trees in the forest.
- 6406531186378. ❌ Decreasing  $p$  increases the performance of individual trees in the forest.

**Sub-Section Number :**

4

**Sub-Section Id :**

64065351996

**Question Shuffling Allowed :**

Yes

**Question Number : 285 Question Id : 640653357940 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

**Question Label : Short Answer Question**

Consider feature matrix  $X = \begin{bmatrix} 1 & 2 \\ 2 & 1 \\ 2 & 3 \end{bmatrix}$ , label vector  $y = \begin{bmatrix} 4 \\ 5 \\ 2 \end{bmatrix}$  and the weight

vector is  $w = \begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}$ . Add a dummy feature to  $X$ .

What will be the value of the loss function if a regression model without regularization is fitted?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

20.5 to 21.5

**Question Number : 286 Question Id : 640653357971 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

**Question Label : Short Answer Question**

Consider a test-dataset of 100 points for a binary classification problem, where 60 belong to the positive class (true label) and the rest belong to the negative class (true label). The following is a table for some classifier that has been prepared by an ML engineer:

	Predicted label (+)	Predicted label (-)
True label (+)	40	20
True label (-)	10	30

If this is a valid confusion matrix (just by looking at the numbers), enter the classifier's precision as the answer. If this is not a valid confusion matrix, enter 0 as the answer. Your answer should be in the interval [0, 1], endpoints inclusive. Enter your answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.79 to 0.81

**Sub-Section Number :** 5

**Sub-Section Id :** 64065351997

**Question Shuffling Allowed :** Yes

**Question Number :** 287 **Question Id :** 640653357944 **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 a modified loss function for linear regression that is of the following form for a training dataset that has  $n$  points:

$$L(\mathbf{w}) = \frac{1}{2} \sum_{i=1}^n r_i (\mathbf{w}^T \mathbf{x}_i - y_i)^2$$

Here,  $r_i$  is some constant in  $[0, 1]$  associated with each data-point in the training dataset. The dummy feature and the corresponding weight are already included in the vectors  $\mathbf{x}$  and  $\mathbf{w}$  respectively. What is the expression of the gradient of  $L(\mathbf{w})$  with respect to  $\mathbf{w}$ ?

**Options :**

6406531186346. ✓  $\sum_{i=1}^n r_i (\mathbf{w}^T \mathbf{x}_i - y_i) \mathbf{x}_i$

6406531186347. ✘  $\sum_{i=1}^n r_i (\mathbf{w}^T \mathbf{x}_i - y_i)$

6406531186348. ✘  $\sum_{i=1}^n (\mathbf{w}^T \mathbf{x}_i - y_i) \mathbf{x}_i$

6406531186349. ✘  $\sum_{i=1}^n r_i (\mathbf{w}^T \mathbf{x}_i - y_i)^2 \mathbf{x}_i$

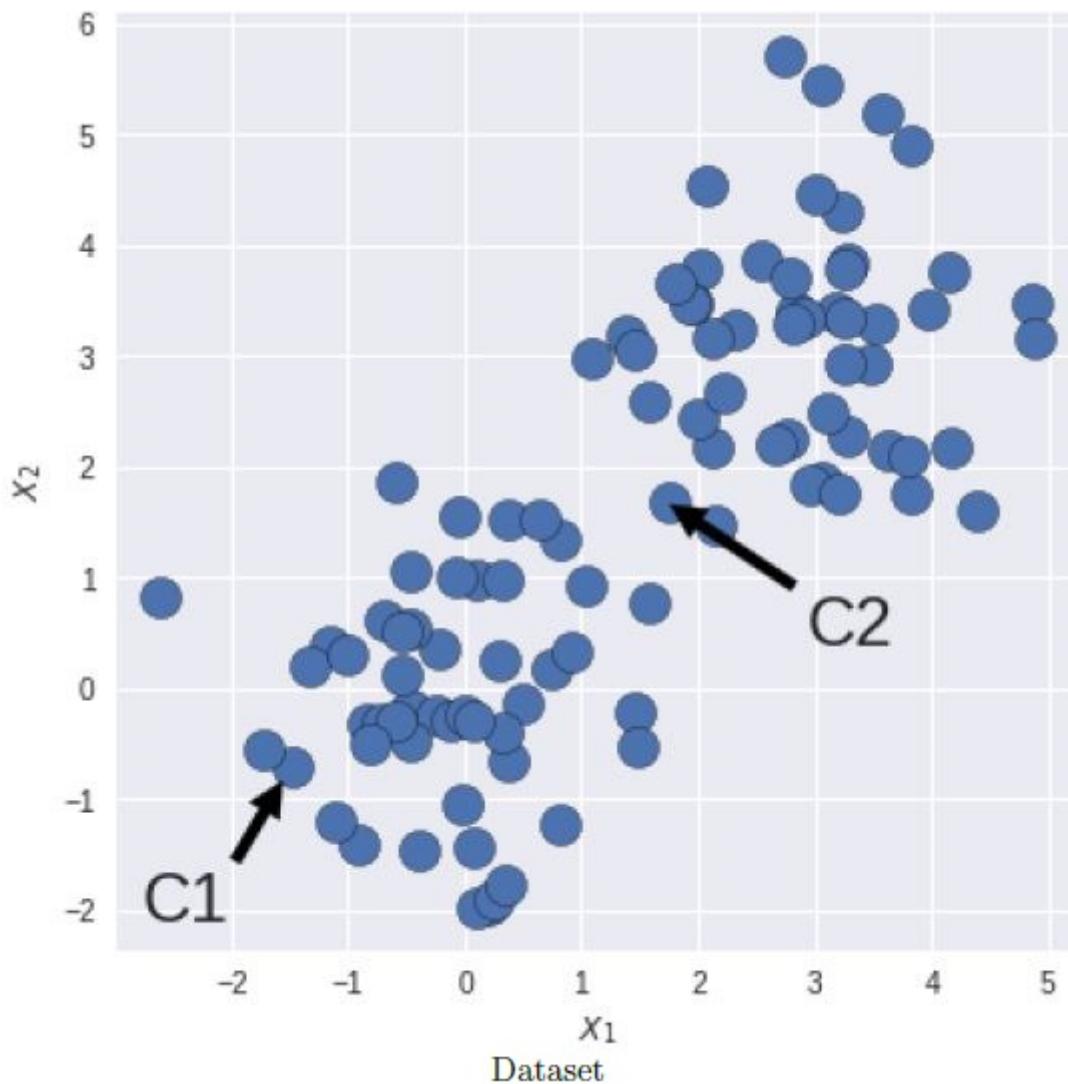
**Question Number : 288 Question Id : 640653357962 Question Type : MCQ Is Question**

**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 unlabeled data with two features  $X_1$  and  $X_2$  as shown in the figure.



$C_1$  and  $C_2$  are the coordinates of centroids obtained after certain iterations of the  $K$ -means algorithm with  $K = 2$ . Which of the following options is correct about the silhouette score  $S$ ? Note: Euclidean distance is used to calculate the distances.

**Options :**

- 6406531186379. ❌  $S$  will be positive and close to 0.
- 6406531186380. ❌  $S$  will be positive and close to 1.
- 6406531186381. ❌  $S$  will be exact -1.
- 6406531186382. ✓  $S$  will be negative but need not be exact -1.

**Question Number : 289 Question Id : 640653357965 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 a neural network for a multi-class, image classification problem. When the network is trained on the images as they are, it does a good job on the test data. Call the dataset (train + test) for this setup  $D_1$  and the network  $N_1$ . Assume that we now turn all images upside down, in both the training and test dataset. Now, the network with the same architecture is trained from scratch on this modified dataset. Call the dataset (train + test) for this setup  $D_2$  and network  $N_2$ . Select the most appropriate option.

**Options :**

6406531186387. ❌ The network  $N_2$  will not be able to learn anything from  $D_2$ . Its test accuracy on  $D_2$  will be very low.

6406531186388. ✓ The network  $N_2$  will be able to learn useful patterns from  $D_2$ . In fact, the performance of network  $N_2$  on  $D_2$  will be similar to  $N_1$  on  $D_1$ .

6406531186389. ❌ The network  $N_2$  will be able to learn somewhat useful patterns from  $D_2$ . But the performance of  $N_1$  on  $D_1$  will be much better than  $N_2$  on  $D_2$ .

**Question Number : 290 Question Id : 640653357970 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

Two classifiers are trained on a dataset for a binary classification problem. They are then tested on the same dataset. The  $F_1$  scores of both classifiers are the same.  $(p_1, r_1)$  and  $(p_2, r_2)$  are the precision-recall scores for the two classifiers.

Consider the following statements:

**Statement-1**

If  $p_1 > p_2$ , then  $r_1 < r_2$

**Statement-2**

If  $p_1 = p_2$ , then  $r_1 = r_2$

Select the most appropriate option.

**Options :**

6406531186400. ❌ Statement-1 is correct, statement-2 is incorrect

6406531186401. ❌ Statement-1 is incorrect, statement-2 is correct

6406531186402. ✓ Both statements 1 & 2 are correct

6406531186403. ❌ Both statements 1 & 2 are incorrect

**Sub-Section Number :** 6

**Sub-Section Id :** 64065351998

**Question Shuffling Allowed :** Yes

**Question Number : 291 Question Id : 640653357938 Question Type : MSQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Select Question

Which of the following code blocks will produce the same value for the variable 'Ans'? Assume the 'numpy' library is imported as 'np'.

**Options :**

A = np.arange(6)  
B = 5 - A

6406531186327. ✓ Ans = B + A - 3

A = np.ones((3,2)).astype('int')  
B = A.reshape(-1)

6406531186328. ✓ Ans = B \* 2

A = np.random.rand(2,3)  
B = A.astype('int').reshape(-1)

6406531186329. ✓ Ans = B + 2

A = np.linspace(10, 60, 6)  
B = (A.astype('int') - 10)//10

6406531186330. ❌ Ans = B + 2

6406531186331. ❌ All the code blocks produce unique results.

6406531186332. ✘ All the code blocks produce same results.

**Question Number : 292 Question Id : 640653357939 Question Type : MSQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Select Question

Rajesh trained a model on house price prediction problem. After training he came up with following model:

$$y = 4000 - 20 \cdot x_1 + 1500 \cdot x_2 - 15 \cdot x_3 + 3 \cdot x_4$$

where,

$y$  is predicted house price,

$x_1$  is age of the house in years,

$x_2$  is the area of house/apartment in square feet,

$x_3$  is the number of floors the house/building is,

$x_4$  represents if the house is facing the sea or not.

According to Rajesh's model, which of the following statements are correct?

**Options :**

6406531186333. ✘ The most important factor in determining the price of the house is if it is sea facing or not.

6406531186334. ✘ No. of floors in the building is the most important feature.

6406531186335. ✓ Carpet area is the most important feature.

6406531186336. ✘ Age is the most important feature.

6406531186337. ✓ Age is the second most important feature.

6406531186338. ✘ None of these.

**Question Number : 293 Question Id : 640653357942 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Select Question

Consider that you have 100 non-linear data points randomly generated from a  $\sin(2\pi x)$  function  $0 \leq x \leq 2$ . Choose the correct statement(s) from the following.

**Options :**

6406531186341. ✓ The polynomial regression model of degree 5 adds a smooth fitting to this data.

6406531186342. ✓ The polynomial regression model of degree 99 overfits this data.

6406531186343. ✗ The polynomial regression model of degree 1 adds a smooth fitting to this data.

6406531186344. ✓ The polynomial regression model of degree 2 underfits this data.

**Sub-Section Number :** 7

**Sub-Section Id :** 64065351999

**Question Shuffling Allowed :** Yes

**Question Number : 294 Question Id : 640653357941 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

What is the output of the following code?

```
import numpy as np

def aFunction(A, d):
    temp = np.ones(1)

    for i in range(1, d + 1):
        temp = np.concatenate((temp, A ** i))

    return temp
```

```
A = np.arange(3)
print(np.sum(aFunction(A, 3)))
```

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

18.0

**Question Number : 295 Question Id : 640653357943 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 feature matrix  $\mathbf{X} = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 4 \end{bmatrix}$  and corresponding label vector

$\mathbf{y} = \begin{bmatrix} 2 \\ 4 \end{bmatrix}$ . Let regularization rate,  $\lambda = 0.1$ . Compute ridge regression loss using weight

$$\mathbf{w} = \begin{bmatrix} 1 \\ 0.01 \\ -0.2 \\ 0.3 \end{bmatrix}.$$

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

2.48 to 2.58

**Question Number : 296 Question Id : 640653357945 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

You are given a linearly separable dataset with feature matrix  $\mathbf{X}$ , for which a perceptron has been

trained until it converges (perfectly separates the data). The weight vector corresponding to it is  $\mathbf{w}$ . This dataset has 70 points from the positive class and 30 from the negative class. What is the output of the following snippet of code?

#### Notes

- The labels for a perceptron lie in  $\{-1, 1\}$ .
- The NumPy arrays  $\mathbf{X}$  and  $\mathbf{w}$  are compatible for matrix multiplication, the dummy feature and the corresponding weight are already built into the arrays.
- None of the 100 points lie on the decision boundary.

```
import numpy as np  
y_hat = np.where(X @ w > 0, 1, -1)  
print(np.sum(y_hat))
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

40

**Question Number :** 297 **Question Id :** 640653357950 **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

A Gaussian Naive Bayes model is trained for a multi-class classification problem that has 10 features and 3 classes. Find the total number of parameters that have to be estimated for this model. Consider each parameter to be a scalar value. In other words, if we decide to store all the parameters in a Python list, with each element of the list being a float value corresponding to a single parameter, what is the size of this list? Ignore the priors in the calculation. Only focus on the parameters of the class conditional densities.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

60

**Question Number :** 298 **Question Id :** 640653357964 **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 following network architecture:

Layer	Number of Neurons
Input	10
Hidden layer-1	20
Hidden layer-2	30
Output layer	3

How many parameters (weights + biases) does this network have?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

943

**Question Number :** 299 **Question Id :** 640653357969 **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

The MNIST digit classification problem has 10 classes. The training dataset has  $n$  data points, with an equal number of points from each of the 10 classes. Consider a dummy classifier that does prediction as follows: for each input data-point, it picks one of the 10 classes at random (uniformly) and outputs that as its prediction. What is the accuracy of the model on the training dataset as  $n$

becomes very large? Your answer should be between 0 and 1. Enter your answer correct to two decimal places.

**Hint:** Think about it in the probabilistic sense.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.09 to 0.11

**Sub-Section Number :** 8

**Sub-Section Id :** 64065352000

**Question Shuffling Allowed :** Yes

**Question Number :** 300 **Question Id :** 640653357949 **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 logistic regression model for a binary classification problem with

two features  $x_1$  and  $x_2$ . The feature vector is  $\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$  and labels lie in  $\{0, 1\}$ . The threshold for inference is 0.5. The dummy feature and the weight corresponding to it can be ignored for this problem. Let  $x_1$  be the horizontal axis and  $x_2$  be the vertical axis. You are given two feature vectors:

$$\mathbf{x}_1 = \begin{bmatrix} 1 \\ \sqrt{3} \end{bmatrix}, \mathbf{x}_2 = \begin{bmatrix} -1 \\ \sqrt{3} \end{bmatrix}$$

The weight vector makes an angle of  $\theta$  with the positive  $x_1$  axis (horizontal). Each  $\theta$  corresponds to a different classifier. For what range of values of  $\theta$  are both  $\mathbf{x}_1$  and  $\mathbf{x}_2$  predicted to belong to class-1?

Hints:

- To draw the weight vector  $\mathbf{w} = \begin{bmatrix} w_1 \\ w_2 \end{bmatrix}$ , plot the point  $(w_1, w_2)$  and draw an arrow starting at the origin to this point.
- $\tan(60^\circ) = \sqrt{3}$

**Options :**

6406531186357. ✓  $30^\circ < \theta < 150^\circ$

6406531186358. ✗  $0^\circ < \theta < 60^\circ$

6406531186359. ✗  $60^\circ < \theta < 180^\circ$

6406531186360. ✗  $0^\circ < \theta < 180^\circ$

6406531186361. ✗  $0^\circ < \theta < 360^\circ$

**Question Number : 301 Question Id : 640653357963 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 data points

(1,1)
(1,2)
(5,4)
(2.4,3)
(2.6, 3)

We perform k-means clustering on the above data, with  $k = 2$ , using Manhattan distance as the distance measure. At  $t$ th iteration, we have (1,1) as the centroid for cluster-1 and (5,4) as the centroid for cluster-2. After performing  $(t + 1)$ th iteration the point (2.4,3) will belong to

**Options :**

6406531186383. ✘ cluster-1

6406531186384. ✓ cluster-2

6406531186385. ✘ can not be determined

**Sub-Section Number :** 9

**Sub-Section Id :** 64065352001

**Question Shuffling Allowed :** Yes

**Question Number : 302 Question Id : 640653357966 Question Type : MSQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Select Question

If  $W_{ij}$  is the weight of the edge from neuron  $i$  in layer  $l - 1$  to neuron  $j$  in layer  $l$ , which of the following statements about the matrix  $\mathbf{W}$  are true? Neurons in a layer are processed (indexed) from top to bottom. So, the first neuron in a layer is the top-most neuron in that layer.

**Options :**

6406531186390. ✓ The first row of the matrix corresponds to all outgoing connections from the first neuron in layer  $l - 1$ .

6406531186391. ✘ The first row of the matrix corresponds to all incoming connections to the first neuron in layer  $l$ .

6406531186392. ✓ The last column of the matrix corresponds to all incoming connections to the last neuron in layer  $l$ .

6406531186393. ✘ The last column of the matrix corresponds to all the outgoing connections

from the last neuron in layer  $l - 1$ .

**Sub-Section Number :** 10

**Sub-Section Id :** 64065352002

**Question Shuffling Allowed :** Yes

**Question Number :** 303 **Question Id :** 640653357946 **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 perceptron model is trained on the following binary classification data-set.

$X_1$	$X_2$	Label ( $y$ )
0	0	-1
0	1	-1
1	0	-1
1	1	1

At one of the iterations, weights are:  $w_0 = -0.5$ ,  $w_1 = 0.9$  and  $w_2 = 0.9$ . Assume that  $w'_0$ ,  $w'_1$  and  $w'_2$  are the updated weights after one epoch (one epoch is completed on going through all the data points). Find the value of  $w'_0 + w'_1 + w'_2$ . Consider the learning rate to be one. Don't change the order of samples while updating the weight vector. Take the original order of samples.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3.3

**Question Number :** 304 **Question Id :** 640653357948 **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

Inference using logistic regression happens as follows.  $T$  is called the threshold and is some real number in the interval  $(0, 1)$ .  $\hat{y}$  stands for the predicted label.

$$\hat{y} = \begin{cases} 1, & P(y = 1 | \mathbf{x}) \geq T \\ 0, & \text{otherwise} \end{cases}$$

Given this setup, the equation of the decision boundary is given below:

$$\mathbf{w}^T \mathbf{x} - u = 0$$

$\mathbf{w}$  has the same dimensions as  $\mathbf{x}$ . The dummy feature is included in  $\mathbf{x}$  and the corresponding weight is included in  $\mathbf{w}$ . If  $T = \frac{e}{1+e}$ , what is the value of the unknown quantity  $u$ ? Here,  $e$  is Euler's number that is associated with the natural logarithm and is the same one found on your calculator. Enter the closest integer as your answer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Question Number :** 305 **Question Id :** 640653357952 **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

An SVM has been trained for a 2D problem. The feature vector is  $\mathbf{x} = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$

It has the following weight vector and bias:

$$\mathbf{w} = \begin{bmatrix} 2 \\ 1 \end{bmatrix}, b = -1$$

Recall that the labels in the SVM setup are +1 and -1. Consider a unit square whose vertices are at:

$$(0,0), (1,0), (0,1), (1,1)$$

The horizontal axis corresponds to  $x_1$  and the vertical axis corresponds to  $x_2$ . A point is picked at random (uniformly) from the region bounded by the square. What is the probability that this point is predicted as belonging to class +1 by the SVM? Enter your answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.74 to 0.76

**Question Number :** 306 **Question Id :** 640653357953 **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

Find the hinge loss for this soft-margin SVM classifier on the dataset that is given in the table. The weight vector and bias are as follows:

$$\mathbf{w} = \begin{bmatrix} 1 \\ -1 \end{bmatrix}, \quad b = 1$$

The coefficient  $C$  can be assumed to be 1.

$x_1$	$x_2$	$y$
1	4	-1
-1	2	-1
0	0	-1
1	2	-1
1	3	1
1	0	1
2	1	1
2	3	1

Note that you just need to report the hinge loss. Do not compute margin loss which involves only the term  $w$ . Also, note that the hinge loss does not have a factor of 0.5 before it. Enter the closest integer as your answer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

6

**Question Number :** 307 **Question Id :** 640653357967 **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 two networks  $N_1$  and  $N_2$  for a binary classification task.  $N_1$  has two neurons at the output layer and uses the softmax activation function.  $N_2$  has one neuron at the output layer and uses sigmoid activation function. We don't need the information about the hidden layers for this problem.

For some test data-point  $x$ , the pre-activations at the output layer for  $N_1$  is given below. The first neuron corresponds to class-0 and the second corresponds to class-1:

$$\mathbf{z} = \begin{bmatrix} 1 \\ 4 \end{bmatrix}$$

It turns out that for this data-point, both networks predict the same probability of this point belonging to class-1. That is  $P(y = 1 | x)$  is the same for both networks. If this is the case, what should be the pre-activation value at the output layer of  $N_2$ , call it  $z$ , corresponding to this data-point? Enter the closest integer as your answer.

Notes

- The activation of  $N_2$  at the output-layer is interpreted as  $P(y = 1 | x)$ .
- The  $\mathbf{z}$  for  $N_1$  is a vector and the  $z$  for  $N_2$  is a scalar.
- Be careful about the distinction between pre-activation and activation.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3

**Sub-Section Number :** 11

**Sub-Section Id :** 64065352003

**Question Shuffling Allowed :** No

**Question Id :** 640653357954 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Calculator :** None **Response Time :** N.A

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

**Question Numbers :** (308 to 309)

**Question Label :** Comprehension

Consider the following training data-set with three features:

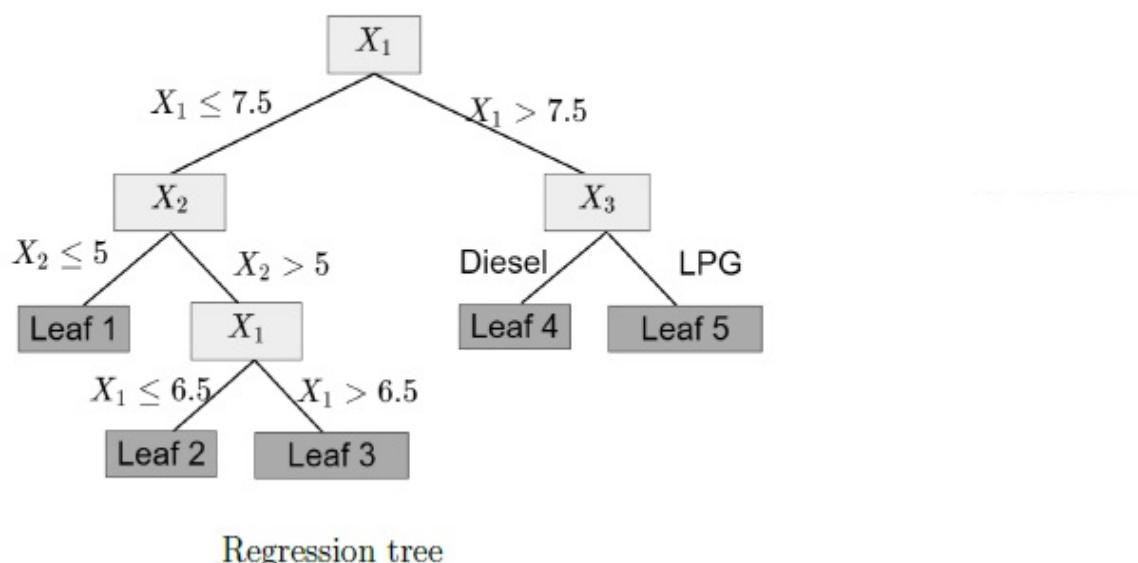
$X_1$  = Present price of the car (values are given in lac)

$X_2$  = Age (How many years the car has been driven)

$X_3$  = Fuel-type (diesel or LPG)

$X_1$	$X_2$	$X_3$	Selling price ( $y$ )
7.7	5	Diesel	4.5
6.5	6	Diesel	2.0
11.2	5	LPG	7.0
8.4	3	Diesel	6.0
5.0	4	LPG	2.5
7.5	3	LPG	4.5
10.0	5	LPG	6.5
18.0	5	Diesel	12.0
12.1	8	Diesel	6.0
7.5	6	Diesel	3.0

Its regression tree is given below. In the tree, each node is denoted by the feature along which it is split.



Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 308 Question Id : 640653357955 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

How many samples of the training data-set belong to Leaf 1?

**Response Type : Numeric**

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number :** 309 **Question Id :** 640653357956 **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

If the present price of a car which is driven for 7 years is 6.0 lac. If the car has a diesel engine, what will be the prediction for the selling price of the car according to the given regression tree? Enter your answer in lac. If your answer is 5.6 lac, enter the answer 5.6.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2.0

**Sub-Section Number :** 12

**Sub-Section Id :** 64065352004

**Question Shuffling Allowed :** No

**Question Id :** 640653357958 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Calculator :** None **Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Question Numbers :** (310 to 311)

Question Label : Comprehension

Consider that the AdaBoost model is trained on the following binary classification dataset.

$X_1$	$X_2$	Label ( $y$ )
2	5	true
2.5	6	false
3	5	true
4	3	false
4	4	false

The data-set is split according to the feature  $X_1$  to create the first stump. Equal sample weights are assigned to each example to create the first stump and the Gini-index measure is used to split the data.

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 310 Question Id : 640653357959 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

What will be the performance of the first stump? Enter your answer correct to two decimal places.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.67 to 0.72

**Question Number : 311 Question Id : 640653357960 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

What sample weight will be assigned to the first example to create the next stump? Don't

normalize the sample weights. Write your answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.08 to 0.12

## PDSA

<b>Section Id :</b>	64065322368
<b>Section Number :</b>	12
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	31
<b>Number of Questions to be attempted :</b>	31
<b>Section Marks :</b>	100
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065352005
<b>Question Shuffling Allowed :</b>	No

**Question Number :** 312 **Question Id :** 640653357972 **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"

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 :**

6406531186405. ✓ Yes

6406531186406. ✗ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065352006

**Question Shuffling Allowed :** Yes

**Question Number : 313 Question Id : 640653357973 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

Here is a function to return the maximum value in a list of integers. There is a logical error in this function.

```
1 def maxbad(L):
2     mymax = 0
3     for i in range(len(L)):
4         if L[i] > mymax:
5             mymax = L[i]
6     return(mymax)
```

Select the input list for which `maxbad` produces incorrect output.

### **Options :**

6406531186407. ✗ [-1, 3, 4, -2]

6406531186408. ✗ [-1, 0, 1, 2]

6406531186409. ✓ [-1,-2,-3,-4]

6406531186410. ✗ [4, 3, 2, 1]

**Question Number : 314 Question Id : 640653357974 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 list having  $2^k$  items has to be processed using either of two given algorithms. Algorithm A takes  $8n \log n$  time units and algorithm B takes  $0.02n^2$  time units to process a list of  $n$  items. What is the smallest value of  $k$  for which algorithm A would be preferred?

**Options :**

6406531186411. ✗ 11

6406531186412. ✗ 12

6406531186413. ✓ 13

6406531186414. ✗ Algorithm A would always be preferred irrespective of  $k$

**Question Number : 315 Question Id : 640653357975 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 iterative code:

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

What would be the running time complexity of the above given function?

**Options :**

6406531186415. ✘  $O(\log n)$

6406531186416. ✘  $O(n \log n)$

6406531186417. ✓  $O(\sqrt{n})$

6406531186418. ✘  $O(n^2)$

**Question Number : 316 Question Id : 640653357976 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

What is the time complexity of the following recurrence relation?

$$T(1) = 1$$

$$\text{For } n > 1, T(n) = 2T(n/4) + n^2$$

**Options :**

6406531186419. ✓  $O(n^2)$

6406531186420. ✘  $O(n^3)$

6406531186421. ✘  $O(n^2 \log_4 n)$

6406531186422. ✘  $O(n^3 \log_4 n)$

**Question Number : 317 Question Id : 640653357977 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 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?

1. Insertion sort is stable and it sorts in-place
2. The complexity of Insertion sort is  $O(n^2)$  in the best case.
3. In Insertion sort, after  $m$  iterations of the for-loop, the first  $m$  elements in the list are in sorted order

**Options :**

6406531186423. ✘ Only statement 1 is true

6406531186424. ✘ Statement 1 and Statement 2 are true

6406531186425. ✓ Statement 1 and Statement 3 are true

6406531186426. ✘ All statements are true

**Question Number : 318 Question Id : 640653357978 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**

Assuming that the median of  $n$  elements can be found in  $O(\log n)$  time. What would be the complexity of quick sort, if the median item is always selected as the pivot?

**Options :**

6406531186427. ✘  $O(\log n)$

6406531186428. ✘  $O(n \log \log n)$

6406531186429. ✓  $O(n \log n)$

6406531186430. ✘  $O(n)$

**Question Number : 319 Question Id : 640653357982 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  $G$  be a undirected connected graph. Let  $T_d$  be a depth-first search tree of  $G$ . Let  $T_b$  be a breadth-first search tree of  $G$ . Consider the following statements.

1. No edge of  $G$  is a cross edge with respect to  $T_d$
2. For every edge  $(u, v)$  of  $G$ , if  $u$  is at depth  $i$  and  $v$  is at depth  $j$  in  $T_b$ , Then  $|i - j| = 1$ .

Which of the above statement(s) must necessarily be **true**?

**Options :**

6406531186437. ✓ 1 only

6406531186438. ✘ 2 only

6406531186439. ✘ Both 1 and 2

6406531186440. ✘ Neither 1 nor 2

**Question Number : 320 Question Id : 640653357983 Question Type : MCQ Is Question**

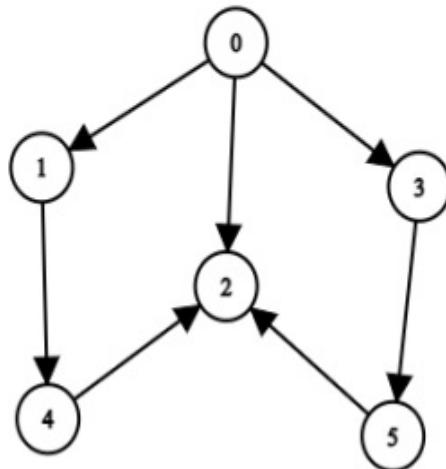
**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following directed graph. Run DFS on this graph from vertex 0. Which of the following is a cross edge.

Note:- In the case of multiple neighbours, the algorithms first pick the node which has the **smallest** labelled value.



**Options :**

6406531186441. ✘ (0, 1)

6406531186442. ✘ (0, 3)

6406531186443. ✓ (5, 2)

6406531186444. ✘ (0, 2)

6406531186445. ✘ (3, 5)

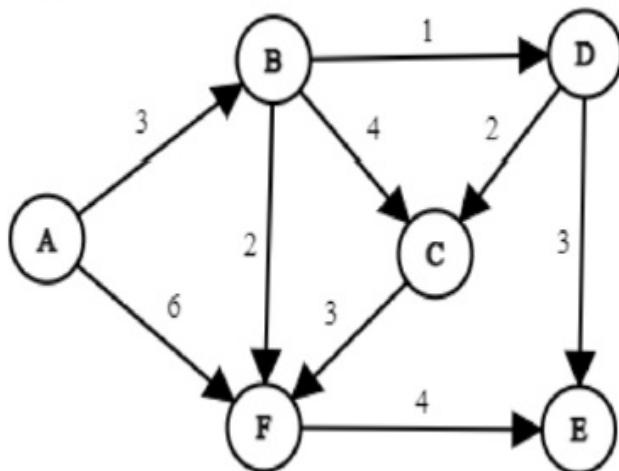
**Question Number : 321 Question Id : 640653357986 Question Type : MCQ Is Question**

**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 directed weighted graph on which the Dijkstra algorithm is run with vertex A as the source vertex.



What is the order of nodes in which the nodes are marked as visited by Dijkstra's algorithm?

**Options :**

6406531186448. ✘ A, B, D, F, E, C

6406531186449. ✘ A, B, D, E, F, C

6406531186450. ✘ A, B, C, D, E, F

6406531186451. ✓ A, B, D, F, C, E

**Question Number : 322 Question Id : 640653357987 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  $G = (V, E)$  is an undirected graph having distinct positive edge weights. Let  $V$  be partitioned into two non-empty sets  $X$  and  $Y$ . Let  $e = (s, t)$  be the minimum cost edge, with  $s$  belonging to  $X$  and  $t$  belonging to  $Y$ . Which one of the following is true?

**Options :**

6406531186452. ✘ Graph  $G$  has multiple MCSTs, every MCST must include edge  $e$

6406531186453. ✘ Graph  $G$  has multiple MCSTs, every MCST must exclude edge  $e$

6406531186454. ✓ Graph  $G$  has only one MCST, which must include edge  $e$

6406531186455. ✘ Graph G has only one MCST, which must exclude edge e

**Question Number : 323 Question Id : 640653357988 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

The maximum and the minimum number of nodes possible in a binary search tree of height 6 are \_\_\_\_\_. Consider that the height of the empty tree is 0.

**Options :**

6406531186456. ✓ 63 and 6, respectively

6406531186457. ✘ 64 and 5, respectively

6406531186458. ✘ 31 and 6, respectively

6406531186459. ✘ 32 and 5, respectively

**Question Number : 324 Question Id : 640653357989 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 a complete binary tree with  $n$  nodes, where the left and right subtrees of the root are max heaps. The upper bound to convert the tree to a max heap by an efficient algorithm is \_\_\_\_.

**Options :**

6406531186460. ✓  $O(\log n)$

6406531186461. ✘  $O(n)$

6406531186462. ✘  $O(n \log n)$

6406531186463. ✘  $O(n^2)$

**Question Number : 325 Question Id : 640653357990 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 a binary min-heap made up of {1, 2, 3, 4, ..., 512}. Assume that each number occurs exactly once in the heap. The depth of a node in the heap is equal to the number of edges to that node from the root node. Thus, the root is at depth 0. What is the maximum possible depth of the node number 6?

**Options :**

6406531186464. ✘ 8

6406531186465. ✘ 7

6406531186466. ✘ 6

6406531186467. ✓ 5

**Question Number : 326 Question Id : 640653357992 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 a text file which has probability of occurrence of seven different characters as follows:

0.076, 0.064, 0.030, 0.169, 0.246, 0.2, 0.215. If Huffman coding is used to compress this file, then what will be the average code length of a character?

**Options :**

6406531186472. ✘ 3.223

6406531186473. ✓ 2.603

6406531186474. ✘ 1.651

6406531186475. ✘ 1.341

**Question Number : 327 Question Id : 640653357994 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

There are 5 sorted arrays of sizes 10, 25, 30, 45, and 15. If the `merge` algorithm is used to optimally combine all of these sorted arrays together into one sorted sequence, then what is the total number of comparisons needed by the `optimal merge` algorithm in the worst case?

*Note: the `merge` algorithm would merge the arrays pairwise, i.e. it would only merge two arrays into a single larger one*

**Options :**

6406531186477. ✘ 186

6406531186478. ✘ 341

6406531186479. ✘ 321

6406531186480. ✓ 271

**Question Number : 328 Question Id : 640653357995 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

In a list `L`, two elements `L[i]` and `L[j]` form a inversion if `L[i] > L[j]` and `i < j`. Which of the following options represents the inversions in the list `L = [1,5,4,2,6,3]` ?

**Options :**

6406531186481. ✘ (5,4), (5,2), (5,3), (2,1), (4,3), (6,3)

6406531186482. ✓ (5,4), (5,2), (4,2), (5,3), (4,3), (6,3)

6406531186483. ✘ (5,4), (5,3), (2,1), (4,2), (5,2), (6,3)

6406531186484. ✘ (5,1), (5,2), (5,3), (4,2), (3,2), (6,3)

**Question Number : 329 Question Id : 640653357999 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

Which of the following option represents the fail function (or prefix function) for pattern 'abcaabca' in the Knuth-Morris-Pratt (KMP) algorithm?

**Options :**

6406531186488. ❌ [1,1,1,1,1,2,3,4]

6406531186489. ❌ [0,0,0,1,2,2,3,4]

6406531186490. ✓ [0,0,0,1,1,2,3,4]

6406531186491. ❌ [0,0,0,1,1,2,3,1]

**Question Number : 330 Question Id : 640653358002 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 and select the appropriate option regarding them

1. Checking algorithm for the Boolean satisfiability problem is intractable.
2. Given a problem  $\alpha$  which is reduced in polynomial time from another problem  $\beta$ . If  $\alpha$  is solvable in polynomial time, then  $\beta$  is also solvable within polynomial time.

**Options :**

6406531186498. ❌ Only statement 1 is correct

6406531186499. ✓ Only statement 2 is correct

6406531186500. ❌ Both the statements are correct

6406531186501. ❌ Both the statements are wrong

**Sub-Section Number :**

3

**Sub-Section Id :**

64065352007

**Question Shuffling Allowed :**

Yes

**Question Number : 331 Question Id : 640653357991 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Select Question

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

**Options :**

While inserting a new element in a max heap of  $n$  elements, a binary search is performed on the path from the new node to the root to find the correct position of the new node. The number 6406531186468. ✘ of comparisons performed in this process is  $O(\log^2 n)$

Given a binary search tree and a min-heap with the same constituent items, the min-heap is 6406531186469. ✘ more efficient for printing the items in ascending order.

When we implement Prim's algorithm using min-heap, the time complexity is improved to 6406531186470. ✓  $O((m + n) \log n)$ .

When we implement Dijkstra's algorithm using min-heap, the time complexity is improved 6406531186471. ✓ to  $O((m + n) \log n)$ .

**Question Number : 332 Question Id : 640653358000 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Select Question

Consider the following problem statement.

There are 15 saree printing machines in a printing press company. Each machine produces 500 sarees and consumes electricity worth Rs 15000 every month. A machine can be overloaded to print more sarees, but it should not be loaded more than 10% of its usual production capacity. Also, when the machine is overloaded, it consumes 20% more electricity. Demand of saree for the  $i^{th}$  month is represented with variables  $d_i | 1 \leq i \leq 12$ . In order to balance demand and production to optimize profit, the company can switch off a machine for a month, but during that month a maintenance charge of Rs 60 is required for that machine. Similarly, in order to switch on a machine that was switched off previously, a startup cost of Rs 40 is required for that machine. The press might produce surplus sarees, the cost to store these surplus sarees is Rs 30 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 :**

6406531186492. ✗  $s_i = 500m_i + g_i$

6406531186493. ✓  $m_i = m_{i-1} + n_i - x_i$

6406531186494. ✗  $g_i = s_i - d_i$

6406531186495. ✓  $m_i \leq 15$

6406531186496. ✓  $o_i \leq 50m_i$

**Sub-Section Number :** 4

**Sub-Section Id :** 64065352008

**Question Shuffling Allowed :** Yes

**Question Number : 333 Question Id : 640653357979 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 implementation for Queue.

```
1 class Queue:  
2     def __init__(self):  
3         self.queue = []  
4     def enqueue(self,v):  
5         self.queue.append(v)  
6     def isempty(self):  
7         return(self.queue == [])  
8     def dequeue(self):  
9         v = None  
10        if not self.isempty():  
11            v = self.queue[0]  
12            self.queue = self.queue[1:]  
13        return(v)
```

```
1 def fun(q):  
2     if (not q.isempty()):  
3         i = q.dequeue()  
4         fun(q)  
5         q.enqueue(i)
```

Assuming that the initial state of the queue `q` was `[12, 24, 20, 40, 6, 12, 8, 16]` , what is `q.queue[3]` after `fun(q)` is executed?

**Options :**

6406531186431. ✘ 40

6406531186432. ✓ 6

6406531186433. ✘ 12

6406531186434. ✘ 16

**Sub-Section Number :**

5

**Sub-Section Id :**

64065352009

**Question Shuffling Allowed :**

Yes

**Question Number : 334 Question Id : 640653357980 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 hash table of size 8 (index 0 to 7) uses open addressing with hash function  $h(k) = k \bmod 8$ , and linear probing. The following elements are added into the hash table, which was initially empty.

25, 11, 84, 26, 46 and 50

The key value 50 is stored at which index of the hash table?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

5

**Question Number : 335 Question Id : 640653357981 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 **directed graph**  $G$  with 55 edges with the least number of vertices possible. What will be 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 :**

8

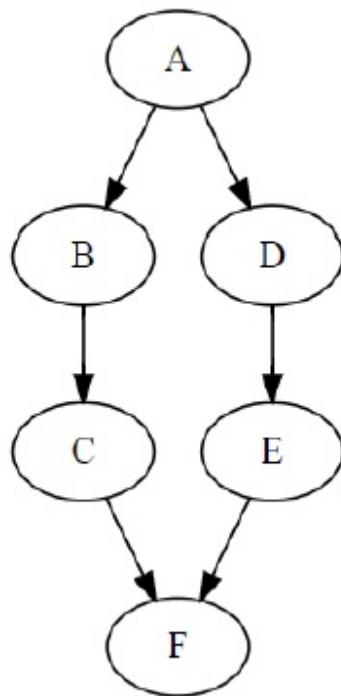
**Question Number : 336 Question Id : 640653357984 Question Type : SA Calculator : None**

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

**Correct Marks : 4**

Question Label : Short Answer Question

Consider the following directed graph.



The number of different topological orderings of the vertices of the graph is \_\_\_\_\_

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

6

**Question Number :** 337 **Question Id :** 640653357985 **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 adjacency matrix `AMat` of an undirected graph with 5 vertices.

$$AMat = \begin{pmatrix} 0 & 1 & 8 & 1 & 4 \\ 1 & 0 & 12 & 10 & 9 \\ 8 & 12 & 0 & 7 & 3 \\ 1 & 10 & 7 & 0 & 2 \\ 4 & 9 & 3 & 2 & 0 \end{pmatrix}$$

What is the cost of the minimum spanning tree for the given adjacency matrix of a graph?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

7

**Question Number :** 338 **Question Id :** 640653357993 **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

What will be the minimum number of nodes in an AVL tree of height 7? Consider that the height of the empty tree is 0.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

33

**Question Number :** 339 **Question Id :** 640653357996 **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  $A_1, A_2, A_3, A_4$  be 4 matrices with dimensions  $(10 \times 5), (5 \times 20), (20 \times 10), (10 \times 15)$  respectively. What is the minimum number of scalar multiplications required to find the product  $A_1 \times A_2 \times A_3 \times A_4$ ?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2500

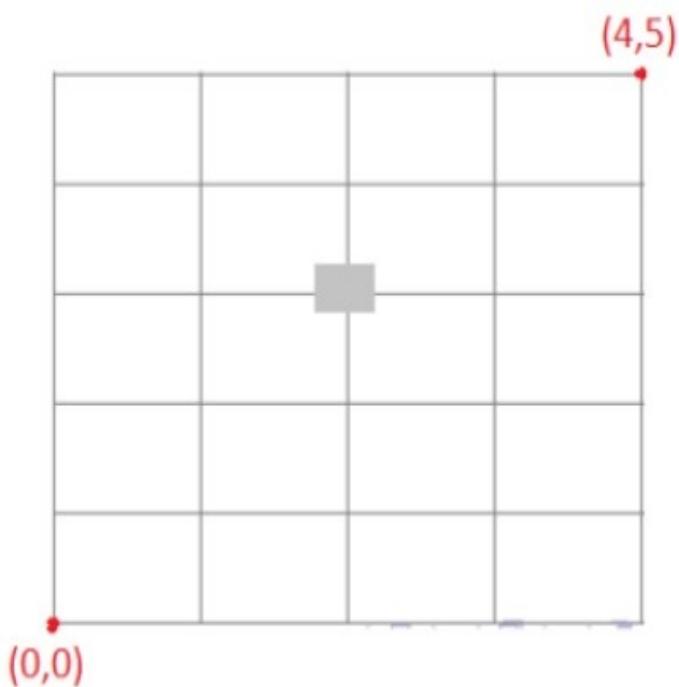
**Question Number :** 340 **Question Id :** 640653357997 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 4

Question Label : Short Answer Question

Consider the following grid.



How many unique paths are available from  $(0,0)$  to  $(4,5)$ ? The condition is that you can only travel one step right or one step up at a time, and the gray box at intersection points  $(2,3)$  represents a blockage.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

66

**Question Number :** 341 **Question Id :** 640653357998 **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 3141592653589363 ?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

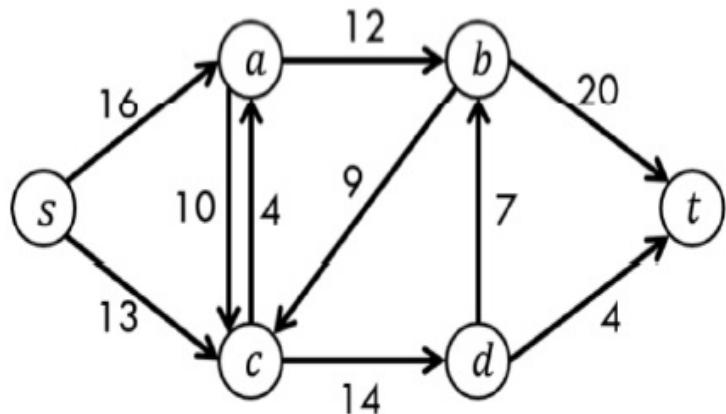
**Question Number :** 342 **Question Id :** 640653358001 **Question Type :** SA **Calculator :** None

**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

## System Commands

<b>Section Id :</b>	64065322369
<b>Section Number :</b>	13
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	21
<b>Number of Questions to be attempted :</b>	21
<b>Section Marks :</b>	100
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and</b>	Yes

**Clear Response :**

**Maximum Instruction Time :** 0  
**Sub-Section Number :** 1  
**Sub-Section Id :** 64065352010  
**Question Shuffling Allowed :** No

**Question Number : 343 Question Id : 640653358003 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: SYSTEM COMMANDS"**

**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 :**

6406531186502. ✓ Yes

6406531186503. ✘ No

**Sub-Section Number :** 2  
**Sub-Section Id :** 64065352011  
**Question Shuffling Allowed :** Yes

**Question Number : 344 Question Id : 640653358010 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

`sed -i '/^$/d' myfile # -i is used for inplace editing in the actual file`

Select the correct statement for the above command with respect to input file `myfile`.

**Options :**

6406531186530. ✘ All lines having the character sequence ^ followed by \$ will be deleted.

6406531186531. ✘ All the lines having the first character as \$ will be deleted.

6406531186532. ✓ All empty lines (no characters in the line) will be deleted

6406531186533. ✘ All lines having only spaces will be deleted.

**Question Number : 345 Question Id : 640653358017 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 that you have checked out a `version1` branch of a git repository on your local machine. You have modified a file named `getStudents.sh` and added a new file named `utilities.sh`. You have also run the `git add` command for the file `utilities.sh`, but not on the modified file `getStudents.sh`.

What could be the correct output if you executed the command `git status` in this state locally on your repository.

**Options :**

```
$ git status
On branch version1
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    modified:   getStudents.sh
    new file:   utilities.sh
```

6406531186560. ✘

```
$ git status
On branch version1
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    new file:   utilities.sh
```

Untracked files:

(use "git add <file>..." to include in what will be committed)

6406531186561. ✘ modified: getStudents.sh

6406531186562. ✓

```
$ git status
On branch version1
Changes to be committed:
(use "git restore --staged <file>..." to unstage)
  new file:  utilities.sh

Changes not staged for commit:
(use "git add <file>..." to include in what will be committed)
  modified: getStudents.sh

$ git status
On branch master
Changes to be committed:
(use "git restore --staged <file>..." to unstage)
  modified: getStudents.sh

Untracked files:
  (use "git add <file>..." to include in what will be committed)
6406531186563. ✘      new file: utilities.sh
```

**Question Number : 346 Question Id : 640653358020 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 is the command to save and exit a file in vim and Emacs respectively?

**Options :**

6406531186570. ✘ Vim: :q! Emacs: ctrl-x Ctrl-c

6406531186571. ✓ Vim: :wq Emacs: ctrl-x Ctrl-c

6406531186572. ✘ Vim: :w! Emacs: ctrl-z

6406531186573. ✘ Vim: :wq Emacs: ctrl-k Ctrl-z

**Sub-Section Number :**

3

**Sub-Section Id :**

64065352012

**Question Shuffling Allowed :**

Yes

**Question Number : 347 Question Id : 640653358004 Question Type : MSQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Select Question

Consider that the current working directory is `/home/varun/Documents`. Select all the commands that will make the root directory `/`, the current working directory.

Note that `/home/varun` is the home directory of the current user who is running these commands.

**Options :**

6406531186504. ✗ `cd; cd ..; cd .;`

6406531186505. ✓ `cd ..; cd ..; cd ..; cd ..;`

6406531186506. ✓ `cd /`

6406531186507. ✓ `cd~; cd ..; cd ..;`

6406531186508. ✗ `cd .; cd .; cd .;`

6406531186509. ✗ `cd ~/;`

**Question Number : 348 Question Id : 640653358015 Question Type : MSQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Select Question

Which of the following bash commands can be used to get the IP address of the machine?

Assume that your machine is part of a Local area network.

**Options :**

6406531186551. ✓ ifconfig -a

6406531186552. ✓ ip add

6406531186553. ✘ give ip

6406531186554. ✘ hostname -I

**Question Number : 349 Question Id : 640653358022 Question Type : MSQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Select Question

Which of the following bash commands can be used to extract the system's processor architecture from the output of `uname -a`?

For example output of `uname -a` on some machine is shown below.

```
$ uname -a
Linux d7812b86c532 5.15.0-1013-gcp #18-20.04.1-Ubuntu SMP Sun Jul 3 08:20:07 UTC 2022
x86_64 GNU/Linux
```

After running the correct command from below the output should be something like.

x86\_64

**Options :**

6406531186578. ✘ uname -a | grep '^.\* '

6406531186579. ✓ uname -a | cut -d" " -f12

6406531186580. ✘ uname -a | grep '^.\* ' | cut -d" " -f11

6406531186581. ✘ uname -a | cut -f12

**Sub-Section Number :** 4

**Sub-Section Id :** 64065352013

**Question Shuffling Allowed :** Yes

**Question Number : 350 Question Id : 640653358008 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

**Question Label : Multiple Choice Question**

`awk 'NR != FNR {print;}' file1 file2 file3`

What will the above awk command do?

Note: `NR` and `FNR` is the number of current record being processed overall(including all the input files) and in the current file respectively.

**Options :**

6406531186522. ✘ Prints the lines in file2 that are not present in file1

6406531186523. ✘ Prints the lines in file1 that are not present in file2

6406531186524. ✘ Prints the lines in file1

6406531186525. ✓ Prints the lines in file2 and file3

**Question Number : 351 Question Id : 640653358012 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

**Question Label : Multiple Choice Question**

Consider a file named `myfile`. We want to merge every two consecutive lines starting from line 1 with a delimiter as `:` between the lines. Suppose the contents of `myfile` are given below.

```
name
Divya
location
New Delhi
occupation
Teacher
education-status
Master of Education
```

Select the command that will merge the lines as described above, and prints to the terminal. The expected output on running the command for the above input should be.

```
name:Divya
location:New Delhi
occupation:Teacher
education-status:Master of Education
```

#### Options :

```
awk '
NR % 2 == 1 {printf "%s:", $0}
NR % 2 == 0 {print}
6406531186539. ✓ ' myfile
```

```
awk '
NR % 2 == 0 {printf "%s:", $0}
NR % 2 == 1 {print}
6406531186540. ✘ ' myfile
```

```
awk '
NR % 2 == 1 {
    printf "%s:", $0
    if (NR % 2 == 0) {
        print
    }
}
6406531186541. ✘ ' myfile
```

```
6406531186542. ✘
```

```

awk '
{
    if (NR % 2 == 1) {
        print
    } else {
        printf "%s:", $0
    }
}
' myfile

```

**Question Number : 352 Question Id : 640653358021 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

**Question Label : Multiple Choice Question**

Which of the following command will run the script /user/home/daily/sunday/run.sh every Sunday at 5:00 PM.

**Hint:** Below is the description of the sequence in the cron job command. It tells at what date/time periodically the job needs to be executed.

*	*	*	*	*	<Command(s) with argument>
					Command or Script to Execute
					Day of the Week(0-6)
					Month of the Year(1-12)
					Day of the Month(1-31)
					Hour(0-23)
					Min(0-59)

**Options :**

6406531186574. \* 0 17 \* 0 \* /user/home/daily/sunday/run.sh

6406531186575. ✘ 0 5 \* 0 \* /user/home/daily/sunday/run.sh

6406531186576. ✓ 0 17 \* \* 0 /user/home/daily/sunday/run.sh

6406531186577. ✘ 0 5 \* \* 0 /user/home/daily/sunday/run.sh

**Sub-Section Number :** 5

**Sub-Section Id :** 64065352014

**Question Shuffling Allowed :** Yes

**Question Number : 353 Question Id : 640653358005 Question Type : MSQ Is Question**

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

**Correct Marks : 5**

**Question Label : Multiple Select Question**

Consider a file myfile located at /home/linda/myfile. The following commands are executed sequentially.

```
$ ln -s /home/linda/myfile /home/meena/myfile  
$ ln -s /home/meena/myfile /home/abdul/myfile  
$ ln -s /home/abdul/myfile /home/arun/myfile  
$ ln -s /home/arun/myfile /home/sanjay/myfile
```

Assuming that all the directories in /home have read and execute permissions for all the users. Select the command running which individually will make the link /home/sanjay/myfile a broken link.

**Options :**

6406531186510. ✓ rm /home/linda/myfile

6406531186511. ✓ rm /home/meena/myfile

6406531186512. ✓ mv /home/abdul/myfile /home/abdul/myfile\_new

6406531186513. ✘ echo "LAST LINE" >>/home/arun/myfile

6406531186514. ✘ None of these.

**Question Number : 354 Question Id : 640653358006 Question Type : MSQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Select Question

Select all the files that are either a soft link or a hard link. If linked, these files are linked only with files in the current working directory.

```
$ ls -li
total 0
18748538 -rw-rw-r-- 3 user user 0 Jul 25 17:50 a
18748538 -rw-rw-r-- 3 user user 0 Jul 25 17:50 b
18748538 -rw-rw-r-- 3 user user 0 Jul 25 17:50 c
18748774 lrwxrwxrwx 1 user user 1 Jul 25 17:51 d -> c
18748823 -rw-rw-r-- 1 user user 0 Jul 25 17:51 e
18748824 -rw-rw-r-- 1 user user 0 Jul 25 17:51 f
```

**Options :**

6406531186515. ✓ a

6406531186516. ✓ b

6406531186517. ✓ c

6406531186518. ✓ d

6406531186519. ✗ e

6406531186520. ✗ f

**Question Number : 355 Question Id : 640653358014 Question Type : MSQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Select Question

Consider the below command and output in the current working directory.

```
$ ls -l
-rw-r--r-- 1 ind ind 325 Jul 22 15:39 script1.sh
-rwxr--r-- 1 ind ind 633 Jul 22 01:15 script2.sh
$
$ cat script1.sh
#!/bin/bash
echo "script1"
$
$cat script2.sh
#!/bin/bash
echo "script2"
```

After running the above commands which of the following commands will run successfully and return with exit code 0.

**Options :**

6406531186547. ✘ ./script1.sh

6406531186548. ✓ ./script2.sh

6406531186549. ✓ bash script1.sh

6406531186550. ✓ bash script2.sh

**Question Number : 356 Question Id : 640653358016 Question Type : MSQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Select Question

Which of the following commands will print all the file names that have execute permissions for the owner and contains at least a line with the exact text #confidential#. The exact text means nothing less or more on the line.

Description of grep options taken from its man page

```
-v, --invert-match
    Invert the sense of matching, to select non-matching
    lines.

-L, --files-without-match
    Suppress normal output; instead print the name of each
    input file from which no output would normally have been
    printed.

-l, --files-with-matches
    Suppress normal output; instead print the name of each
    input file from which output would normally have been
    printed. Scanning each input file stops upon first match.

-o, --only-matching
    Print only the matched (non-empty) parts of a matching
    line, with each such part on a separate output line.
```

### Options :

6406531186555. ✗ find ./ -type f -perm 444 -exec grep -l "#confidential#" {} \;

6406531186556. ✓ find ./ -type f -perm 744 -exec grep -l "#confidential#" {} \;

6406531186557. ✗ find ./ -type f -perm 444 -exec grep -l "#confidential#" {} \;

6406531186558. ✗ find ./ -type f -perm 765 -exec grep -l "#confidential#" {} \;

6406531186559. ✓ find ./ -type f -perm 765 -exec grep -l "#confidential#" {} \;

**Question Number : 357 Question Id : 640653358019 Question Type : MSQ Is Question**

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

**Correct Marks : 5**

### Question Label : Multiple Select Question

Analyse the location and other details of the script `mycommand` from the below command output.

```
$ ls -l~  
-rw-r--r-- 1 SC SC 4096 Jul 22 10:20 mycommand
```

You want to be able to execute this script just by typing `mycommand` on your shell from any working directory. Which of the following command are all necessary to be executed to do that.

#### Options :

6406531186565. ✓ `PATH=$PATH:~`

6406531186566. ✗ `mv ~/mycommand ~/mycommand.sh`

6406531186567. ✓ `chmod 744 ~/mycommand`

6406531186568. ✗ `mv ~/mycommand $PWD/`

6406531186569. ✗ `chown root ~/mycommand`

**Sub-Section Number :** 6

**Sub-Section Id :** 64065352015

**Question Shuffling Allowed :** Yes

**Question Number : 358 Question Id : 640653358007 Question Type : SA Calculator : None**

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

**Correct Marks : 5**

Question Label : Short Answer Question

The below examples show how the brace expansion work.

```
$ echo {a,b}{a,b}
aa ab ba bb
$ echo {a,b}{a,a} | sed 's/ /\n/g'
aa
aa
ba
ba
```

What will be the output of the below bash command? Enter only a number.

```
echo {a,b,c}{a,a,d} | sed 's/ /\n/g' | sort | uniq | wc -l
```

Hint: `sort` command sorts the values, `uniq` command outputs only distinct consecutive values.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

6

**Question Number : 359 Question Id : 640653358018 Question Type : SA Calculator : None**

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

**Correct Marks : 5**

Question Label : Short Answer Question

How many sleep processes are active at the end of execution of for loop?

Note: `kill %` will kill the last job

```
for i in {1..11}; do
    sleep 100 &
    (( $i % 2 )) || kill %
done
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

5

**Sub-Section Number :** 7

**Sub-Section Id :** 64065352016

**Question Shuffling Allowed :** Yes

**Question Number :** 360 **Question Id :** 640653358013 **Question Type :** MCQ **Is Question**

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

**Correct Marks :** 6

**Question Label :** Multiple Choice Question

Select the command that will print the lines containing a pattern that,

- should not have any spaces,
- should have at least three consecutive alphabets (upper or lower),
- should have at least two consecutive digits (0-9),
- should start with an alphabet,
- should end with a digit, and
- can have any character other than whitespace.

For example below are the contents of the input file `myfile`

```
iadsje2ex
e21me21E!@WE1
12dwaiuedj1
awjsiuc 09w 8a
funa9wepf
fweuan95f9
paowe
Haisfhewa12312810293
```

Running the required command should give the output as.

```
e21me21E!@WE1
Haisfhewa12312810293
```

Description of `grep` options taken from its man page

```
grep - print lines that match patterns
-e PATTERNS, --regexp=PATTERNS
    Use PATTERNs as the patterns. If this option is used
    multiple times or is combined with the -f (--file) option,
    search for all patterns given. This option can be used to
    protect a pattern beginning with "-".
-v, --invert-match
    Invert the sense of matching, to select non-matching
    lines.
```

## Options :

```
cat myfile |
egrep -v '[:space:]' |
egrep '^[:alpha:]*[:digit:]$' |
egrep '[:alpha:]{3,}' |
6406531186543. ✓ egrep '[:digit:]{2,}'
```

6406531186544. ❌

```

cat myfile |
egrep -v '[[space:]]' |
egrep -e '^[[alpha:]].*[[digit:]]$' \
-e '[[alpha:]]{3,}' \
-e '[[digit:]]{2,}'

cat myfile |
egrep -v '[[space:]]' |
6406531186545. ✘ egrep '^[[alpha:]][[alpha:]]{3,}.*[[digit:]]{2,}[[digit:]]$'

cat myfile |
6406531186546. ✘ egrep '^[[alpha:]][[alpha:]]{3,}[[:space:]]*[[digit:]]{2,}[[digit:]]$'

```

**Sub-Section Number :** 8

**Sub-Section Id :** 64065352017

**Question Shuffling Allowed :** Yes

**Question Number : 361 Question Id : 640653358009 Question Type : MSQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Select Question

Command 1:

```
sed 's/\(\.\.\.\)/\1/' input.txt
```

Command 2:

```
sed 's/(.\\)(.\\)(.\\)/\\1\\2\\3/' input.txt
```

Select all the correct options with respect to the two commands above.

Note: Consider that the system on which this command is run uses the Basic Regular Expression engine(BRE).

**Options :**

Command 1 and Command 2 will return the same output irrespective of the number of characters in the file input.txt.

6406531186526. ✓

Command 1 and Command 2 will return the same output irrespective of the number of lines in the file

6406531186527. ✓ input.txt

6406531186528. ❌ The output from Command 1 will have more characters than that in the file input.txt.

6406531186529. ✓ The output from Command 2 will be the same as the contents of the file input.txt.

**Question Number : 362 Question Id : 640653358011 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 6**

Question Label : Multiple Select Question

Consider a file named `myfile`. We want to merge every two consecutive lines starting from line 1 with a delimiter as `:` between the lines. Suppose the contents of `myfile` are given below.

```
name
Divya
location
New Delhi
occupation
Teacher
education-status
Master of Education
```

Select the command that will merge the lines as described above, and prints to the terminal. The expected output on running the command for the above input should be.

```
name:Divya
location:New Delhi
occupation:Teacher
education-status:Master of Education
```

From the `sed` manual,

#### COMMAND SYNOPSIS

...

Commands which accept address ranges

...

`n N` Read/append the next line of input into the pattern space.

...

`s/regexp/replacement/`

Attempt to match regexp against the pattern space. If successful, replace that portion matched with replacement. The replacement may contain the special character `&` to refer to that portion of the pattern space which matched, and the special escapes `\1` through `\9` to refer to the corresponding matching sub-expressions in the regexp.

...

Note: Assume that `myfile` contains even number of lines.

#### Options :

6406531186534. ✓ `sed 'N; s/\n/:/' myfile`

6406531186535. ✘ `sed 's/N/:/' myfile`

6406531186536. ✘ `sed 's/\n/:/' myfile`

6406531186537. ✓ sed '1~2 s/\$/:/' myfile | sed 'N;s/\n/ /'

6406531186538. ✘ sed 's/\n/:; N' myfile

**Sub-Section Number :** 9

**Sub-Section Id :** 64065352018

**Question Shuffling Allowed :** Yes

**Question Number : 363 Question Id : 640653358023 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 8**

**Question Label : Multiple Select Question**

Which of the following commands can be used to identify empty **files** immediately under the current working directory?

See the below examples as help for some command functions in the options.

```
$ cat input.txt
11
22
33
$ wc -l <input.txt
3
$ wc -c <input.txt
8
$ grep '.' input.txt
11
22
33
$ echo $?
0
$ cat file1
$ grep '.' file1
$ echo $?
1
$ wc -l <file1
0
```

find ./ -maxdepth 1 -type f lists only files directly under the current working directory.

## Options :

```
files=`find . -maxdepth 1 -type f`  
6406531186582. ✓ for file in $files; do if [ `wc -c <$file` -eq 0 ]; then echo $file; fi; done
```

```
files=`find . -maxdepth 1 -type f`  
6406531186583. ✘ for file in $files; do wc -l <$file || echo $file; done
```

```
files=`find . -maxdepth 1 -type f`  
6406531186584. ✘ for file in $files; do grep '.' $file >/dev/null && echo $file; done
```

```
files=`find . -maxdepth 1 -type f`  
for file in $files; do if [ `awk 'END{print NR}' $file` -eq 0 ]; then echo $file; fi;  
6406531186585. ✓ done
```

```
files=`find . -maxdepth 1 -type f`  
6406531186586. ✓ for file in $files; do grep '.' $file >/dev/null || echo $file; done
```

```
6406531186587. ✓ find ./ -maxdepth 1 -type f -size 0
```

## TDS

**Section Id :** 64065322370

**Section Number :** 14

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 46

**Number of Questions to be attempted :** 46

**Section Marks :** 46

**Display Number Panel :** Yes

**Group All Questions :** No

**Enable Mark as Answered Mark for Review and  
Clear Response :** Yes

<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065352019
<b>Question Shuffling Allowed :</b>	No

**Question Number : 364 Question Id : 640653358024 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: TOOLS IN DATA SCIENCE"**

**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 :**

6406531186588. ✓ Yes

6406531186589. ✗ No

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	64065352020
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 365 Question Id : 640653358025 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

The dataset consists of geographic, demographic information about countries and their respective GDPs. You would like to visualize this data and study the relationship between the location of countries and their GDPs. You decide to use Power BI to visualize the dataset. But you would also like to generate a summary of the data. Choose the most suitable answer among the given options.

**Options :**

6406531186590. ❌ The summary can be generated using Quill and this is possible because Quill can be used as an extension in Power BI.
6406531186591. ❌ Quill can only be used for visualization. Therefore a summary of the dataset cannot be generated.
6406531186592. ❌ Power BI does not support generation of summary. Therefore using other visualization tools such as Tableau would work.
6406531186593. ✓ None of the options are appropriate for the generation of summary for the given question.

**Question Number : 366 Question Id : 640653358026 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Your project requires you to study the districts and their respective health indicators. You have a shapefile with you that provides the required details. The objective of the project is to identify and carve out districts that present high levels of health indicators. Choose the most suitable answer among the given options.

**Options :**

6406531186594. ✓ QGIS can be used to create the shapefiles for districts with high levels of health indicators.
6406531186595. ❌ While QGIS can be used to create shapefiles for the requirement, it cannot be used to identify the districts with high levels of health indicators.
6406531186596. ❌ QGIS cannot be used to meet the objectives of the project.
6406531186597. ❌ None of the options are suitable to meet the objectives of the project.

**Question Number : 367 Question Id : 640653358027 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

What are the two outputs provided by the Excel Azure Machine Learning plugin?

**Options :**

6406531186598. ✘ Percentage, Score

6406531186599. ✘ Sentiment, Percentage

6406531186600. ✓ Sentiment, Score

6406531186601. ✘ Score, Labels

**Question Number : 368 Question Id : 640653358028 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Provided below is an incomplete code snippet that enables you to compute distance between two locations. Choose the most appropriate option that can be used in place of <missing line> to compute the distance. Assume the coordinates of location one is stored in the variable "location1" and the coordinates of location 2 is stored in the variable "location2".

**Code Snippet:**

```
distances_km = []

for row in df.itertuples(index=False):
    distances_km.append(
        <missing line>
    )
df['Distance'] = distances_km
df.head(10)
```

**Options :**

6406531186602. ✘ geopy.distance(location1, location2).km

6406531186603. ✘ geopy.distance(location1, location2)

6406531186604. ✓ geopy.distance.distance(location1, location2).km

6406531186605. ✘ geopy.distance.distance.distance(location1\_coord, location2\_coord).km

**Question Number : 369 Question Id : 640653358029 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

**Question Label : Multiple Choice Question**

Provided below is a snippet of the code block of HTML tags from a website providing weather forecast. Your goal is to scrape the high and low values for the 10-day temperature forecast.

```
<div class="wr-day-temperaturehigh">
    <span class="wr-day-temperature__high-label wr-hide-visually">High</span>
    <span class="wr-day-temperature__high-value">
        <span class="wr-value--temperature ">
            <span class="wr-value--temperature--c">31°</span>
            <span class="wr-hide"> </span>
            <span class="wr-value--temperature--f">87°</span>
        </span>
    </span>
</div>
<div class="wr-day-temperaturelow">
    <span class="wr-day-temperature__low-label wr-hide-visually">Low</span>
    <span class="wr-day-temperature__low-value">
        <span class="wr-value--temperature ">
            <span class="wr-value--temperature--c">21°</span>
            <span class="wr-hide"> </span>
            <span class="wr-value--temperature--f">71°</span>
        </span>
    </span>
</div>
```

Also provided below, is the python code to extract values from the tags. But the tags represented as <A> and <B> are missing. Choose the most appropriate tag that will get you the high and low values for the 14-day temperature forecast..

#Daily High Values

```
daily_high_values = soup.find_all('span', attrs={'class': '<B>'})
```

#Daily Low Values

```
daily_low_values = soup.find_all('span', attrs={'class': '<A>'})
```

**Options :**

<A> = wr-value--temperature--f

6406531186606. ✖ <B> = wr-value--temperature--c

<A> = wr-value--temperature--c

6406531186607. ✘ <B> = wr-value--temperature--c

<A> = wr-day-temperaturelow

6406531186608. ✓ <B> = wr-day-temperaturehigh

<A> = low-label wr-hide-visually

6406531186609. ✘ <B> = high-label wr-hide-visually

**Question Number : 370 Question Id : 640653358030 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

The dataset consists of year, annual cotton production, annual rainfall, loan interest rates and fuel prices. You would like to compute the correlation coefficient between annual cotton production and other variables in the dataset to analyze the effects of various variables on the target variable. Choose the most suitable option among the following choices:

**Options :**

6406531186610. ✘ Excel cannot be used to compute correlation coefficients. Although we can use excel to visualize the data using scatter plots to study the relationships.

6406531186611. ✘ The CORREL() function in Excel is not suitable for this analysis because it doesn't take more than two variables as inputs.

6406531186612. ✘ Correlation coefficients cannot be computed for continuous variables.

6406531186613. ✓ None of the options are appropriate.

**Question Number : 371 Question Id : 640653358031 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

You would like to prepare your dataset before analysis. You choose python pandas-profiling library to perform exploratory analysis. Choose the most suitable option among the given choices:

**Options :**

6406531186614. ❌ Your choice of pandas-profiling library is not appropriate because it does not provide information about outliers.

6406531186615. ✓ Your choice is appropriate because the pandas-profiling library provides information about outliers.

6406531186616. ❌ pandas-profiling library is appropriate because it helps build models.

**Question Number : 372 Question Id : 640653358032 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which piece of code below will extract and display details of the **9 scheduled airlines** in India?

**Options :**

```
import requests

import pandas as pd

from bs4 import BeautifulSoup
website_url =
requests.get('https://web.archive.org/web/20220603020500/https://en.wikipedia.org/wiki/List_of_airlines_of_India').text

soup = BeautifulSoup(website_url,'html.parser')

required_table = soup.find_all('table')[0]

df = pd.read_html(str(required_table))

df=pd.DataFrame(df[0])
```

6406531186617. ✓ df

6406531186618. ❌

```
import requests

import pandas as pd

from bs4 import BeautifulSoup
website_url =
requests.get('https://web.archive.org/web/20220603020500/https://en.
wikipedia.org/wiki/List_of_airlines_of_India').text

soup = BeautifulSoup(website_url,'html.parser')

required_table = soup.find_all('table')[1]

df = pd.read_html(str(required_table))

df=pd.DataFrame(df[0])

df
```

```
import get

import pandas as pd

from bs4 import BeautifulSoup
website_url = get.requests
('https://web.archive.org/web/20220603020500/https://en.wikipedia.or
g/wiki/List_of_airlines_of_India').text

soup = BeautifulSoup(website_url,'html.parser')

required_table = soup.find_all('table')[0]

df = pd.read_html(str(required_table))

df=pd.DataFrame(df[0])
```

6406531186619. ✖ df

```
import requests  
  
import pandas as pd  
  
from bs4 import BeautifulSoup  
website_url =  
    requests.get('https://web.archive.org/web/20220603020500/https://en.  
wikipedia.org/wiki/List_of_airlines_of_India').text  
soup = BeautifulSoup(website_url, 'python.html')  
  
required_table = soup.find_all('table')[0]  
  
df = pd.read_html(str(required_table))  
  
df=pd.DataFrame(df[0])
```

6406531186620. ✘ df

**Question Number : 373 Question Id : 640653358033 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

*Comicgen* is a useful tool in narrating data stories using comics. Which of the following is not a function of comicgen?

**Options :**

6406531186621. ✘ Comicgen creates comic characters

6406531186622. ✘ Comicgen provides options to custom create different comic characters and their emotions and pose

6406531186623. ✘ Comicgen can be easily integrated into Google sheets or Excel to narrate your data stories

6406531186624. ✓ You can type in your data story into comicgen to get your comic in return

**Question Number : 374 Question Id : 640653358034 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

**Question Label :** Multiple Choice Question

A very large Matrix **A** has a lot of zero entries in it. Which function from the *scipy* library is useful in efficient storage of such a matrix **A**?

**Options :**

6406531186625. ✘ compressed\_mat

6406531186626. ✘ comp\_mat

6406531186627. ✓ csr\_matrix

6406531186628. ✘ zip\_mat

**Question Number : 375 Question Id : 640653358035 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following libraries has functions and tools that are useful in the analysis of large graphs?

**Options :**

6406531186629. ✓ scikit-network

6406531186630. ✘ pandas-network

6406531186631. ✘ numpy-network

6406531186632. ✘ pd-network

**Question Number : 376 Question Id : 640653358036 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Kumu is a tool that allows you to:

**Options :**

6406531186633. ✘ Visualize project management charts

6406531186634. ✘ create stunning dashboards for large projects

6406531186635. ❌ merge Comicgen characters into a comic

6406531186636. ✓ Visualize complex network data

**Question Number : 377 Question Id : 640653358037 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following libraries has functions extensively written to extract data from Wikipedia pages?

**Options :**

6406531186637. ❌ BeautifulSoup

6406531186638. ❌ wikipedia

6406531186639. ✓ wikipedia

6406531186640. ❌ wiki\_scrape

**Question Number : 378 Question Id : 640653358038 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

A dataset provided to you has information about countries and respective populations. You plan to visualize the data in Tableau using the map representation. But you are unable to do so because the map representation is not activated for you to choose. What might be the issue? Provided below is a snapshot of the dataset column names and types. Choose the most appropriate option that would solve the problem.

Column Name	Column Type
Country	String
Population	Integer

**Options :**

6406531186641. ✘ The provided dataset is incomplete
6406531186642. ✘ We also need Latitude and Longitude information to activate the map representation
6406531186643. ✓ There might be column type incompatibility issues
6406531186644. ✘ The given information provided would not have caused any issues. It is sufficient for map representation

**Question Number : 379 Question Id : 640653358039 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Logical calculations in tableau helps to determine if a certain condition is true or false. Is the following expression valid ?

```
IF [Profit] > 0 THEN 'Profitable' ELSEIF [Profit] = 0 THEN  
'Breakeven' ELSE 'Loss'
```

**Options :**

6406531186645. ✘ TRUE

6406531186646. ✓ FALSE

**Question Number : 380 Question Id : 640653358040 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

\_\_\_\_\_ is helpful to understand the structure of (or inspect) a website before writing a scraping script.

**Options :**

6406531186647. ✘ BeautifulSoup

6406531186648. ✓ Developer Tools

6406531186649. ✗ Airflow

6406531186650. ✗ Pycaret

**Question Number : 381 Question Id : 640653358041 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

\_\_\_\_\_ library has tools to get a webpage's html contents into Python.

**Options :**

6406531186651. ✗ BeautifulSoup

6406531186652. ✗ numpy

6406531186653. ✓ requests

6406531186654. ✗ get

**Question Number : 382 Question Id : 640653358042 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which among the following code blocks will get you the latitude and longitude of "IIT Madras"?

Assume the Nominatim library is imported using the command given below:

```
from geopy.geocoders import Nominatim
```

**Options :**

```
location = locator.geocode("IIT Madras, Chennai, India")
print("Latitude = {}, Longitude = {}".format(location.latitude,
```

6406531186655. ✗ location.longitude))

```
locator = Nominatim(user_agent="myGeocoder")
location = locator.geocode("IIT Madras, Chennai, India")
6406531186656. ✘ print("Latitude = {}, Longitude = {}")
```

```
locator = Nominatim(user_agent="myGeocoder")
location = locator.geocode("IIT Madras, Chennai, India")
print("Latitude = {}, Longitude =
6406531186657. ✓ {}".format(location.latitude, location.longitude))
```

```
locator = Nominatim(user_agent="myGeocoder")
print("Latitude = {}, Longitude =
6406531186658. ✘ {}".format(location.latitude, location.longitude))
```

**Question Number : 383 Question Id : 640653358043 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Type of location (tourist/historic/etc.) can be retrieved using Nominatim in Python

**Options :**

6406531186659. ✓ TRUE

6406531186660. ✘ FALSE

**Question Number : 384 Question Id : 640653358044 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following delimiters cannot be used in text-to-column function in Excel?

**Options :**

6406531186661. ✘ Comma (,)

6406531186662. ✘ Tab (\t)

6406531186663. ❌ Semi colon (;)

6406531186664. ❌ Tilde (~)

6406531186665. ✓ None of these

**Question Number : 385 Question Id : 640653358045 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

What is the y-axis in autocorrelation plot?

**Options :**

6406531186666. ✓ Correlation

6406531186667. ❌ Covariance

6406531186668. ❌ Standard deviation

6406531186669. ❌ Variance

6406531186670. ❌ None of these

**Question Number : 386 Question Id : 640653358046 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following tools cannot be used for anonymising the data?

**Options :**

6406531186671. ❌ Anonimatron

6406531186672. ❌ ARX anonymization tool

6406531186673. ✓ PowerBI

6406531186674. ❌ Amnesia

6406531186675. ❌ sdcMicro

**Question Number : 387 Question Id : 640653358047 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

For a one-time anonymization, static anonymization is sufficient. Is this statement true or false?

**Options :**

6406531186676. ✓ TRUE

6406531186677. ✗ FALSE

**Question Number : 388 Question Id : 640653358051 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

We have a variable X, which can take values AA, BB, or CC. The first 4 values of this variable in a dataset are CC, AA, BB, AA. The format of representing this information as shown in the table below is called:

AA	BB	CC
0	0	1
1	0	0
0	1	0
1	0	0

**Options :**

6406531186686. ✗ multi-col format

6406531186687. ✓ one - hot encoding

6406531186688. ✗ long format

6406531186689. ✗ integer

**Question Number : 389 Question Id : 640653358052 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

We have a variable X, which can take values AA, BB, or CC. The first 4 values of this variable in a dataset are CC, AA, BB, AA. This information is represented as shown below.

AA	BB	CC
0	0	1
1	0	0
0	1	0
1	0	0

To convert a variable to this format in Python, one can use:

**Options :**

6406531186690. ✓ pandas.get\_dummies

6406531186691. ✗ from sklearn.preprocessing import BinaryEncoder

6406531186692. ✗ import numpy as np

6406531186693. ✗ import seaborn as sb

**Question Number : 390 Question Id : 640653358053 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

k-means is typically influenced by the start values. What option in sklearn.cluster.KMeans helps reduce the impact?

**Options :**

- 6406531186694. ✘ verbose
- 6406531186695. ✘ algorithm
- 6406531186696. ✓ n\_init
- 6406531186697. ✘ init

**Question Number : 391 Question Id : 640653358054 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

A Pandas dataframe *DF* has a column named *salary\_range* which contains the salary details of 10000 employees of a firm binned as *medium*, *high*, and *very high*. You are interested in finding out the number of employees in each category of *salary\_range*. Which of the following commands will help you to achieve this goal?

**Options :**

- 6406531186698. ✘ DF['salary\_range'].bin\_count()
- 6406531186699. ✓ DF['salary\_range'].value\_counts()
- 6406531186700. ✘ DF\$'salary\_range.bin\_count()'
- 6406531186701. ✘ DF\$'salary\_range.value\_counts()'

**Question Number : 392 Question Id : 640653358055 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Scikit-learn has a DecisionTreeClassifier module that is useful in building decision tree classifiers. Suppose, our dataset is imbalanced in class. Which feature in the DecisionTreeClassifier() will help us tackle this problem?

**Options :**

- 6406531186702. ✘ random\_state

6406531186703. ✘ min\_sample\_split

6406531186704. ✘ class\_balance

6406531186705. ✓ class\_weight

**Question Number : 393 Question Id : 640653358056 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

We have predictions ( $y_{\text{hat}}$ ) on a train dataset of 100 records. Let  $y$  be the true value. We are interested in calculating  $\text{Sum}_{i=1 \text{ to } 100} |y_i - y_{\text{hat},i}| / 100$ . Which of the following functions will help you in achieving this easily?

**Options :**

6406531186706. ✓ from sklearn.metrics import mean\_absolute\_error

6406531186707. ✘ from sklearn.metrics import median\_absolute\_error

6406531186708. ✘ from sklearn.metrics import median\_absolute\_percentage\_error

6406531186709. ✘ from sklearn.metrics import average\_absolute\_percentage\_error

**Question Number : 394 Question Id : 640653358057 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

We are interested in fitting an ARIMA model to our time series data. Specifically, we are interested in a moving average model of 0, setting a lag value of 4 for autoregression, and a difference order of 1. Which of the following gives you such a model?

**Options :**

6406531186710. ✘ ARIMA(..., trend = (4,1,0))

6406531186711. ✓ ARIMA(..., order = (4,1,0))

6406531186712. ✘ ARIMA(..., order = (0,4,1))

6406531186713. ✘ ARIMA(..., trend = (0,4,1))

**Question Number : 395 Question Id : 640653358058 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

*pycaret* is a

**Options :**

6406531186714. ❌ Visualization tool

6406531186715. ❌ Dashboard helper

6406531186716. ✓ low-code machine learning library

6406531186717. ❌ Data cleaning solution

**Question Number : 396 Question Id : 640653358059 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

*subjectivity* and *polarity* are two properties returned by the sentiment function of library:

**Options :**

6406531186718. ❌ TextBulb

6406531186719. ❌ NLPText

6406531186720. ✓ TextBlob

6406531186721. ❌ NLP

**Question Number : 397 Question Id : 640653358060 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

A subjectivity score of 0.8 means that the text statement:

**Options :**

6406531186722. ✘ has a positive sentiment
6406531186723. ✘ has a negative sentiment
6406531186724. ✓ is more of an opinion statement
6406531186725. ✘ is more of a factual statement

**Question Number : 398 Question Id : 640653358061 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

A *polarity* score of negative 0.5 means that the text statement:

**Options :**

6406531186726. ✘ has a positive sentiment
6406531186727. ✓ has a negative sentiment
6406531186728. ✘ is more of an opinion statement
6406531186729. ✘ is more of a factual statement

**Question Number : 399 Question Id : 640653358062 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

You are working on a piece of code that classifies different fruits into its respective groups (citrus, berries, melons, apples & pears, and tropical & exotic). Which of the following loss functions from Keras would you pick for the task?

**Options :**

6406531186730. ✘ binary\_crossentropy
6406531186731. ✓ categorical\_crossentropy
6406531186732. ✘ mean\_squared\_error
6406531186733. ✘ mean\_absolute\_error

**Question Number : 400 Question Id : 640653358063 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

*classification\_report* function from the `sklearn.metrics` module

**Options :**

6406531186734. ❌ builds a decision tree classifier and prints the accuracy of the classifier

6406531186735. ❌ reports the root mean square error of the model

6406531186736. ❌ runs different classification models and compares the results

6406531186737. ✓ builds a text report displaying the main classification metrics

**Question Number : 401 Question Id : 640653358064 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

*csr\_matrix* from the `scipy` library:

**Options :**

6406531186738. ❌ always helps reduce matrix space

6406531186739. ✓ helps reduce matrix space when there are a lot of zero entries in the matrix

6406531186740. ❌ helps reduce matrix space when there are a lot of negative entries in the matrix

6406531186741. ❌ makes matrix multiplication more meaningful and powerful

**Question Number : 402 Question Id : 640653358066 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Google Studio is a tool that allows you to

**Options :**

6406531186746. ✘ merge Comicgen characters into a comic

6406531186747. ✘ visualize complex network data

6406531186748. ✓ create dashboards for small scale projects

6406531186749. ✘ Edit photographs and videos

**Question Number : 403 Question Id : 640653358067 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following tabs is used to identify API calls in the Inspect element in any browser?

**Options :**

6406531186750. ✓ Network

6406531186751. ✘ Elements

6406531186752. ✘ Console

6406531186753. ✘ Sources

**Question Number : 404 Question Id : 640653358068 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following libraries is used to construct API urls?

**Options :**

6406531186754. ✓ Urllib

6406531186755. ✘ BeautifulSoup

6406531186756. ✘ Requests

6406531186757. ✘ Pandas

**Question Number : 405 Question Id : 640653358069 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

The final output from the BBC Weather Location Service API is in JSON format:

**Options :**

6406531186758. ✓ TRUE

6406531186759. ✗ FALSE

**Question Number : 406 Question Id : 640653358070 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which among the following excel charts is the most suitable for detecting outliers in the data?

**Options :**

6406531186760. ✗ Bar chart

6406531186761. ✗ Line chart

6406531186762. ✓ Box and Whisker chart

6406531186763. ✗ Histogram

**Question Number : 407 Question Id : 640653358071 Question Type : MCQ Is Question**

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

**Time : 0**

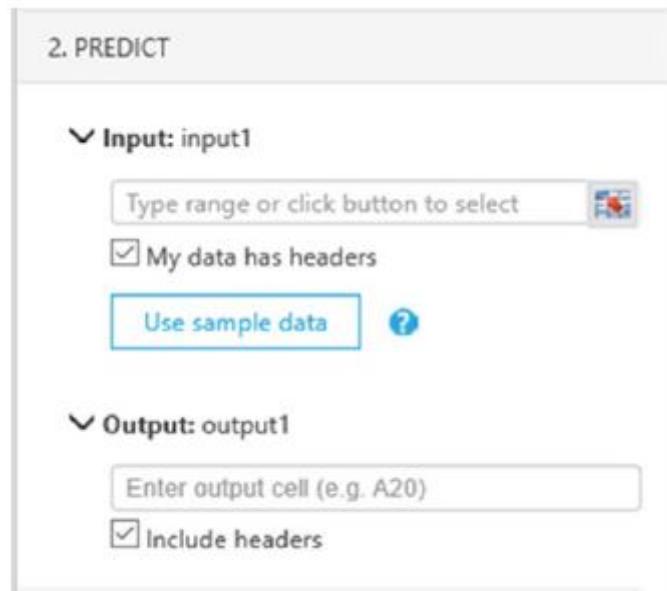
**Correct Marks : 1**

Question Label : Multiple Choice Question

Provided below is a snapshot of the dataset which consists of movie reviews and respective labels.

	A	B
1	review	sentiment
2	One of the other reviewers has	positive
3	A wonderful little production. <	positive
4	I thought this was a wonderful v	positive
5	Basically there's a family where	negative
6	Petter Mattei's "Love in the Tim	positive
7	Probably my all-time favorite m	positive
8	I sure would like to see a resurre	positive
9	This show was an amazing, fresh	negative
10	Encouraged by the positive com	negative
11	If you like original gut wrenchin	positive

To compute the sentiment scores the Azure Machine Learning add-in requires input and output values. In the figure provided below the input and output cells need to be populated with appropriate values to obtain sentiment scores.



Choose the most appropriate option that enables you to predict sentiment scores using the Excel Azure Machine Learning add-in.

#### Options :

Input: Sheet1!A1:A11  
6406531186764. ✓      Output: Sheet1!C1

Input: Sheet1!B1:B11  
6406531186765. ✘      Output: Sheet1!C1

<b>Sub-Section Number :</b>	3
<b>Sub-Section Id :</b>	64065352021
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 408 Question Id : 640653358065 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Select Question

*scikit-network* package contains functions for (pick all correct sentences):

**Options :**

6406531186742. ❌ analysis of faults in a computer network

6406531186743. ✓ social network analysis

6406531186744. ✓ analysis of large graphs

6406531186745. ❌ enhancing one's social network

<b>Sub-Section Number :</b>	4
<b>Sub-Section Id :</b>	64065352022
<b>Question Shuffling Allowed :</b>	No

**Question Id : 640653358048 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (409 to 410)**

Question Label : Comprehension

Answer the given subquestions

**Sub questions**

**Question Number : 409 Question Id : 640653358049 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

**Question Label : Multiple Choice Question**

We are analyzing how much the number of lecture hours attended by students affects their exam scores. Which Excel function would you use as a starting point in this analysis?

**Options :**

6406531186678. ❌ STDEV.P()

6406531186679. ❌ STDEV.S()

6406531186680. ✓ SLOPE()

6406531186681. ❌ EXACT()

**Question Number : 410 Question Id : 640653358050 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

In the previous question, we plan to run a regression analysis after the preliminary analysis. Which of the following features provide you with the capability to do this?

**Options :**

6406531186682. ✓ Data Analysis Toolpak

6406531186683. ❌ Regression Analyzer

6406531186684. ❌ Regression ToolBokz

6406531186685. ❌ OptSol finder