

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 IMPROVEMENT FN EXAM QDD2 01 Sep 2024
Subject Name :	2024 Sep01: IIT M FN EXAM QDD2
Creation Date :	2024-08-28 17:49:00
Duration :	180
Total Marks :	1085
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
Change Background Color :	No
Change Theme :	No
Help Button :	No
Show Reports :	No
Show Progress Bar :	No

Group I

Group Number :	1
Group Id :	64065320257
Group Maximum Duration :	0
Group Minimum Duration :	90

Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	1085
Is this Group for Examiner? :	No
Examiner permission :	Cant View
Show Progress Bar? :	No
Revisit allowed for group Instructions? :	Yes
Maximum Instruction Time :	0
Minimum Instruction Time :	0
Group Time In :	Minutes
Navigate To Group Summary From Last Question? :	No
Disable Submit Button During Assessment? :	No
Section Selection Time? :	0
No of Optional sections to be attempted :	0

Sem1 CT

Section Id :	64065364204
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	18
Number of Questions to be attempted :	18
Section Marks :	100
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134602
Question Shuffling Allowed :	No

Question Number : 1 Question Id : 640653906287 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : SEMESTER I: COMPUTATIONAL THINKING (COMPUTER BASED EXAM)"

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

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

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

Options :

6406533050719. ✓ YES

6406533050720. ✗ NO

Question Number : 2 Question Id : 640653906288 Question Type : MCQ Calculator : Yes

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 Maigudi 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
Carrots	Vegetables/Food	1.5	50
Soup	Toiletries	4	32
Tomatoes	Vegetables/Food	2	40
Bananas	Vegetables/Food	8	64
Socks	Footwear/Apparel	3	168
Curd	Dairy/Food	0.5	32
Milk	Dairy/Food	1.5	24
			36
			567

Sun General		Vignesh 14	
Item	Category	Qty	Price
Phone Charger	Utilities	1	230
Razor Blades	Grooming	1	12
Razor	Grooming	1	45
Shaving Lotion	Grooming	0.8	144
Earphones	Electronics	1	210
Pencils	Stationery	3	15
			656

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

Options :

6406533050721. ✓ Useful Data has been mentioned above.

6406533050722. ✗ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number :

2

Sub-Section Id :

640653134603

Question Shuffling Allowed :

Yes

Question Number : 3 Question Id : 640653906289 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

The given pseudocode is executed using the "Scores" dataset. What will the value of **Count** represent at the end of the execution?

```
1 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         Count = Count + DoSomething(X, Y)
8         Move Y to Table 3
9     }
10    Move all rows from Table 3 to Table 1
11 }
12
13 Procedure DoSomething(A, B)
14     if(A.Gender != B.Gender or A.TownCity == B.TownCity){
15         return(1)
16     }
17     else{
18         return(0)
19     }
20 End DoSomething
```

Options :

- 6406533050723. ✓ Number of pairs of students with different gender or same TownCity
- 6406533050724. ✗ Number of pairs of students with same gender or different TownCity
- 6406533050725. ✗ Number of pairs of students with the same gender and the same TownCity
- 6406533050726. ✗ The code will give an error due to incorrect return statements in lines 15 and 18

Question Number : 4 Question Id : 640653906292 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Scores" dataset. What will **cityD[k]** represent at the end of execution?

```
1 cityD = {}
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     if(isKey(cityD, X.Town/City)){
5         if(isKey(cityD[X.Town/City], X.Gender)){
6             if(cityD[X.Town/City][X.Gender] > X.Physics){
7                 cityD[X.Town/City][X.Gender] = X.Physics
8             }
9         }
10    else{
11        cityD[X.Town/City][X.Gender] = X.Physics
12    }
13 }
14 else{
15     cityD[X.Town/City] = {}
16     cityD[X.Town/City][X.Gender] = X.Physics
17 }
18 Move X to Table 2
19 }
```

Options :

6406533050735. ❌ A dictionary with gender as key mapped to the Physics marks
6406533050736. ❌ A dictionary with gender as key mapped to the highest Physics marks scored by that gender in city **k**
6406533050737. ✓ A dictionary with gender as key mapped to the lowest Physics marks scored by that gender in city **k**
6406533050738. ❌ A dictionary with cities as keys mapped to the Physics marks

Question Number : 5 Question Id : 640653906293 Question Type : MCQ Calculator : Yes

Correct Marks : 5

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 }
13 else{
14   D[X.TownCity] = [X.Mathematics, X.Mathematics]
15 }
16 Move X to Table 2
17 }
```

Options :

6406533050739. ✓ The difference between highest and lowest Mathematics marks of the city i
6406533050740. ✗ The difference between overall highest and lowest Mathematics marks of the dataset
6406533050741. ✗ The difference between highest and second highest Mathematics marks of the city i
6406533050742. ✗ It will be always 0

Sub-Section Number :

3

Sub-Section Id :

640653134604

Question Shuffling Allowed :

Yes

Question Number : 6 Question Id : 640653906290 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the following procedure, where **L1** and **L2** are two non-empty lists.

```
1 Procedure findsomething(L1, L2)
2     if(length(L1) != length(L2)){
3         return(False)
4     }
5     while(length(L1) > 0){
6         if(last(L1) != last(L2)){
7             return(False)
8         }
9         L1 = init(L1)
10        L2 = init(L2)
11    }
12    return(True)
13 End findsomething
```

When will **findSomething(L1, L2)** return True?

Options :

6406533050727. ✘ all the elements of both lists **L1** and **L2** are same but arranged in the reverse order.

6406533050728. ✓ all the elements of both lists **L1** and **L2** are same and are arranged in the same order.

6406533050729. ✘ all the elements of list **L1** are present in **L2** where **length(L2) > length(L1)**.

6406533050730. ✘ all the elements of list **L2** are present in **L1** where **length(L1) > length(L2)**.

Sub-Section Number :

4

Sub-Section Id :

640653134605

Question Shuffling Allowed :

Yes

Question Number : 7 Question Id : 640653906291 Question Type : MCQ Calculator : Yes

Correct Marks : 6

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) == 1){
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 :

6406533050731. ❌ Number of words in which vowels occur consecutively

6406533050732. ❌ Number of words in which no two vowels occur consecutively

6406533050733. ✓ Number of words in which either vowels or consonants occur consecutively

6406533050734. ❌ Number of words in which no two vowels and no two consonants occur consecutively

Sub-Section Number :

5

Sub-Section Id :

640653134606

Question Shuffling Allowed :

Yes

Question Number : 8 Question Id : 640653906294 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following pseudocode. At the end of the execution of the following pseudocode, if **flag** has value True, then choose the possible values of list **L** from the given choices.

```
1 flag = False
2 position = 0
3 foreach element in L{
4     if((position == 1) and (element == 'x')){
5         flag = True
6     }
7     position = position + 1
8 }
```

Options :

6406533050743. ❌ ['z', 'y']

6406533050744. ✓ ['y', 'x', 'z']

6406533050745. ❌ ['x', 'y']

6406533050746. ✓ ['z', 'x', 'y']

Sub-Section Number :

6

Sub-Section Id :

640653134607

Question Shuffling Allowed :

Yes

Question Number : 9 Question Id : 640653906295 Question Type : MSQ Calculator : Yes

Correct Marks : 5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the procedure given below, where **aList** is a non-empty list of positive numbers.

```
1 procedure cumulative(aList)
2     sum = 0, cumuList = []
3     foreach element in aList{
4         sum = sum + element
5         cumuList = cumuList ++ [sum]
6     }
7     return(cumuList)
8 end cumulative
```

At the end of the execution, which of the following option(s) would be correct? It is a Multiple Select Question (MSQ).

Options :

6406533050747. ✓ The first element of both the lists, **cumuList** and **aList**, will be same.

6406533050748. ❌ Number of elements in **cumuList** will be one lesser than that of **aList**.

6406533050749. ✓ **cumuList** is a list of numbers in increasing order.

6406533050750. ❌ Number of elements in both lists, **cumuList** and **aList**, will be different.

Sub-Section Number :

7

Sub-Section Id :

640653134608

Question Shuffling Allowed :

Yes

Question Number : 10 Question Id : 640653906296 Question Type : MSQ Calculator : Yes

Correct Marks : 6 Max. Selectable Options : 0

Question Label : Multiple Select Question

For the 'Words' dataset, consider a scenario where we want to find the number of sentences containing at least 10 distinct letters. We asked ChatGPT to generate the pseudocode for this task. Below are the two pseudocodes provided by ChatGPT.

Pseudocode 1 :

```
1 count = 0
2 L = []
3 while(Table 1 has more rows){
4     Read the first row X in Table 1
5     L = addSomething(L, X)
6     if(X.word ends with a full stop){
7         if(length(L) >= 10){
8             count = count + 1
9         }
10        L = []
11    }
12    Move X to Table 2
13 }
14
15 Procedure addSomething(M, Y)
16     i = 1
17     while(i <= Y.LetterCount){
18         p = ith letter of Y.word
19         if(not (member(M, p))){
20             M = M ++ [p]
21         }
22         i = i + 1
23     }
24     return(M)
25 End addSomething
```

Pseudocode 2 :

```
1 count = 0
2 L = []
3 while(Table 1 has more rows){
4     Read the first row X in Table 1
5     L = addSomething(L, X)
6     if(X.word ends with a full stop and length(L) >= 10){
7         count = count + 1
8         L = []
9     }
10    Move X to Table 2
11 }
12
13 Procedure addSomething(M, Y)
14     i = 1
15     while(i <= Y.LetterCount){
16         p = ith letter of Y.word
17         if(not (member(M, p))){
18             M = M ++ [p]
19         }
20         i = i + 1
21     }
22     return(M)
23 End addSomething
```

Which of the following statements is/are correct? It is a Multiple Select Question (MSQ).

Options :

6406533050751. ❌ Both **Pseudocode 1** and **Pseudocode 2** will give the same required output.

6406533050752. ✓ **Pseudocode 1** produces the desired output, while **Pseudocode 2** does not.

6406533050753. ❌ **Pseudocode 2** produces the desired output, while **Pseudocode 1** does not.

6406533050754. ❌ Both **Pseudocode 1** and **Pseudocode 2** will not give the required output.

For **Pseudocode 1**, if any sentence contains less than 10 distinct integers, List L will not be reinitialized to `[]`.

6406533050755. ❌ For **Pseudocode 2**, if any sentence contains less than 10 distinct integers, List L will not be reinitialized to `[]`.

Question Number : 11 Question Id : 640653906297 Question Type : MSQ Calculator : Yes

Correct Marks : 6 Max. Selectable Options : 0

Question Label : Multiple Select Question

The following pseudocode is executed using the "Library" dataset. At the end of the execution, A stores a dictionary with the author's name as key and the number of books written by him/her as its value. But the code may have mistakes. Identify all such mistakes (if any). Assume that all statements not listed in the options below are free of errors.

```
1 A = {}
2 while(Table 1 has more rows){
3     Read the first row X from Table 1
4     if(not isKey(A, X.Author)){
5         A[X.Author] = A[X.Author] + 1
6     }
7     else{
8         A[X.Author] = 1
9     }
10    Move X to Table 2
11 }
```

Options :

Replacing the condition given in line 4 with the statement given below will provide the correct result.

```
1 | if(isKey(A, X.Author))
```

6406533050757. ✓

Replacing the statements given from line 4 to 9 with the statements given below will provide the correct result.

```
1 | if(not isKey(A, X.Author)){
2     A[X.Author] = 0
3 }
4 A[X.Author] = A[X.Author] + 1
```

6406533050758. ✓

6406533050759. ✓ Interchanging Line 5 and 8 will provide the correct result.

Replacing the statements given from line 4 to 9 with the statements given below will provide the correct result.

```
1 if(not isKey(A, X.Author)){  
2     A[X.Author] = 0  
3 }  
4 else{  
5     A[X.Author] = A[X.Author] + 1  
6 }  
7
```

6406533050760. ✘

Question Number : 12 Question Id : 640653906298 Question Type : MSQ Calculator : Yes

Correct Marks : 6 Max. Selectable Options : 0

Question Label : Multiple Select Question

The given pseudocode is executed using the "Words" dataset. At the end of execution **A** captures the frequency count of the most frequent vowel in the dataset. 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 D = { }, A = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     D = updateDictionary(D, X)
5     Move X to Table 2
6 }
7 foreach C in keys(D){
8     if(C is a vowel and D[C] < A){
9         A = D[C]
10    }
11 }
12 Procedure updateDictionary(D, Y)
13     i = 1
14     while(i ≤ Y.LetterCount){
15         B = ith letter in Y.Word
16         if(not isKey(D, B)){
17             D[B] = D[B] + 1
18         }
19         else{
20             D[B] = 1
21         }
22         i = i + 1
23     }
24     return(D)
25 End updateDictionary
```

Options :

6406533050761. ❌ Line 1: Incorrect initialization of **D**

6406533050762. ✓ Line 8: Incorrect conditional expression

6406533050763. ❌ Line 9: **A** updated with wrong value

6406533050764. ❌ Line 13: Incorrect initialization of **i**

6406533050765. ✓ Line 16: Conditional expression should not use "**not**" operator

6406533050766. ❌ Line 22: **i** updated at wrong place

Sub-Section Id :

640653134609

Question Shuffling Allowed :

Yes

Question Number : 13 Question Id : 640653906299 Question Type : SA Calculator : None

Correct Marks : 5

Question Label : Short Answer Question

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

```
1 L1 = [1, -1, 5]
2 L2 = [3, 1, 2]
3 S = dosomething(L1, L2) - dosomething(L2, L1)
4
5 Procedure dosomething(X, Y)
6     if(length(X) != length(Y)){
7         return(0)
8     }
9     if(length(X) == 1 and length(Y) == 1){
10        return(first(X) * first(Y))
11    }
12    return(first(X) * last(Y) + dosomething(rest(X), init(Y)))
13 End dosomething
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

0

Question Number : 14 Question Id : 640653906300 Question Type : SA Calculator : None

Correct Marks : 5

Question Label : Short Answer Question

The given pseudocode is executed using a dataset having the same fields as the "Words" dataset, and contains the following words:

"I ordered this product from Gitark. I am very happy to share my review regarding this awesome product. It is not only nice to use, but also has a very cool look. I think this is the best and the most awesome product which can be bought in this price range."

Consider the following information:

1. **unique(L)** returns a list of unique elements of list **L**. For example **unique(["think", "like", "toppers", "think"])** will return **["think", "like", "toppers"]**.
2. **comNo(L1, L2)** returns the number of common elements in lists **L1** and **L2**.
3. Ignore the upper and lower case, and punctuation symbols while comparing with other words.

```
1 positiveList = ["happy", "awesome", "nice", "fine", "best", "cool"]
2 posSen = 0, L = []
3 while(Table 1 has more rows){
4     Read the first row X in Table 1
5     L = L ++ [x.word]
6     if(x.word ends with full stop){
7         L = unique(L)
8         posCount = comNo(positiveList, L)
9         if(posCount >= 2){
10             posSen = posSen + 1
11         }
12         L = []
13     }
14     Move X to Table 2
15 }
```

What will the value of **posSen** be at the end of the execution of the above pseudocode?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Sub-Section Number : 9

Sub-Section Id : 640653134610

Question Shuffling Allowed : No

Question Id : 640653906301 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Question Pattern Type :** NonMatrix **Calculator :** None

Question Numbers : (15 to 16)

Question Label : Comprehension

Let **a** and **b** be positive integers. Procedure **remainder(a, b)** returns remainder if **a** is divided by **b**.

```
1 Procedure doSomething(x)
2     j = 2, Flag = True
3     if(x == 1){
4         return(False)
5     }
6     while(j < x){
7         if(remainder(x, j) == 0){
8             Flag = False
9             exitloop
10        }
11        j = j + 1
12    }
13    return(Flag)
14 End doSomething
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 15 Question Id : 640653906302 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

When will procedure **doSomething(X)** return True?

Options :

6406533050769. ✓ X is a prime number

6406533050770. ✗ X is an even number

6406533050771. ✗ X is an odd number

6406533050772. ✗ X is more than 1

Question Number : 16 Question Id : 640653906303 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the procedure discussed above. What will the value of M be at the end of the execution of the given pseudocode below?

```
1 | L = [8, 12, 13, 23, 11, 40]
2 | M = []
3 | position = 1
4 | foreach element in L{
5 |     if(dosomething(position) and dosomething(element)){
6 |         M = M ++ [element]
7 |     }
8 |     position = position + 1
9 | }
```

Options :

6406533050773. ✓ M = [13, 11]

6406533050774. ✗ M = [13, 23, 11]

6406533050775. ✗ M = [11, 23]

6406533050776. ✗ M = [13, 23]

Question Id : 640653906310 Question Type : COMPREHENSION Sub Question Shuffling

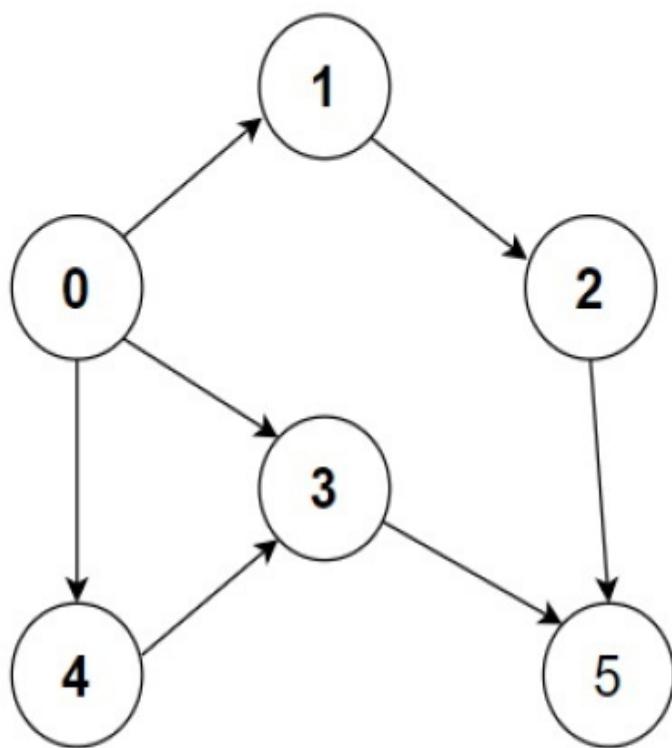
Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (17 to 18)

Question Label : Comprehension

Let M be the adjacency matrix of the graph G as shown below and consider the procedure **Dosomething** given below.



```
1 Procedure Dosomething(M, q)
2     count = 0
3     foreach i in rows(M){
4         if(M[i][q] == 1 or M[q][i] == 1){
5             count = count + 1
6         }
7     }
8     return(count)
9 End Dosomething
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 17 Question Id : 640653906311 Question Type : SA Calculator : None

Correct Marks : 5

Question Label : Short Answer Question

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

```
1 | B = Dosomething(M, 3)
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 18 Question Id : 640653906312 Question Type : SA Calculator : None

Correct Marks : 4

Question Label : Short Answer Question

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

```
1 | B = Dosomething(M, 4)
```

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 : 640653134611

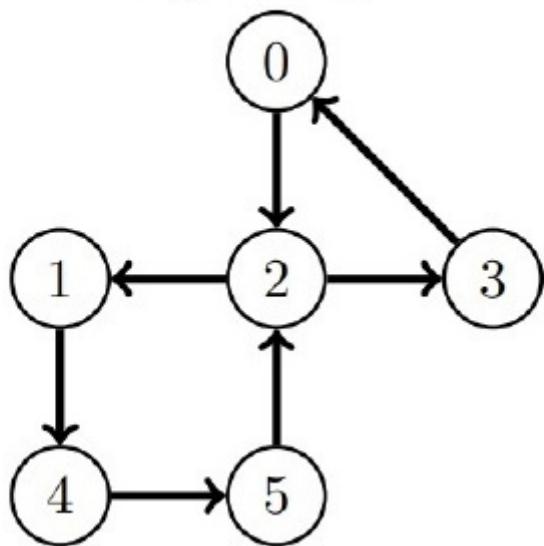
Question Shuffling Allowed : No

Question Id : 640653906304 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (19 to 20)

Question Label : Comprehension

Let M be an adjacency matrix of a graph G given below, where $M[i][j] = 1$ if there is an edge from i to j , otherwise 0.



```
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 : 19 Question Id : 640653906305 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

What will the values of p and q be at the end of execution of pseudocode given below?

```
1 newMatrix = updateMatrix(M)
2 p = newMatrix[0][3]
3 q = newMatrix[3][4]
```

Options :

6406533050777. * $p = 0, q = 0$

6406533050778. ✓ p = 1, q = 0

6406533050779. ✗ p = 0, q = 1

6406533050780. ✗ p = 1, q = 1

Question Number : 20 Question Id : 640653906306 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

What will the values of **p** and **q** be at the end of execution of pseudocode given below?

```
1 newMatrix1 = updateMatrix(M)
2 newMatrix2 = updateMatrix(newMatrix1)
3 p = newMatrix2[0][3]
4 q = newMatrix2[3][4]
```

Options :

6406533050781. ✗ p = 0, q = 0

6406533050782. ✗ p = 1, q = 0

6406533050783. ✗ p = 0, q = 1

6406533050784. ✓ p = 1, q = 1

Question Id : 640653906307 Question Type : COMPREHENSION Sub Question Shuffling

Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (21 to 22)

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 : 21 Question Id : 640653906308 Question Type : MSQ Calculator : Yes

Correct Marks : 5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Choose the correct option(s) with respect to the graph G.

Options :

6406533050785. ✓ G is always acyclic.

6406533050786. ✗ If $B[i][j] = 1$ then $B[j][i] = 1$, for any i, j

6406533050787. ✓ If $B[i][j] = 1$ then $B[j][i] = 0$, for any i, j

6406533050788. ✗ If $B[i][j] = 0$ then $B[j][i] = 1$, for any i, j

Question Number : 22 Question Id : 640653906309 Question Type : MCQ Calculator : Yes

Correct Marks : 5

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 :

6406533050789. ✗ If student i has scored greater total marks than at least one student

6406533050790. ✗ If student i has scored less total marks than at least one student

6406533050791. ✗ If student i has scored lowest total marks among all students

6406533050792. ✓ If student i has scored highest total marks among all students

Sem2 Intro to python

Section Id :	64065364205
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory

Number of Questions :	18
Number of Questions to be attempted :	18
Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134612
Question Shuffling Allowed :	No

Question Number : 23 Question Id : 640653906313 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "[FOUNDATION LEVEL : SEMESTER II: INTRODUCTION TO PYTHON \(COMPUTER BASED EXAM\)](#)"

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

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

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

Options :

6406533050795. ✓ YES

6406533050796. ✗ NO

Question Number : 24 Question Id : 640653906314 Question Type : MCQ Calculator : Yes

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

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

Input or Output

0
2
4
6
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:

Line Numbers ← → Code/Input/Output

1	0
2	2
3	4
4	6
5	8

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 :

6406533050797. ✓ Useful Data has been mentioned above.

6406533050798. ❌ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number : 2

Sub-Section Id : 640653134613

Question Shuffling Allowed : Yes

Question Number : 25 Question Id : 640653906315 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

A system categorizes people based on their age as follows:

Marks	Grade
$0 \leq Age < 13$	<i>Child</i>
$13 \leq Age < 20$	<i>Teenager</i>
$20 \leq Age < 60$	<i>Adult</i>
$Age > 60$	<i>SeniorCitizen</i>

Which of the following snippets computes and prints the category after accepting the age as input? Assume that the input entered by the user will be an integer and will lie only in the range $[0, 70]$.

Snippet-1

```
age = int(input())
if age < 13:
    category = 'Child'
elif age < 20:
    category = 'Teenager'
elif age < 60:
    category = 'Adult'
else:
    category = 'Senior Citizen'
print(category)
```

Snippet-2

```
age = int(input())
if age < 13:
    category = 'Child'
if age < 20:
    category = 'Teenager'
if age < 60:
    category = 'Adult'
else:
    category = 'Senior Citizen'
print(category)
```

Options :

6406533050799. ✓ Only snippet-1 is correct

6406533050800. ✗ Only snippet-2 is correct

6406533050801. ✗ Both snippets are correct

6406533050802. ❌ Both snippets are incorrect

Question Number : 26 Question Id : 640653906316 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

What will be the output of the following Python code?

```
string1 = 'diploma'
string2 = 'data science'
L = []
for i in range(0, len(string1)):
    for j in range(0, len(string2)):
        if (string1[i] == string2[j]):
            L.append(string1[i])
            break
        else:
            continue
print(L)
```

Options :

['d', 'i', 'a']

6406533050803. ✓

['d', 'i', 'a', 'd', 'i', 'a']

6406533050804. ❌

['d', 'd', 'i', 'i', 'a', 'a']

6406533050805. ❌

6406533050806. ❌ None of these

Question Number : 27 Question Id : 640653906317 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

`check_level` is a method of the class `Tank` that updates the attribute `fill_required` to the Boolean literal `True` if the attribute `waterlevel` is less than 50 litres, indicating that the tank needs refilling and `False` otherwise. Select the correct implementation of this method.

Options :

```
def check_level(self):
    if self.waterlevel < 50:
        self.fill_required = True
    else:
        self.fill_required = False
```

6406533050807. ✓

```
def check_level():
    if self.waterlevel < 50:
        self.fill_required = True
    else:
        self.fill_required = False
```

6406533050808. ✗

```
def check_level(self):
    if waterlevel < 50:
        self.fill_required = True
    else:
        self.fill_required = False
```

6406533050809. ✗

```
def check_level(self):
    if self.waterlevel <= 50:
        fill_required = True
    else:
        fill_required = False
```

6406533050810. ✗

Question Number : 28 Question Id : 640653906318 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following function.

```
def createList(nums):
    outlist = []

    for x in nums:
        for y in range(len(outlist)):
            outlist.append(outlist[y]+[x])

    print(outlist)
```

The output when we invoke `createList([1,2,5])` is:

Options :

6406533050811. ✘ `[]`, `[1]`, `[2]`, `[1, 2]`, `[1, 2, 5]`, `[2, 5]`, `[5]`, `[1, 5]`

6406533050812. ✘ `[]`, `[1]`, `[2]`, `[1, 2]`, `[5]`, `[1, 5]`, `[2, 5]`, `[1, 2, 5]`

6406533050813. ✘ `[[], [1], [2], [1, 2], [1, 2, 5], [2, 5], [5], [1, 5]]`

6406533050814. ✓ `[[], [1], [2], [1, 2], [5], [1, 5], [2, 5], [1, 2, 5]]`

Question Number : 29 Question Id : 640653906319 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

What will be the output of the code below.

```
def matrix_operation(matrix):
    new_matrix = []
    for j in range(len(matrix[0])):
        modified_row = []
        for i in range(len(matrix)):
            modified_row.append(matrix[i][j])
        new_matrix.append(modified_row)
    print(new_matrix)

A = [[1, 2, 3], [4, 5, 6], [7, 8, 9]]
matrix_operation(A)
```

Options :

6406533050815. ✓ [[1, 4, 7], [2, 5, 8], [3, 6, 9]]

6406533050816. ✗ [[1, 2, 3], [4, 5, 6], [7, 8, 9]]

6406533050817. ✗ [[1, 2, 3], [7, 8, 9], [4, 5, 6]]

6406533050818. ✗ [[1, 3, 2], [7, 9, 8], [4, 6, 5]]

Question Number : 30 Question Id : 640653906320 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the file `countries.txt` given below, also consider the python file both in the same directory. What will be the output of the code below?

`countries.txt`

```
IND-New Delhi-+91  
USA-Washington D.C.-+1  
RU-Moscow-+7  
CHN-Beijing-+86  
BR-Brasilia-+55
```

```
file_path = "countries.txt"  
file = open(file_path, "r")  
  
for line in file:  
    modified_line = line.strip()  
    modified_line = modified_line.split('-')  
    print(modified_line[0], "|", modified_line[2])  
  
file.close()
```

The separator used in `countries.txt` is `-` which is same as the one used in `.split()` method in python code.

Options :

```
IND-New Delhi  
USA-Washington D.C.  
RU-Moscow  
CHN-Beijing  
BR-Brasilia
```

6406533050819. ✘

6406533050820. ✘

IND | Delhi
USA | States-Washington
RU |
CHN |
BR |

IND | +91
USA | +1
RU | +7
CHN | +86
BR | +55

6406533050821. ✓

IND | New Delhi
USA | Washington D.C.
RU | Moscow
CHN | Beijing
BR | Brasilia

6406533050822. ❌

Sub-Section Number : 3
Sub-Section Id : 640653134614
Question Shuffling Allowed : Yes

Question Number : 31 Question Id : 640653906321 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

Consider the Python code given below.

```
f = open('output.txt', 'w')
f.write('rose')
f.write('jasmine\n')
f.write('''lotus
lilly
orchard''')
f.close()
```

How many number of lines will be present in the file `output.txt` after the execution of the above code?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Question Number : 32 **Question Id :** 640653906322 **Question Type :** SA **Calculator :** None

Correct Marks : 3

Question Label : Short Answer Question

What is the output of the following snippet of code?

```
given = '27{4517}90'
word = '' # empty string
index = 0
flag = False
while index < len(given):
    char = given[index]
    if char == '{':
        flag = True
    if flag and char not in '{}':
        word += char
    if char == '}':
        break
    index += 1

print(int(word))
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4517

Question Number : 33 **Question Id :** 640653906323 **Question Type :** SA **Calculator :** None

Correct Marks : 3

Question Label : Short Answer Question

Given below is the python code.

```
s1, s2 = set(), set()
s3 = s1

for i in range(7,10,2):
    s1.add(i)

for i in range(6,20,3):
    s2.add(i)

for i in range(18,14,-1):
    s3.add(i)

tup = tuple(s1 & s2 & s3)

print(len(tup))
```

What will be in the length of variable named `tup` .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 34 **Question Id :** 640653906324 **Question Type :** SA **Calculator :** None

Correct Marks : 3

Question Label : Short Answer Question

```
numbers = [20, 10, 9, 12, 3]

result = []

for num in numbers:
    if num % 3 == 0:
        result.append(num * num)

result.sort()

result.pop()

print(result[-1])
```

What will be the output of the snippet of code?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

81

Question Number : 35 **Question Id :** 640653906325 **Question Type :** SA **Calculator :** None

Correct Marks : 3

Question Label : Short Answer Question

Consider the following snippet of code.

```
def filter(people, age, city):
    people_list = []
    for person in people:
        if person["age"] >= age and person["city"] == city:
            people_list.append(person)
    return people_list

people = [
    {"name": "Alice", "age": 25, "city": "New York"},
    {"name": "Bob", "age": 30, "city": "Los Angeles"},
    {"name": "Charlie", "age": 20, "city": "Chicago"},
    {"name": "David", "age": 35, "city": "New York"},
    {"name": "Elsie", "age": 31, "city": "New York"}]

print(len(filter(people, 30, "New York")))
```

What will be the output of the snippet of code?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Sub-Section Number : 4

Sub-Section Id : 640653134615

Question Shuffling Allowed : Yes

Question Number : 36 **Question Id :** 640653906326 **Question Type :** MSQ **Calculator :** Yes

Correct Marks : 3 **Max. Selectable Options :** 0

Question Label : Multiple Select Question

Consider the below snippets which are intended to create a dictionary with the elements as key and their frequency in the given list as values.

Snippet-1

```
L = ['yellow', 'indigo', 'blue', 'yellow', 'blue']
freq = {word: L.count(word) for word in L}
print(freq)
```

Snippet-2

```
L = ['yellow', 'indigo', 'blue', 'yellow', 'blue']
freq = {word: count(word) for word in L}
print(freq)
```

Choose all the correct options regarding the given code .

Options :

6406533050828. ✓ Snippet-1 is correct

6406533050829. ✗ Snippet-2 is correct

The correct snippet generates the output:

```
{['yellow': 2], ['indigo': 1], ['blue': 2]}
```

6406533050830. ✗

The correct snippet generates the output:

```
{'yellow': 2, 'indigo': 1, 'blue': 2}
```

6406533050831. ✓

Question Number : 37 Question Id : 640653906327 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Select error-free implementations of a program that reads and prints `input.txt` line by line. If the file doesn't exist, the program should terminate without raising any error.

Options :

6406533050832. ✓

```
try:  
    f = open('input.txt', 'r')  
    for line in f:  
        print(line.strip())  
except FileNotFoundError:  
    print('File does not exist')
```

```
try:  
    f = open('input.txt', 'r')  
    for line in f:  
        print(line.strip())  
except:  
    print('File does not exist')
```

6406533050833. ✓

```
try:  
    f = open('input.txt', 'r')  
    for line in f:  
        print(line.strip())  
except InvalidError:  
    print('File does not exist')
```

6406533050834. ✗

```
try:  
    f = open('input.txt', 'r')  
    for line in f:  
        print(line.strip())  
except FileNotFoundError:  
    print('File does not exist')  
  
except:  
    print('This is for all other errors that might come up')
```

6406533050835. ✓

Sub-Section Number :

5

Sub-Section Id :

640653134616

Question Shuffling Allowed :

Yes

Question Number : 38 Question Id : 640653906328 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following python code.

```
def word_shuffle(s, t):
    if len(s) != len(t):
        return False
    dict_s = {}
    dict_t = {}

    for char in s:
        dict_s[char] = dict_s.get(char, 0) + 1

    for char in t:
        dict_t[char] = dict_t.get(char, 0) + 1

    return dict_s == dict_t
```

Each input is a word in which all the characters are in lower case. These will be set as argument when the function `word_shuffle()` is called. Select all set of arguments which will return True.

Hint:

`dict.get(key, default_value)` returns the value corresponding to the `key`, if `key` is not found then it returns the `default_value`.

Example:

```
sample_dict = {'a' : 1}
sample_dict.get('a') # returns 1
sample_dict.get('b') # returns None
sample_dict.get('b',0) # retuns 0
```

Options :

6406533050836. ❌ "rat", "cat"

6406533050837. ✓ "listen", "silent"

6406533050838. ✓ "race", "care"

6406533050839. ✘ "train", "intro"

Sub-Section Number : 6

Sub-Section Id : 640653134617

Question Shuffling Allowed : No

Question Id : 640653906329 Question Type : COMPREHENSION Sub Question Shuffling

Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (39 to 40)

Question Label : Comprehension

Consider the class `Player` :

```
class Player:  
    def __init__(self, name, score):  
        self.name = name  
        self.score = score  
  
    def change_score(self, new_score):  
        self.score = new_score  
  
    def print_info(self):  
        print(f'Player name: {self.name}')  
        print(f'Player score: {self.score}')
```

`Captain` is a sub-class of `Player`:

```
class Captain(Player):  
    count = 0  
  
    def __init__(self, name, score, game_type):  
        super().__init__(name, score)  
        self.game_type = game_type  
        Captain.count += 1  
  
    def is_Cricket(self):  
        return self.game_type == 'Cricket'  
  
    def print_info(self):  
        super().print_info()  
        print('Player is a Captain')  
        print(f'Game type: {self.game_type}')
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 39 Question Id : 640653906330 Question Type : MCQ Calculator : Yes

Correct Marks : 1.5

Question Label : Multiple Choice Question

What is the output of the following snippet of code?

```
capt = Captain('Ronaldo', 708, 'Football')
capt.change_score(800)
capt.print_info()
```

Options :

Player name: Ronaldo
Player score: 800

6406533050840. ✘

Player is a Captain
Game type: Football

6406533050841. ✘

Player name: Ronaldo
Player score: 708
Player is a Captain
Game type: Football

6406533050842. ✘

Player name: Ronaldo
Player score: 800
Player is a Captain
Game type: Football

6406533050843. ✓

Question Number : 40 Question Id : 640653906331 Question Type : SA Calculator : None

Correct Marks : 1.5

Question Label : Short Answer Question

`matches` represents a list of objects of type `Captain`. What is the output of the following snippet of code?

```
Captain.count = 0
matches = [Captain('Ali', 678, 'Football'),
           Captain('Sachin', 128, 'Cricket'),
           Captain('Madonna', 134, 'Football'),
           Captain('Dhoni', 120, 'Cricket')]
count = 0

for c in matches:
    if c.is_Cricket():
        count = count + 1
print(count)
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Sub-Section Number : 7

Sub-Section Id : 640653134618

Question Shuffling Allowed : No

Question Id : 640653906332 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Question Pattern Type :** NonMatrix
Calculator : None

Question Numbers : (41 to 43)

Question Label : Comprehension

Execute the following snippet of code and answer the given sub-questions

```
li = ['valorant', 'apex', 'cod']

def count(s):
    n = 0
    for char in s:
        if char in 'aeiou':
            n += 1
    return {s : n}

def recursiveFunc(n):
    if n <= 0:
        print("Blastoff!")
    else:
        print(n)
        elem = li.pop(0)
        li.append(count(elem))
        recursiveFunc(n - 1)

recursiveFunc(3)
```

Sub questions

Question Number : 41 Question Id : 640653906333 Question Type : MCQ Calculator : Yes

Correct Marks : 1.5

Question Label : Multiple Choice Question

What will be printed when the code
is run?

Options :

- 3
- 2
- 1

6406533050845. ✘

6406533050846. ✓

3
2
1
Blastoff!

Blastoff!

1
2
3

6406533050847. ✘

3
2
1
Blastoff!
Blastoff!

6406533050848. ✘

Question Number : 42 Question Id : 640653906334 Question Type : MCQ Calculator : Yes

Correct Marks : 1.5

Question Label : Multiple Choice Question

What will be the value of `li`

at the end of execution?

Options :

6406533050849. ✘ `['valorant', 'apex', 'cod']`

6406533050850. ✘ `['cod', 'apex', 'valorant']`

6406533050851. ✘ `[{'cod': 1}, {'apex': 2}, {'valorant': 3}]`

6406533050852. ✓ `[{'valorant': 3}, {'apex': 2}, {'cod': 1}]`

Question Number : 43 Question Id : 640653906335 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

For which argument will the function

`recursiveFunc()` cause an error?

Options :

6406533050853. ✘ `recursiveFunc(1)`

6406533050854. ✘ `recursiveFunc(-1)`

6406533050855. ✓ `recursiveFunc(5)`

6406533050856. ✘ `recursiveFunc(0)`

DBMS

Section Id :	64065364206
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	21
Number of Questions to be attempted :	21
Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134619
Question Shuffling Allowed :	No

Question Number : 44 Question Id : 640653906336 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

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

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

6406533050857. ✓ YES

6406533050858. ✗ NO

Sub-Section Number : 2

Sub-Section Id : 640653134620

Question Shuffling Allowed : Yes

Question Number : 45 Question Id : 640653906337 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Let $S(Y, U, V)$ be a relation. Let $R(P, W, X, Y, Z)$ be another relation with the following functional dependencies:

$$\mathcal{F} = \{X \rightarrow ZW, Y \rightarrow X, W \rightarrow P\}$$

R contains 250 tuples and S contains 300 tuples. What is the maximum number of tuples possible as output of $R \times S$?

Options :

6406533050859. ✗ 75000

6406533050860. ✗ 250

6406533050861. ✓ 300

6406533050862. ✗ 50

Question Number : 46 Question Id : 640653906338 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Choose the correct output obtained on running the given SQL statements on Table Employee.

EID	EName
E01	Arthur
E02	Raina
E03	Meena
E04	Arthur
E06	Joey

Table Employee

```
SQL> SAVEPOINT SP1;
SQL> UPDATE Employee SET EName='Jainie'
      WHERE EID='E06';
SQL> SAVEPOINT SP2;
SQL> DELETE FROM Employee WHERE EID='E02';
SQL> SAVEPOINT SP3;
SQL> UPDATE Employee SET EName='Raina'
      WHERE EID='E04';
SQL> ROLLBACK TO SP2;
```

Options :

EID	EName
E01	Arthur
E02	Raina
E03	Meena
E04	Arthur
E06	Jainie

6406533050863. ✓

EID	EName
E01	Arthur
E03	Meena
E04	Arthur
E06	Jainie

6406533050864. ✘

EID	EName
E01	Arthur
E03	Meena
E04	Raina
E06	Jainie

6406533050865. ✘

EID	EName
E01	Arthur
E02	Raina
E03	Meena
E04	Arthur
E06	Joey

6406533050866. ✘

Question Number : 47 Question Id : 640653906339 Question Type : MCQ Calculator : Yes**Correct Marks : 2**

Question Label : Multiple Choice Question

Given below are four statements. Match each of them with the corresponding property in the set of ACID properties.

Statement 1: Any data written to the database must be valid according to all the defined rules like the check and key constraints and triggers.

Statement 2: Every completed transaction is saved into the secondary storage.

Statement 3: During money transfer, either the amount debited from the source account must be credited to the destination account or the money should not be debited from the source account at all.

Statement 4: If multiple transactions are being executed concurrently, then the final result should be the same irrespective of the sequence in which the transactions were executed.

Let A denote Atomicity, C denote Consistency, I denote Isolation and D denote Durability. From among the given options, find the correct match.

Options :

6406533050867. ✘ 1 - A, 2 - C, 3 - I, 4 - D

6406533050868. ✓ 1 - C, 2 - D, 3 - A, 4 - I

6406533050869. ✘ 1 - C, 2 - D, 3 - I, 4 - A

6406533050870. ✘ 1 - I, 2 - A, 3 - D, 4 - C

Question Number : 48 Question Id : 640653906340 Question Type : MCQ Calculator : Yes**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the following monthly backup schedule used by a company:

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1/ Full	2/ Incremental	3/ Incremental	4/ Incremental	5/ Incremental	6/ Incremental	7/ Differential
8/ Incremental	9/ Incremental	10/ Incremental	11/ Incremental	12/ Differential	13/ Incremental	14/ Incremental
15/ Incremental	16/ Incremental	17/ Differential	18/ Incremental	19/ Incremental	20/ Incremental	21/ Incremental
22/ Differential	23/ Incremental	24/ Incremental	25/ Incremental	26/ Incremental	27/ Incremental	28/ Incremental
29/ Incremental	30/ Incremental					

If a failure occurs on the 27th day of the month before the backup for the day has been completed, how many backup sets have to be loaded for a full recovery?

Options :

6406533050871. ✘ 4

6406533050872. ✘ 5

6406533050873. ✓ 6

6406533050874. ✘ 7

Question Number : 49 Question Id : 640653906343 Question Type : MCQ Calculator : Yes**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the table Players as given below:

PID	name	gender	level
001	Percy	Male	International
002	Jason	Male	District
003	Hazel	Female	National
004	Leo	Male	National
005	Rayna	Female	District
006	Annabeth	Female	National
007	Frank	Male	International
008	Piper	Female	District

Table 1: Players

Let us create two different bitmap indices, one on the *gender* attribute and the other on the *level* attribute. Which of the following options will give the correct result if we want to find all females who are playing in the 'District' level.

Note: Options are in the form of gender (operation) level

Options :

6406533050883. ✓ 00101101 AND 01001001

6406533050884. ✗ 00101101 OR 00110100

6406533050885. ✗ 11010010 AND 01001001

6406533050886. ✗ 11010010 OR 00110100

Sub-Section Number :

3

Sub-Section Id :

640653134621

Question Shuffling Allowed :

Yes

Question Number : 50 Question Id : 640653906341 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider a schedule S given below where $W_i(a)$ means that transaction T_i is performing a write operation on data item (a) and similarly $R_i(a)$ means that transaction T_i is performing a read operation on data item (a) .

S : $R_1(B), R_4(A), W_2(A), W_3(C), R_1(B), W_2(A), W_3(A), W_4(D), R_2(D), R_1(D)$

Identify the appropriate time stamp ordering for transactions T_1, T_2, T_3 and T_4 that allows to execute the given schedule S using the time stamp protocol.

Options :

6406533050875. ✗ 20, 30, 25, 15

6406533050876. ✗ 15, 20, 25, 30

6406533050877. ✓ 20, 25, 30, 15

6406533050878. ✗ 20, 25, 15, 30

Question Number : 51 Question Id : 640653906342 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

The following key values are inserted into a B^+ tree of order 4 in a given sequence. The tree is initially empty.

25,8,13,59,3,31,60,11,43

How many node splits will be required to perform these insertions?

Options :

6406533050879. ✘ 5

6406533050880. ✘ 4

6406533050881. ✘ 6

6406533050882. ✓ 3

Question Number : 52 Question Id : 640653906344 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Imagine you're designing a database for an employee management system where employees are categorized based on their departments, job roles, and joining dates. The schema includes a relation $\text{Employees}(EmpID, EmpName, Dept, JobRole, JoiningDate)$ to store information about the employees.

Choose the correct sets of functional dependencies for the relation

$\text{Employees}(EmpID, EmpName, Dept, JobRole, JoiningDate)$ under which Employees is in 3NF:

Options :

6406533050887. ✓ $\{EmpID \rightarrow (EmpName, Dept, JobRole, JoiningDate)\}$

6406533050888. ✘ $\{EmpID \rightarrow (EmpName, Dept, JobRole, JoiningDate), EmpName \rightarrow JoiningDate\}$

6406533050889. ✘ $\{EmpID \rightarrow (EmpName, Dept), Dept \rightarrow (JobRole, joiningDate)\}$

6406533050890. ✘ $\{EmpID \rightarrow EmpName, EmpName \rightarrow (Dept, JobRole, JoiningDate)\}$

Sub-Section Number :

4

Sub-Section Id :

640653134622

Question Shuffling Allowed :

Yes

Question Number : 53 Question Id : 640653906346 Question Type : MSQ Calculator : Yes

Correct Marks : 1 Max. Selectable Options : 0

Question Label : Multiple Select Question

Choose the correct statement(s):

Options :

- 6406533050895. ✓ In a dense index, index record appears for every search-key value in the file.
- 6406533050896. ✓ Secondary index is also called non-clustering index
- 6406533050897. ✓ Sparse index contains index records for only some search-key values.
- 6406533050898. ✓ In an ordered index, index entries are stored sorted on the search key value.

Sub-Section Number :

5

Sub-Section Id :

640653134623

Question Shuffling Allowed :

Yes

Question Number : 54 Question Id : 640653906345 Question Type : MSQ Calculator : Yes**Correct Marks : 3 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Let $A(T, U, V, W)$ be a relational schema with the following functional dependencies:

$$\mathcal{F} = \{W \rightarrow UT, UV \rightarrow W, V \rightarrow T, W \rightarrow U\}$$

We want to decompose the relation A into 3NF. We asked ChatGPT to decompose the relation into 3NF and below shown is the response from ChatGPT:

The decomposed schema in 3NF is:

1. R1(W, U, T)
2. R2(V, T)
3. R3(U, V, W)

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

Options :

6406533050891. ✓ The decomposition **R1, R2, R3** are in 3NF and all the dependencies are getting preserved.

6406533050892. ✗ In the decomposition, **R2** is not required. As **R1 and R3** is sufficient decomposition in 3NF and all the dependencies are getting preserved.

6406533050893. ✗ In the decomposition, **R1** is not required. As **R2 and R3** is sufficient decomposition in 3NF and all the dependencies are getting preserved.

6406533050894. ✓ In the decomposition, **R2** is not required. As **R1 and R3** is sufficient decomposition in 3NF but all the dependencies will not get preserved.

Question Number : 55 Question Id : 640653906347 Question Type : MSQ Calculator : Yes**Correct Marks : 3 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Consider the following schedule S.

$$S : R_1(A), R_2(B), W_1(C), Com_1, R_3(B), R_3(C), W_2(B), W_3(A), Com_2, Com_3$$

Which of the following options is/are correct?

Options :

6406533050899. ✗ Schedule **S** can not be two-phase lockable.

6406533050900. ✓ Schedule **S** can be two-phase lockable.

6406533050901. ✓ Schedule **S** can be strict two-phase lockable.

6406533050902. ✓ Schedule **S** is conflict serializable.

Question Number : 56 Question Id : 640653906348 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following schedule **S**.

T1	T2
r(A)	r(b)
w(A)	r(A)
	w(A)
	w(B)
r(B)	
w(B)	

Table 2: schedule: **S**

Which of the following is true for schedule **S**?

Options :

6406533050903. ✗ Schedule **S** is Conflict serializable

6406533050904. ✗ Schedule **S** is View serializable

6406533050905. ✓ Schedule **S** is not Conflict Serializable

6406533050906. ✓ Schedule **S** is not View Serializable

Question Number : 57 Question Id : 640653906349 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Given relation `student_info(roll_no, name, subject, marks)` with `(roll_no, subject)` as candidate key. Which of the following functional dependencies violates the Third normal form(3NF)?

Options :

6406533050907. ✗ $roll_no, subject \rightarrow marks$

6406533050908. ✗ $roll_no, subject \rightarrow name$

6406533050909. ✓ $name \rightarrow marks$

6406533050910. ✓ $marks \rightarrow name$

Question Number : 58 Question Id : 640653906350 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following schema

Customers(C_id, C_name, address)

Items(Itm_id, Itm_name)

Orders(ord_id, C_id, Itm_id, cost)

Which of the following relational algebra expressions returns the name of customers who purchased biscuits?

Options :

6406533050911. ❌ $\Pi_{C_name}(\sigma_{Itm_name='biscuits'} Items \bowtie Orders)$

6406533050912. ✓ $\Pi_{C_name}(\Pi_{C_id}(\Pi_{Itm_id}(\sigma_{Itm_name='biscuits'} Items) \bowtie Orders) \bowtie Customers)$

6406533050913. ❌ $\Pi_{C_name}(\sigma_{Itm_name='biscuits'} Items \bowtie Customers)$

6406533050914. ✓ $\Pi_{C_name}((\sigma_{Itm_name='biscuits'} Items) \bowtie Orders \bowtie Customers)$

Question Number : 59 Question Id : 640653906352 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following schema

Students(StudentID, Name, Department)

Hostels(HostelID, H_name)

Hostel_Allocation(StudentID, HostelID, RoomNumber)

Which of the following queries returns the *StudentID* and *Name* of students to whom Narmada hostel is allotted?

Options :

6406533050919. ✓
SELECT Students.StudentID, Students.Name FROM Students
JOIN Hostel_Allocation ON Students.StudentID = Hostel_Allocation.StudentID
JOIN Hostels ON Hostel_Allocation.HostelID = Hostels.HostelID
WHERE Hostels.H_name = 'Narmada';

6406533050920. ❌
SELECT StudentID, Name FROM Students WHERE StudentID IN
(SELECT HostelID from Hostels WHERE Hostels.H_Name = 'Narmada');

```
SELECT Students.StudentID, Students.Name FROM Students  
JOIN Hostel_Allocation ON Students.StudentID = Hostel_Allocation.StudentID  
6406533050921. ✘ WHERE Hostels.H_Name = 'Narmada';
```

```
SELECT StudentID, Name FROM Students WHERE StudentID IN  
(SELECT StudentID from Hostel_Allocation WHERE HostelID =  
6406533050922. ✓ (SELECT HostelID from Hostels WHERE Hostels.H_Name = 'Narmada'));
```

Sub-Section Number :

6

Sub-Section Id :

640653134624

Question Shuffling Allowed :

Yes

Question Number : 60 Question Id : 640653906354 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

The following numbers are inserted into an empty binary search tree in the given order: 27, 23, 33, 49, 51, 92, 83, 10, 78. What is the height of the resulting binary search tree?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

6

Question Number : 61 Question Id : 640653906355 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

Consider a **Block nested loop join** for the two relations,**instructor** and **department**. Assuming the worst-case memory availability and **instructor** as the outer relation, the provided details are as follows:

- Total number of block transfers: 20500
- Total number of seeks required: 1000
- Number of block in the outer relation: 500

What is the number of blocks in the inner relations?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

40

Sub-Section Number : 7

Sub-Section Id : 640653134625

Question Shuffling Allowed : Yes

Question Number : 62 **Question Id :** 640653906356 **Question Type :** SA **Calculator :** None

Correct Marks : 2

Question Label : Short Answer Question

Consider the given log records at an instance of time:

Table 3: Log records

< T_0 start >
< T_0 , A, 100, 200 >
< T_1 start >
< T_1 , B, 400, 300 >
< T_0 , C, 500, 600 >
< T_2 start >
< T_2 , D, 800, 700 >
< Commit T_1 >
< Checkpoint L >
< T_2 , C, 500, 1000 >
< Commit T_2 >
< T_0 , B, 400, 500 >

Suppose there is a system crash after the last log record. What will be the value of the expression $(B+C)-(A+D)$, based on the values stored on the disk at that point:

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

500

Sub-Section Number : 8

Sub-Section Id : 640653134626

Question Shuffling Allowed : Yes

Question Number : 63 **Question Id :** 640653906351 **Question Type :** MSQ **Calculator :** Yes

Correct Marks : 2 **Max. Selectable Options :** 0

Question Label : Multiple Select Question

Consider the relational schema $R(A, B, C, D, E, F, G)$ with the given list of functional dependencies: $\mathcal{F} = \{B \rightarrow AC, E \rightarrow G, CD \rightarrow F\}$
Which of the following is/are a super key for R ?

Options :

6406533050915. ✓ $\{BDE\}$

6406533050916. ✗ $\{DE\}$

6406533050917. ✗ $\{CD\}$

6406533050918. ✗ $\{BGE\}$

Question Number : 64 Question Id : 640653906353 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the ER Diagram as shown below:

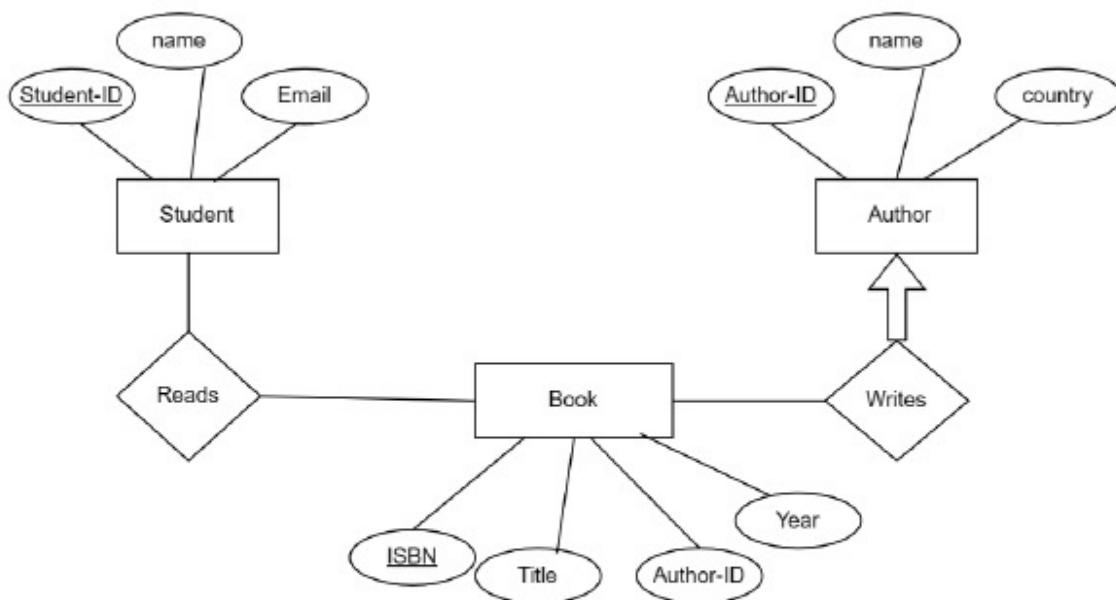


Figure 1: Library

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

Options :

6406533050923. ✗ There might exist an author who has not written any books

6406533050924. ✓ There might exist a student who has not read any book

6406533050925. ✗ An author can write at most one book

6406533050926. ✗ A student can read at most one book

PDSA

Section Id :	64065364207
Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	25
Number of Questions to be attempted :	25
Section Marks :	100
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134627
Question Shuffling Allowed :	No

Question Number : 65 Question Id : 640653906357 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

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Options :

6406533050930. ✓ YES

6406533050931. ✗ NO

Sub-Section Number :	2
Sub-Section Id :	640653134628
Question Shuffling Allowed :	Yes

Question Number : 66 Question Id : 640653906358 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the following function:

$$g1(n) = 5n + \log n$$

$$g2(n) = n \log n + n$$

$$g3(n) = n^3 + 100n \log n$$

$$g4(n) = 10 \log n$$

$$g5(n) = n \log (2^n)$$

Arrange the above functions in increasing order of asymptotic complexity.

Options :

6406533050932. ✘ $g4(n), g1(n), g2(n), g3(n), g5(n)$

6406533050933. ✓ $g4(n), g1(n), g2(n), g5(n), g3(n)$

6406533050934. ✘ $g1(n), g4(n), g2(n), g3(n), g5(n)$

6406533050935. ✘ $g4(n), g1(n), g3(n), g2(n), g5(n)$

Question Number : 67 Question Id : 640653906359 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

A list consisting of 2^k elements needs to be sorted on a system. Algorithms A and B require $100n \log_2 n$ and $2n^2$ time respectively. What is the maximum value of k for which algorithm B should be preferred over algorithm A?

Options :

6406533050936. ✓ 8

6406533050937. ✘ 9

6406533050938. ✘ 10

6406533050939. ✘ 11

Question Number : 68 Question Id : 640653906360 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

What is the recurrence and time complexity for the worst case behaviour of **Merge Sort** ?

Options :

6406533050940. ❌ Recurrence is $T(n) = 2T(n/2) + O(n)$ and time complexity is $O(n^2)$

6406533050941. ❌ Recurrence is $T(n) = T(n/2) + O(n)$ and time complexity is $O(n)$

6406533050942. ✓ Recurrence is $T(n) = 2T(n/2) + O(n)$ and time complexity is $O(n \log n)$

6406533050943. ❌ Recurrence is $T(n) = 2T(n/2) + O(1)$ and time complexity is $O(n \log n)$

Question Number : 69 Question Id : 640653906362 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider following is the updated list after applying the **Quick-sort partition** algorithm once.

```
L = [21, 33, 29, 34, 45, 48, 40, 60, 65]
```

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

Options :

6406533050945. ❌ 1

6406533050946. ❌ 2

6406533050947. ❌ 3

6406533050948. ✓ 4

Question Number : 70 Question Id : 640653906363 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

There is a stack `s` and a queue `Q`. Suppose the elements A, B, C, D, E, F, G and H are enqueued into `Q` in the reverse order i.e., starting from H . The following operations are performed on the stack and the queue.

```
1 S.push(Q.dequeue())
2 S.push(Q.dequeue())
3 S.push(Q.dequeue())
4 Q.enqueue(S.pop())
5 Q.enqueue(S.pop())
6 S.push(Q.dequeue())
7 S.push(Q.dequeue())
8 Q.enqueue(S.pop())
9 Q.enqueue(S.pop())
```

What is the state of queue `Q` after the above operation? Consider the first element of the list as front element of queue in options.

Options :

6406533050949. ✓ [C, B, A, F, G, D, E]

6406533050950. ✗ [C, B, A, G, F, D, E]

6406533050951. ✗ [C, B, A, F, G, E, D]

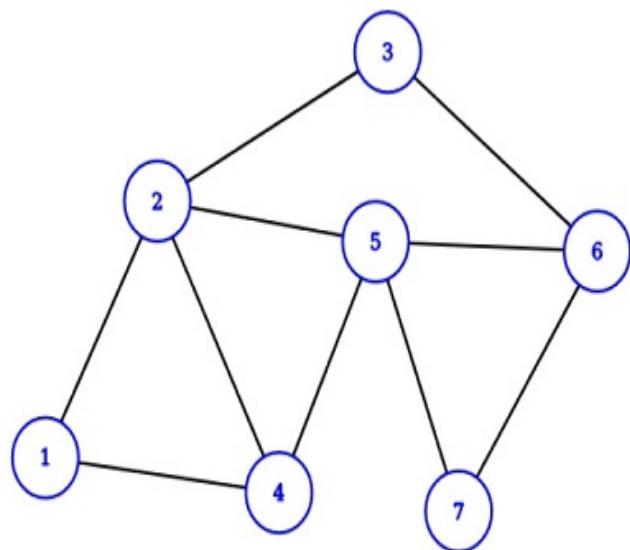
6406533050952. ✗ [C, B, A, G, F, E, D]

Question Number : 71 Question Id : 640653906364 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the following graph



Which of the following vertex sequence is the correct **DFS traversal** on the graph started from node 6? Assume that when a node has multiple neighbours, DFS would visit the numerically smaller valued node first.

Options :

6406533050953. ✓ 6,3,2,1,4,5,7

6406533050954. ✗ 6,3,2,1,5,4,7

6406533050955. ✗ 6,3,2,4,1,5,7

6406533050956. ✗ 6,3,5,7,2,4,1

Question Number : 72 Question Id : 640653906366 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

To determine the minimum number of sequential steps required for a chef to prepare a dish J, consider the following dependencies and constraints for the preparation process, where each step represents a time unit during which one or more items can be prepared in parallel:

1. Item A is used to make items C and D.
2. Item B is added to cook items E and F.
3. Item G is prepared by mixing items D and E.
4. Item B is made by boiling item A.
5. Item H is made by mixing items C and G.
6. Item I is made by adding water to item F.
7. The dish J is prepared by cooking items H and I together.

Given that the chef has enough assistants to work on multiple items in parallel, what is the minimum number of steps required to complete the dish J, considering all dependencies?

Options :

6406533050961. ✗ 4

6406533050962. ✘ 5

6406533050963. ✘ 3

6406533050964. ✓ 6

Question Number : 73 Question Id : 640653906367 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider a weighted, directed acyclic graph $G = (V, E, w)$ in which edges that leave the source vertex s may have negative weights and all other edge weights are non-negative.

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

I. Dijkstra's algorithm computes an incorrect shortest-path weight $\delta(s, t)$ from s to at least one vertex t in this graph G .

II. Bellman's Ford algorithm correctly computes the shortest-path weight $\delta(s, t)$ from s to every vertex t in this graph G .

Options :

6406533050965. ✘ Only I is correct

6406533050966. ✓ Only II is Correct

6406533050967. ✘ Both I and II are correct

6406533050968. ✘ Both I and II are incorrect

Question Number : 74 Question Id : 640653906368 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Which of the following is/are always true about the Floyd-Warshall algorithm?

I. If the shortest path entry `SP[i][i]` in the resultant matrix is negative, then it represents the graph has a negative weight cycle.

II. It works correctly if the graph has negative edge weights but does not have negative weight cycles.

III. It is single source shortest path algorithm.

Options :

6406533050969. ✓ Only statement I and II are correct

6406533050970. ✘ Only statement I and III are correct

6406533050971. ✘ Only statement II and III are correct

6406533050972. ✘ All statements are correct

6406533050973. ✘ All statements are incorrect

Question Number : 75 Question Id : 640653906371 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Pre-order traversal of a given binary search tree T produces the following sequence of keys:

15, 12, 5, 2, 8, 6, 11, 14, 25, 20, 35

Right child of element 8 is__.

Options :

6406533050976. ✘ 12

6406533050977. ✓ 11

6406533050978. ✘ 14

6406533050979. ✘ 8 is a leaf node.

Question Number : 76 Question Id : 640653906376 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the following recursive function to find the maximum element in list L of size n where

lower and upper represents the first index and last index of list L respectively.

```
1 def find_max(L, lower, upper):
2     if upper-lower == 0:
3         return L[lower]
4     mid = (upper+lower) // 2
5     left_max = find_max(L,lower,mid)
6     right_max = find_max(L,mid+1,upper)
7     return max(left_max, right_max)
```

What is the Recurrence relation of the given function?

Options :

6406533050990. ✓ $T(n) = 2T(n/2) + 1$, $T(1) = 1$

6406533050991. ✘ $T(n) = 2T(n/2) + n$, $T(1) = 1$

6406533050992. ✘ $T(n) = T(n/2) + n$, $T(1) = 1$

6406533050993. ✘ $T(n) = T(n/2) + 1$, $T(1) = 1$

Question Number : 77 Question Id : 640653906377 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Subsequence: A subsequence is a sequence that appears in the same relative order in the source strings, but not necessarily consecutively.

In the Longest Common Subsequence problem we are given two string $S_1 = a_1a_2\dots a_m$ and $S_2 = b_1b_2,\dots b_n$. To get the length of Longest Common Subsequence at $LCS[m][n]$, the recursion formula is given as follows to fill matrix $LCS[i][j]$ where $0 \leq i \leq m$ and $0 \leq j \leq n$.

$$LCS[i, j] = \begin{cases} 0, & \text{if } i = 0 \text{ or } j = 0 \\ 1 + LCS[i - 1, j - 1], & \text{if } a_i = b_j \\ \underline{\quad}, & \text{if } a_i \neq b_j \end{cases}$$

Which among the following is the correct statement to fill the blank.

Options :

6406533050994. ✘ $\min(LCS[i - 1, j], LCS[i, j - 1])$

6406533050995. ✓ $\max(LCS[i - 1, j], LCS[i, j - 1])$

6406533050996. ✘ $\min(LCS[i - 1, j] + 1, LCS[i, j - 1] + 1)$

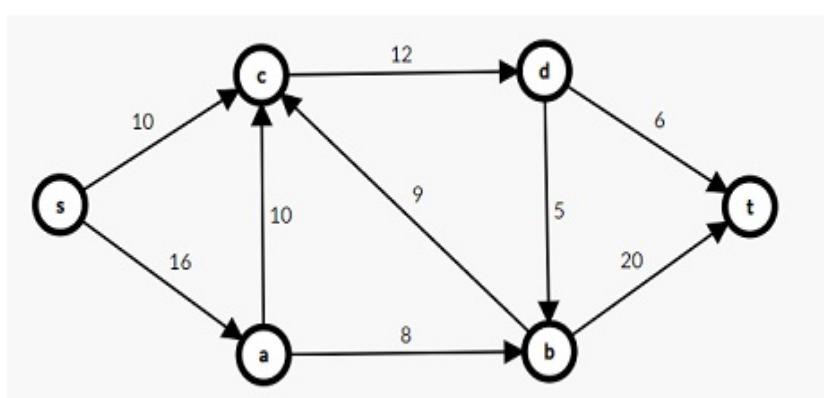
6406533050997. ✘ $LCS[i - 1, j - 1] + 1$

Question Number : 78 Question Id : 640653906382 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the network given below 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__

Options :

6406533051011. ✘ 14

6406533051012. ✘ 25

6406533051013. ✓ 19

6406533051014. ✗ 20

Question Number : 79 Question Id : 640653906383 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

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

Options :

6406533051015. ✗ Y is NP-complete

6406533051016. ✓ Y is NP-hard

6406533051017. ✗ X is NP-complete

6406533051018. ✗ X is NP-hard

Sub-Section Number :

3

Sub-Section Id :

640653134629

Question Shuffling Allowed :

Yes

Question Number : 80 Question Id : 640653906361 Question Type : SA Calculator : None

Correct Marks : 4

Question Label : Short Answer Question

Given the following sorted list :

[16, 53, 59, 81, 94, 99, 121, 150, 162, 170]

If we use the binary search algorithm to search for element 99 in the given list, then the number of list elements for comparison to 99 (including comparison with 99 in list) in this process is__.

Note: Assume here that binary search will compute the midpoint by using

$(First\ index + Last\ index)/2$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 81 Question Id : 640653906369 Question Type : SA Calculator : None

Correct Marks : 4

Question Label : Short Answer Question

Consider a complete undirected graph with vertex set {0, 1, 2, 3, 4}. Every entry $w[i][j]$ where $i \neq j$ in the matrix w below is the weight of the edge from vertex i to vertex j .

$$W = \begin{bmatrix} 0 & 2 & 10 & 3 & 5 \\ 2 & 0 & 8 & 4 & 6 \\ 10 & 8 & 0 & 9 & 7 \\ 3 & 4 & 9 & 0 & 1 \\ 5 & 6 & 7 & 1 & 0 \end{bmatrix}$$

What is the weight of the minimum spanning tree for the given graph?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

13

Question Number : 82 Question Id : 640653906370 Question Type : SA Calculator : None

Correct Marks : 4

Question Label : Short Answer Question

The number of leaf nodes in a rooted tree of 10 nodes, with each node having 0 or 3 children is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

7

Question Number : 83 Question Id : 640653906373 Question Type : SA Calculator : None

Correct Marks : 4

Question Label : Short Answer Question

Consider the following tasks T_1, \dots, T_9 .

Task	T1	T2	T3	T4	T5	T6	T7	T8	T9
Deadline	7	2	5	3	4	5	2	7	3

The execution of each task requires one unit of time. We can execute one task at a time. What is the maximum number of tasks that can be completed without lateness(before or by the deadline)? Consider the start time 0.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

7

Question Number : 84 **Question Id :** 640653906375 **Question Type :** SA **Calculator :** None

Correct Marks : 4

Question Label : Short Answer Question

Consider the following code to find median.

```
1 def MoM(L):
2     if len(L) <= 5:
3         L.sort()
4         return L[2]
5     M = []
6     for i in range(0,len(L),5):
7         X = L[i:i+5]
8         X.sort()
9         M.append(X[2])
10    return MoM(M)
```

What median value will be returned by the given `MoM` function for the following list?

L = [73, 3, 55, 8, 49, 69, 35, 84, 39, 60, 18, 67, 94, 52, 5, 16, 41, 58, 36, 91, 19, 59, 7, 78, 81]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

52

Sub-Section Number : 4

Sub-Section Id : 640653134630

Question Shuffling Allowed : Yes

Question Number : 85 **Question Id :** 640653906365 **Question Type :** MSQ **Calculator :** Yes

Correct Marks : 4 **Max. Selectable Options :** 0

Question Label : Multiple Select Question

Let T_B and T_D be the BFS tree and DFS tree respectively generated when BFS and DFS are applied on the node s in undirected and unweighted graph G . Let $d(x)$ be the shortest distance of node x from the node s in G . Which among the following statements is/are correct ?

Options :

6406533050957. ✓ For every neighbor v of s in graph G , the edge (s, v) must exist in T_B .

6406533050958. ✗ If (u, v) is an edge of G that is not in T_B then $|d(u) - d(v)| > 1$.

6406533050959. ✗ If there is path from s to u in T_D , then u is in a different component from s .

6406533050960. ✓ The number of edges in T_B and T_D is equal.

Question Number : 86 Question Id : 640653906372 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider a binary **max-heap** implemented using list. Which of the following lists represents a binary max-heap?

Options :

6406533050980. ✗ [25, 12, 16, 13, 10, 8, 14]

6406533050981. ✗ [25, 14, 13, 16, 10, 8, 12]

6406533050982. ✓ [25, 14, 16, 13, 10, 8, 12]

6406533050983. ✓ [25, 14, 16, 13, 12, 8, 10]

Question Number : 87 Question Id : 640653906374 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

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

Options :

In a Huffman tree, if a leaf labelled x is at depth(from root) smaller than the leaf labelled y ,

6406533050985. ✓ then $frequency(x) \geq frequency(y)$.

6406533050986. ✓ Huffman coding algorithm uses greedy approach to construct the Huffman tree.

In a Huffman tree, if a leaf labelled x is at depth(from root) smaller than the leaf labelled y ,

6406533050987. ✗ then $frequency(x) \leq frequency(y)$.

6406533050988. ✗ In Huffman codes, The code of one character can be prefix of other character's code.

Question Number : 88 Question Id : 640653906381 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

A company makes two kinds of leather belts, belt A and belt B . Belt A is a high quality belt and belt B is of lower quality. The respective profits are Rs 4 and Rs 3 per belt. The production of each type A requires twice as much time as a belt of type B ; if all belts were of type B , the company could make only 1000 belts per day. The supply of leather is sufficient for only 800 belts per day (both A and B combined). Belt A requires a fancy buckle and only 400 of these are available per day. There are only 700 buckles a day available for belt B .

The above problem is to be formulated as a linear programming problem. Let x_1 and x_2 be the number of belts of type A and B respectively manufactured each day.

Which of the following is/are valid constraints ?

Options :

6406533051006. ✓ $x_1 \leq 400$

6406533051007. ✓ $x_2 \leq 700$

6406533051008. ✗ $x_1 + 2x_2 \leq 800$

6406533051009. ✓ $2x_1 + x_2 \leq 1000$

6406533051010. ✗ $x_1, x_2 \leq 0$

Sub-Section Number :

5

Sub-Section Id :

640653134631

Question Shuffling Allowed :

No

Question Id : 640653906378 Question Type : COMPREHENSION Sub Question Shuffling

Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (89 to 90)

Question Label : Comprehension

Your final end term exams are going to be over and you are catching up on Netflix. You have a schedule of interesting live shows during the next day. You hate to start or stop watching a show midway, so your aim is to watch as many complete shows as possible during the day.

Suppose there are n such shows S_1, S_2, \dots, S_n available during the same day.

The shows are ordered by starting time, so for each $i \in \{1, 2, \dots, n - 1\}$, S_i starts before S_{i+1} . However, show S_i may not end before S_{i+1} starts, so for each $i \in \{1, 2, \dots, n - 1\}$, $\text{next}[i]$ is the smallest $j > i$ such that S_j starts after S_i finishes if such a j exists, otherwise -1 . Given the sequence S_1, S_2, \dots, S_n and the values $\text{next}[i]$ for each $i \in \{1, 2, \dots, n - 1\}$, aim is to compute the maximum number of complete shows that can be watched.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 89 Question Id : 640653906379 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the following dynamic programming approach. Let $\text{watch}[i]$ denote the maximum number of complete shows that can be watched among S_i, \dots, S_n .

Consider the following

optimal substructure of $\text{watch}[i]$

for $i \in n, n - 1, n - 2, \dots, 2, 1$?

$$\text{watch}[i] = \begin{cases} 1, & \text{if } i = n \\ \text{watch}[i + 1], & \text{if } \text{next}[i] = -1 \\ \underline{\quad}, & \text{if } \text{next}[i] \neq -1 \end{cases}$$

Which among the following statements

fills the blank correctly ?

Options :

6406533050998. ✓ $\max\{1 + \text{watch}[\text{next}[i]], \text{watch}[i + 1]\}$

6406533050999. ✘ $\max\{watch[next[i]], watch[i + 1]\}$

6406533051000. ✘ $\max\{watch[next[i]], 1 + watch[i + 1]\}$

6406533051001. ✘ $\max\{1 + watch[next[i]], 1 + watch[i + 1]\}$

Question Number : 90 Question Id : 640653906380 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

What is the time complexity of the given algorithm ?

Options :

6406533051002. ✘ $O(n^2)$

6406533051003. ✘ $O(n \log n)$

6406533051004. ✓ $O(n)$

6406533051005. ✘ $O(n^3)$

AppDev1

Section Id :	64065364208
Section Number :	5
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	32
Number of Questions to be attempted :	32
Section Marks :	100
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134632
Question Shuffling Allowed :	No

Question Number : 91 Question Id : 640653906384 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : MODERN APPLICATION DEVELOPMENT I (COMPUTER BASED EXAM)"

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

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

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

Options :

6406533051019. ✓ YES

6406533051020. ✘ NO

Sub-Section Number : 2

Sub-Section Id : 640653134633

Question Shuffling Allowed : Yes

Question Number : 92 Question Id : 640653906385 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following Python code snippet.

```

file.py
from jinja2 import Template
import sys
input_list = sys.argv
var_a, var_b = input_list[1], input_list[2]

if input_list[1]=="Meera":
    var_b = "Data Analyst"
elif input_list[1]=="Radha":
    var_b = "Scientist"
else:
    pass
template = "{{var_a}} is {{var_b}}"
t = Template(template)
print(t.render(var_a = var_a, var_b = var_b))

```

Map the commands in column A with the output on the terminal in column B.

Column A	Column B
a) python file.py Radha Data Analyst	1) Meera is Scientist
b) python file.py Meera Scientist	2) Sneha is Web
c) python file.py Sneha Web Developer	3) Meera is Data Analyst
	4) Radha is Data Analyst
	5) Radha is Scientist
	6) Sneha is Web developer

Options :

6406533051021. ✘ a - 4, b - 1, c - 6

6406533051022. ✘ a - 5, b - 3, c - 6

6406533051023. ✘ a - 5, b - 1, c - 2

6406533051024. ✓ a - 5, b - 3, c - 2

Question Number : 93 Question Id : 640653906386 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following HTML document.

```

<!DOCTYPE html>
<html>
<head>
    <style>
        span {
            background-color: yellow;
            color: red;
        }
        #id {
            border: 2px solid purple;
            color: blue;
            display: inline-block;
        }
        .class {
            background-color: aqua;
            color: red;
            display: block;
            width: 20%;
        }
    </style>
</head>
<body>
    <span class="class" id="id">SPAN</span>
    <span class="class">SPAN</span>
    <span>SPAN</span>
</body>
</html>

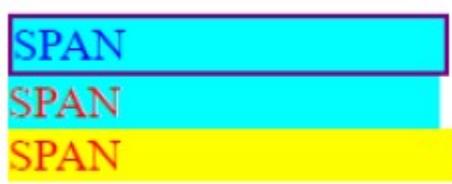
```

How will the browser render above HTML file?

Options :

6406533051025. ✘ 

6406533051026. ✘ 

6406533051027. ✘ 

6406533051028. ✓

SPAN

SPAN

SPAN

Question Number : 94 Question Id : 640653906387 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following flask application.

app.py

```
from flask import Flask, request
app = Flask(__name__)
@app.route('/calculate')
def calculate():
    a = request.args.get('a')
    b = request.args.get('b')
    operator = request.args.get('operator')
    if a and b and operator:
        if operator == 'one':
            return f'{a} + {b} = {a+b}'
        elif operator == 'two':
            return f'{a} - {b} = {int(a) - int(b)}'
        elif operator == 'three':
            return f'{a} x {b} = {int(a)*b}'
    else:
        return 'Error: Insufficient arguments'
app.run(debug=True)
```

If the application is running locally on <http://127.0.0.1:5000> then match the URLs with their rendered output?

	URLs		Output
1	http://localhost:5000/calculate?a=4&b=2&operator=two	a	$4 \times 2 = 8$
2	http://localhost:5000/calculate?a=4&b=2&operator=three	b	$4 + 2 = 6$
3	http://localhost:5000/calculate?a=4&b=2&operator=one	c	$4 - 2 = 2$
		d	$4 + 2 = 42$
		e	$4 \times 2 = 2222$

Options :

640653051029. ✖ 1-c, 2-a, 3-b

640653051030. ✖ 1-c, 2-a, 3-d

6406533051031. ✓ 1-c, 2-e, 3-d

6406533051032. ✗ 1-c, 2-a, 3-e

Question Number : 95 Question Id : 640653906396 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Which of the following flask view functions will return a 200 OK for the URL:

`http://127.0.0.1:5000/details/1001/Michael ?`

Options :

```
@app.route('/details/<int:id>/<string:name>')
def show(id, name):
    details = {'student_id': id, 'student_name': name}
    return details
```

6406533051061. ✗

```
@app.route('/details/<string:id>/<string:name>')
def show(id, name):
    details = {'student_id': id, 'student_name': name}
    return details
```

6406533051062. ✗

```
@app.route('/details/<id>/<name>')
def show(id, name):
    details = {'student_id': id, 'student_name': name}
    return details
```

6406533051063. ✗

6406533051064. ✓ All of these

Question Number : 96 Question Id : 640653906397 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider a function func, and a set of test cases given below.

Filename: test_file.py

```
import pytest
def func(x,y):
    out = x**2+y**2
    return out

class Test_class0():
    def test_case1(self):
        assert func(1,2) == 5

    def case_test2(self):
        assert func(2,3) == 13

    def case_test3(self):
        assert func(6,2) == 38

class Test_class1():
    def test_case1(self):
        assert func(5,2) == 29

    def case_test2(self):
        assert func(1,1) == 2
```

What will be the output on the terminal for the command below?

pytest test_file.py -k Test_class

Options :

6406533051065. ✘ == 1 failed, 4 passed in 0.17s ===

6406533051066. ✘ == 2 passed, 3 deselected in 0.17s ===

6406533051067. ✓ == 2 passed in 0.07s ===

6406533051068. ✘ == 3 failed, 2 passed in 0.17s ===

Question Number : 97 Question Id : 640653906400 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

The lens of an HDD can read data on the rotating disk with the speed of 42,000 bits per second.

The disk is designed such that 600 bits pass under the lens for every revolution of the disk, what should be the maximum speed of disk in RPM so that the lens does not miss any data?

Options :

- 6406533051077. ✘ 70 RPM
- 6406533051078. ✘ 100 RPM
- 6406533051079. ✓ 4200 RPM
- 6406533051080. ✘ 6000 RPM

Question Number : 98 Question Id : 640653906403 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the below two python files code snippets *app.py* and *test_app_route.py*.

app.py

```
from flask import Flask
app = Flask(__name__)

@app.route("/greet/<string:name>")
def home(name):
    return "Hello, " + name

if __name__ == "__main__":
    app.run()
```

test_app_route.py:

```
import pytest, requests

@pytest.fixture
def get_response():
    resp = requests.get("http://127.0.0.1:5000/greet/IITM")
    return resp

def test_response(get_response):
    assert get_response.text == "Hello, IITM"
```

Assume that *app.py* and *test_app_route.py* are running on two different terminals. And also all required modules are installed. Which of the below statement(s) are True?

i) Executing the command `pytest test_app_route.py` on the terminal returns

`===== 1 passed =====`

ii) Executing the command `pytest test_app_route.py` on the terminal returns

`===== 1 failed =====`

iii) Executing the command `pytest test_app_route.py` on the terminal returns

`===== 1 selected, 1 passed =====`

iv) Executing the command `pytest test_app_route.py` on the terminal returns

`===== 1 deselected =====`

Options :

6406533051089. ✓ Only statement i is correct

6406533051090. ✗ Only statement ii is correct

6406533051091. ✗ Statements i and iii are correct

6406533051092. ✗ Statements ii and iv are correct

Question Number : 99 Question Id : 640653906405 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following flask resource created using flask_restful.

```
from flask import Flask, request
from flask_restful import Api, Resource, reqparse

app = Flask(__name__)
api = Api(app)

parser = reqparse.RequestParser()
parser.add_argument("val")

class RestApi(Resource):
    def post(self, val):
        arg1 = parser.parse_args()
        arg2 = request.args
        return {
            "Course_1": arg1["val"],
            "Course_2": arg2["val"],
            "Course_3": val
        }

api.add_resource(RestApi, "/api/courses/<val>")
app.run(debug = True)
```

If the application is running locally on `http://127.0.0.1:5000`, What will be the output on the terminal for the command:

```
curl http://127.0.0.1:5000/api/courses/DBMS?val=JAVA -d
"{"val":"PDSA"}" -X POST -H "Content-Type: application/json"
```

Options :

```
{
    "Course_1": "JAVA",
    "Course_2": "PDSA",
    "Course_3": "DBMS"
}
```

6406533051097. ✘

6406533051098. ✘

```
{  
    "Course_1": "DBMS",  
    "Course_2": "JAVA",  
    "Course_3": "PDSA"  
}
```

```
{  
    "Course_1": "PDSA",  
    "Course_2": "JAVA",  
    "Course_3": "DBMS"  
}
```

6406533051099. ✓

```
{  
    "Course_1": "PDSA",  
    "Course_2": "DBMS",  
    "Course_3": "JAVA"  
}
```

6406533051100. ✘

Question Number : 100 Question Id : 640653906409 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

A flask application shown below is running locally on <http://127.0.0.1:5000>.

```
from flask import Flask, request, session, abort

app = Flask(__name__)
app.config['SECRET_KEY'] = "yekterces"

@app.route('/login')
def log_in():
    user = request.args['user']
    role = request.args['role'] if 'role' in request.args else
    'general'
    session['user'], session['role'] = user, role
    return "Logged in successfully!"

@app.route('/home')
def land():
    if 'user' in session:
        if session['role'] == 'admin':
            return f"Welcome {session['user']}"
        return abort(401)
    return abort(404)

@app.route('/logout')
def log_out():
    session.pop('user', None)
    session.pop('role', None)
    return "Logged out sucessfully!"

app.run(debug=True)
```

If the application is running locally on <http://127.0.0.1:5000>, What will be the correct sequence of response status codes if the client visits the URLs one by one in the sequence given below?

1. <http://127.0.0.1:5000/home>
2. <http://127.0.0.1:5000/login/admin>
3. <http://127.0.0.1:5000/login?user=admin>
4. <http://127.0.0.1:5000/home>
5. <http://127.0.0.1:5000/logout>

Options :

6406533051113. *

401
401
200
404
200

404
200
200
200

6406533051114. ✘ 200

404
404
200
401

6406533051115. ✓ 200

404
200
404
200

6406533051116. ✘ 200

Question Number : 101 Question Id : 640653906410 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following flask application.

Python file: app.py

```
from flask import Flask, render_template, request

app = Flask(__name__)

emp = {'admin':'manoj', 'user':'sumit'}

@app.route('/profile/<user>')
def profile(user):
    access = request.args.get('access')
    if emp[access] != user:
        return render_template("profile.html", user = user,
                               access = access, error = True)
    return render_template("profile.html", user = user,
                           access = access, error = False)

app.run()
```

Template file: profile.html

```
<body>
    <div>
        {% if error %}
            <h3>Hi {{user}}, {{access}} access denied</h3>
        {% else %}
            <h3>Hi {{user}}, you are logged in as {{access}}.</h3>
        {% endif %}
    </div>
</body>
```

If the application is running locally on <http://127.0.0.1:5000>, then what will be rendered by the browser for URL,

<http://127.0.0.1:5000/profile/sumit?access=admin> ?

Options :

6406533051117. ✘ **Hi sumit, you are logged in as admin.**

6406533051118. ✘ **Hi sumit, you are logged in as user.**

6406533051119. ✓ **Hi sumit, admin access denied.**

6406533051120. ✘

Hi sumit, user access denied.

Question Number : 102 Question Id : 640653906413 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following models Library and Book corresponding to tables library and book in SQLite database.

```
class Library(db.Model):
    id = db.Column(db.Integer(), primary_key = True)
    name = db.Column(db.String(), unique = True)

class Book(db.Model):
    id = db.Column(db.Integer(), primary_key = True)
    name = db.Column(db.String(), unique = True)
    library = db.Column(db.Integer(), db.ForeignKey("library.id"))
```

Based on the model schemas, what relationship do the classes Library and Book share?

Options :

640653051130. ✘ Many-to-Many

640653051131. ✓ One-to-Many

640653051132. ✘ One-to-One

640653051133. ✘ The tables are not at all related

Question Number : 103 Question Id : 640653906416 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Read the statements given below carefully and select the correct option.

Statement 1: If an element having an ID and a class is styled externally using both its ID and the class, then for the same attribute, it will acquire styling from the latest selector in order.

Statement 2: If an element that belongs to two different classes is styled externally using both the classes, then for the same attribute, it will acquire styling from the latest class in order

Options :

640653051142. ✘ Both statements 1 and 2 are correct

640653051143. ✘ Both statements 1 and 2 are incorrect

640653051144. ✘ Statement 1 is correct but statement 2 is incorrect

640653051145. ✓ Statement 2 is correct but statement 1 is incorrect

Sub-Section Id :

640653134634

Question Shuffling Allowed :

Yes

Question Number : 104 Question Id : 640653906399 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

Consider the following Python code snippet.

log.py

```
import logging
import sys

logging.basicConfig(level=logging.WARNING,
                    format='%(asctime)s - %(levelname)s - %(message)s')

def check_val(value):
    if value < 0:
        raise ValueError("Invalid value: Please enter a positive value.")
    else:
        logging.info("Value added: %s", value)

try:
    input_value = -int(sys.argv[1])
    check_val(input_value)
except ValueError as ve:
    logging.exception("Exception occurred: %s", str(ve))
```

What will be the output on the terminal for the command: python log.py -12 ?

Options :

6406533051073. ✘

2023-08-14 21:01:05,684 - INFO - Value added: 12

6406533051074. ✘

2023-08-14 21:01:05,684 - WARNING - Value added: -12

6406533051075. ✘

Error: Exception occurred: Invalid value: Please enter a positive value.

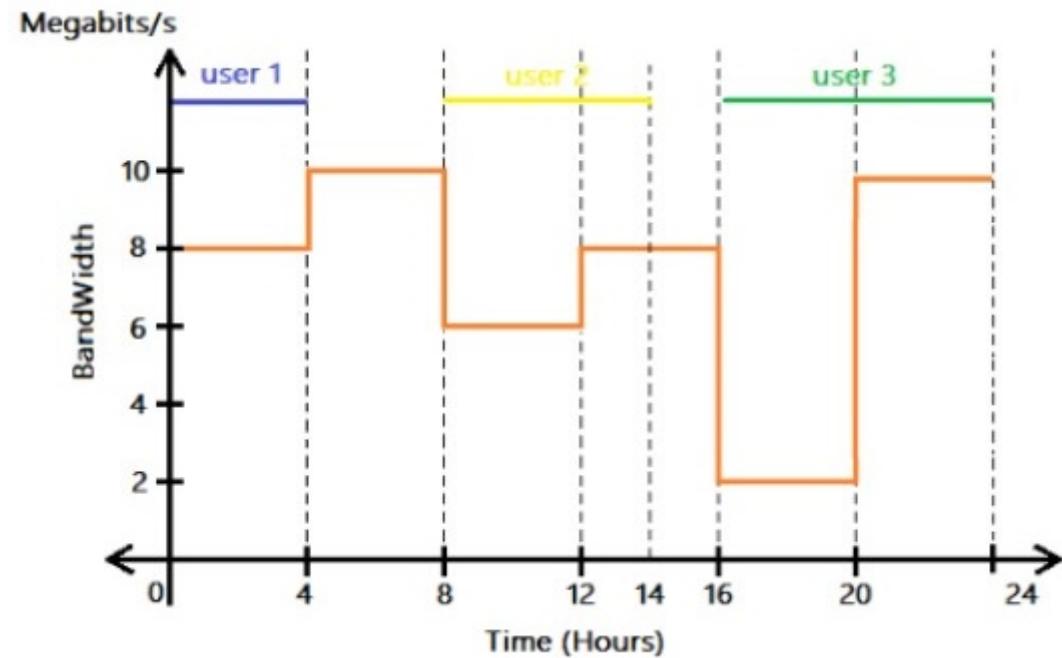
6406533051076. ✓ None of these

Question Number : 105 Question Id : 640653906402 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

Consider the following graph that represents the variation in bandwidth of a network for an entire day (24 hours). Three users were connected to the network at three different times of the day. What is the total data consumed in GigaBytes by all the users in 24 hrs?



Options :

6406533051085. ❌ 633.6 GB

6406533051086. ✓ 54 GB

6406533051087. ❌ 120 GB

6406533051088. ❌ 432 GB

Question Number : 106 Question Id : 640653906406 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

Consider the below flask application.

```
from flask_sqlalchemy import SQLAlchemy
from flask import Flask

app = Flask(__name__)
app.config['SQLALCHEMY_DATABASE_URI'] = 'sqlite:///testdb.sqlite3'
db = SQLAlchemy(app)
app.app_context().push()

class Material(db.Model):
    m_id = db.Column('m_id', db.Integer, primary_key=True)
    name = db.Column('name', db.String(100), unique=True)

db.create_all()
material1 = Material(name='Steel')
db.session.add(material1)
material2 = Material(name='Iron')
material3 = Material(name='Aluminium')
db.session.add(material2)
db.session.commit()
db.session.add(material3)

all_material = Material.query.all()
print([(x.m_id, x.name) for x in all_material])
```

If you run the flask application using a terminal. What will be the output in the terminal?

Options :

[(1, 'Steel'), (2, 'Iron')] will be displayed in the terminal and two records will be **6406533051101.** ✘ added in the “testdb” database.

[(1, 'Steel'), (2, 'Iron'), (3, 'Aluminium')] will be displayed in the terminal
6406533051102. ✘ and three records will be added in the “testdb” database.

[(1, 'Steel'), (2, 'Iron'), (3, 'Aluminium')] will be displayed in the terminal
6406533051103. ✓ and two records will be added in the “testdb” database.

[(1, 'Steel', 2, 'Iron', 3, 'Aluminium')] will be displayed in the terminal and
6406533051104. ✘ two records will be added in the “testdb” database.

Question Number : 107 Question Id : 640653906412 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

A client machine C is 18000 kms away from the server machine S. A router R is situated somewhere in between the client C and the server S and is connected to client C with cable and makes aerial connection with the server S. What will be the round-trip latency (milliseconds) of the network if the router is placed at exactly midway from the client and the server? [Assume: The speed of light on cable is 1.5×10^8 m/s and in air is 3×10^8 m/s. The client, server and the router lie on a straight line]

Options :

6406533051126. ✘ 45

6406533051127. ✘ 90

6406533051128. ✓ 180

6406533051129. ✘ 270

Sub-Section Number :

4

Sub-Section Id :

640653134635

Question Shuffling Allowed :

Yes

Question Number : 108 Question Id : 640653906394 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Consider the following flask app and Jinja2 template.

app.py

```
from flask import Flask, render_template
app = Flask(__name__)

@app.route('/')
def index():
    return render_template("index.html", data=['Harry', 'Karl', 'John',
'Jason', 'Ros'])

app.run()
```

index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <title>Macro</title>
</head>
<body>
    {% macro unordered_list(items)%}
        <ul>
            {% for item in items %}
                {% if item|length >= 5 %}>
                    <li>{{item}}</li>
                {% endif %}
            {% endfor %}
        </ul>
    {% endmacro %}
    {{ unordered_list(data) }}
</body>
</html>
```

If the flask app is running locally on <http://127.0.0.1:5000>. What will be the output on the browser for the base URL?

Options :

- Harry
- Karl
- John
- Jason
- Ros

6406533051053. ✘

6406533051054. ✘

- Karl
- John

- Harry

6406533051055. ✓ • Jason

- Karl
- John
- Ros

6406533051056. ✗

Question Number : 109 Question Id : 640653906395 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Match the following types of testing with their functionality.

A. Regression testing	1. Beta Testing
B. User Acceptance testing	2. one step beyond integration testing, includes server and environment
C. System Testing	3. Simulates actual user interaction, allows to script browser
D. System testing Automation	4. Type of testing that runs after every change to ensure that the change introduces no unintended breaks.

Which of the following is the correct matching?

Options :

6406533051057. ✗ A → 1, B → 2, C → 3, D → 4

6406533051058. ✗ A → 4, B → 3, C → 2, D → 1

6406533051059. ✓ A → 4, B → 1, C → 2, D → 3

6406533051060. ✗ A → 3, B → 2, C → 1, D → 4

Question Number : 110 Question Id : 640653906398 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Consider the following python code snippet app.py, the HTML files, base.html and home.html residing in "templates" folder.

app.py

```
from flask import Flask, render_template
app = Flask(__name__)
@app.route('/')
def home():
    return render_template('home.html')
app.run(debug=True)
```

home.html

```
{% extends "base.html" %}
{% block content %}
<p>MAD I</p>
<span>MAD II</span>
<p>DBMS</p>
{% endblock %}
```

base.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <title>IITM</title>
</head>
<body>
    <h2 style="color: violet;"> Diploma Courses </h2>
    {% block content %}
    {% endblock %}
</body>
</html>
```

What will be the rendered output for base URL if flask app is running locally on
<http://localhost:5000> ?

Options :

MAD I

MAD II

6406533051069. ✘ DBMS

6406533051070. ✓

Diploma Courses

MAD I

MAD II

DBMS

Diploma Courses

MAD I

6406533051071. ✘ MAD II DBMS

MAD I

6406533051072. ✘ MAD II DBMS

Question Number : 111 Question Id : 640653906404 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

You have a DRAM module with bus width of 64 bits, clock speed of 2 GHz, and operating in DDR (double-data-rate or two values per clock cycle) mode. What is the maximum bandwidth (in Giga-bytes per second) of data transfer achievable with this module?

Options :

6406533051093. ✘ 16

6406533051094. ✘ 8

6406533051095. ✓ 32

6406533051096. ✘ 128

Question Number : 112 Question Id : 640653906407 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

The hexadecimal equivalent of the IPv4 address 172.16.254.10 would be _____.

Options :

6406533051105. ✘ AC0A FE01

6406533051106. ✘ CA10 EF0A

6406533051107. ✘ AC01 0AEF

6406533051108. ✓ AC10 FE0A

Question Number : 113 Question Id : 640653906415 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Which of the following is true about the term “stateless” in the client-server model?

Options :

6406533051138. ❌ The server keeps the state of the client to respond to the required request.
6406533051139. ❌ Server use variant HTTP methods to respond to the client's request.
6406533051140. ✓ Server ready to respond to the client's request without knowing anything about the client.
6406533051141. ❌ Server use the URL to convey context to the client.

Sub-Section Number :

5

Sub-Section Id :

640653134636

Question Shuffling Allowed :

Yes

Question Number : 114 Question Id : 640653906388 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following Python code snippet “code.py”.

Filename: code.py

```
import sys
from jinja2 import Template
vars = sys.argv

course_technologies = {'python': 'backend', 'javascript': 'frontend'}
template = Template("This course focuses on {{ technology }} development.")

if len(vars) > 2 and vars[2] in course_technologies:
    course = vars[1]
    technology = course_technologies[course]
    print(template.render(technology=technology))
else:
    print("Please specify a valid course name!")
```

Which of the following will be the correct command line input to the terminal to get the output: This course focuses on backend development. ?

Options :

6406533051033. ❌ python code.py course python

6406533051034. ✓ python code.py python javascript

6406533051035. ✓ python code.py python python

6406533051036. ✖ python code.py python backend

Question Number : 115 Question Id : 640653906393 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following flask application.

app.py

```
from flask import Flask, abort, request
app = Flask(__name__)

data = {"CS2001": "DBMS", "CS2003": "MAD-I", "CS2006": "MAD-II"}
@app.route('/login')
def login():
    username = request.args.get('uname')
    if username not in data:
        abort(400, "Bad Request: Invalid Username")
    return f'{<h1>Welcome to {data[username]} course!</h1>'

app.run(debug=True)
```

Which of the following statements is/are true if the application is running locally on <http://127.0.0.1:5000> ?

Options :

For URL <http://127.0.0.1:5000?uname=CS2001> the browser will render
6406533051049. ✖ **Welcome to DBMS course!**

For URL <http://127.0.0.1:5000/login> the browser will render
6406533051050. ✖ **Welcome to MAD-I course!**

For URL <http://127.0.0.1:5000/login?uname> the browser will render
6406533051051. ✓ **Bad Request: Invalid Username**

For URL <http://127.0.0.1:5000/login?uname=CS2006> the browser will
6406533051052. ✓ render **Welcome to MAD-II course!**

Sub-Section Number :

6

Sub-Section Id :

640653134637

Question Shuffling Allowed :

Yes

Question Number : 116 Question Id : 640653906389 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following flask application.

```
from flask import Flask, request
app = Flask(__name__)

@app.route('/home')
def home():
    var_a = request.args.get('method')
    if var_a == "GET":
        return "Hello from GET method"

    elif var_a == "POST":
        return "Hello from POST method"

    else:
        return "Invalid Method"

app.run(debug=True)
```

If the application is running locally on `http://127.0.0.1:5000` then which of the following statements are correct?

Options :

The command `curl -X GET http://127.0.0.1:5000/home?method=GET` will give output
6406533051037. ✓ as `Hello from GET method` on terminal

The command `curl -X POST http://127.0.0.1:5000/home?method=POST` will give output
6406533051038. ✓ as `Method not Allowed` on terminal

The command `curl -X POST http://127.0.0.1:5000/home?method=POST` will give output
6406533051039. ✗ output as `Hello from POST method` on terminal

The command `curl -X POST http://127.0.0.1:5000/home?method` will give output as
6406533051040. ✗ `Invalid Method` on terminal

Question Number : 117 Question Id : 640653906411 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following flask_sqlalchemy data models "User" and "Role".

```
class User(db.Model):
    id = db.Column(db.Integer, primary_key=True)
    username= db.Column(db.String(), unique=True, nullable=False)
    password = db.Column(db.String(), nullable=False)
    email= db.Column(db.String())
    roles= db.relationship("Role", backref="bearer")

class Role(db.Model):
    id = db.Column(db.Integer, primary_key=True)
    r_name = db.Column(db.String(), unique=True, nullable=False)
    user = db.Column(db.Integer, db.ForeignKey("user.id"))
```

python shell:

```
>>> from app import *
>>> db.create_all()
>>> user1 = User(username="Rakesh",password="1234",email="user1@gmail.com")
>>> user2 = User(username="Suresh",password="123",email="user2@gmail.com")
>>> db.session.add_all([user1,user2])
>>> db.session.commit()
>>> r1=Role(r_name="instructor",user=1)
>>> r2=Role(r_name="admin",user=1)
>>> r3=Role(r_name="ops",user=2)
>>> r4=Role(r_name="student",user=2)
>>> db.session.add_all([r1,r2,r3,r4])
>>> db.session.commit()
>>> users = User.query.all()
>>> roles = Role.query.all()
```

If the above commands are run in the python shell then which of the following options is /are correct with respect to these models?

Options :

6406533051121. ✘ Command: >>> users
Output: ["Ramesh", "Suresh"]

6406533051122. ✓ Command: >>> u1 = users[1]
>>> u1.roles
Output: [<Role 3>, <Role 4>]

6406533051123. ✘ Command: >>> roles[2].user
Output: ["Suresh"]

Command: >>> roles[3].user

6406533051124. ✓ Output: 2

Command: >>> roles[0].bearer

6406533051125. ✓ Output: <User 1>

Question Number : 118 Question Id : 640653906417 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Suppose a request <https://xyz.com?name=amey&age=34> generates the below response on the browser's console,

Name : amey

The definition of the flask endpoint which handles the above request is given below,

```
@app.route(code1)
def getData():
    data = code2
    print("Name :", data)
```

Which of the following options should be used to fill the placeholders "code1" and "code2", to achieve the desired result as shown above?

Options :

Code1: "/"
Code2: request.form['name']

6406533051146. ✘

Code1: "/", methods = ['GET']
Code2: request.form['name']

6406533051147. ✘

Code1: "/", methods = ['GET', 'POST']
Code2: request.args['name']

6406533051148. ✓

Code1: "/"
Code2: request.args.get('name')

6406533051149. ✓

Sub-Section Id :

640653134638

Question Shuffling Allowed :

Yes

Question Number : 119 Question Id : 640653906401 Question Type : MSQ Calculator : Yes

Correct Marks : 4.5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following function to be tested and test functions given in the Python code snippet below.

test_file.py

```
import pytest

def square(x):
    sum = 0
    for counter in range(x):
        sum += x
    return sum

@pytest.mark.marker1
def testcase_1():
    assert square(10) == 100

@pytest.mark.marker2
def testcase_2():
    assert square(4) == 4

@pytest.mark.marker3
def testcase_3():
    assert square(5) == 25

@pytest.mark.marker4
def testcase_4():
    assert square(6) == 6
```

On running this file on the terminal using pytest, the summary of the output is;

```
===== 1 passed, 3 deselected, 4 warnings in 0.04s =====
```

What command will result into the outcome given above?

Options :

6406533051081. ✓ pytest test_file.py -m marker4

6406533051082. ✘

```
pytest test_file.py -m marker1
```

6406533051083. ✓

```
pytest test_file.py -m marker2
```

6406533051084. ✘

```
pytest test_file.py -m marker3
```

Question Number : 120 Question Id : 640653906408 Question Type : MSQ Calculator : Yes

Correct Marks : 4.5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following flask application.

```

from flask import Flask, abort
app = Flask(__name__)
modules = ['python', 'react', 'node']

@app.route('/home/modules/')
def all_modules():
    return f"<h3>List of modules: {modules}</h3>"

@app.route('/get/<string:module_1>')
def get_module(module_1):
    if module_1 in modules:
        return f"<h3>One module found: {module_1}.</h3>"
    else:
        abort(400)

@app.errorhandler(400)
def module_error(error):
    return "<h3>Cannot find module</h3>"

@app.errorhandler(404)
def module_error(error):
    return "<h3>Incorrect Path</h3>"

app.run(debug=True)

```

If the application is running locally on `http://127.0.0.1:5000`, select the correct statement(s).

Options :

For the URL, `http://127.0.0.1:5000/home/modules`, the browser will render;
✓ 6406533051109. **List of modules: ['python', 'react', 'node']**

For the URL, `http://127.0.0.1:5000/home/modules`, the browser will render;
✗ 6406533051110. **Incorrect Path**

For the URL, `http://127.0.0.1:5000/get/vuejs`, the browser will render;
✓ 6406533051111. **Cannot find module**

For the URL, `http://127.0.0.1:5000/get/react/`, the browser will render;
✗ 6406533051112. **One module found: react.**

Question Number : 121 Question Id : 640653906414 Question Type : MSQ Calculator : Yes

Correct Marks : 4.5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following code snippet.

```
@app.route('/student/<student_id>')
def profile(student_id):
    # CODE BLOCK HERE
```

Assume the database has a "student" table which has a TEXT column "student_id". If we want the server to return a 404 status code when a user goes to the route '/student/<student_id>' with a student_id that does not exist in the database, which of the following lines would give us the desired output?

Options :

```
student = Student.query.filter_by(student_id=student_id).first()
if student is None:
    abort(404)
return render_template('profile.html', student=student)
```

6406533051134. ✓

```
student = Student.query.filter_by(student_id=student_id).first()
if student is None:
    return render_template("404.html")
return render_template('profile.html', student=student)
```

6406533051135. *

```
student = Student.query.filter_by(student_id=student_id).first_or_404()
return render_template('profile.html', student=student)
```

6406533051136. ✓

```
student = Student.query.filter_by(student_id=student_id).first()
if student is None:
    return render_template("404.html"), 404
return render_template('profile.html', student=student)
```

6406533051137. ✓

Sub-Section Number :

8

Sub-Section Id :

640653134639

Question Shuffling Allowed :

No

Question Id : 640653906390 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (122 to 123)

Question Label : Comprehension

Consider the following flask application running locally on

<http://127.0.0.1:5000>

app.py

```
from flask import Flask, request
import sys
app = Flask(__name__)
data = ["Java", "Application Development", "DBMS"]

@app.route('/course')
def home():
    course = request.args.get('course')
    if course in sys.argv[1]:
        if sys.argv[1] in data:
            return f"Welcome to {sys.argv[1]}!"

    return f"Welcome to {course}!"
else:
    return "Invalid Data"

app.run(debug=True)
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 122 Question Id : 640653906391 Question Type : MSQ Calculator : Yes

Correct Marks : 4.5 Max. Selectable Options : 0

Question Label : Multiple Select Question

What should be the code to run the application, and what should be the URL respectively such that the browser gives output as: [Welcome to Application Development!](http://127.0.0.1:5000/course?course=Application Development) ?

Options :

Code: `python app.py Application Development DBMS`

6406533051041. ✘ URL: <http://127.0.0.1:5000/course?course=Application Development>

6406533051042. ✓

Code: python app.py "Application Development" Java

URL: http://127.0.0.1:5000/course?course=Application

Code: python app.py Application Development DBMS

6406533051043. ✖ URL: http://127.0.0.1:5000/course?course=Application

Code: python app.py "Application Development" DBMS

6406533051044. ✓ URL: http://127.0.0.1:5000/course?course=Application Development

Question Number : 123 **Question Id :** 640653906392 **Question Type :** MCQ **Calculator :** Yes

Correct Marks : 3

Question Label : Multiple Choice Question

What will be the output given by

browser if the application is

run with command

python app.py Application Development DBMS

on terminal with URL:

http://127.0.0.1:5000/course?course=Application Development ?

Options :

6406533051045. ✖ Welcome to Application Development!

6406533051046. ✖ Welcome to DBMS!

6406533051047. ✓ Invalid Data

6406533051048. ✖ Not Found

MLF

Section Id : 64065364209

Section Number : 6

Section type : Online

Mandatory or Optional : Mandatory

Number of Questions :	13
Number of Questions to be attempted :	13
Section Marks :	40
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134640
Question Shuffling Allowed :	No

Question Number : 124 Question Id : 640653906418 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : MACHINE LEARNING FOUNDATIONS (COMPUTER BASED EXAM)"

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

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

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

Options :

640653051150. ✓ YES

640653051151. ✗ NO

Sub-Section Number : 2

Sub-Section Id : 640653134641

Question Shuffling Allowed : No

Question Id : 640653906419 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (125 to 126)

Question Label : Comprehension

A company produces two types of products P_1 and P_2 . The cost price per unit of P_1 and P_2 are ₹2 and ₹3, respectively. The production process requires two types of resources: labor hours and machine hours. Each unit of P_1 requires 2 labor hours and 1 machine hour, while each unit of P_2 requires 1 labor hour and 3 machine hours. The company has constraints on the availability of labor and machine hours, which are 80 and 90 hours, respectively.

Use the above information to answer the given sub-questions.

Sub questions

Question Number : 125 Question Id : 640653906420 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Choose the correct **Primal** optimization problem from the following.

Options :

6406533051152. ❌ Minimize: $3x + 2y$
Subject to: $2x + y \leq 80, x + 3y \leq 90, x \geq 0, y \geq 0$

6406533051153. ✓ Minimize: $2x + 3y$
Subject to: $2x + y \leq 80, x + 3y \leq 90, x \geq 0, y \geq 0$

6406533051154. ❌ Minimize: $3x + 2y$
Subject to: $2x + y \leq 90, x + 3y \leq 80, x \geq 0, y \geq 0$

6406533051155. ❌ Minimize: $2x + 3y$
Subject to: $2x + y \leq 90, x + 3y \leq 80, x \geq 0, y \geq 0$

Question Number : 126 Question Id : 640653906421 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

Find the minimum cost price of the products.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

80

Sub-Section Number : 3

Sub-Section Id : 640653134642

Question Shuffling Allowed : Yes

Question Number : 127 Question Id : 640653906422 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following scenarios involving geographical regions (w.r.t some reference of x - axis and y - axis), which of the following regions represents the convex set in \mathbb{R}^2 .

Options :

6406533051157. ❌ A circular park with one side boundary is a circle of radius of 200 meters and another side boundary is a circle of radius of 300 meters, both centered at the origin.

6406533051158. ✓ City district defined by the region above the x-axis within a radius of 10 miles from the origin, forming a semicircle.

6406533051159. ✓ A triangular region with vertices at (0, 0), (1, 0), and (0, 1).

6406533051160. ❌ A path consisting of two connected line segments (forming the boundaries of the path on either sides) formed a "V" shape with vertices at (0, 0), (2, 2), and (2, 0)

Question Number : 128 Question Id : 640653906423 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following options is/are true?

Options :

6406533051161. ❌ $f(x) = (x^2 - 3x + 2)(x^2 - 7x + 12)$ is a convex function.

6406533051162. ✓ $f(v) = v^T Av$ is a convex function, where $A = \begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}$ and $v = \begin{bmatrix} x \\ y \end{bmatrix}$.

6406533051163. ✓ $f(x, y) = x^2 + y^2 + 3$ is a convex function.

6406533051164. ✓ $f(v) = v^T Av$ is a convex function, where $A = \begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix}$ and $v = \begin{bmatrix} x \\ y \end{bmatrix}$.

Sub-Section Number :

4

Sub-Section Id :

640653134643

Question Shuffling Allowed :

Yes

Question Number : 129 Question Id : 640653906424 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

A farmer has 120 meters of fencing and wants to fence off a rectangular field that borders a straight river. The farmer does not need to fence along the river. Find the maximum possible fenced area of the field.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

Question Number : 130 Question Id : 640653906428 Question Type : SA Calculator : None**Correct Marks : 3**

Question Label : Short Answer Question

Suppose a random variable X has a mean μ of 70 and a standard deviation σ of 8. Using Chebyshev's inequality, determine the maximum probability that X will deviate from the mean by more than 16 units. Enter the answer correct to two decimal places.

Response Type : Numeric**Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Equal****Text Areas : PlainText****Possible Answers :**

0.25

Question Number : 131 Question Id : 640653906432 Question Type : SA Calculator : None**Correct Marks : 3**

Question Label : Short Answer Question

Consider the following input data points:

x	y
[2, 3, 4]	9
[-1, 1, 2]	2
[4, 2, 2]	7
[0, -2, -1]	-4
[-3, 5, -2]	4

Suppose we fit a linear model $f(\mathbf{x}) = x_1 + 2x_2 + x_3$, where $\mathbf{x} = (x_1, x_2, x_3)$. Compute the value of the loss function L for this dataset which is defined as $L = \frac{1}{n} \sum_{i=1}^n (f(\mathbf{x}^i) - y^i)^2$.

Enter the answer correct to one decimal place.

Response Type : Numeric**Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Equal****Text Areas : PlainText****Possible Answers :**

4.2

Question Number : 132 Question Id : 640653906433 Question Type : SA Calculator : None**Correct Marks : 3**

Question Label : Short Answer Question

Let X and Y be two independent random variables, where $X \sim \text{Normal}(-1, 1)$ and $Y \sim \text{Normal}(1, 9)$. Define $U = 2X - 3Y$. Find the value of $P(U > 2)$. Enter the answer correct to three decimal places.

Hint: Use the following values of F_Z if required. F_Z stands for the CDF of the standard normal.

- $F_Z(0.62) = 0.7343$
- $F_Z(-0.62) = 0.2656$
- $F_Z(1.25) = 0.8947$
- $F_Z(-1.25) = 0.1052$

Response Type : Numeric**Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Range****Text Areas : PlainText****Possible Answers :**

0.262 to 0.268

Sub-Section Number :

5

Sub-Section Id :

640653134644

Question Shuffling Allowed :

Yes

Question Number : 133 Question Id : 640653906425 Question Type : MSQ Calculator : Yes**Correct Marks : 4 Max. Selectable Options : 0****Question Label : Multiple Select Question**

Consider a square matrix A of order 3 such that $\text{trace}(A) = 3$ and $\det(A) = 2$. If 1 is an eigenvalue of A , then which of the following options is/are true?

Options :

640653051166. ❌ Matrix A is symmetric matrix.

640653051167. ❌ Matrix A is Hermitian matrix.

640653051168. ✓ 1 + i is an eigenvalue of A .

640653051169. ❌ 2 - i is an eigenvalue of A .

640653051170. ✓ Matrix A is diagonalizable.

Question Number : 134 Question Id : 640653906427 Question Type : MSQ Calculator : Yes**Correct Marks : 4 Max. Selectable Options : 0****Question Label : Multiple Select Question**

Suppose we have 10 data points randomly distributed in space, \mathbb{R}^3 given by $D = \{x_1, x_2, \dots, x_{10}\}$. Let $g(p) = \sum_{i=1}^{10} \|p - x_i\|^2$ be a function defined to calculate the sum of the square of distances of data points from a fixed point, say $p \in \mathbb{R}^3$. If $g(p)$

attains the minimum at $q = \begin{bmatrix} 4 \\ 0 \\ 3 \end{bmatrix}$, then which of the following options is true?

Options :

$$x_1 + x_2 + \dots + x_{10} = \begin{bmatrix} 30 \\ 0 \\ 40 \end{bmatrix}$$

6406533051175. *

$$x_1 + x_2 + \dots + x_{10} = \begin{bmatrix} 40 \\ 0 \\ 30 \end{bmatrix}$$

6406533051176. ✓

6406533051177. ✓ The distance of point $(x_1 + x_2 + \dots + x_{10})$ from the origin is 50.

6406533051178. * The distance of point $(x_1 + x_2 + \dots + x_{10})$ from the origin is 40.

Sub-Section Number :

6

Sub-Section Id :

640653134645

Question Shuffling Allowed :

Yes

Question Number : 135 Question Id : 640653906426 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following is/are true about PCA?

Options :

6406533051171. ✓ PCA will transform the original data set onto a lower dimension subspace such that the variance of the project is maximized.

6406533051172. * PCA calculates the mean of each data set to determine its significance.

6406533051173. ✓ PCA can be used to reduce the dimensionality of the dataset.

6406533051174. * PCA will transform the original data set onto a lower dimension subspace such that the reconstruction error is maximized.

Sub-Section Number :

7

Sub-Section Id :

640653134646

Question Shuffling Allowed :

No

Question Id : 640653906429 Question Type : COMPREHENSION Sub Question Shuffling

Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (136 to 137)

Question Label : Comprehension

Let X and Y have the following joint density function

$$f(x, y) = \begin{cases} 18x^2y^2 & x, y \geq 0, x + y \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 136 Question Id : 640653906430 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Find the conditional distribution $f_{X|Y}(x | y)$.

Options :

6406533051180. ❌ $f_{X|Y}(x | y) = \frac{3x^2}{(1-y)^3}, 0 < x < 1$

6406533051181. ✓ $f_{X|Y}(x | y) = \frac{3x^2}{(1-y)^3}, 0 < x < 1-y$

6406533051182. ❌ $f_{X|Y}(x | y) = 3x^2(1-y)^3, 0 < x < 1$

6406533051183. ❌ $f_{X|Y}(x | y) = 3x^2(1-y)^3, 0 < x < 1-y$

Question Number : 137 Question Id : 640653906431 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

Find the value of $P\left(X < \frac{1}{2} | Y = \frac{1}{2}\right)$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

Sub-Section Number :	8
Sub-Section Id :	640653134647
Question Shuffling Allowed :	Yes

Question Number : 138 Question Id : 640653906434 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Let $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{pmatrix}$. Find the nullspace of A .

Options :

6406533051187. ✓ $\text{span} \left\{ \begin{pmatrix} 1 \\ -2 \\ 1 \end{pmatrix} \right\}$

6406533051188. ✗ $\text{span} \left\{ \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} \right\}$

6406533051189. ✗ $\left\{ \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \right\}$

6406533051190. ✗ $\text{span} \left\{ \begin{pmatrix} 1 \\ 2 \\ 0 \end{pmatrix}, \begin{pmatrix} 2 \\ 3 \\ 1 \end{pmatrix} \right\}$

Java

Section Id :	64065364210
Section Number :	7
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	24
Number of Questions to be attempted :	24
Section Marks :	100
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No

Enable Mark as Answered	Mark for Review and Clear Response :	No
Maximum Instruction Time :	0	
Sub-Section Number :	1	
Sub-Section Id :	640653134648	
Question Shuffling Allowed :	No	

Question Number : 139 Question Id : 640653906435 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : PROGRAMMING CONCEPTS USING JAVA (COMPUTER BASED EXAM)"

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

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

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

Options :

640653051191. ✓ YES

640653051192. ✘ NO

Sub-Section Number :	2
Sub-Section Id :	640653134649
Question Shuffling Allowed :	Yes

Question Number : 140 Question Id : 640653906436 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class Monitor {  
    public void screenSize() {  
        System.out.println("Normal screen size");  
    }  
    public void resolution() {  
        System.out.println("Normal resolution");  
    }  
}  
class LCD extends Monitor {  
    public void screenSize() {  
        System.out.println("Screen size is large");  
    }  
}  
class LED extends Monitor {  
    public void screenSize() {  
        System.out.println("Screen size is medium");  
    }  
    public void resolution() {  
        System.out.println("HD resolution");  
    }  
}  
public class Test {  
    static void show(Monitor[] monitors) {  
        for (int i = 0; i < monitors.length; i++) {  
            monitors[i].screenSize();  
            monitors[i].resolution();  
        }  
    }  
    public static void main(String[] args) {  
        Monitor[] monitors = {new LCD(), new LED()}; // LINE 1  
        show(monitors);  
    }  
}
```

Choose the correct option.

Options :

This code generates the output:

Screen size is medium

HD resolution

Screen size is medium

6406533051193. ✘ HD resolution

6406533051194. ✘

This code generates the output:

```
Normal screen size  
Normal resolution  
Normal screen size  
Normal resolution
```

This code generates the output:

```
Screen size is large  
Normal resolution  
Screen size is medium
```

6406533051195. ✓ HD resolution

Compilation error at LINE 1 because a reference variable of type Monitor can-

6406533051196. ❌ not refer to an object of class LED

Question Number : 141 Question Id : 640653906437 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the code given below that checks whether two candidates are from the same college. Method `equals` is overridden to compare two `Candidate` objects as follows. If two candidates are from the same college then they are said to be equal. Based on the given information, answer the question that follows.

```
class Candidate {  
    private String name;  
    private String college;  
    // Constructor to initialize instance variables  
    public String toString() {  
        return name;  
    }  
  
    public boolean equals(Object obj) {  
        // CODE BLOCK  
    }  
}  
  
public class Test {  
    public static void main(String[] args) {  
        Candidate c1 = new Candidate("Shreya", "IITMadras");  
        Candidate c2 = new Candidate("Hari", "IITDelhi");  
        Candidate c3 = new Candidate("Aisha", "IITMadras");  
        if (c1.equals(c3)) {  
            System.out.println(c1 + " and " + c3 + " belong to the same college");  
        }  
        if (c2.equals(c3)) {  
            System.out.println(c2 + " and " + c3 + " belong to the same college");  
        }  
    }  
}
```

Choose the correct option to fill in place of CODE BLOCK so that the output is:

Shreya and Hari belong to the same college

Options :

- `if(obj instanceof Candidate) {
 if(this.college.equals(obj.college))
 return true;
}
6406533051197. ✘ return false;`

- `if(this.college.equals(obj.college))
 return true;
6406533051198. ✘ return false;`

- `6406533051199. ✓`

```
if(obj instanceof Candidate) {  
    Candidate c = (Candidate) obj;  
    if(this.college.equals(c.college))  
        return true;  
}  
return false;  
  
if(obj instanceof Candidate) {  
    Candidate c = obj;  
    if(this.college.equals(c.college))  
        return true;  
}  
6406533051200. ✘ return false;
```

Question Number : 142 Question Id : 640653906438 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class Intern {  
    private String name;  
    public Intern(String n) {  
        name = n;  
    }  
    public Intern(Intern i) {  
        this.name = i.name;  
    }  
    public void setName(String n) {  
        name = n;  
    }  
    public String getName() {  
        return name;  
    }  
}  
public class Test {  
    public static void main(String[] args) {  
        Intern i1 = new Intern("Jaya");  
        Intern i2 = new Intern(i1);  
        Intern i3 = i1;  
        i1.setName("Subash");  
        System.out.println(i1.getName());  
        System.out.println(i2.getName());  
        System.out.println(i3.getName());  
    }  
}
```

What will the output be?

Options :

Subash
Jaya

6406533051201. ❌ Jaya

Subash
Jaya

6406533051202. ✓ Subash

Subash
Subash

6406533051203. ❌ Subash

Subash
Subash

6406533051204. ❌ Jaya

Question Number : 143 Question Id : 640653906439 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the code given below.

```
class Device {  
    public void powerOn() {  
        System.out.println("Device is on");  
    }  
}  
  
class Mobile extends Device {  
    public void display() {  
        System.out.println("Mobile display");  
    }  
}  
  
class Smartphone extends Mobile {  
    public void display() {  
        System.out.println("Smartphone display");  
    }  
    public void connect() {  
        System.out.println("Connected to Internet");  
    }  
}  
  
public class TestDevice {  
    public static void main(String[] args) {  
        Device d = new Mobile();  
        Mobile m = new Smartphone(); // LINE 1  
        d.powerOn();  
        ((Mobile)d).display(); // LINE 2  
        m.connect(); // LINE 3  
    }  
}
```

Choose the correct option.

Options :

LINE 1 generates a compilation error because a variable of type **Mobile** cannot refer to an object of type **Smartphone**. 6406533051205. ✘

LINE 2 generates a compilation error because a variable of type **Device** cannot be type cast to an object of type **Mobile**. 6406533051206. ✘

6406533051207. ✓

LINE 3 generates a compilation error because the method `connect()` is not defined in class `Mobile`.

This code generates the output:

Device is on
Mobile display
6406533051208. ✖ Connected to Internet

Question Number : 144 Question Id : 640653906440 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.util.*;  
public class Test{  
    public static void main(String[] args) {  
        ArrayDeque<String> queue1 = new ArrayDeque<String>();  
        queue1.add("Violet");  
        queue1.addFirst("Yellow");  
        queue1.add("Pink");  
        queue1.addFirst("Blue");  
        queue1.add("Blue");  
        System.out.println(queue1);  
        TreeSet<String> set = new TreeSet<String>(queue1);  
        System.out.println(set);  
    }  
}
```

What will the output be?

Options :

This program generates the output:

[Blue, Yellow, Violet, Pink, Blue]

6406533051209. ✓ [Blue, Pink, Violet, Yellow]

This program generates the output:

[Blue, Pink, Violet, Yellow]

6406533051210. ✖ [Blue, Yellow, Violet, Pink, Blue]

This program generates the output:

[Blue, Pink, Violet, Yellow]

6406533051211. ✖ [Blue, Pink, Violet, Yellow]

This program generates the output:

[Blue, Yellow, Violet, Pink, Blue]

6406533051212. ✶ [Blue, Yellow, Violet, Pink, Blue]

Question Number : 145 Question Id : 640653906441 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class Chef {  
    String name;  
    public Chef(String n) {  
        name = n;  
    }  
}  
  
class Dish implements Cloneable {  
    String dishName;  
    Chef[] chefs;  
    public Dish(String name, Chef[] chefs) {  
        dishName = name;  
        this.chefs = chefs;  
    }  
    public Dish clone() throws CloneNotSupportedException {  
        Dish d = (Dish) super.clone();  
        d.chefs = this.chefs.clone();  
        return d;  
    }  
}  
  
public class Test {  
    public static void main(String[] args) throws CloneNotSupportedException {  
        Chef[] chefs1 = { new Chef("Ravi"), new Chef("Raju") };  
        Dish d1 = new Dish("Biryani", chefs1);  
        Dish d2 = d1.clone();  
        Chef[] chefs2 = d2.chefs;  
        chefs2[0].name = "Veena";  
        d2.dishName = "Fried Rice";  
  
        System.out.println(d1.dishName + " : " + d1.chefs[0].name);  
        System.out.println(d2.dishName + " : " + d2.chefs[0].name);  
    }  
}
```

What will the output be?

Options :

Biryani : Veena
6406533051213. ✘ Biryani : Veena

FriedRice : Veena
6406533051214. ✘ FriedRice : Veena

Biryani : Ravi
6406533051215. ✘ FriedRice : Veena

Biryani : Veena
6406533051216. ✓ FriedRice : Veena

Question Number : 146 Question Id : 640653906442 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.util.*;
public class Test {
    public static void main(String[] args) {
        List<String> list = new ArrayList<String>();
        list.add("Date");
        list.add("Durian");
        list.add("Banana");
        list.add("Cherry");
        list.add("Dragonfruit");

        list.stream().takeWhile(s -> s.startsWith("D"))
            .forEach(s -> System.out.print(s + " "));

        System.out.println();

        list.stream().dropWhile(s -> s.startsWith("D"))
            .forEach(s -> System.out.print(s + " "));

    }
}
```

What will the output be?

Options :

Date Durian Dragonfruit
6406533051217. ✘ Banana Cherry

Date Durian

6406533051218. ✘ Banana Cherry

Date Durian

6406533051219. ✓ Banana Cherry Dragonfruit

6406533051220. ✘ Date Durian Banana Cherry Dragonfruit

Question Number : 147 Question Id : 640653906445 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
1 class ClassOne{
2     public void methodOne(){
3         // ...
4         methodTwo();
5         // ...
6     }
7     public void methodTwo(){
8         // ...
9     }
10 }
11 class ClassTwo{
12     public static void methodThree(){
13         // ...
14         ClassOne c = new ClassOne();
15         c.methodOne();
16         // ...
17     }
18     public static void methodFour(){
19         // ...
20         methodThree();
21         // ...
22     }
23     public static void main(String[] args) {
24         // ...
25         methodFour();
26     }
27 }
```

During the execution of Line 16 in the above code, the activation record of which method is at the top of the stack of activation records?

Options :

6406533051229. ✘ main

6406533051230. ✘ methodOne

6406533051231. ✘ methodTwo

6406533051232. ✓ methodThree

6406533051233. ✘ methodFour

Question Number : 148 Question Id : 640653906446 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
interface TransportService {  
    void bookRide();  
}  
class TransportApp {  
    public TaxiService getTaxiService() {  
        return new TaxiService();  
    }  
    public BusService getBusService() {  
        return new BusService();  
    }  
    private class TaxiService implements TransportService {  
        public void bookRide() {  
            System.out.println("Booking a taxi");  
        }  
    }  
    private class BusService implements TransportService {  
        public void bookRide() {  
            System.out.println("Booking a bus");  
        }  
    }  
}  
public class Test {  
    public static void main(String[] args) {  
        TransportApp t = new TransportApp();  
        //CODE BLOCK  
        obj1.bookRide();  
        obj2.bookRide();  
    }  
}
```

Choose the correct option to fill in place of CODE BLOCK so that the output is:

Booking a taxi
Booking a bus

Options :

TaxiService obj1 = new TaxiService();
6406533051234. ❌ BusService obj2 = new BusService();

TransportService obj1 = t.getTaxiService();
6406533051235. ✓ TransportService obj2 = t.getBusService();

TaxiService obj1 = t.getTaxiService();
6406533051236. ❌ BusService obj2 = t.getBusService();

TransportService obj1 = new TaxiService();
6406533051237. ❌ TransportService obj2 = new BusService();

Question Number : 149 Question Id : 640653906447 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
interface OnlineCourse {  
    default void showDetails() {  
        System.out.println("Course duration is 3 months");  
    }  
    default void enroll() {  
        System.out.println("Enrolled");  
    }  
}  
class CloudCourse implements OnlineCourse { //LINE 1  
    public void enroll() {  
        System.out.println("Enrolled in cloud course");  
    }  
}  
class MLCourse implements OnlineCourse { //LINE 2  
    public void showDetails() {  
        System.out.println("ML Course");  
    }  
}  
public class Test {  
    public static void main(String[] args) {  
        OnlineCourse courses[] = new OnlineCourse[2];  
        courses[0] = new CloudCourse();  
        courses[1] = new MLCourse();  
        for (OnlineCourse course : courses) {  
            course.showDetails();  
            course.enroll();  
        }  
    }  
}
```

Choose the correct option.

Options :

Compilation error at LINE 1 because method showDetails() is not overridden
6406533051238. ❌ in class CloudCourse

Compilation error at LINE 2 because method `enroll()` is not overridden in
6406533051239. ❌ class `MLCourse`

This program generates the output:

Enrolled in cloud course

6406533051240. ❌ ML Course

This program generates the output:

Course duration is 3 months

Enrolled in cloud course

`MLCourse`

6406533051241. ✓ Enrolled

Question Number : 150 Question Id : 640653906448 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
abstract class Bag {  
    abstract void open();  
    void carry() { // LINE 1  
        System.out.println("Carrying bag");  
    }  
}  
class Backpack extends Bag {  
    void open() {  
        System.out.println("Opening backpack");  
    }  
    void carry() {  
        System.out.println("Wearing backpack");  
    }  
}  
class ToteBag extends Bag {  
    void open() {  
        System.out.println("Opening tote bag");  
    }  
    void carry() {  
        System.out.println("Holding tote bag");  
    }  
}  
public class Test {  
    public static void main(String[] args) {  
        Bag bag1 = new Backpack(); // LINE 2  
        Bag bag2 = new ToteBag(); // LINE 3  
        bag1.carry();  
        bag1.open();  
        bag2.carry();  
        bag2.open();  
    }  
}
```

Choose the correct option.

Options :

LINE 1 generates compilation error because abstract class must contain only
6406533051242. ✘ abstract methods.

LINE 2 and LINE 3 generate compilation errors because reference variable of
6406533051243. ✘ type Bag cannot store the objects of type Backpack and ToteBag.

6406533051244. ✓

This program generates the output:

Wearing backpack

Opening backpack

Holding tote bag

Opening tote bag

This program generates the output:

Carrying bag

Opening backpack

Carrying bag

6406533051245. ❌ Opening tote bag

Question Number : 151 Question Id : 640653906449 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
interface Iterator{
    public boolean has_next();
    public Object get_next();
}

abstract class Printable{
    public abstract void print();
}

class ProductList{
    private final int limit = 3;
    private Product[] list = { new Product("Laptop", "P1001"),
        new Product("Smartphone", "P1002"),
        new Product("Smartwatch", "P1003")
    };
    private class Product extends Printable{
        private String name, productId;
        //Constructor to initialize instance variables
        public void print() {
            System.out.println(productId + ", " + name);
        }
    }
    private class ProdIter implements Iterator{
        private int indx;
        public ProdIter() {
            //constructor
        }
        public boolean has_next() {
            //if next element available in list return true;
            //else false
        }
        public Object get_next() {
            //return next element from list
        }
    }
    public Iterator getIterator() {
        return new ProdIter();
    }
}
```

```
public class IterTest {  
    public static void main(String[] args) {  
        ProdList pList = new ProdList();  
        Iterator iter = pList.getIterator();  
        while(iter.hasNext()) {  
            -----; //LINE 1  
        }  
    }  
}
```

Identify the appropriate statement to fill in the blank at LINE 1, such that the output is:

P1001, Laptop
P1002, Smartphone
P1003, Smartwatch

Options :

6406533051246. ✓ ((Printable)iter.getNext()).print()

6406533051247. ✗ ((Product)iter.getNext()).print()

6406533051248. ✗ ((ProdList)iter.getNext()).print()

6406533051249. ✗ iter.getNext().print();

Question Number : 152 Question Id : 640653906451 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.util.*;
class ZeroValueException extends Exception {
    public String toString() {
        return "Zero encountered during update";
    }
}
public class Test {
    public static void update(int[] array, int index) throws ZeroValueException {
        if (array[index] == 0) {
            throw new ZeroValueException();
        }
        array[index] = array[index] * 5;
    }
    public static void main(String[] args) {
        int[] arr = {1, -1, 0, 2, -2};
        try {
            for (int i = 0; i < arr.length; i++) {
                update(arr, i);
            }
        } catch (ZeroValueException e) {
            System.out.println(e);
        }
        for (int n : arr) {
            System.out.print(n + " ");
        }
    }
}
```

What will the output be?

Options :

6406533051254. ❌ Zero encountered during update

6406533051255. ❌ 5 -5 0 2 -2

Zero encountered during update

6406533051256. ❌ 5 -5

Zero encountered during update

6406533051257. ✓ 5 -5 0 2 -2

Correct Marks : 4

Question Label : Multiple Choice Question

Method `Optional.ofNullable(T value)` returns an `Optional` that describes the specific value, if non-null; otherwise returns an empty `Optional`.

Based on this description, consider the code given below, and answer the question that follows.

```
import java.util.*;
class Movie {
    HashMap<String, String> actors = new HashMap<>();
    public Movie() {
        actors.put("Action", "Akshay");
        actors.put("Comedy", "Kapil");
    }
    public String getActor(String genre) {
        return actors.get(genre);
    }
}
public class Test {
    public static void main(String[] args) {
        Optional<String> a1 = Optional.ofNullable(new Movie().getActor("Action"));
        Optional<String> a2 = Optional.ofNullable(new Movie().getActor("Thriller"));
        a1.ifPresent(n ->System.out.println(n.toUpperCase()));
        a2.ifPresent(n -> System.out.println(n.toUpperCase()));
    }
}
```

Choose the correct option.

Options :

This program generates the output:

6406533051258. ✓ AKSHAY

This program terminates due to `NullPointerException` after printing the message:

6406533051259. ✗ AKSHAY

This program generates the output:

AKSHAY

6406533051260. ✗ null

This program generates the output:

ACTION

6406533051261. ✗ AKSHAY

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.io.*;
class HealthCard implements Serializable {
    private String cardNumber = "*****";
    private transient String insuranceProvider = "Unknown";
    private String issueDate = "00/00";
    public HealthCard(String cN, String iP, String iD) {
        cardNumber = cN;
        insuranceProvider = iP;
        issueDate = iD;
    }
    public String toString() {
        return cardNumber + ", " + insuranceProvider + ", " + issueDate;
    }
}
public class Test {
    public static void main(String[] args) throws Exception {
        var fos = new FileOutputStream("healthcard.txt");
        var os = new ObjectOutputStream(fos);
        os.writeObject(new HealthCard("H123456", "HIInsurance", "03/24"));
        os.close();
        var fis = new FileInputStream("healthcard.txt");
        var ois = new ObjectInputStream(fis);
        HealthCard card = (HealthCard) ois.readObject();
        ois.close();
        System.out.println(card);
    }
}
```

What will the output be?

Options :

6406533051262. ✘ null, null, null

6406533051263. ✓ H123456, null, 03/24

6406533051264. ✘ H123456, Unknown, 03/24

6406533051265. ✘ H123456, HIInsurance, 03/24

6406533051266. ✘ ******, Unknown, 00/00

Question Number : 155 Question Id : 640653906454 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.util.*;
import java.util.stream.*;
class Car {
    private String model;
    private double mileage;
    //Constructor to initialize instance variables
    public double getMileage() {
        return mileage;
    }
    public String toString() {
        return model;
    }
}
public class Test {
    public static void main(String[] args) {
        var carArr = new ArrayList<Car>();
        carArr.add(new Car("Toyota", 20.5));
        carArr.add(new Car("Ford", 25.3));
        carArr.add(new Car("Honda", 18.9));
        carArr.add(new Car("Chevrolet", 22.0));
        Map<Boolean, List<Car>> mileageMap;
        mileageMap = carArr.stream()
            .collect(Collectors.partitioningBy(c -> c.getMileage() >= 22.0));
        System.out.println(mileageMap.get(false));
    }
}
```

Choose the correct option.

Options :

6406533051267. ❌ This program generates the output: [Ford, Chevrolet]

6406533051268. ❌ This program generates the output: [Ford]

6406533051269. ✓ This program generates the output: [Toyota, Honda]

6406533051270. ❌ This program generates the output: [Toyota, Honda, Chevrolet]

Question Number : 156 Question Id : 640653906455 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the code given below. Assume that the file food.txt contains the following lines of text in it.

A balanced diet is key to good health.

Food provides essential nutrients for the body.

Food preparation is an art form.

```
import java.io.*;
import java.util.Scanner;
public class Example {
    public static void main(String[] args) {
        try {
            var in=new FileInputStream("food.txt");
            var scanner=new Scanner(in); //LINE 1
            System.out.println("Data from file:");
            System.out.println(scanner.nextLine());
            System.out.println(scanner.next());
            System.out.println(scanner.nextLine());
        }
        catch (FileNotFoundException e) {
            System.out.println("File does not exist.");
        }
        catch (IOException e) {
            System.out.println("Error in writing a file.");
        }
    }
}
```

Choose the correct option.

Options :

6406533051271. ❌ LINE 1 generates IOException.

This program generates the output:

Data from file:

A balanced diet is key to good health.

Food provides essential nutrients for the body.

6406533051272. ❌ Food preparation is an art form.

6406533051273. ✓

This program generates the output:

Data from file:

A balanced diet is key to good health.

Food

provides essential nutrients for the body.

This program generates the output:

Data from file:

A balanced diet is key to good health.

A

6406533051274. ❌ Food preparation is an art form.

Sub-Section Number :

3

Sub-Section Id :

640653134650

Question Shuffling Allowed :

Yes

Question Number : 157 Question Id : 640653906444 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import javax.swing.*;
import java.awt.*;
public class GUITest extends JFrame {
    JPanel pnlLbl, pnlTxt, pnlBtn;
    JLabel lblId, lblPwd;
    JTextField txtId, txtPwd;
    JButton btn;
    public GUITest() {
        lblId = new JLabel("Phone no:");
        lblPwd = new JLabel("OTP:");
        txtId = new JTextField(10);
        txtPwd = new JTextField(10);
        btn = new JButton("Login");
        pnlLbl = new JPanel();
        //add lblId and txtId to pnlLbl
        pnlTxt = new JPanel();
        //add lblPwd and txtPwd to pnlTxt
        pnlBtn = new JPanel();
        //add btn to pnlBtn

        //CODE BLOCK

        setVisible(true);
        setSize(300,200);
    }
    public static void main(String[] args) {
        new GUITest();
    }
}
```

Choose the correct option to be filled in place of CODE_BLOCK such that the above program produces the GUI given below.



Figure 1

Options :

- add(pnlLbl, "Center");
- add(pnlTxt, "North");
- 6406533051225. ✘ add(pnlBtn, "South");

- add(pnlLbl, "North");
- add(pnlTxt, "South");
- 6406533051226. ✘ add(pnlBtn, "Center");

```
    add(pnlLbl, "North");
    add(pnlTxt, "Center");
6406533051227. ✓ add(pnlBtn, "South");
```

```
    add(pnlLbl, "South");
    add(pnlTxt, "Center");
6406533051228. ✘ add(pnlBtn, "North");
```

Sub-Section Number : 4

Sub-Section Id : 640653134651

Question Shuffling Allowed : Yes

Question Number : 158 Question Id : 640653906450 Question Type : MSQ Calculator : Yes

Correct Marks : 5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the Java code given below that prints the highest priced stock among a set of given Stock objects. From among the options, identify the appropriate function header for the function printHighestPricedStock that takes as input an array of Stock objects and prints the highest priced stock.

```
import java.util.*;
interface Stock {
    public abstract double getPrice();
}
class AStock implements Stock {
    private double price;
    // Constructor
    // method getPrice() that returns price
}
class BStock implements Stock {
    private double price;
    // Constructor
    // method getPrice() that returns price
}
public class Test {
    // LINE 1: FUNCTION HEADER
    {
        // invokes method getPrice()
        // to print the value of highest priced stock
    }

    public static void main(String[] args) {
        Stock[] stocks = {
            new AStock(150.50),
            new BStock(200.75),
            new AStock(160.25)
        };
        printHighestPricedStock(stocks);
    }
}
```

Choose the correct option(s).

Options :

6406533051250. ❌ public static <T extends AStock> void printHighestPricedStock(T[] items)
6406533051251. ✓ public static <T extends Stock> void printHighestPricedStock(T[] items)
6406533051252. ❌ public static <T extends BStock> void printHighestPricedStock(T[] items)
6406533051253. ✓ public static void printHighestPricedStock(Stock[] items)

**Question Number : 159 Question Id : 640653906457 Question Type : MSQ Calculator : Yes
Correct Marks : 5 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Consider the Java code given below.

```
class Stadium {  
    int available = 1;  
    public synchronized void bookSeat(int n, String name) {  
        if (available >= n) {  
            available = available - n;  
            System.out.println(name + " booked " + n + " seat");  
        } else {  
            System.out.println(name + " cannot book " + n + " seat");  
        }  
    }  
}  
  
class SeatBooking implements Runnable {  
    private Stadium s;  
    private String name;  
    private int n_seats;  
    public SeatBooking(Stadium s, String n, int ns) {  
        this.s = s;  
        this.name = n;  
        this.n_seats = ns;  
    }  
    public void run() {  
        s.bookSeat(n_seats, name);  
    }  
}  
  
public class ThreadTest {  
    public static void main(String[] args) {  
        Stadium obj = new Stadium();  
        SeatBooking sb1 = new SeatBooking(obj, "Virat", 1);  
        SeatBooking sb2 = new SeatBooking(obj, "Saniya", 1);  
        Thread t1 = new Thread(sb1);  
        Thread t2 = new Thread(sb2);  
        t1.start();  
        t2.start();  
    }  
}
```

Which of the following options is/are possible result/s of the above code?

Options :

- Saniya booked 1 seat
- 6406533051279. ✓ Virat cannot book 1 seat

Saniya booked 1 seat

6406533051280. ✘ Virat booked 1 seat

Virat booked 1 seat

6406533051281. ✓ Saniya cannot book 1 seat

Virat cannot book 1 seat

6406533051282. ✘ Saniya cannot book 1 seat

Question Number : 160 Question Id : 640653906458 Question Type : MSQ Calculator : Yes

Correct Marks : 5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Choose the correct option.

```
import java.util.*;
import java.util.concurrent.*;
class Example extends Thread {
    Map cuMap;
    Example(Map m) {
        this.cuMap = m;
    }
    public void run() {
        cuMap.put("4", "Four");
    }
}
public class Test {
    public static void main (String[] args) {
        Map<Integer, String> cuMap = new ConcurrentHashMap();
        Integer[] iarr = {1, 2, 3};
        String[] arr = {"One", "Two", "Three"};
        for(int i = 0; i < iarr.length; i++) {
            cuMap.put(iarr[i], arr[i]);
        }
        Example t = new Example(cuMap);
        t.start();
        Set s = cuMap.entrySet();
        Iterator itr = s.iterator();
        while(itr.hasNext()) {
            Map.Entry m = (Map.Entry)itr.next();
            System.out.println(m.getKey() + " => " + m.getValue());
        }
    }
}
```

Which of the following is true about the given code.

Options :

6406533051283. ❌ This program may generate ConcurrentModificationException.

The program may generate the output:

1 => One
2 => Two
3 => Three

6406533051284. ✓ 4 => Four

The program may generate the output:

1 => One
2 => Two

6406533051285. ✓ 3 => Three

The program always generate the output:

1 => One
2 => Two
3 => Three
4 => Four

6406533051286. *

Sub-Section Number :

5

Sub-Section Id :

640653134652

Question Shuffling Allowed :

Yes

Question Number : 161 Question Id : 640653906443 Question Type : MSQ Calculator : Yes

Correct Marks : 6 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the Java code given below.

```
import javax.swing.*;
import java.awt.event.*;
public class ButtonEventTest extends JFrame implements ActionListener{
    private JButton b1, b2;
    private JLabel l1;
    JPanel panel1, panel2;
    public ButtonEventTest() {
        b1 = new JButton("Encrypt");
        b2 = new JButton("Decrypt");
        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("action1");
        b2.setActionCommand("action2");

        b1.addActionListener(this);
        b2.addActionListener(this);
    }

    public void actionPerformed(ActionEvent e) {
        //CODE SEGMENT
    }
}

public static void main(String[] args) {
    new ButtonEventTest();
}
```

Choose the correct code segment(s) to be filled inside method `actionPerformed()` such that on clicking the Encrypt button, the label text changes to Text encrypted and on clicking the Decrypt button, the label text changes to Text decrypted.



Options :

```
if(e.getActionCommand().equals("action1"))
    l1.setText("Text encrypted");
else if(e.getActionCommand().equals("action2"))
    l1.setText("Text decrypted");
```

6406533051221. ✓ l1.setText("Text decrypted");

6406533051222. ✘

```
if(e.getActionCommand().equals("b1"))
    l1.setText("Text encrypted");
else if(e.getActionCommand().equals("b2"))
    l1.setText("Text decrypted");
```

```
        if(e.getSource().equals(b1))
            l1.setText("Text encrypted");
        else if(e.getSource().equals(b2))
            l1.setText("Text decrypted");
```

6406533051223. ✓

```
if(e.getSource().equals("action1"))
    l1.setText("Text encrypted");
else if(e.getSource().equals("action2"))
    l1.setText("Text decrypted");
```

6406533051224. ✘

Question Number : 162 Question Id : 640653906456 Question Type : MSQ Calculator : Yes

Correct Marks : 6 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the Java code given below.

```
class Pattern implements Runnable {
    boolean stopRequested = false;
    String[] pattern = {"One", "Two", "Three", "Four", "Five"};
    int index = 0;
    public void run() {
        while (!stopRequested) {
            System.out.print(pattern[index] + " ");
            index = (index + 1) % pattern.length;
        }
    }
    public void setStop(boolean stop) {
        stopRequested = stop;
    }
}
public class Test {
    public static void main(String[] args) throws InterruptedException {
        Pattern p = new Pattern();
        Thread t1 = new Thread(p);
        t1.start();
        p.setStop(true);
    }
}
```

Choose the correct option(s).

Options :

6406533051275. ✘ The program will always generate the output: One Two Three Four Five

6406533051276. ✘ The program will always generate the output: One

The output can be One or One Two or One Two Three or One Two Three Four
6406533051277. ✓ or One Two Three Four Five and can also cycle back and start again.

6406533051278. ✓ The program may not generate any output.

AppDev2

Section Id :	64065364211
Section Number :	8
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	31
Number of Questions to be attempted :	31
Section Marks :	100
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134653
Question Shuffling Allowed :	No

Question Number : 163 Question Id : 640653906459 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : MODERN APPLICATION DEVELOPMENT II (COMPUTER BASED EXAM)"

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

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

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

Options :

6406533051287. ✓ YES

6406533051288. ✗ NO

Sub-Section Number :

2

Sub-Section Id :

640653134654

Question Shuffling Allowed :

Yes

Question Number : 164 Question Id : 640653906460 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

What of the following is the primary objective of a CSRF token?

Options :

6406533051289. ✗ To encrypt the user's session

6406533051290. ✓ To validate that the request comes from the authenticated user

6406533051291. ✗ To store the user's password securely

6406533051292. ✗ To compress the HTTP request

Question Number : 165 Question Id : 640653906464 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Suppose an application is being loaded from the origin https://example.com. Which of the following origins will the browser allow while making a fetch call, by default?

Options :

6406533051305. ✗ <https://api.example.com>

6406533051306. ✗ <http://example.com/api>

6406533051307. ✗ <https://example.com:8080>

6406533051308. ✓ <https://example.com/subdir>

Question Number : 166 Question Id : 640653906489 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

What is the correct sequence of steps to update the state in Vuex when handling an asynchronous operation?

Options :

6406533051397. ✗ State → Dispatch an action → Commit a mutation → State change

6406533051398. ✓ Dispatch an action → Commit a mutation → State change

6406533051399. ✗ Commit a mutation → Dispatch an action → State change

6406533051400. ❌ State change → Commit a mutation → Dispatch an action

Sub-Section Number : 3

Sub-Section Id : 640653134655

Question Shuffling Allowed : Yes

Question Number : 167 Question Id : 640653906462 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Suppose you are developing an application for millions of users that will perform intensive data analysis and return the results asynchronously. Arrange the following set of actions/operations to achieve an efficient and scalable design.

- I) Save the result to a database
- II) Invoke a callback URL
- III) Queue the analysis job

Options :

6406533051297. ❌ II, I, III

6406533051298. ✓ III, I, II

6406533051299. ❌ III, II, I

6406533051300. ❌ I, II, III

Question Number : 168 Question Id : 640653906465 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Which of the following statements about Redis is true?

Options :

6406533051309. ❌ Redis is a relational database that uses SQL for querying data.

6406533051310. ✓ Redis is an in-memory data structure store, commonly used as a database, cache, and message broker.

6406533051311. ❌ Redis can only store string data types and does not support complex data structures like lists or sets.

6406533051312. ❌ Redis cannot handle numerous operations per second.

Question Number : 169 Question Id : 640653906466 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Which of the following scenarios is an example of a Cross-Site Request Forgery (CSRF) attack?

Options :

6406533051313. ❌ A user receives an email containing a link to a phishing site that asks for their login credentials.

6406533051314. ✓ A user clicks on a malicious link while logged into their bank account, and without their knowledge, a money transfer request is sent to the bank's server using the user's

authenticated session.

6406533051315. ❌ A hacker uses a brute-force attack to guess the password of a user's online account.

6406533051316. ❌ A user is tricked into downloading and installing malware that steals their sensitive information.

Question Number : 170 Question Id : 640653906468 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Match the following technologies with their typical use cases:

1. Webhooks	A. Real-time communication in chat applications
2. Web Sockets	B. Fetching data periodically from an API endpoint
3. API	C. Receiving notifications when a specific event occurs
4. Polling	D. Exchanging data between client and server using HTTP requests
5. Pub/Sub	E. Broadcasting messages to multiple subscribers simultaneously

Options :

6406533051321. ✓ 1 - C, 2 - A, 3 - D, 4 - B, 5 - E

6406533051322. ❌ 1 - D, 2 - E, 3 - A, 4 - C, 5 - B

6406533051323. ❌ 1 - C, 2 - C, 3 - E, 4 - A, 5 - D

6406533051324. ❌ 1 - D, 2 - A, 3 - C, 4 - D, 5 - B

Question Number : 171 Question Id : 640653906475 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the below javascript program.

```
function parent() {
    var a = 1;
    function child() {
        console.log(a);
    }
    a = 2;
    return child;
}

var closure = parent();
closure();
```

What will be the output of the above program, if executed?

Options :

6406533051345. ✓ 2

6406533051346. ❌ 1

6406533051347. ✘ undefined

6406533051348. ✘ Error

Question Number : 172 Question Id : 640653906485 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following JavaScript code snippet.

```
// Code Snippet 1
sessionStorage.setItem('username', 'course_user');
let storedUsername = sessionStorage.getItem('username');

// Code Snippet 2
sessionStorage.removeItem('username');
let removedUsername = sessionStorage.getItem('username');

// Code Snippet 3
sessionStorage.clear();
let clearedStorage = sessionStorage.username;
```

What will be the values of 'storedUsername', 'removedUsername', and 'clearedStorage' after the execution of the above code snippets?

Options :

6406533051381. ✘ storedUsername: 'course_user', removedUsername: null, clearedStorage: null

6406533051382. ✘ storedUsername: 'course_user', removedUsername: undefined, clearedStorage: null

6406533051383. ✓ storedUsername: 'course_user', removedUsername: null, clearedStorage: undefined

6406533051384. ✘ storedUsername: 'course_user', removedUsername: undefined, clearedStorage: undefined

Question Number : 173 Question Id : 640653906488 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following javascript code

```
const obj = {
    num: 40,
    regularFunction: function() {
        return this.value;
    },
    arrowFunction: () => {
        return this.value;
    }
};

const regularResult = obj.regularFunction();
const arrowResult = obj.arrowFunction();
```

What are the values of `regularResult` and `arrowResult`?

Options :

6406533051393. ✘ `regularResult = 40, arrowResult = 40`

6406533051394. ✘ `regularResult = undefined, arrowResult = undefined`

6406533051395. ✓ `regularResult = 40, arrowResult = undefined`

6406533051396. ✘ `regularResult = undefined, arrowResult = 40`

Question Number : 174 Question Id : 640653906490 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the below 2 approaches:

Approach 1:

```
<script>
    setInterval(() => document.title = "Title A", 2000)
    setInterval(() => document.title = "Title B", 1000)
</script>
```

Approach 2:

```
<script>
    setInterval(() => document.title = "Title A", 1000)
    setInterval(() => document.title = "Title B", 2000)
</script>
```

Choose the correct statement:

Options :

6406533051401. ✘ The approach 1 will toggle the page title between “Title A” and “Title B” after every 1 second (approx).

6406533051402. ✘ The approach 2 will toggle the page title between “Title A” and “Title B” after

every 1 second (approx).

6406533051403. ✓ None of the approaches will toggle the page title after every 1 second.

6406533051404. ✗ None of these

Question Number : 175 Question Id : 640653906492 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the below JavaScript program.

```
<script>
  for (var i = 0; i <= 3; i++) {
    setTimeout(() => console.log(i), (i+1)*1500);
  }
</script>
```

What will be the output of the above program, if executed? Also, predict the minimum number of seconds the program will take to complete the execution?

Options :

0
1
2
3

6406533051409. ✗ Minimum time taken will be: 15 sec

1
2
3
4

6406533051410. ✗ Minimum time taken will be: 9 sec

3
3
3
3

6406533051411. ✗ Minimum time taken will be: 6 sec

6406533051412. ✓

4
4
4
4

Minimum time taken will be: 6 sec

Sub-Section Number :	4
Sub-Section Id :	640653134656
Question Shuffling Allowed :	Yes

Question Number : 176 Question Id : 640653906461 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

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

Options :

6406533051293. ✓ Webhooks use HTTP requests to communicate events from one service to another.

6406533051294. ✗ Webhooks require the recipient service to periodically poll the sender for updates.

6406533051295. ✓ Webhooks are typically implemented using HTTP POST requests.

6406533051296. ✗ Webhooks guarantee that events will be delivered in order and exactly once.

Question Number : 177 Question Id : 640653906463 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

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

Options :

6406533051301. ✓ Function declarations are hoisted along with their definitions.

6406533051302. ✗ Variable declarations with var are hoisted with their initializations.

6406533051303. ✓ let and const declarations are hoisted to the top of their block but remain uninitialized until execution reaches the declaration.

6406533051304. ✗ Only function declarations are hoisted, not function definition.

Question Number : 178 Question Id : 640653906467 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following scenarios are best suited for using Celery tasks?

Options :

6406533051317. ✗ Handling real-time user interactions on a website.

6406533051318. ✓ Sending out periodic email notifications to users.

6406533051319. ✅ Generating and displaying dynamic content on a web page.

6406533051320. ✓ Performing long-running data processing tasks in the background.

Question Number : 179 Question Id : 640653906486 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following statements is/are true regarding webhooks and server sent events (SSE)?

Options :

6406533051385. ✓ Webhooks are typically used for server-to-server communication, while SSE is used for server-to-client communication.

6406533051386. ✅ Webhooks require the client to maintain an open connection to receive updates, while SSE does not.

6406533051387. ✓ Webhooks are initiated by the server, while SSE connections are initiated by the client.

6406533051388. ✅ SSE supports bidirectional communication, whereas webhooks do not.

Question Number : 180 Question Id : 640653906491 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following is/are the correct ways to achieve the following.

1. Always apply class named “errorClass”,
2. The class named “activeClass” should only be applied when the Vue data variable “isActive” is truthy

Options :

6406533051405. ✓ <div :class="['activeClass', 'errorClass']"></div>

6406533051406. ✅ <div :class="['activeClass', 'errorClass']"></div>

6406533051407. ✅ <div :class="['activeClass', 'errorClass']"></div>

6406533051408. ✓ <div :class="['activeClass', 'errorClass']"></div>

Sub-Section Number :

5

Sub-Section Id :

640653134657

Question Shuffling Allowed :

Yes

Question Number : 181 Question Id : 640653906469 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following is/are true about Server-Sent Events (SSE)?

Options :

6406533051325. ✓ SSE connections are established using HTTP.
6406533051326. ✗ SSE supports bidirectional communication between client and server.
6406533051327. ✗ SSE automatically switches to web socket if the connection is successful.
6406533051328. ✓ SSE is suitable for sending updates to multiple clients simultaneously.

Question Number : 182 Question Id : 640653906484 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following HTTP header(s) can be used to control caching behavior in web applications?

Options :

6406533051377. ✓ Cache-Control
6406533051378. ✓ Expires
6406533051379. ✗ Bearer
6406533051380. ✗ Content-Type

Question Number : 183 Question Id : 640653906493 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following statement(s) is/are true regarding long and short polling?

Options :

6406533051413. ✗ A webhook is the same as short polling.
6406533051414. ✓ The short polling can be used to know the state of an asynchronous task, and trigger an action if the task gets completed.
6406533051415. ✗ The long polling cannot be achieved using HTTP protocol.
6406533051416. ✓ Long Polling can be used to achieve real time communication.

Sub-Section Number : 6

Sub-Section Id : 640653134658

Question Shuffling Allowed : Yes

Question Number : 184 Question Id : 640653906470 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

Consider the following Vue.js 2 component using CDN.

```

<div id="app">
  <input v-model="newItem" placeholder="Add an item" />
  <button @click="addItem">Add</button>

  <ul>
    <li v-for="(item, index) in items" :key="index">
      {{ index + 1 }}. {{ item }}
    </li>
  </ul>
</div>

<script src="https://cdn.jsdelivr.net/npm/vue@2"></script>
<script>
  new Vue({
    el: '#app',
    data: {
      newItem: '',
      items: ['Apple', 'Banana']
    },
    methods: {
      addItem() {
        if (this.newItem) {
          this.items.push(this.newItem, this.newItem);
          this.newItem = '';
        }
      }
    }
  );
</script>

```

After entering "Orange" in the input box and clicking the "Add" button, what will be seen in the browser?

Options :

6406533051329. ✓ 1. Apple

2. Banana

3. Orange

4. Orange

6406533051330. ✗ 1. Apple

2. Banana

3. Orange

3. Orange

6406533051331. ✗ 1. Apple

2. Banana

3. Orange

3. Orange

6406533051332. ✗ 1. Apple

2. Banana

Question Number : 185 Question Id : 640653906471 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

Consider the following javascript code running on browser

```
localStorage.setItem('counter', '0');
sessionStorage.setItem('total', '5');

for (let i = 0; i < 3; i++) {
    let counter = localStorage.getItem('counter');
    let total = sessionStorage.getItem('total');

    counter += 2;
    total *= 2;

    localStorage.setItem('counter', counter);
    sessionStorage.setItem('total', total);
}

sessionStorage.clear();

console.log(localStorage.getItem('counter'));
console.log(sessionStorage.getItem('total'));
```

What will be the output in the browser console?

Options :

640653051333. ❌ 6

40

640653051334. ❌ null

40

640653051335. ❌ 6

null

640653051336. ✓ 0222

null

Question Number : 186 Question Id : 640653906476 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

Consider the below JavaScript program.

```
class Animal {
    constructor(name) {
        this.name = name;
    }

    speak() {
        console.log(` ${this.name} makes a noise.`);
    }
}

class Dog extends Animal {
    speak() {
        console.log(` ${this.name} barks`);
    }
}

const d = new Dog('Rex');
d.speak();
console.log(d.__proto__ === Dog.prototype);
console.log(d.__proto__.__proto__ === Animal.prototype);
```

What will be the output of the above program?

Options :

6406533051349. ✓ Rex barks

true

true

6406533051350. ✗ Rex barks

false

true

6406533051351. ✗ Rex barks.

true

false

6406533051352. ✗ Rex barks.

false

false

Question Number : 187 Question Id : 640653906477 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

Consider the below flask application.

```

from flask import Flask
from flask_caching import Cache
from time import sleep

config = {
    "CACHE_TYPE": "SimpleCache",
    "CACHE_DEFAULT_TIMEOUT": 180
}

app = Flask(__name__)
app.config.from_mapping(config)
cache = Cache(app)

@cache.memoize(timeout=180)
def get_data(param):
    sleep(5)
    return f"Data for {param}"

@app.route('/data/<param>')
def data(param):
    result = get_data(param)
    return f"Result: {result}"

if __name__ == '__main__':
    app.run(debug=True)

```

If the application is running on “<http://127.0.0.1:5000>” and the user visits the URL “<http://127.0.0.1:5000/data/test>” three times in the following sequence:

1. First visit
2. Second visit after 2 minutes and 30 seconds
3. Third visit after 1 minute from the second visit

What will be the approximate difference in response times between the first and third requests?

Options :

- 6406533051353. ✘ 5 seconds
- 6406533051354. ✓ 0 seconds
- 6406533051355. ✘ 10 seconds
- 6406533051356. ✘ 180 seconds

Question Number : 188 Question Id : 640653906478 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

Consider the below JavaScript program.

```
new Promise((resolve, reject) => {
    const num = 0.6;
    if (num > 0.5) {
        resolve(num);
    } else {
        reject(num);
    }
})
.then(data => {
    console.log("Step 1:", data);
    if (data > 0.75) {
        return data * 2;
    } else {
        return Promise.reject(new Error("Less than 0.75"));
    }
})
.then(data => {
    console.log("Step 2:", data);
    return data + 5;
})
.catch(error => {
    console.log("Step 3:", error.message);
    if (error.message === "Less than 0.75") {
        return 1;
    } else {
        throw error;
    }
})
.then(data => {
    console.log("Step 4:", data);
    if (data === 1) {
        throw new Error("Fallback value");
    } else {
        return data * 3;
    }
})
.catch(error => {
    console.log("Step 5:", error.message);
    return "Error handled";
})
.finally(() => {
    console.log("Step 6: Finally block executed");
})
```

What will be the output of the above program?

Options :

6406533051357. ❌ Step 1: 0.6

Step 2: 1.2

Step 4: 6.2

Step 6: Finally block executed

6406533051358. ✓ Step 1: 0.6

Step 3: Less than 0.75

Step 4: 1

Step 5: Fallback value

Step 6: Finally block executed

6406533051359. ❌ Step 1: 0.6

Step 2: 1.2

Step 3: Error

Step 4: 1

Step 5: Fallback value

Step 6: Finally block executed

6406533051360. ❌ Step 1: 0.6

Step 3: Less than 0.75

Step 4: 1

Step 6: Finally block executed

Question Number : 189 Question Id : 640653906479 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

In a Vue CLI project with Vuex, you have the following configuration:

src/store/index.js:

```
import Vue from 'vue';
import Vuex from 'vuex';

Vue.use(Vuex);

export default new Vuex.Store({
  state: {
    value: " ",
  },
  mutations: {
    setValue(state, payload) {
      state.value = payload;
    }
  },
  actions: {
    async fetchValue({ commit }) {
      // Simulate async API call
      const response = await new Promise(resolve => setTimeout(() =>
        resolve('API Value'), 500));
      commit('setValue', response);
    }
  }
});
```

src/App.vue:

```
<template>
  <div>
    <p>{{ value }}</p>
    <button @click="updateValue">Update Value</button>
  </div>
</template>

<script>
export default {
  computed: {
    value() {
      return this.$store.state.value;
    }
  },
  methods: {
    async updateValue() {
      await this.$store.dispatch('fetchValue');
    }
}
</script>
```

After running “npm run serve”, if you click the "Update Value" button, what will be displayed in the <p> tag?

Options :

6406533051361. ✓ API Value

6406533051362. ✗ ""

6406533051363. ✗ undefined

6406533051364. ✗ null

Question Number : 190 Question Id : 640653906480 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

Consider the below JavaScript code.

```
async function newFetch(url) {
  try {
    console.log(url)
    const res = await fetch(url)
    if (!res.ok) {
      throw new Error(`HTTP Error: ${res.status}`)
    }
    try {
      const data = await res.json()
      console.log(data)
    } catch {
      throw new Error('Error')
    }
  } catch {
    throw new Error('Data is not JSON serializable')
  }
}
newFetch('https://example.com/api/users/23').catch((err) => {
  console.error(err)
})
```

Suppose the API URL “<https://example.com/api/users/23>” returns a valid HTML output. What will be logged on to console?

Options :

- 640653051365. ❌ “Network Error”
- 640653051366. ❌ “HTTP Error: 404”
- 640653051367. ✓ “Data is not JSON serializable”
- 640653051368. ❌ Data returned by the API

Question Number : 191 Question Id : 640653906487 Question Type : MCQ Calculator : Yes

Correct Marks : 4.5

Question Label : Multiple Choice Question

Consider the following Flask application with Redis caching. Redis is running normally on port 6379.

```
from flask import Flask, jsonify
from flask_caching import Cache

app = Flask(__name__)
app.config['CACHE_TYPE'] = 'redis'
app.config['CACHE_REDIS_HOST'] = 'localhost'
app.config['CACHE_REDIS_PORT'] = 6379
cache = Cache(app)

def compute_value(x, y):
    result = x * y
    return result

@app.route('/compute/<int:x>/<int:y>')
@cache.cached(timeout=60, key_prefix='compute')
def compute(x,y):
    result = compute_value(x, y)
    return jsonify({'result': result})

if __name__ == '__main__':
    app.run(debug=True, port=5000)
```

Two requests are given to localhost:5000/compute/10/20 and localhost:5000/compute/5/10 within 60 seconds. What would be the json response from the server respectively?

Options :

- 6406533051389. ✘ {"result": 200} and {"result": 50}
- 6406533051390. ✘ {"result": 50} and {"result": 200}
- 6406533051391. ✘ {"result": 100} and {"result": 100}
- 6406533051392. ✓ {"result": 200} and {"result": 200}

Sub-Section Number :

7

Sub-Section Id :

640653134659

Question Shuffling Allowed :

No

Question Id : 640653906472 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (192 to 193)

Question Label : Comprehension

Consider the following flask/python code snippets and answer the given subquestions

Note : The `yield` keyword makes a function return one value at a time, saving its place so it can continue from where it left off.

`requests.get()` makes a http GET request to a given url, like `fetch` in JavaScript.

Options:

A.

```
import requests

response = requests.get('https://some-api')
print(response.json())
```

B.

```
from flask import Flask, request

app = Flask(__name__)

@app.route('/server-route', methods=['POST'])
def server_route():
    data = request.json
    print(data)
    return 'OK', 200
```

C.

```
from flask import Flask, Response
import time

app = Flask(__name__)

def stream():
    while True:
        time.sleep(5)
        yield f'data: The time is {time.strftime("%Y-%m-%d %H:%M:%S")}\n\n'

@app.route('/server-route')
def server_route():
    return Response(stream(), mimetype='text/event-stream')

if __name__ == '__main__':
    app.run(debug=True, port=5000)
```

D.

```
import time
import requests

while True:
    response = requests.get('https://some-endpoint')
    print(response.json())
    time.sleep(10)
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 192 Question Id : 640653906473 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Which code snippet represents a **Webhook receiver** implementation?

Options :

640653051337. ✘ A

640653051338. ✓ B

640653051339. ✘ C

640653051340. ✘ D

Question Number : 193 Question Id : 640653906474 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Which code snippet represents a **Pub/Sub** implementation?

Options :

6406533051341. ✘ A

6406533051342. ✘ B

6406533051343. ✓ C

6406533051344. ✘ D

Question Id : 640653906481 Question Type : COMPREHENSION Sub Question Shuffling

Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (194 to 195)

Question Label : Comprehension

Consider the following HTML document and the script file shown below. Assuming the CDNs for Vue2 and VueRouter are correctly configured, answer the given subquestions

Filename: index.html

```
<div id="app">
    <router-view></router-view>
</div>
<script src="script.js"></script>
```

Filename: script.js

```
const Error = {template: `<div>Page Not Found</div>`}
const Profile = {
  template: `<div>
    <div v-if='user'>
      Name: {{user.name}}, State: {{user.state}}
    </div>
    <div v-else>
      Unknown User
    </div>
  </div>`,
  data() {
    return {
      profiles: [
        { id: '1234', name: 'Animesh', state: 'MP' },
        { id: '1235', name: 'Arnav', state: 'Goa' },
      ],
    }
  },
  computed: {
    user(){
      let user = this.profiles.find((profile) => {
        return profile.id == this.$route.params.id
      })
      return user
    },
  },
}
```

```

computed: {
  user(){
    let user = this.profiles.find((profile) => {
      return profile.id == this.$route.params.id
    })
    return user
  },
},
}

const routes = [
  { path: '/profile/:id', component: Profile },
  { path: '*', component: Error },
]

const router = new VueRouter({
  routes,
})

new Vue({
  el: '#app',
  router,
})

```

Sub questions

Question Number : 194 Question Id : 640653906482 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Suppose the application is running on port 8080.

What will be rendered inside router-view for the URL

[“<http://127.0.0.1:8080/#/profile/1235>”?](http://127.0.0.1:8080/#/profile/1235)

Options :

640653051369. ❌ Page Not Found

640653051370. ❌ Unknown User

640653051371. ❌ Name: Animesh, State: MP

640653051372. ✓ Name: Arnav, State: Goa

Question Number : 195 Question Id : 640653906483 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Suppose the application is running on port 8080. What will be rendered inside router-view for the URL

"<http://127.0.0.1:8080/#/profile/Arnav>"?

Options :

- 6406533051373. ✗ Page Not Found
- 6406533051374. ✗ Name: Animesh, State: MP
- 6406533051375. ✗ Name: Arnav, State: Goa
- 6406533051376. ✓ Unknown User

MLT

Section Id :	64065364212
Section Number :	9
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	18
Number of Questions to be attempted :	18
Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134660
Question Shuffling Allowed :	No

Question Number : 196 Question Id : 640653906494 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : MACHINE LEARNING TECHNIQUES (COMPUTER BASED EXAM)"

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

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

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

Options :

6406533051417. ✓ YES

6406533051418. ✗ NO

Sub-Section Number :

2

Sub-Section Id :

640653134661

Question Shuffling Allowed :

Yes

Question Number : 197 Question Id : 640653906495 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

The eigenvalues of the covariance matrix of a centered dataset in \mathbb{R}^5 are 15, 5, 5, 0, 0. Standard PCA is performed on this dataset. What is the variance captured by the top two principal components expressed as a percentage of total variance?

Options :

6406533051419. ✓ 80%

6406533051420. ✗ 60%

6406533051421. ✗ 20%

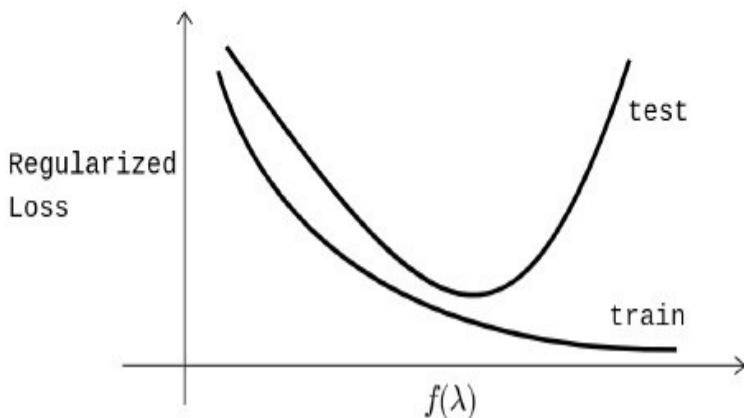
6406533051422. ✗ 15%

Question Number : 198 Question Id : 640653906496 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider a regression problem that has a training and test dataset. Ridge regression is applied on the problem for various values of λ . The training and test loss are plotted against some function of λ , which we call $f(\lambda)$. Note that the continuous curves are obtained by connecting the points using a smooth curve. What is the most appropriate choice of $f(\lambda)$? Recall that the regularized loss is the sum of the SSE and the regularization term. Note that SSE is the sum of squared errors.



Options :

1

6406533051423. ✓ $\frac{1}{\lambda}$

6406533051424. ✗ λ

6406533051425. ✘ λ^2

6406533051426. ✘ $\log(\lambda)$

Question Number : 199 Question Id : 640653906497 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Match the characteristics given below with the appropriate ensemble technique.

1. Decision stumps
2. Deep decision trees
3. Parallel execution
4. Sequential execution

Options :

6406533051427. ✓ Bagging → (2), (3); Boosting → (1), (4)

6406533051428. ✘ Bagging → (1), (4); Boosting → (2), (3)

6406533051429. ✘ Bagging → (1), (3); Boosting → (2), (4)

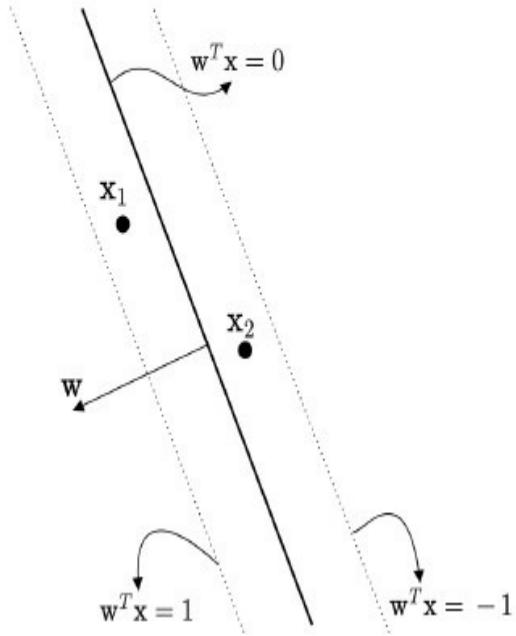
6406533051430. ✘ Bagging → (2), (4); Boosting → (1), (3)

Question Number : 200 Question Id : 640653906498 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider a hard-margin SVM that has been trained on a linearly separable dataset with positive margin. Two test data-points are given below along with the decision boundary and the supporting hyperplanes. Which of the following is true?



Options :

6406533051431. ✓ The predicted labels for x_1 and x_2 are 1 and -1 respectively.
 6406533051432. ✗ The predicted labels for x_1 and x_2 are -1 and 1 respectively.
 6406533051433. ✗ The predicted label for both data-points is 1.
 6406533051434. ✗ The predicted label for both data-points is -1.

Question Number : 201 Question Id : 640653906499 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

For a dataset with features in \mathbb{R}^3 , which of the following expresses the class conditional independence assumption in a Naive Bayes model? $p(\cdot)$ denotes probability.

Options :

6406533051435. ✓ $p((x_1, x_2, x_3) | y) = p(x_1 | y) \cdot p(x_2 | y) \cdot p(x_3 | y)$
 6406533051436. ✗ $p((x_1, x_2, x_3), y) = p(y) \cdot p(x_1) \cdot p(x_2) \cdot p(x_3)$

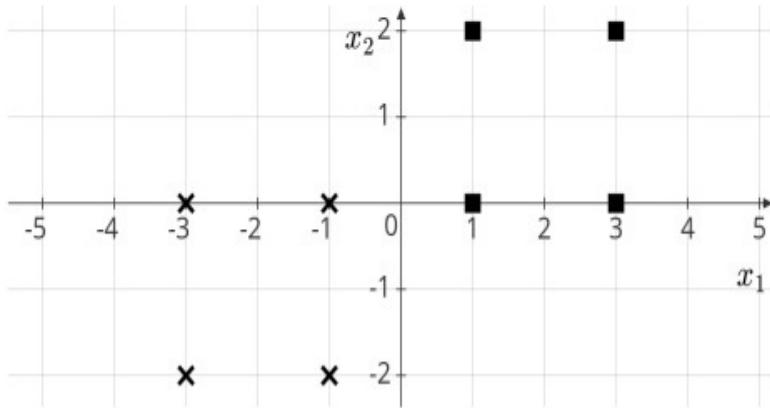
$$6406533051437. ✗ p((x_1, x_2, x_3) | y) = \frac{p((x_1, x_2, x_3), y)}{p(y)}$$

$$6406533051438. ✗ p(y | (x_1, x_2, x_3)) = \frac{p((x_1, x_2, x_3), y)}{p(x_1, x_2, x_3)}$$

Question Number : 202 Question Id : 640653906500 Question Type : MCQ Calculator : Yes

Correct Marks : 3**Question Label : Multiple Choice Question**

The result of k-means clustering on a dataset of eight points is displayed below. Four points belong to the cluster denoted by the ■ symbol and the rest belong to the cluster denoted by the ✕ symbol. The cluster boundary is a line such that all points on it could belong to either of the two clusters. Which of the following is the equation of the cluster boundary?

**Options :**6406533051439. ✓ $2x_1 + x_2 = 0$ 6406533051440. ✗ $x_1 - 2x_2 = 0$ 6406533051441. ✗ $x_1 + x_2 = 0$ 6406533051442. ✗ $x_1 + 2x_2 = 0$ **Sub-Section Number :**

3

Sub-Section Id :

640653134662

Question Shuffling Allowed :

Yes

Question Number : 203 Question Id : 640653906505 Question Type : SA Calculator : None**Correct Marks : 3****Question Label : Short Answer Question**

A hard-margin SVM is trained on a linearly separable dataset with a positive margin. The features are in \mathbb{R}^2 . The optimal weight vector is $\begin{bmatrix} 3 \\ 4 \end{bmatrix}$. Find the distance between the two supporting hyperplanes.

Response Type : Numeric**Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Equal****Text Areas : PlainText****Possible Answers :**

0.4

Question Number : 204 Question Id : 640653906506 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

Consider a dataset for an unsupervised learning problem in which each data-point is either 1 or 0. This dataset is modeled using a Bernoulli distribution with parameter p . The MLE for p is 0.25. If the number of ones in the dataset is 10, find the number of zeros.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

30

Question Number : 205 Question Id : 640653906507 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

Consider a decision stump (parent with two children). The parent node has 200 data-points out of which 50 belong to the positive class. The left child has 100 data-points out of which 50 belong to the positive class. Find the information gain. Use \log_2 . Enter your answer correct to three decimal places.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

0.26 to 0.37

Sub-Section Number :	4
Sub-Section Id :	640653134663
Question Shuffling Allowed :	Yes

Question Number : 206 Question Id : 640653906502 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider $k : \mathbb{R}^d \times \mathbb{R}^d \rightarrow \mathbb{R}$, a polynomial kernel of degree p . If the kernel always outputs a non-negative value, which of the following are possible values for p ?

Options :

6406533051447. ✓ 2

6406533051448. ✓ 4

6406533051449. ✗ 3

6406533051450. ✗ 5

Question Number : 207 Question Id : 640653906503 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider a training dataset of 100 points for a binary classification problem with the following structure.

- The features are in \mathbb{R}^2 and the labels are in $\{-1, 1\}$
- For every data-point $((x_1, x_2), y)$ in the training dataset, $x_1 x_2 > 0$ and $x_1 y > 0$.

Which of the following statements are true?

Options :

6406533051451. ✓ The dataset is linearly separable with a positive margin.

6406533051452. ✓ The perceptron algorithm will terminate after a finite number of iterations when trained on this dataset.

6406533051453. ✗ The dataset is linearly separable, but the margin may be zero.

6406533051454. ✗ The dataset is not linearly separable.

Question Number : 208 Question Id : 640653906504 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider a logistic regression model trained for a binary classification problem

with features in \mathbb{R}^2 and labels in $\{1, 0\}$. The probability that the test point $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$ belongs

to class 1 is equal to $\frac{1}{1 + e^2}$. Which of the following could be the weight vector of the logistic regression classifier? Select all possible answers.

Options :

6406533051455. ✓ $\begin{bmatrix} -1 \\ -1 \end{bmatrix}$

6406533051456. ✓ $\begin{bmatrix} 1 \\ -3 \end{bmatrix}$

6406533051457. ✘ $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$

6406533051458. ✘ $\begin{bmatrix} 3 \\ -1 \end{bmatrix}$

Sub-Section Number :

5

Sub-Section Id :

640653134664

Question Shuffling Allowed :

No

Question Id : 640653906508 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (209 to 211)

Question Label : Comprehension

Consider a linearly separable dataset with a positive margin. The symbol α_i^* in the context of SVMs has its usual meaning. Are the following statements true or false?

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 209 Question Id : 640653906509 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

The weight vector output by the perceptron algorithm on this dataset can be expressed as a linear combination of the data-points where the coefficients of the linear combination are integers.

Options :

6406533051462. ✓ TRUE

6406533051463. ✘ FALSE

Question Number : 210 Question Id : 640653906510 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

In the case of a hard-margin SVM,

if $\alpha_i^* \geq 0$, the point x_i is a support vector.

Options :

6406533051464. ✘ TRUE

6406533051465. ✓ FALSE

Question Number : 211 Question Id : 640653906511 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

If a soft-margin SVM is trained on this dataset, the optimal weight vector it returns will be the same as the one returned by a hard-margin SVM, irrespective of the value of the hyperparameter C .

Options :

6406533051466. ✘ TRUE

6406533051467. ✓ FALSE

Question Id : 640653906512 Question Type : COMPREHENSION Sub Question Shuffling

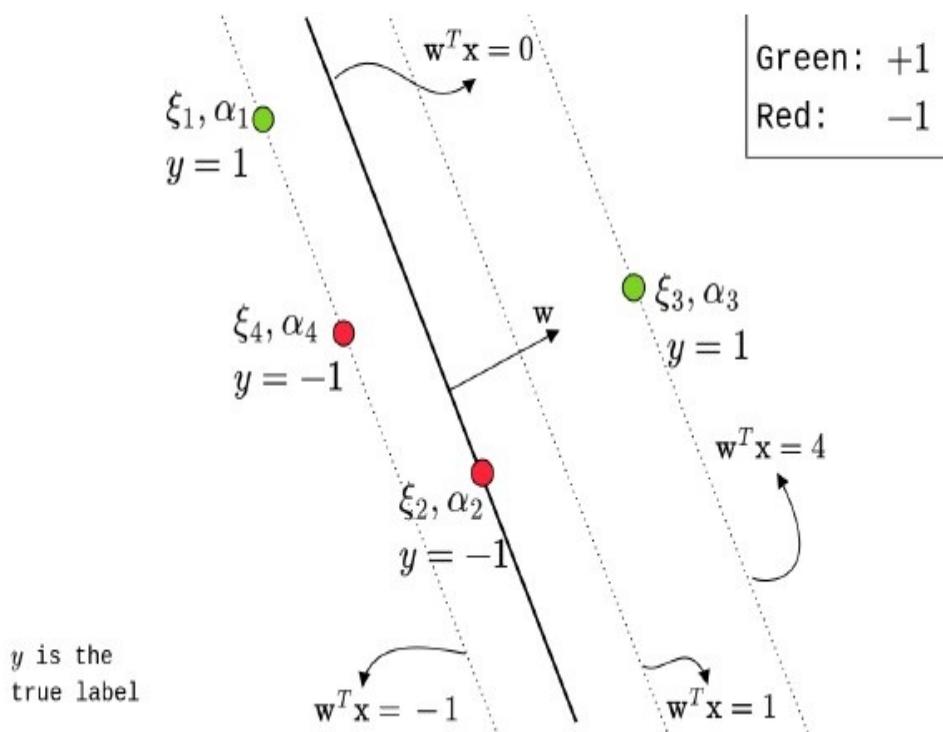
Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (212 to 217)

Question Label : Comprehension

Consider a soft-margin SVM with $C = 3$ that has been trained on a dataset with features in \mathbb{R}^2 . The decision boundary and the supporting hyperplanes are displayed below. Four points from the training dataset are also displayed. Green data-points belong to class 1 and red data-points belong to class -1. Symbols ξ and α have their usual meanings. Assume that w, ξ_i, α_i represent the optimal values.



Based on the above data, answer the given subquestions.

Sub questions

Question Number : 212 Question Id : 640653906513 Question Type : SA Calculator : None

Correct Marks : 0.5

Question Label : Short Answer Question

What is ξ_1 ? _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Question Number : 213 Question Id : 640653906514 Question Type : SA Calculator : None

Correct Marks : 0.5

Question Label : Short Answer Question

What is ξ_2 ? _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 214 Question Id : 640653906515 Question Type : SA Calculator : None

Correct Marks : 0.5

Question Label : Short Answer Question

What is ξ_3 ? _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

0

Question Number : 215 Question Id : 640653906516 Question Type : SA Calculator : None

Correct Marks : 0.5

Question Label : Short Answer Question

What is α_1 ? If it cannot be determined exactly, enter -1. _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 216 Question Id : 640653906517 Question Type : SA Calculator : None

Correct Marks : 0.5

Question Label : Short Answer Question

What is α_3 ? If it cannot be determined exactly, enter -1. _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

0

Question Number : 217 Question Id : 640653906518 Question Type : SA Calculator : None

Correct Marks : 0.5

Question Label : Short Answer Question

What is α_4 ? If it cannot be determined exactly, enter -1. _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

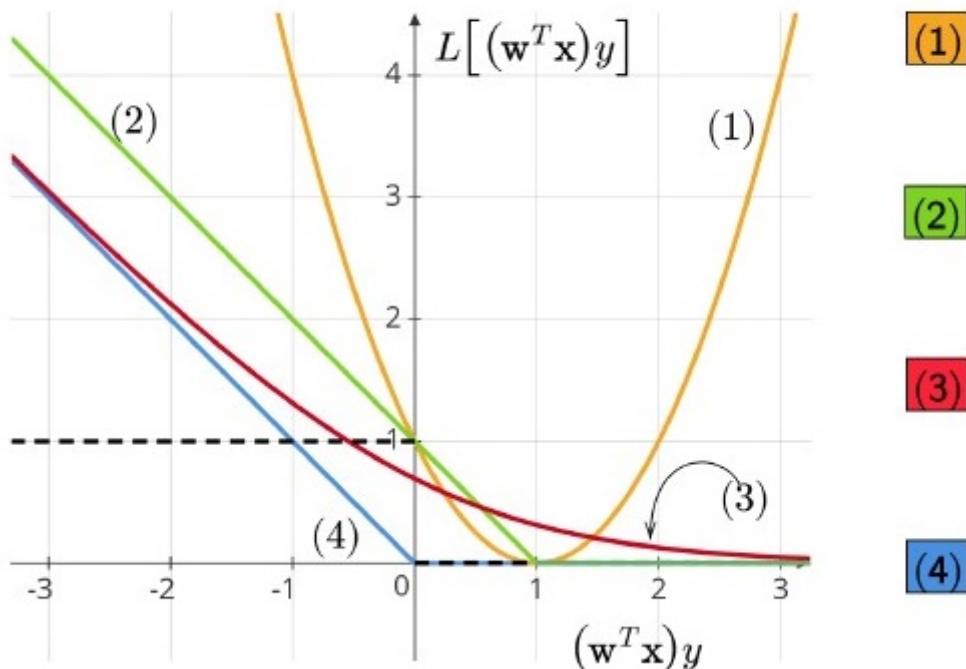
-1

Question Id : 640653906519 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (218 to 222)

Question Label : Comprehension

The convex surrogates for the 0-1 loss are displayed below:



Based on the above data, answer the given subquestions.

Sub questions**Question Number : 218 Question Id : 640653906520 Question Type : SA Calculator : None****Correct Marks : 0.5**

Question Label : Short Answer Question

Enter the number corresponding
to the logistic loss. _____**Response Type :** Numeric**Evaluation Required For SA :** Yes**Show Word Count :** Yes**Answers Type :** Equal**Text Areas :** PlainText**Possible Answers :**

3

Question Number : 219 Question Id : 640653906521 Question Type : SA Calculator : None**Correct Marks : 0.5**

Question Label : Short Answer Question

Enter the number corresponding to the
(SVM) hinge loss. _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Question Number : 220 **Question Id :** 640653906522 **Question Type :** SA **Calculator :** None

Correct Marks : 0.5

Question Label : Short Answer Question

Enter the number corresponding to
the perceptron loss. _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Question Number : 221 **Question Id :** 640653906523 **Question Type :** SA **Calculator :** None

Correct Marks : 0.5

Question Label : Short Answer Question

Enter the number corresponding to the squared loss. _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 222 **Question Id :** 640653906524 **Question Type :** MCQ **Calculator :** Yes

Correct Marks : 1

Question Label : Multiple Choice Question

Which of the following statements is true? $\ln = \log_e$.

Options :

6406533051478. ✓

The logistic loss and the (SVM) hinge loss intersect when $(\mathbf{w}^T \mathbf{x})y = \ln(e - 1)$.

The logistic loss and the (SVM) hinge loss do not intersect.
6406533051479. ❌

The logistic loss and the (SVM) hinge loss intersect when $(\mathbf{w}^T \mathbf{x})y = \ln(1 - \frac{1}{e})$.
6406533051480. ❌

The logistic loss and the (SVM) hinge loss intersect when $(\mathbf{w}^T \mathbf{x})y = \frac{1}{e}$.
6406533051481. ❌

Question Id : 640653906525 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (223 to 225)

Question Label : Comprehension

Consider the following architecture of a neural network for a binary classification problem:

Layer type	Number of neurons
Input	5
Hidden layer-1	10
Hidden layer-2	10
Output	1

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 223 Question Id : 640653906526 Question Type : SA Calculator : None

Correct Marks : 1

Question Label : Short Answer Question

How many learnable parameters does this network have? Ignore the biases in the computation.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

160

Question Number : 224 Question Id : 640653906527 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

What is the most appropriate choice of activation function for the output layer if the binary cross-entropy loss is used?

Options :

6406533051483. ✓ Sigmoid

6406533051484. ✗ Linear

6406533051485. ✗ ReLU

Question Number : 225 Question Id : 640653906528 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

For a particular data-point, the activations after the first hidden layer in the forward pass is given to be

$[0.2 \ 0.1 \ 1.5 \ 0.3 \ 0.1 \ 0 \ 0.8 \ 1.2 \ 1 \ 0]^T$.

What is the activation function used in the first hidden layer?

Options :

6406533051486. ✓ ReLU

6406533051487. ✗ Sigmoid

Sub-Section Number :

6

Sub-Section Id :

640653134665

Question Shuffling Allowed :

Yes

Question Number : 226 Question Id : 640653906501 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Consider a linear regression problem. Which of the following is the gradient of the SSE function with respect to $w \in \mathbb{R}^d$, the weight vector, for a single data-point $x \in \mathbb{R}^d$? y is the true label and \hat{y} is the predicted label. Note that SSE is the sum of squared errors.

Options :

6406533051443. ✓ $(\hat{y} - y)x$

6406533051444. ✗ $(w^T x)w$

6406533051445. ✗ $\hat{y}x$

6406533051446. ✗ xy

MLP

Section Id :	64065364213
Section Number :	10
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	33
Number of Questions to be attempted :	33
Section Marks :	100
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134666
Question Shuffling Allowed :	No

Question Number : 227 Question Id : 640653906529 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : MACHINE LEARNING PRACTICE (COMPUTER BASED EXAM)"

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

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

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

Options :

6406533051488. ✓ YES

6406533051489. ✘ NO

Sub-Section Number :

2

Sub-Section Id :

640653134667

Question Shuffling Allowed :

No

Question Id : 640653906530 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (228 to 232)

Question Label : Comprehension

Consider following common data and answer the subquestions:

```
import pandas as pd
import numpy as np
columns = ["Glucose", "BloodPressure", "Insulin",
           "BMI", "Age"]
data = [[148, 72, 0, 33.6, 50],
        [85, 66, 0, 26.6, np.nan],
        [183, 64, 0, 23.3, 32],
        [89, 66, 94, 28.1, 21],
        [137, 40, 168, 43.1, 33]]
df = pd.DataFrame(data=data, columns=columns)
```

Sub questions

Question Number : 228 Question Id : 640653906531 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

What will be the output of the following code snippet?

```
print(df.shape[0]*df.shape[1] - df.isna().sum().sum())
```

Enter -1, if you think the above code snippet will generate an error.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

24

Question Number : 229 Question Id : 640653906532 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

What will be the output of the following code snippet?

```
t = df.Insulin.value_counts()  
print(t.loc[0])
```

Enter -1, if you think the above code snippet will generate an error.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 230 Question Id : 640653906533 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

What will be the output of the following code snippet?

```
t= df.iloc[:,4]  
print(t.mean())
```

Enter -1, if you think the above code snippet will generate an error.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

34

Question Number : 231 Question Id : 640653906534 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

How many columns have datatype as "float64"?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Question Number : 232 **Question Id :** 640653906535 **Question Type :** SA **Calculator :** None

Correct Marks : 2

Question Label : Short Answer Question

What will be the output of the following code snippet?

```
t=(df
    .query("Glucose > 100")
    .head(2)
    .tail(1)
    .iloc[0,1])
print(t)
```

Enter -1, if you think the above code snippet will generate an error.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

64

Sub-Section Number :

3

Sub-Section Id :

640653134668

Question Shuffling Allowed :

Yes

Question Number : 233 **Question Id :** 640653906536 **Question Type :** SA **Calculator :** None

Correct Marks : 2

Question Label : Short Answer Question

Consider following parameter grid for regression with RandomForest:

```
parameter_grid = [
    {'n_estimators':[10,20,30],
     'max_features': [2,3,4,5,6]},
    { 'bootstrap':[True, False],
      'min_samples_leaf':[1,2,3]}]
```

How many unique combinations of hyperparameters are there in the above parameter grid?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

21

Sub-Section Number : 4

Sub-Section Id : 640653134669

Question Shuffling Allowed : Yes

Question Number : 234 **Question Id :** 640653906543 **Question Type :** MCQ **Calculator :** Yes

Correct Marks : 1

Question Label : Multiple Choice Question

How to make SGDRegressor stop after 1000 epochs?

Options :

from sklearn.linear_model import SGDRegressor
6406533051521. ✘ linear_regressor = SGDRegressor(max_epoch=1000)

from sklearn.linear_model import SGDRegressor
6406533051522. ✘ linear_regressor = SGDRegressor(stopping_criteria=1000)

from sklearn.linear_model import SGDRegressor
6406533051523. ✓ linear_regressor = SGDRegressor(max_iter=1000)

from sklearn.linear_model import SGDRegressor
6406533051524. ✘ linear_regressor = SGDRegressor(stop_after_iter=1000)

Sub-Section Number : 5

Sub-Section Id : 640653134670

Question Shuffling Allowed : Yes

Question Number : 235 **Question Id :** 640653906539 **Question Type :** MCQ **Calculator :** Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Consider following data:

```
data = [{'age': 4, 'height':96.0},  
        {'age': 1, 'height':73.9},  
        {'age': 3, 'height':88.9},  
        {'age': 2, 'height':81.6}]
```

Which one of the following APIs can be used to extract features from the above data?

Options :

6406533051506. ✓ DictVectorizer

6406533051507. ✗ HashingVectorizer

6406533051508. ✗ FeatureHasher

Question Number : 236 Question Id : 640653906540 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Which of the following is an example of an ordinal variable?

Options :

6406533051509. ✗ Blood type (A, B, AB, O)

6406533051510. ✓ Satisfaction rating (Very Unsatisfied, Unsatisfied, Neutral, Satisfied, Very Satisfied)

6406533051511. ✗ Height of individuals

6406533051512. ✗ Gender

Question Number : 237 Question Id : 640653906548 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Which of the following method is used to find the predicted probability of each class of training samples using a trained model = SGDClassifier() ?

Options :

6406533051538. ✓ model.predict_proba(X_train)

6406533051539. ✗ model.predict(X_train)

6406533051540. ✗ model.estimate_

6406533051541. ✗ model.predict_proba_

Question Number : 238 Question Id : 640653906553 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Consider following code snippet:

```
estimator = RidgeClassifier(normalize=False, _____=0)
pipe_ridge = make_pipeline(MinMaxScaler(),estimator)
pipe_ridge.fit(x,y)
```

If we want to apply the ridge classifier on X with no regularization, what will be the missing attribute.

Options :

6406533051545. ✘ cv

6406533051546. ✘ reg_rate

6406533051547. ✓ alpha

6406533051548. ✘ tol

Sub-Section Number :

6

Sub-Section Id :

640653134671

Question Shuffling Allowed :

Yes

Question Number : 239 Question Id : 640653906542 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

For a dataset with 1000 data points and 100 features, the following code will generate how many models during execution?

Note: X is the feature matrix and y is the target vector.

```
from sklearn.model_selection import cross_val_score
from sklearn.model_selection import LeaveOneOut
from sklearn.linear_model import linear_regression
lin_reg = linear_regression()
loocv = LeaveOneOut()
score = cross_val_score(lin_reg, X, y, cv=loocv)
```

Options :

6406533051517. ✓ 1000

6406533051518. ✘ 100

6406533051519. ✘ 99

6406533051520. ✘ 999

Question Number : 240 Question Id : 640653906544 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Which of the following code snippets correctly applies Lasso regression with a regularization strength of 0.1 on scaled dataset?

```
from sklearn.linear_model import Lasso
from sklearn.preprocessing import StandardScaler
from sklearn.pipeline import make_pipeline

lasso = make_pipeline(StandardScaler(), Lasso(alpha=0.1))
lasso.fit(X_train, y_train)
```

Options :

6406533051525. ✘ Lasso(alpha=0.5)

6406533051526. ✓ Lasso(alpha=0.1)

6406533051527. ✘ Lasso(alpha=0.01, max_iter=500)

6406533051528. ✘ Lasso(alpha=1.0, tol=0.01)

Question Number : 241 Question Id : 640653906545 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following polynomial regression model. What is the effect of the include_bias parameter?

```
from sklearn.preprocessing import PolynomialFeatures
poly = PolynomialFeatures(degree=2, include_bias=False)
X_poly = poly.fit_transform(X)
```

Options :

6406533051529. ✓ It determines whether to include a bias term in the model.

6406533051530. ✘ It sets the degree of the polynomial features.

6406533051531. ✘ It controls the regularization strength.

6406533051532. ✘ It specifies the number of features to consider when fitting the model.

Question Number : 242 Question Id : 640653906558 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following code snippet for training a decision tree classifier.
What is the purpose of the `max_depth` parameter?

```
from sklearn.tree import DecisionTreeClassifier  
clf = DecisionTreeClassifier(max_depth=3, random_state=0)  
clf.fit(X_train, y_train)
```

Options :

- 6406533051562. ✘ To specify the maximum number of samples per leaf.
- 6406533051563. ✓ To limit the depth of the tree.
- 6406533051564. ✘ To set the minimum number of samples required to split an internal node.
- 6406533051565. ✘ To control the minimum impurity decrease required for a split.

Question Number : 243 Question Id : 640653906559 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Given the code below, which of the following statements is true about the `criterion` parameter?

```
from sklearn.tree import DecisionTreeRegressor  
reg = DecisionTreeRegressor(criterion='mse', random_state=42)  
reg.fit(X_train, y_train)
```

Options :

- 6406533051566. ✓ It determines the function to measure the quality of a split.
- 6406533051567. ✘ It specifies the number of features to consider when looking for the best split.
- 6406533051568. ✘ It sets the strategy used to choose the split at each node.
- 6406533051569. ✘ It controls whether to use the Gini impurity or entropy.

Question Number : 244 Question Id : 640653906561 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Which of the following code snippets correctly initializes a `RandomForestClassifier` with 100 trees and bootstrapping enabled?

```
from sklearn.ensemble import RandomForestClassifier  
clf = ?
```

Options :

- 6406533051575. ✘ `RandomForestClassifier(n_estimators=100,bootstrap=False)`
- 6406533051576. ✘ `RandomForestClassifier(n_features=100, bootstrap=False)`

6406533051577. ❌ RandomForestClassifier(estimators_number=100, bootstrap=True)

6406533051578. ✓ RandomForestClassifier(n_estimators=100, bootstrap=True)

Question Number : 245 Question Id : 640653906562 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider below statements and choose the correct option:

Statement1:The bagging technique combines multiple models trained on different subsets of data

Statement2:The Boosting technique trains the model Parallelly, focusing on the error made by the other model.

Options :

6406533051579. ❌ Statement1 is True, Statement2 is True

6406533051580. ✓ Statement1 is True, Statement2 is False

6406533051581. ❌ Statement1 is False, Statement2 is True

6406533051582. ❌ Statement1 is False, Statement2 is False

Question Number : 246 Question Id : 640653906565 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

How does agglomerative clustering handle outliers?

Options :

6406533051591. ❌ It ignores outliers during the clustering process.

6406533051592. ✓ It assigns outliers to the nearest cluster.

6406533051593. ❌ It creates separate clusters for outliers.

6406533051594. ❌ It removes outliers from the dataset before clustering.

Question Number : 247 Question Id : 640653906566 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

What is agglomerative clustering?

Options :

6406533051595. ✓ A hierarchical clustering technique that starts with each data point as its cluster and merges the closest clusters iteratively.

6406533051596. ❌ A method for partitioning data into a predefined number of clusters.

6406533051597. ❌ A clustering algorithm that uses centroids to iteratively assign data points to clusters.

6406533051598. ❌ A dimensionality reduction technique that projects data onto a lower-

dimensional space.

Question Number : 248 Question Id : 640653906567 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

In K-Means clustering, what does the `inertia_` attribute represent?

Options :

6406533051599. ❌ The distance between cluster centroids

6406533051600. ❌ The number of clusters formed

6406533051601. ✓ The within-cluster sum of squared distances

6406533051602. ❌ The silhouette coefficient

Sub-Section Number :

7

Sub-Section Id :

640653134672

Question Shuffling Allowed :

Yes

Question Number : 249 Question Id : 640653906538 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the following ML task/steps for a regression dataset:

1. Read the data from a file (named 'dataset.csv'). It has 7 columns. The last column is the target variable, all 6 features numerical.
2. Remove rows which has target values missing.
3. Split the data into training and test sets. Take randomly the 70% of rows in the training set and the rest of them into the test set.
4. Fill the missing values in the features by KNNImputer using 3 nearest neighbours.
5. Train a **LinearRegression** model on the training set.
6. Report R2 score on the test set.

Which of the following code snippets correctly accomplishes the above task? Assume necessary imports.

Options :

```
data = pd.read_csv('dataset.csv')
X, y = data[data.columns[:-1]], data[data.columns[-1]]
X = X[y.notna()]
y = y.dropna()
X_train, X_test, y_train, y_test = train_test_split(X,y,
                                                    train_size=0.7)
pipe = Pipeline([('imputer', KNNImputer(n_neighbors = 3)),
                 ('estimator', LinearRegression())])

pipe.fit(X_train,y_train)
print(pipe.score(X_test, y_test))
```

6406533051500. ✓

```
data = pd.read_csv('dataset.csv')
data.dropna(inplace=True)
X, y = data[data.columns[:-1]], data[data.columns[-1]]
X = X[y.notna()]
y = y.dropna()
X_train, X_test, y_train, y_test = train_test_split(X,y,
                                                    train_size=0.7)
pipe = Pipeline([('imputer', KNNImputer(n_neighbors = 3)),
                 ('estimator', LinearRegression())])

pipe.fit(X_train,y_train)
print(pipe.score(X_test, y_test))
```

6406533051501. *

```
data = pd.read_csv('dataset.csv')
X, y = data[data.columns[:-1]], data[data.columns[-1]]
X_train, X_test, y_train, y_test = train_test_split(X,y,
                                                    train_size=0.8)
pipe = Pipeline([('imputer', KNNImputer(n_neighbors = 3)),
                 ('estimator', LinearRegression())])

pipe.fit(X_train,y_train)
print(pipe.score(y_test, y_test))
```

6406533051502. *

```
data = pd.read_csv('dataset.csv')
X, y = data[data.columns[:-1]], data[data.columns[-1]]
X = X[y.notna()]
y = y.dropna()
X_train, X_test, y_train, y_test = train_test_split(X,y,
                                                    train_size=0.7)
pipe = Pipeline([('imputer', KNNImputer(n_neighbors = 5)),
                 ('estimator', LinearRegression())])

pipe.fit(X_train,y_train)
print(pipe.score(X_test, y_test))
```

6406533051503. *

```
data = pd.read_csv('dataset.csv')
data = data.dropna()
X, y = data[data.columns[:-1]], data[data.columns[-1]]

X_train, X_test, y_train, y_test = train_test_split(X,y,
                                                    test_size=0.2)
pipe = Pipeline([('imputer', KNNImputer(n_neighbors = 3)),
                 ('estimator', LinearRegression())])
pipe.fit(X_train,y_train)
print(pipe.score(X_test, X_test))
```

6406533051504. *

6406533051505. ✘ None of these

Question Number : 250 Question Id : 640653906557 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider two classifiers as shown in the following block of code:

```
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 = 0.2,
                                                random_state = 1)
clf1 = DecisionTreeClassifier(min_samples_split = 7,
                               min_samples_leaf = 4,
                               random_state = 5)
clf1.fit(X_train, y_train)

clf2 = DecisionTreeClassifier(min_samples_split = 4,
                               min_samples_leaf = 2,
                               random_state = 5)
clf2.fit(X_train, y_train)
```

Which of the following option is True?

Options :

6406533051558. ✘ `clf1.tree_.max_depth >= clf2.tree_.max_depth`

6406533051559. ✓ `clf1.tree_.max_depth <= clf2.tree_.max_depth`

6406533051560. ✘ `clf1.tree_.max_depth == clf2.tree_.max_depth`

6406533051561. ✘ Insufficient Information

Question Number : 251 Question Id : 640653906560 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Given the following code using BaggingClassifier with KNeighborsClassifier as the base estimator:

```
from sklearn.ensemble import BaggingClassifier
from sklearn.neighbors import KNeighborsClassifier

base_knn = KNeighborsClassifier(n_neighbors=3, weights='distance')

bag_clf = BaggingClassifier(base_knn,
                            n_estimators=30,
                            max_samples=100,
                            bootstrap=False,
                            random_state=42)
```

Which of the following statements is correct?

Options :

6406533051570. ✘ Above code uses bootstrapping to generate samples for each base classifier.

6406533051571. ✘ model will be tested on out of the bags samples.

Due to `weights='distance'`, each base KNN classifier will treat all neighbors

6406533051572. ✘ equally in terms of voting power.

6406533051573. ✘ The ensemble will consist of 3 base KNN classifiers.

6406533051574. ✓ None of these

Question Number : 252 Question Id : 640653906563 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the following code for a VotingClassifier. What is the effect of setting `voting='soft'`?

```
from sklearn.ensemble import VotingClassifier
clf1 = LogisticRegression()
clf2 = RandomForestClassifier()
clf3 = SVC(probability=True)
eclf = VotingClassifier(estimators= [('lr', clf1), ('rf', clf2), ('svc', clf3)],
                       voting='soft')
eclf.fit(X_train, y_train)
```

Options :

6406533051583. ✘ The predictions are based on the majority vote.

6406533051584. ✓ The predictions are based on the average of probabilities predicted by each classifier.

6406533051585. ✗ The predictions are based on the weighted sum of the predictions.

6406533051586. ✗ The predictions are based on the classifier with the highest accuracy

Question Number : 253 Question Id : 640653906568 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Suppose that we use Kmeans clustering for a dataset having 100 samples.

The initial centroids for k clusters can be initialized in multiple ways. One such way is shown below

```
km = KMeans(n_clusters=5, init='random', n_init=10, random_state=42)
km.fit(X)
```

Choose the correct statements

Options :

6406533051603. ✓ 5 centroids are randomly initialized 10 times

6406533051604. ✗ 10 centroids are randomly initialized 5 times

6406533051605. ✗ 5 samples in the dataset are selected as initialization point such that they are at least 10 units away from each other

6406533051606. ✗ 10 samples in the dataset are selected as initialization point such that they are at least 5 units away from each other

Sub-Section Number :

8

Sub-Section Id :

640653134673

Question Shuffling Allowed :

Yes

Question Number : 254 Question Id : 640653906537 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Data snooping:

Options :

6406533051496. ✓ Leads to biased estimation on test sets

6406533051497. ✓ Increases the risk of false positives

6406533051498. ✗ Leads to better estimation on training sets

6406533051499. ✗ Reduces the risk of false positives

Question Number : 255 Question Id : 640653906541 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following algorithms may get impacted by feature scaling?

Options :

6406533051513. ✓ LinearRegression

6406533051514. ✗ DecisionTree

6406533051515. ✓ SVM

6406533051516. ✗ NaiveBayes

Sub-Section Number :

9

Sub-Section Id :

640653134674

Question Shuffling Allowed :

Yes

Question Number : 256 Question Id : 640653906547 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following code snippet that employs LogisticRegression from sklearn on a feature matrix X and corresponding label vector y:

```
from sklearn.linear_model import LogisticRegression  
model = LogisticRegression(class_weight='balanced', C=0.5)  
model.fit(X, y)
```

Given the code above, which of the following statements is true?

Options :

6406533051534. ✗ The logistic regression model will use equal weights for both the classes in an imbalanced dataset.

6406533051535. ✗ The model does not use any regularization because the parameter C is set.

6406533051536. ✓ The “balanced” mode uses the values of y to automatically adjust weights inversely proportional to class frequencies in the input data.

6406533051537. ✓ The value of C indicates that the model will apply a regularization.

Question Number : 257 Question Id : 640653906554 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following statements are true?

Options :

6406533051549. ✗ KNeighborsClassifier with high values of n_neighbors produces complex decision boundaries.

6406533051550. ✓ KNeighborsClassifier with high values of n_neighbors produces smooth decision boundaries.

6406533051551. ✓ In KNeighborsClassifier the scale of the features(columns) can impact the decision boundaries.

6406533051552. ✗ None of these

Question Number : 258 Question Id : 640653906556 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which options are correct for Support Vectors in SVM ?

Options :

- 6406533051554. ✓ Support vectors are the data points nearest to the hyperplane
- 6406533051555. ✓ Using these support vectors, we maximize the margin of the classifier.
- 6406533051556. ✗ Using these support vectors, we minimize the margin of the classifier.
- 6406533051557. ✗ None of these

Question Number : 259 Question Id : 640653906564 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following are correct for **Kmeans** clustering algorithm?

Options :

- 6406533051587. ✓ It only finds spherical clusters.
- 6406533051588. ✓ The output of the algorithms depends upon initial cluster centroids.
- 6406533051589. ✗ It can automatically detect most appropriate value of k .
- 6406533051590. ✗ None of these.

Sub-Section Number : 10

Sub-Section Id : 640653134675

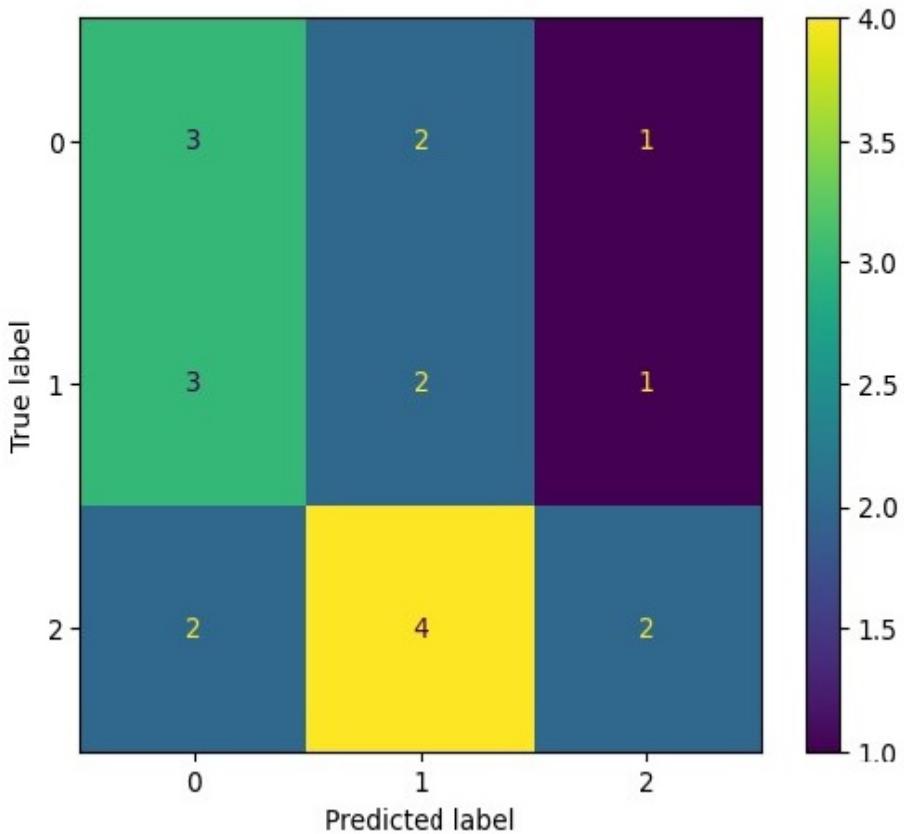
Question Shuffling Allowed : Yes

Question Number : 260 Question Id : 640653906546 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

Using the confusion matrix given below. What is the precision score for the label (class) 1 ?



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

0.25

Question Number : 261 Question Id : 640653906549 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

What will be the output of the following code snippet?

```
from sklearn.linear_model import Perceptron
# Sample data
X = [[0, 0], [0, 2], [2, 0], [2, 2]]
y = [1, 1, 1, 2]
clf = Perceptron(tol=None, shuffle=False)
clf.fit(X, y)
print(clf.predict([[0, 1.5]]))
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 262 Question Id : 640653906555 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

Consider the following code snippet:

```
from sklearn.neighbors import KNeighborsClassifier  
  
X_train = [[1, 2], [3, 4], [5, 6]]  
y_train = [0, 1, 2]  
  
knn = KNeighborsClassifier(n_neighbors=4)  
knn.fit(X_train, y_train)
```

What will be the output of the following code:

```
print(len(knn.classes_))
```

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 : 640653134676

Question Shuffling Allowed : No

Question Id : 640653906550 Question Type : COMPREHENSION Sub Question Shuffling

Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (263 to 264)

Question Label : Comprehension

Let X be a feature matrix with shape (1000,5) and y be the label vector with two classes: 0 and 1. Assume that 650 examples of training data belong to class 1. Consider following code:

```
base_clf = DummyClassifier(strategy='most_frequent')
base_clf.fit(X,y)
print(base_clf.score(X,y))
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 263 Question Id : 640653906551 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

What will be the output of the following code?

```
print(recall_score(y, base_clf.predict(X)))
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 264 Question Id : 640653906552 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

What will be the output of the following code?

```
print(precision_score(y, base_clf.predict(X)))
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

0.64 to 0.66

Section Id :	64065364214
Section Number :	11
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	25
Number of Questions to be attempted :	25
Section Marks :	100
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134677
Question Shuffling Allowed :	No

Question Number : 265 Question Id : 640653906569 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DEGREE LEVEL : SOFTWARE ENGINEERING (COMPUTER BASED EXAM)"

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

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

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

Options :

6406533051607. ✓ YES

6406533051608. ✗ NO

Sub-Section Number :	2
Sub-Section Id :	640653134678
Question Shuffling Allowed :	Yes

Question Number : 266 Question Id : 640653906570 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Which of the following is the primary responsibility of the data scientists at a software company?

Options :

6406533051609. ✗ To communicate with users and create prototypes.

6406533051610. ✗ To shape the terms of service of the software product, software licenses,

privacy policy etc.

6406533051611. ✓ To analyze data generated from various teams and users in order to assist the organization in making better decisions.

6406533051612. ✗ To address and resolve issues that clients encounter.

Question Number : 267 Question Id : 640653906571 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Which of the following is the benefit of using project management tools?

Options :

6406533051613. ✗ It helps to document and archive the knowledge of one project that might be required in some other project.

6406533051614. ✓ It helps all members of the team to get a big picture as well as detailed view of progress.

6406533051615. ✗ It helps in easy migration of developers between different projects.

6406533051616. ✗ It helps the developers to become more productive by using tools like IDEs.

Question Number : 268 Question Id : 640653906577 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

What is velocity from the agile project estimation perspective?

Options :

6406533051637. ✗ Number of user stories per sprint

6406533051638. ✓ Number of points per sprint

6406533051639. ✗ The time required to complete an agile project

6406533051640. ✗ The point assigned to each user story

Question Number : 269 Question Id : 640653906584 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Which of the following diagrams models the sequence of message exchanges among parts of a system?

Options :

6406533051667. ✗ Class diagram

6406533051668. ✗ State machine diagram

6406533051669. ✗ Activity view

6406533051670. ✓ Interaction view

Question Number : 270 Question Id : 640653906586 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Which of the following types of software metrics considers the number of lines of code which include code, comments, white spaces etc.?

Options :

6406533051675. ❌ Cyclomatic complexity

6406533051676. ✓ Raw Metrics

6406533051677. ❌ Halstead's Metrics

6406533051678. ❌ None of these

Question Number : 271 Question Id : 640653906587 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider an eCommerce portal that has been integrated with a payment gateway with a set of APIs. Which of the following debugging strategies involves the task of searching the documentation and code examples to understand the correct use of the APIs?

Options :

6406533051679. ❌ Input manipulation

6406533051680. ❌ Backwards

6406533051681. ❌ Forwards

6406533051682. ✓ Blackbox debugging

Question Number : 272 Question Id : 640653906594 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Heroku and Google App Engine are examples of _____.

Options :

6406533051703. ❌ Bare metal server

6406533051704. ❌ Infrastructure-as-a-service

6406533051705. ✓ Platform-as-a-service

6406533051706. ❌ Software-as-a-service

Sub-Section Number :

3

Sub-Section Id :

640653134679

Question Shuffling Allowed :

Yes

Question Number : 273 Question Id : 640653906572 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Which of the following is true about the production environment of deployment?

Options :

6406533051617. ❌ It is primarily created for performing integration and system testing.

6406533051618. ✓ It is also known as live environment where all the users can interact with the deployed system.

6406533051619. ✗ It is the local environment for individual developers that provides IDEs and other tools.

6406533051620. ✗ It exactly resembles the production environment, and it runs on a remote machine.

Question Number : 274 Question Id : 640653906573 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

In which of the software deployment strategies are changes incrementally rolled out to a small subset of users?

Options :

6406533051621. ✗ Blue/Green deployment

6406533051622. ✓ Canary deployment

6406533051623. ✗ Versioned deployment

6406533051624. ✗ None of these

Question Number : 275 Question Id : 640653906576 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider an embedded project that has an estimated 3,00,000 lines of code.

The values for the constants in the COCOMO model for the different types of the project are as follows:

- Organic project: $a = 2.4, b = 1.05$
- Semi-organic project: $a = 3.0, b = 1.12$
- Embedded project: $a = 3.6, b = 1.20$

Considering that the salary of each staff is Rs. 50,000/-, what is the approximate cost of the project?

Options :

6406533051633. ✗ 4,80,00,000

6406533051634. ✗ 8,95,00,000

6406533051635. ✓ 16,90,00,000

6406533051636. ✗ 2,85,00,000

Question Number : 276 Question Id : 640653906578 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Suppose you are creating a prototype for a web application which is presented on multiple papers

as handdrawn UIs of different screens.

In the above case, identify the type of prototype technique you have chosen.

Options :

- 6406533051641. ✘ Storyboards
- 6406533051642. ✓ Paper prototype
- 6406533051643. ✘ Digital mock-ups
- 6406533051644. ✘ Interactive prototype

Question Number : 277 Question Id : 640653906579 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Suppose a software organization is designing the UI of a web application for an employee payroll system. For all the icons on the buttons and links, they have chosen various animal pictures. Which one of the following UI evaluation heuristics would be missing in this design?

Options :

- 6406533051645. ✘ Flexibility
- 6406533051646. ✓ Recognition over recall
- 6406533051647. ✘ Clean and functional design
- 6406533051648. ✘ Freedom

Question Number : 278 Question Id : 640653906580 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider an EdTech company that decided to develop an educational portal based on GenAI services. However, there are some requirements that are ambiguous or conflicting. As a result, the company has arranged a meeting of all the managers of different departments to discuss the issues and requirements and reach some consensus on them. In the given scenario, which of the following requirement gathering techniques is in use?

Options :

- 6406533051649. ✘ Questionnaires
- 6406533051650. ✘ Interviews
- 6406533051651. ✓ Focus group
- 6406533051652. ✘ Documentations

Question Number : 279 Question Id : 640653906581 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Which of the SMART characteristics of user stories specifies that if the implementation of a user story is not possible in one iteration, then subdivide the story into smaller ones?

Options :

6406533051653. ✘ Specific

6406533051654. ✘ Measurable

6406533051655. ✓ Achievable

6406533051656. ✘ Relevant

6406533051657. ✘ Timeboxed

Question Number : 280 Question Id : 640653906582 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

A software company has to develop a job portal that will allow job seekers to apply for different organizations at different positions. Therefore, the entire task of the project is divided into different modules, and the interactions between the modules are outlined. Which phase of the SDLC is the software currently in?

Options :

6406533051658. ✘ Requirements gathering

6406533051659. ✓ Design

6406533051660. ✘ Development

6406533051661. ✘ Testing

6406533051662. ✘ Maintenance

Question Number : 281 Question Id : 640653906583 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider a software is designed in the following manner:

- Each module has some functions which all are designed to achieve a single objective.
- Function calls between two different modules involve passing a large chunk of shared data.

Which of the following is true about the design of the software?

Options :

6406533051663. ✓ Has high coupling and high cohesion

6406533051664. ✘ Has high coupling and low cohesion

6406533051665. ✘ Has low coupling and high cohesion

6406533051666. ✘ Has low coupling and low cohesion

Question Number : 282 Question Id : 640653906588 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the Python function below.

```
def ssort(items, n):
    for it in range(size):
        .
        min_i = it
        for i in range(it + 1, n):
            if items[i] < items[min_i]:
                min_i = i
        (items[it], items[min_i]) = (items[min_i], items[it])
```

What is the cyclomatic complexity of the function?

Options :

640653051683. ✘ 2

640653051684. ✘ 3

640653051685. ✓ 4

640653051686. ✘ 5

Question Number : 283 Question Id : 640653906595 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider a mobile application for enhancing image quality. The image quality enhancement application is made up of several data filters. The filters are connected one after another. Each filter processes the data it receives and sends the output to the next filter in line. Which type of architecture is used to design the data processing software?

Options :

640653051707. ✘ Client-server

640653051708. ✓ Pipe and filter

640653051709. ✘ Model-view-controller

640653051710. ✘ Peer-to-peer

Sub-Section Number :

4

Sub-Section Id :

640653134680

Question Shuffling Allowed :

Yes

Question Number : 284 Question Id : 640653906575 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the following table for risk assessment of a software project.

Risk	Impact	Assessed risk
Personnel shortfall	1	0.6
Lack of experience building banking applications	2	0.8
Budget slippage	3	0.9
Product not competitive in the market	2	0.8

Which of the following risks is most probable to occur in the project?

Options :

6406533051629. ✓ Personnel shortfall

6406533051630. ✗ Lack of experience building banking applications

6406533051631. ✗ Budget slippage

6406533051632. ✗ Product not competitive in the market

Question Number : 285 Question Id : 640653906596 Question Type : MCQ Calculator : Yes

Correct Marks : 5

Question Label : Multiple Choice Question

Consider the design of an e-shopping application. It has an `Order` class. In order to make payment for an order, the `Order` class interacts with `PaymentManager` class. Depending on the payment type selected by the customer, `PaymentManager` calls the payment method from `PayByCash` class or `PayByCheque` class. However, the designers want to add more payment types in the future without violating the open-close principle. Therefore, the designers plan to utilize a design pattern known as `X`. The designers have added an interface named `Payable` to the design, and any payment class, such as `PayByCash`, `PayByCheque`, and possibly `PayByUPI` or `PayByCard`, will need to implement this interface in the future. Instead of directly interacting with payment classes, the `PaymentManager` now interacts with the `Payable` interface, which enables the `PaymentManager` to use any payment class that is implementing the `Payable` interface.

Identify the design pattern referred to as `X`.

Options :

6406533051711. ✗ Iterator design pattern

6406533051712. ✗ Adapter design pattern

6406533051713. ✓ Strategy design pattern

6406533051714. ✗ Facade design pattern

Sub-Section Number :

5

Sub-Section Id :

640653134681

Question Shuffling Allowed :

Yes

Question Number : 286 Question Id : 640653906574 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following is/are considered as the primary objective(s) of monitoring tools for enhancing the performance of web applications?

Options :

6406533051625. ❌ It stores the results of common operations in memory.

6406533051626. ✓ It helps to understand customer behaviour.

6406533051627. ❌ It compresses static pages.

6406533051628. ✓ It can be used to analyze page resources, find optimization suggestions, check SEO and accessibility metrics and calculate your performance score.

Question Number : 287 Question Id : 640653906593 Question Type : MSQ Calculator : Yes**Correct Marks : 4 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Consider the following code base in Python.

```
def findInterest(months):
    if months <= 0:
        print("invalid input")
    elif months < 12:
        return 0.05
    elif months < 36:
        return 0.07
    else:
        return 0.06
```

Identify the set(s) of valid test cases for function `findInterest` using the equivalence class technique.

Options :

6406533051699. ❌ {months = -4, months = 0, months = 25}

6406533051700. ✓ {months = -4, months = 4, months = 25, months = 48}

6406533051701. ❌ {months = -4, months = 4, months = 40, months = 48}

6406533051702. ✓ {months = -4, months = 0, months = 4, months = 25, months = 48}

Sub-Section Number :

6

Sub-Section Id :

640653134682

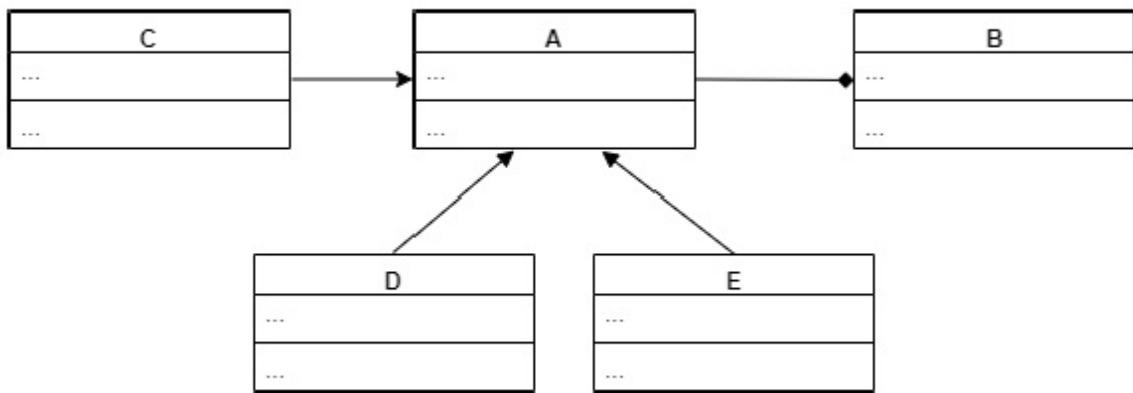
Question Shuffling Allowed :

Yes

Question Number : 288 Question Id : 640653906585 Question Type : MSQ Calculator : Yes**Correct Marks : 5 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Consider the class diagram given below.



Which of the following statement(s) are true about the given class diagram?

Options :

- 6406533051671. ✗ A inherits from B
- 6406533051672. ✓ B is composition of A
- 6406533051673. ✗ B is associated C
- 6406533051674. ✓ D and E inherit from A

Sub-Section Number :

7

Sub-Section Id :

640653134683

Question Shuffling Allowed :

No

Question Id : 640653906589 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (289 to 291)

Question Label : Comprehension

Consider the Python function below.

```
def fact(n):  
    f = 1  
    if n < 0:  
        return -1    #invalid  
    else:  
        if n == 0 or n == 1:  
            f = 1  
        else:  
            for i in range(2, n):  
                f *= i  
    return f
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 289 Question Id : 640653906590 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Identify the set(s) of valid test cases for branch coverage.

Options :

6406533051687. ✘ {-5, 5}

6406533051688. ✓ {-5, 0, 2, 5}

6406533051689. ✘ {-5, 2, 5, 10}

6406533051690. ✓ {-5, 0, 1, 2, 5}

Question Number : 290 Question Id : 640653906591 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Identify the set(s) of valid test cases for multiple condition coverage.

Options :

6406533051691. ✘ {-5, 5}

6406533051692. ✘ {-5, 0, 2, 5}

6406533051693. ✘ {-5, 2, 5, 10}

6406533051694. ✓ {-5, 0, 1, 2, 5}

Question Number : 291 Question Id : 640653906592 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Identify the number of linearly independent paths in the code base.

Options :

6406533051695. ✘ 2

6406533051696. ✘ 3

6406533051697. ✓ 4

6406533051698. ✘ 5

Intro to Big Data

Section Id : 64065364215

Section Number : 12

Section type : Online

Mandatory or Optional : Mandatory

Number of Questions : 31

Number of Questions to be attempted : 31

Section Marks : 50

Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134684
Question Shuffling Allowed :	No

Question Number : 292 Question Id : 640653906597 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DEGREE LEVEL : INTRODUCTION TO BIG DATA (COMPUTER BASED EXAM)"

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

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

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

Options :

6406533051715. ✓ YES

6406533051716. ✗ NO

Sub-Section Number :	2
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Sub-Section Id :	640653134685
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Question Shuffling Allowed :	Yes
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Question Number : 293 Question Id : 640653906598 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

What best describes "hot potato principle" in the world of big data?

Options :

6406533051717. ✗ It is a rule-of-thumb where one program does all the work required to "cook" the data fully for the sake of completeness

6406533051718. ✗ It is a rule-of-thumb applicable mainly to batch processing of data where fresh data is prioritized for processing ahead of older data

6406533051719. ✓ It is a rule-of-thumb applicable only in the world of stream processing where a program does the minimal processing required to produce a logical output which is then handed off via a message store to the next program that is also designed similarly, and so on, until the bigger problem is solved.

6406533051720. ✗ It is a principle for network packet routing, and not really applicable in big data.

Question Number : 294 Question Id : 640653906599 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

Which of these are implementations of the divide-and-conquer paradigm?

Options :

- 6406533051721. ❌ Spark and Map
- 6406533051722. ❌ Serverless and Message Broker
- 6406533051723. ✓ Hadoop and Spark Streaming
- 6406533051724. ❌ MapReduce and Google Cloud Functions

Question Number : 295 Question Id : 640653906601 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

A website sees 1 Billion hits every month. The website owner wants to count average hits per customer in the latest month, where a customer is denoted by the IP address of the device from which the customer is accessing the website. The owner has at his disposal a Hadoop cluster of 5 workers and 2 masters each with 1GB of RAM. Which of the following methods is the most likely to finish fastest?

Options :

- 6406533051730. ❌ Write a MapReduce program where the Map does nothing useful, Combine computes the aggregated hits per customer, Shuffle combined data based on IP address across workers, and in the Reduce, build hash table on each machine with hash key = IP address and hash value = counter, followed by another Reduce that finally computes the avg on top of all hash values.
- 6406533051731. ❌ Write a Spark program that forms a Dataframe as grouping by IP address with count as aggregate, followed by a take into a list in the Spark driver which further computes the average of all the individual counts in the list
- 6406533051732. ✓ Write a Spark program that forms a Dataframe as grouping by IP address with count as aggregate, followed by another stage that computes the avg on top of the Dataframe of the first stage
- 6406533051733. ❌ Write a MapReduce program where 2 pairs of Map Reduce are chained together: 1st pair is where the Map does nothing useful, Shuffle data based on IP address across workers, and in the Reduce, build hash table on each machine with hash key = IP address and hash value = counter, while the 2nd pair is another Map that does nothing useful followed by a Reduce that finally computes avg on top of all hash values.
- 6406533051734. ❌ All will finish in approximately the same time.

Question Number : 296 Question Id : 640653906602 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

An enterprise software designer wants to leverage the best of Google cloud to minimize the number of administrative overheads associated with her big data pipeline while also getting on-

demand scalability without sacrificing flexibility. What option should she choose to best serve these needs?

Options :

6406533051735. ❌ Build the data pipeline using VMs – one for Python & one for storing files

6406533051736. ❌ Build the data pipeline using Python running on Google Cloud Functions where the data is stored on GCS

6406533051737. ❌ Build the data pipeline using MapReduce on, data storage on HDFS, and deploy both on Dataproc

6406533051738. ✓ Build the data pipeline using Dataflow on top of data stored on GCS

Question Number : 297 Question Id : 640653906603 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

Consider an application that can scale from handling 1000 users to handling 100 million users by simply making copies of itself, logs information about its workings on a central logger backed by Kafka, but has no automation to detect task failures and retry. Which of the following statements is true?

Options :

6406533051739. ❌ This application has adopted cloud-native design

6406533051740. ❌ This application cannot be called as cloud-native since it is not observable at all times

6406533051741. ❌ This application cannot be called as cloud-native since it is not manageable easily

6406533051742. ✓ This application cannot be called as cloud-native since it is not resilient

Question Number : 298 Question Id : 640653906605 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

Consider a file “data.bin” which is formatted as follows: every data record has 10 key-value pairs of the format “key:value”, with each pair separated by a comma. Every data record occurs in its own line. You are asked to write a data processing script using Python that scales with big data. Which of the following represents your approach?

Options :

6406533051747. ✓ Since data.bin is compliant with the RFC 4180, use PySpark’s read_csv() to read the data as is.

6406533051748. ❌ Rename the file data.bin to data.csv to make it compliant with RFC 4180 and then use PySpark’s read_csv() to read the data

6406533051749. ❌ The problem cannot be solved since the file cannot be converted to a valid format for reading consistently without additional information

6406533051750. ❌ Write PySpark code to read all lines in data.bin, use string split on "," as delimiter, and then collect all column names and corresponding values into a RDD for further processing

Question Number : 299 Question Id : 640653906606 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

Consider the program outline as below running on a Spark cluster of 1 driver and 4 worker nodes with 2 executors per worker node:

```
sc = pyspark.SparkContext()
train_master = ... #python dictionary of trains in India (about 1L trains
in total)
bookings_rdd = ... #Spark RDD that is having all ticket bookings of
format (train_no, date, seats, ticket_price)
bookings_rdd.map( train_no => train_master.has_key(train_no) ).count()
```

Consider the below mutually-exclusive characterisations about the program:

- i. Program will not run since RDD transformation operation map() runs on Executors that is referencing a variable train_master which is declared in the Spark driver
- ii. Program will run successfully and produce the count of bookings that match for trains present in the train_master

For either of the 2 characterizations, consider the following (one or more) actions you could carry out in order to improve on the characterizations:

1. Program will need to be changed to bring the train_master into the Closure for executors to pick it up
2. Program will perform more poorly as the number of executors per worker node increases. Broadcast of train_master will need to be used to make it perform better.
3. Program will perform more poorly as the number of worker nodes increases (keeping number of executors per worker node constant). Broadcast of train_master will need to be used to make it perform better.

Which of the following combinations of statements are correct?

Options :

6406533051751. ✘ i and 1

6406533051752. ✘ i and 1 followed by 2

6406533051753. ✘ i and 1 followed by 2 & 3

6406533051754. ✘ ii and both 2 & 3

6406533051755. ✓ ii and 2

6406533051756. ✘ ii and 3

Question Number : 300 Question Id : 640653906611 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

What happens when a Spark Structured Streaming pipeline operating with Kafka as source is subject to a failure of a machine in either of the Kafka cluster or the Spark cluster?

Options :

6406533051779. ✘ Failure of a machine in the Kafka cluster will result in an Exception in the Spark pipeline which will then fail and halt.

6406533051780. ❌ The Spark pipeline will not be able to start again from previously committed offset by restarting itself, resulting in at least-once processing semantics
6406533051781. ❌ Irrespective of whatever machine fails, Spark will throw an error and halt.
6406533051782. ❌ Data that is being processed will not be processed again, resulting in atmost-once semantics.

6406533051783. ✓ The pipeline will be restarted automatically by Spark which is able to pick up the exact data from Kafka which was being processed at the time of error, resulting in exactly-once semantics.

Question Number : 301 Question Id : 640653906612 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

A big data streaming application that uses Kafka as source is observed to be really lagging behind currently live data. The Kafka cluster has 2 broker nodes and this application is reading from 1 topic that has 10 partitions. On closer investigation, it was found that Kafka is not scaling to the velocity of input data coming in. What can you first try to do to scale Kafka further while incurring minimal overall costs?

Options :

6406533051784. ❌ Add disks to each broker in the cluster, and disks are the cheapest computer component

6406533051785. ✓ Increase memory in each of the brokers in the cluster. While cost of memory is more than cost of disks, it is still cheaper than adding brokers and helps to scale.

6406533051786. ❌ Add new brokers to the cluster, even though this is more expensive than the other options this is the only foolproof way to scale.

6406533051787. ❌ Create more topics and change input application to reroute data to all topics to be able to spread input data better. This is nearly the least expensive since only developer effort is required to change application.

6406533051788. ❌ Double the number of partitions for this single topic to be able to spread input data better. This is the least expensive since only administrator effort is required without changing application.

Question Number : 302 Question Id : 640653906614 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

A company with headquarters (HQ) in the Middle East operates on a Sunday-Thursday weekday schedule with Friday & Saturday as weekend days. It computes end of week revenue numbers using an ETL pipeline by first computing sales for each day at 1AM local time of the next day, and then summing up the weekly sales every Sunday early morning at 3AM local time. This number gets reported to leadership every Sunday morning 9AM local time, so the ETL pipeline is scheduled to run every Sunday morning at 8AM local time. As a result of management change, it has decided to relocate its HQ to India. Which of the following changes will need to be done to its ETL pipeline to ensure the correct output continues to be produced?

Options :

6406533051794. ❌ The business time for the final weekly sum operation needs to be changed to

that of Monday 3AM India time instead of Sunday 3AM Middle East time.

6406533051795. ✓ There is zero change needed since neither event time nor business time is changing whereas only the operational time is changing.

6406533051796. ❌ Since time zone has changed as well as week definition too, the definition of business time has changed. So, the ETL has to be rewritten entirely.

6406533051797. ❌ Nothing needs to change since daily sales is available at 1AM Middle East time which is anyway behind India time and so the numbers will be available before leadership comes in at 9AM.

6406533051798. ❌ Event time has changed since the event of week ending has changed in definition, and so the ETL needs to be changed to consider the new event in the data.

Question Number : 303 Question Id : 640653906615 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

You are appointed as a Data Engineer in a company that has a legacy reporting application written in Java which suffers from performance problems. The reporting application plots dashboards with near real-time refresh (once every minute) of key business indicators to help management take live decisions. The application reads data directly from the source database of MongoDB, aggregates using simple counts and shows them visually in a UI. The performance problem of this application comes because the source database is at times overloaded and therefore the dashboard is not able to refresh fast enough. Choose the best option that gives the best performance with minimal maintenance effort:

Options :

6406533051799. ❌ Since MongoDB is OLTP, it is not able to support business reporting. So, replace it with Hadoop which supports OLAP better

6406533051800. ❌ Convert the application from using plain Java to using Spark Streaming in Java

6406533051801. ✓ Extract raw data from MongoDB using Change Data Capture (CDC) once every minute into Kafka, and then use Spark Streaming to compute the KPIs and then populate into a NoSQL DB like Redis for the UI to consume.

6406533051802. ❌ Query MongoDB every 1 minute for new data using a check on document inserted timestamp, use Spark Streaming to compute the KPIs with the queried data, and then populate into a NoSQL DB like Redis for the UI to consume.

6406533051803. ❌ Convert application to using Python along with a NoSQL database for storing and retrieving the aggregated counts.

Question Number : 304 Question Id : 640653906616 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

Dhoni is on the crease with a bat in hand that has sensors embedded throughout. The sensors talk to the spider cam every second. The spider cam is itself a powerful ARM-based computer which has connectivity to the cloud through the wire on which it hangs. Using this connectivity, it can send as much or as little data as required and also receive instructions from the cloud. There is a machine learning model which suggests to the batsman to loosen the grip on his bat or tighten it based on the shots played using the sensor measurements. The way the suggestion happens is

using dynamic vibration intensity communicated to the sensors embedded in the bat handle. Your task is to design the data pipeline that enables such feedback to Dhoni ideally before every ball with as much accuracy as possible throughout the match. Which of the following options best satisfies the requirements?

Options :

6406533051804. ✘ Ingest all data into Pub/Sub, process using Google Cloud Dataflow, invoke the ML model, and then write back output from Cloud to the spider cam to relay to the bat.

6406533051805. ✘ Compress the ML model to fit into the spider cam's available resource, and write pipelines to execute the model in the spider cam itself

6406533051806. ✓ Compress the ML model to fit into the spider cam's available resource, and write pipelines to execute in the spider cam itself, with periodically data being sent to the cloud, retrain the model using Google Cloud ML and then redeploy the model to the spider cam.

6406533051807. ✘ Compress the data in the spider cam every 5 seconds, write to Pub/Sub the compressed data, invoke the ML model and then write back output from Cloud to the spider cam to relay to the bat.

Question Number : 305 Question Id : 640653906617 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

In the class, we saw the UDF for mobilenet_v2. By definition, UDFs are scalar. In Spark, there is another class of user defined routines called UDAFs, which stand for User Defined Aggregator Functions. UDAFs are meant to provide a means to write a custom aggregation function which aggregates over a grouping of values to arrive at a single value. UDAF structure differs saliently from UDFs in that it provides a buffer to keep track of intermediate state before finalizing aggregate output. Why is a buffer required for UDAF and not for a UDF?

Options :

6406533051808. ✘ A UDF is a scalar operation executing on 1 row at a time and producing output immediately, and therefore there is no intermediate output necessary. Whereas, a UDAF operates on multiple rows which will require multiple passes for the final output thereby requiring a buffer.

6406533051809. ✓ A UDF is a scalar operation executing on 1 row at a time and producing output immediately, and therefore there is no intermediate output necessary. Whereas, a UDAF operates on multiple rows of unbounded size requiring a divide-and-conquer approach for computing aggregates, which uses the intermediate buffer to store partial values before finalizing the result aggregate.

6406533051810. ✘ A UDF is a scalar operation executing on many rows at a time, grouped by a key and producing a single output, and therefore there is no intermediate output necessary. Whereas, a UDAF operates on multiple rows which will require multiple passes for the final output thereby requiring a buffer.

6406533051811. ✘ A UDF is a scalar operation executing on many rows at a time, grouped by a key and producing a single output, and therefore there is no intermediate output necessary. Whereas, a UDAF operates on multiple rows of unbounded size requiring a divide-and-conquer approach for computing aggregates, which uses the intermediate buffer to store partial values before finalizing the result aggregate.

Question Number : 306 Question Id : 640653906618 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

In the class, we saw the UDF for mobilenet_v2. Specifically, the predict() function contained the below lines of code

```
def predict(content_series_iter):
    model = model_fn()
    model.eval()
    ...
    ...
```

Suppose there's a new transformer model from Facebook that is orders of magnitude bigger than mobilenet_v2 but that is able to provide better F1 score. Will these lines of code still be required in the pipeline?

Options :

- 6406533051812. ❌ Yes, since they check the syntax of the model function so that there are no errors
- 6406533051813. ❌ Yes, they invoke PyTorch libraries that have already been setup for model scoring on GCP using APIs embedded within the function
- 6406533051814. ❌ No, since the primary function of these lines of code is to eliminate repeated DL model loads as DL models are large in size
- 6406533051815. ❌ Yes, they are Map-style UDFs that make it an embarrassingly parallel computation thus making the execution parallelized and fast.
- 6406533051816. ✓ Yes, since the new model will potentially have large load times.

Question Number : 307 Question Id : 640653906619 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

You are given a Spark Streaming pipeline that invokes a pre-trained DL model for every image it receives as input and produces the classification result in quick time. The model with the best recall rate from the PyTorch library already runs in under 3 seconds on an average, when executing on a single GPU Spark worker machine. However, your management has instructed you to reduce the cost of AI projects significantly. What is the best option to explore to meet the expectations without compromising on false negatives while also being within 10-20% of the average execution time?

Options :

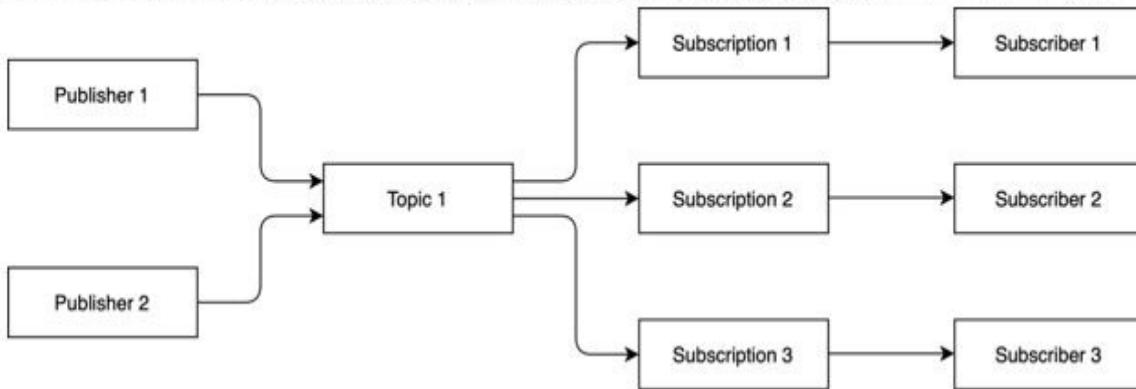
- 6406533051817. ✓ Build a custom model that compresses the highest recall rate model just enough to be able to execute within the stipulated time, and measure recall.
- 6406533051818. ❌ Use a different DL model from PyTorch that is already compressed to half the size.
- 6406533051819. ❌ Remove complexity associated with Spark Streaming and convert the model execution pipeline into a single threaded Python application running on the same GPU machine.
- 6406533051820. ❌ Change Spark machine to use CPUs and train a fresh pipeline to achieve objectives.

Question Number : 308 Question Id : 640653906620 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

Observe the below image and select the options that are true.



Options :

6406533051821. ❌ Each subscriber gets one third of all messages published into *Topic 1*.
6406533051822. ❌ Publisher 1 can safely send data only for Subscriber 1's consumption while restricting access to Subscribers 2 & 3.
6406533051823. ❌ Subscriber 2 gets all messages published into *Topic 1* by *Publisher 1* but only half of Publisher 2's messages.
6406533051824. ✓ Each subscriber gets all messages published into *Topic 1*.

Question Number : 309 Question Id : 640653906621 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

Consider a Structured Streaming application running on Google Dataproc firing up every 10 seconds, consuming any number of records from Kafka available since last read, and emitting some computed answers to another Kafka topic. Consider also that apart from the functional logic, the same application is also emitting into a file the start time and end time of every batch invocation for audit purposes.

Assume there is a failure in one of the Dataproc machines that results in a failure of a specific run. For the external world (i.e. anybody consuming the outputs of this application), will they see any change in output as a result of the failure at all, or will the only visible impact of failure be of slower performance for the failed-and-retried run?

Options :

6406533051825. ❌ No, the failure is not visible. The only visible effect for the external world would be in the form of a slowdown in runtime for completion of that mini-batch as Structured Streaming retries the mini-batch that failed thus taking twice as much time as normal.
6406533051826. ❌ No, the failure is not visible since Structured Streaming uses transactions and idempotence to achieve exactly-once processing.
6406533051827. ❌ No, the failure is not visible since Structured Streaming can process the same data in a retry resulting in the same outputs again.
6406533051828. ✓ Yes, the failure is visible because the side effect of emitting timestamps in a batch will be visible as 2 consecutive Start timestamps without any end timestamp as Structured Streaming retries the failed batch.

6406533051829. ❌ Yes, the failure is visible since the logs in the backend of Spark Structured Streaming are also logging the state of the machine.

**Question Number : 310 Question Id : 640653906622 Question Type : MCQ Calculator : Yes
Correct Marks : 1**

Question Label : Multiple Choice Question

Let us say we are using structured streaming for continuously reading data from Kafka and storing the results back into a Kafka topic using window function aggregates. Now, instead, we decide that we need to just perform a one-time batch operation using the same logic, where there is a need to read specific data from Kafka (i.e. using pre-determined offsets). How will we need to modify the code to make it work?

Options :

6406533051830. ❌ The read and write commands will remain the same, but the remaining code will need to be modified, as operations on streaming dataframes are not supported on static dataframes.

6406533051831. ❌ The entire code will need to be modified as the APIs for stream and batch processing are completely different.

6406533051832. ❌ The read and write commands need to be modified to specify that it's a batch operation. Further, the specific logic of window functions will also need to be modified since there are no time windows anymore in batch processing.

6406533051833. ✓ Only the read and write commands need to be modified to specify that it's a batch operation.

Question Number : 311 Question Id : 640653906623 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

Consider a Kafka system that has two brokers with the exact same resources. Let's consider a topic A with a single partition, whose two copies are being maintained in sync by Kafka. Consider the following cases:

Case 1: Each broker has one copy of the partition

Case 2: Both the copies reside in the same broker

Two of the key promises of Kafka are:

- (i) Availability
- (ii) Throughput

Regarding which of the above promises, case 1 is at an advantage as compared to case 2?

Options :

6406533051834. ❌ Only (ii)

6406533051835. ✓ Only (i)

6406533051836. ❌ Both (i) and (ii)

6406533051837. ❌ Neither (i) nor (ii)

Question Number : 312 Question Id : 640653906624 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

Kubernetes is an open-source system for automating deployment, scaling and management of containerized applications. Google Datastore and HBase are both highly-scalable NoSQL database systems for interactive, real-time applications. Consider the following pipeline choices for effecting the same outcome:

- (i) Shell producer on VM on GCP → Pub/Sub → Spark Streaming on Hadoop VMs on GCP → HBase on same Hadoop VMs on GCP
- (ii) Shell producer in Google Cloud Function → Kafka VM on GCP → Dataflow → Datastore
- (iii) Shell producer in Kubernetes on GCP → Pub/Sub → Spark Streaming on Google Dataproc → Datastore
- (iv) Shell producer on VM on GCP → Pub/Sub → Dataflow → Datastore
- (v) Shell producer in Kubernetes on GCP → Pub/Sub → Spark Streaming on Hadoop VMs on GCP → HBase on same Hadoop VMs on GCP

Which option below represents the correct order of pipeline options that has the “most IaaS” entry to the left and the “most PaaS” entry to the right?

Options :

6406533051838. ✓ (i), (v), (iii), (iv), (ii)

6406533051839. ✗ (i), (ii), (iii), (iv), (v)

6406533051840. ✗ (ii), (iii), (i), (iv), (v)

6406533051841. ✗ (v), (iii), (i), (iv), (ii)

6406533051842. ✗ All are equally PaaS / IaaS

Question Number : 313 Question Id : 640653906625 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

A Spark Streaming application is configured to execute once per minute. However, each run takes 10+ minutes consistently resulting in a never-ending backlog of work. The code in a nutshell looks as follows:

```
clicks = (      # schema - adId: String, clickTime: Timestamp,  
...  
    spark  
        .readStream  
        .format("kafka")  
        .option("subscribe", "clicks")  
        ...  
        .load()  
)  
  
clicks  
    .join(pages, "pageId")  
    .groupBy("pageName")  
    .count()
```

Your goal is to optimize the code to bring down execution of each iteration within 1 minute. Which of the following represent options that will help in this mission?

Options :

Convert to batch and use cron to schedule for every 1 minute since streaming
6406533051843. ❌ computation has more overhead than batch processing

Ensure "pages" dataframe is broadcast before the streaming begins so that each
6406533051844. ✓ executor has access to its own copy without having to reshuffle

Rewrite the join code as follows

```
clicks  
    .groupBy("pageId")  
    .count()  
    .join(pages, "pageId")  
    .select("pagename", "count")
```

6406533051845. ❌

Rewrite the join code as follows

```
pages  
    .join(clicks, "pageId")  
    .groupBy("pageName")  
    .count()
```

6406533051846. ❌

Question Number : 314 Question Id : 640653906626 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

You are given a Spark program that runs on a Google Dataproc cluster on a daily schedule from 8PM-10PM to produce as output the total amount spent on purchases made by every customer

the previous day. The data is coming into GCS every minute from a variety of sources as standalone files. Therefore, the business leader now feels that having to wait till 10PM the next day is no longer acceptable and instead wants approximate purchase information for each customer at least every 5 minutes. What's more, she wants to be able to change this time window later without involving you. Which amongst the below represents the best option to achieve the above?

Options :

- 6406533051847. ✘ Change the code to run every 5 minutes, no other change required
- 6406533051848. ✘ Change the code to leverage Spark Streaming with streaming window as "5 minutes", & let her manage the execution of the code on Dataproc
- 6406533051849. ✓ Change the code to leverage Spark Streaming with streaming window as "5 minutes", convert from Dataproc to Dataflow, & let her manage the execution of the code on Dataflow
- 6406533051850. ✘ Write a Cloud Function to move all incoming per-minute standalone files from GCS to Pub/Sub, change the code to leverage Spark Streaming with streaming window as "5 mins", convert from Dataproc to Dataflow, point source to Pub/Sub, & let her manage the execution of the code on Dataflow

Question Number : 315 Question Id : 640653906627 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

At the onset of every festive season, there is a surge in railway ticket bookings. The business head at IRCTC is interested in a real-time view of all of her stations irrespective of whether there were bookings or not. She wants to see this be presented in a monitor mounted in her office wall that refreshes with the latest info on an India map every 1 minute. Along with the info, there also needs to be the current time so that she gets a visual confirmation that this is the latest data. This dashboard allows her to plan for new summer-special trains as required. What solution option below best solves for the need?

Options :

- 6406533051851. ✘ Route a copy of the ticket purchase to a Kafka topic, use Spark Structured Streaming to continuously read from this topic and update the aggregates by destinations, and emit using output mode "Update".
- 6406533051852. ✓ Route a copy of the ticket purchase to a Kafka topic, use Spark Structured Streaming to periodically read from this topic every 1 minute and update the aggregates by destinations, and emit all aggregates using the output mode "Complete".
- 6406533051853. ✘ Route a copy of the ticket purchase to a Kafka topic, use Spark Structured Streaming to periodically read from this topic every 1 minute and count the destinations in that batch, and emit only all aggregates in that batch using the output mode "Append".

Sub-Section Number :

3

Sub-Section Id :

640653134686

Question Shuffling Allowed :

Yes

Question Number : 316 Question Id : 640653906600 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

What option(s) best describe the differences between MapReduce and Spark?

Options :

6406533051725. ❌ MapReduce leverages memory heavily, while Spark optimizes for disk-based computations

6406533051726. ✓ MapReduce forces barrier synchronization after every step, while Spark uses directed acyclic graphs to execute as many steps as possible in parallel

6406533051727. ✓ MapReduce leverages disk heavily, while Spark optimizes for memory-based computations

6406533051728. ❌ MapReduce enables massively parallel computation, while Spark's driver program sequentially executes each worker

6406533051729. ❌ MapReduce is restricted in flexibility since only Map and Reduce are possible steps, while Spark has a variety of Actions possible making it highly flexible

Sub-Section Number :

4

Sub-Section Id :

640653134687

Question Shuffling Allowed :

Yes

Question Number : 317 Question Id : 640653906604 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

You are provided with a Spark program that picks out a list of suspicious transactions. Its logic is based on both the financial value of the transaction and the geographic location of the transaction. If the financial value is higher than a threshold and the geographic location is from a set of suspected locations (provided as a 1MB file), then the program deems the transaction as suspicious. The version of the Spark program given to you is written in such a way that it pulls all the transactions from the Workers to the Driver and then applies the. Which 2 changes from the list below will get you the most benefit in performance?

Options :

6406533051743. ✓ Use broadcast variables for the 1MB file

6406533051744. ❌ Hardcode threshold value as a filter condition in the Driver program

6406533051745. ❌ Reorder operations on the Driver such that geographic location is checked first before filtering high value transactions

6406533051746. ✓ Hardcode threshold value as a filter condition in the Workers itself

Question Number : 318 Question Id : 640653906607 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following types of data sources can you read successfully without missing data using a program that extracts once every day? If no data is missed, then all data in source will match data extracted successfully.

Options :

6406533051757. ✓ A MySQL table that is modelled as a Type II SCD where all Creates are new rows and all Updates are appended only, and these can happen anytime during the day.

6406533051758. ✓ A Linux machine's system.log file into which all processes append their events
6406533051759. ✗ Share transactions stored as facts & share prices updated in-place in a PostgreSQL database
6406533051760. ✗ A weather API that provides the temperature & rainfall readings for all its weather stations in India for the specific time instant when being queried
6406533051761. ✓ Google drive account that stores all historical census data for India

Question Number : 319 Question Id : 640653906608 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following is true?

Options :

6406533051762. ✓ Snapshots of source systems can be created using an event capture tool like CDC and then replaying the events in sequence for that time period.
6406533051763. ✗ A data lake is a collection of data to be provided as input for data science algorithms.
6406533051764. ✓ Zookeeper is a library for ensuring that critical services used in big data are able to stay in sync with each other as to the health of those services.
6406533051765. ✗ A single Spark cluster can have multiple "leader" master nodes.
6406533051766. ✓ Spark is optimized for in-memory computation.
6406533051767. ✓ Given the RDD underlying a Dataframe, you can recreate the same Dataframe provided you know the schema

Question Number : 320 Question Id : 640653906609 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

What are some capabilities common to both "streaming processing" & "batch processing" when using Spark for big data?

Options :

6406533051768. ✓ Batch operates on a set of data elements taken together while streaming can also operate on a set of data elements as determined by the window
6406533051769. ✗ Batch operates on data that is static while streaming operates on data that is dynamically changing
6406533051770. ✗ Batch processing can assume data as fully specified and complete while streaming cannot make that assumption
6406533051771. ✗ Batch processing is typically high latency while streaming processing is necessary for real-time latencies
6406533051772. ✓ Both Streaming & Batch processing can operate on massively large data sets
6406533051773. ✓ Both Streaming and Batch processing in Spark can use the same syntax for programming the main functional logic of the application

Question Number : 321 Question Id : 640653906610 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following are best practices associated with Streaming applications?

Options :

6406533051774. ✓ Use a message store that supports message replay so that no data is lost in processing.

6406533051775. ✓ “Hot potato” principle is when the streaming application operates on the minimum amount of processing to produce valid output, which then becomes input for the next minimal processor, and so on, thus ensuring that no single process is doing too many things in one go.

6406533051776. ✗ Hadoop is best suited for executing Streaming applications.

6406533051777. ✓ Use checkpointing when faced with mission-critical workloads that require 100% accuracy.

6406533051778. ✗ Handle state pollution by restarting the persistent store software periodically.

Question Number : 322 Question Id : 640653906613 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

You are given the task of improving the performance of a Spark SQL program that is doing a simple count after a series of transformations. You suspect that the culprit is the main transformation job in the program. When you run EXPLAIN on that SQL, you see that Spark wrongly estimates that there are only 10 values for the key on which the main transformation job is hinged upon, whereas in reality the underlying data has a million values for that key. What actions would you perform from the below to improve performance of the program?

Options :

6406533051789. ✗ Create all tables as external tables.

6406533051790. ✓ Ensure cost based optimizer (CBO) is ON.

6406533051791. ✗ Partition all tables on the same key on which the aggregate is happening.

6406533051792. ✓ Run ANALYZE on all tables to ensure the right estimates are available to the optimizer.

6406533051793. ✓ Cache the table in a step with actions ahead of the SQL statement that is the culprit.

Sem1 Maths1

Section Id :	64065364216
Section Number :	13
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	16
Number of Questions to be attempted :	16

Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134688
Question Shuffling Allowed :	No

Question Number : 323 Question Id : 640653906628 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : SEMESTER I: MATHEMATICS FOR DATA SCIENCE I (COMPUTER BASED EXAM)"

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

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

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

Options :

6406533051854. ✓ YES

6406533051855. ✗ NO

Question Number : 324 Question Id : 640653906629 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

Instructions:

- There are some questions that have functions with discrete-valued domains (such as day, month, year etc).
- For NAT-type questions, enter only one right answer even if you get multiple answers for that particular question.
- Notations:
 - \mathbb{R} = Set of real numbers
 - \mathbb{Q} = Set of rational numbers
 - \mathbb{Z} = Set of integers
 - \mathbb{N} = Set of natural numbers
- The set of natural numbers includes 0.

Options :

6406533051856. ✓ Instructions has been mentioned above.

6406533051857. ✗ This Instructions is just for a reference & not for an evaluation.

Sub-Section Number :

2

Sub-Section Id :

640653134689

Question Shuffling Allowed :

Yes

Question Number : 325 Question Id : 640653906630 Question Type : MSQ Calculator : Yes

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following is (are) correct?

Options :

6406533051858. ✓ Floyd-Warshall algorithm is used for all pair shortest paths.

6406533051859. ✓ The Shortest path problem is not applicable to a graph with a negative weight cycle.

6406533051860. ✓ Bellman-Ford algorithm is used for single source shortest path.

6406533051861. ✗ Dijkstra's algorithm is used for all pair shortest paths.

Sub-Section Number :

3

Sub-Section Id :

640653134690

Question Shuffling Allowed :

Yes

Question Number : 326 Question Id : 640653906631 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following adjacency matrix

$$\begin{array}{c|ccccc} & A & B & C & D & E \\ \hline A & 0 & 1 & 0 & 1 & 1 \\ B & 1 & 0 & 1 & 0 & 1 \\ C & 0 & 1 & 0 & 0 & 1 \\ D & 1 & 0 & 0 & 0 & 1 \\ E & 1 & 1 & 1 & 1 & 0 \end{array}$$

which represents graph G which has 5 vertices A, B, C, D and E .

Which of the following is true about the graph G ?

Options :

6406533051862. ❌ The number of vertices in G of degree 3 are 3.

6406533051863. ✓ The total number of edges in G are 7.

6406533051864. ❌ The total number of edges in G are 14.

6406533051865. ✓ There is a cycle in G .

Question Number : 327 Question Id : 640653906640 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following function:

$$f(x) = \begin{cases} \frac{x}{(x+1)(x+2)}, & x \geq 1, \\ \frac{1}{x-5}, & x < 1 \end{cases}$$

Which of the following options is (are) correct?

Options :

6406533051878. ❌ $\lim_{x \rightarrow -2^+} f(x) = \infty$

6406533051879. ❌ The function f is continuous.

6406533051880. ✓ $\lim_{x \rightarrow 5^+} f(x) = \lim_{x \rightarrow 5^-} f(x) = \frac{5}{42}$

6406533051881. ✓ At $x = 1$, the function f is discontinuous.

Question Number : 328 Question Id : 640653906641 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following statements is/are true about the function $f(x) = x^2 + 2x - 8$?

Options :

- 6406533051882. ✘ f is one-one on its domain.
- 6406533051883. ✘ f has an inverse on its domain.
- 6406533051884. ✓ The vertex of this parabola is at (-1, -9).
- 6406533051885. ✓ y -intercept of the given parabola is -8.

Question Number : 329 Question Id : 640653906644 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following relations defined on the set of integers

- $R_1 = \{(x, y) | x, y \in \mathbb{Z} \text{ and } 7 \text{ divides } (x - y)\}$
- $R_2 = \{(x, y) | x, y \in \mathbb{Z} \text{ and } x + y = 2\}$

Choose the correct option(s).

Options :

- 6406533051894. ✘ R_1 is not transitive.
- 6406533051895. ✓ R_2 is symmetric.
- 6406533051896. ✓ R_1 is symmetric.
- 6406533051897. ✘ R_2 is transitive.

Sub-Section Number :

4

Sub-Section Id :

640653134691

Question Shuffling Allowed :

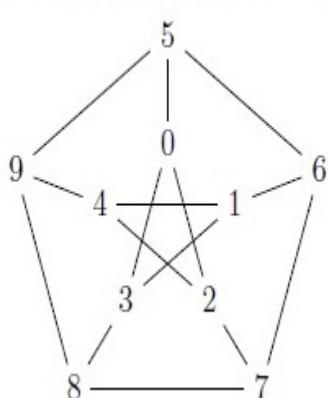
Yes

Question Number : 330 Question Id : 640653906632 Question Type : SA Calculator : None

Correct Marks : 4

Question Label : Short Answer Question

What is the minimum number of colours required to colour the graph given below?



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 331 Question Id : 640653906646 Question Type : SA Calculator : None

Correct Marks : 4

Question Label : Short Answer Question

You have been closely monitoring your bike's mileage recently. Here is a table showing two rows representing the amount paid for fuel(in ₹) and the corresponding mileage (in Km). Consider y as the amount paid and x as the corresponding mileage in Km. You have noted down the distance traveled each time when the fuel meter falls back to a fixed reference mark and predicted that the equation of the best fit line is $y = 5x - 21$. What will be the value of SSE w.r.t the best fit line?

Amount paid (in ₹)	80	50	60	100	48
Distance (in Km)	20	15	16	25	14

Table: 1

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

35

Sub-Section Number : 5

Sub-Section Id : 640653134692

Question Shuffling Allowed : No

Question Id : 640653906633 Question Type : COMPREHENSION Sub Question Shuffling

Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (332 to 333)

Question Label : Comprehension

Consider a weighted graph G with 7 vertices { rows and columns are in the order $V_1, V_2, V_3, V_4, V_5, V_6, V_7$ }, which is represented by the following adjacency matrix.

Use the following information for given sub-questions

$$\begin{bmatrix} 0 & 24 & 0 & 0 & 36 & 0 & 28 \\ 24 & 0 & 0 & 32 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 4 & 12 \\ 0 & 32 & 0 & 0 & 8 & 0 & 0 \\ 36 & 0 & 0 & 8 & 0 & 0 & 0 \\ 0 & 0 & 4 & 0 & 0 & 0 & 20 \\ 28 & 0 & 12 & 0 & 0 & 20 & 0 \end{bmatrix}.$$

Sub questions

Question Number : 332 Question Id : 640653906634 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Suppose we perform Prim's algorithm on the graph G starting from vertex V_1 to find an MCST. Then the order in which the vertices are added is

Options :

6406533051867. ✘ $V_1, V_3, V_6, V_7, V_2, V_4, V_5$

6406533051868. ✓ $V_1, V_2, V_7, V_3, V_6, V_4, V_5$

6406533051869. ✘ $V_1, V_2, V_4, V_5, V_7, V_3, V_6$

6406533051870. ✘ $V_1, V_3, V_6, V_7, V_5, V_4, V_2$

Question Number : 333 Question Id : 640653906635 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

Find the value MCST.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

108

Sub-Section Number :

6

Sub-Section Id :

640653134693

Question Shuffling Allowed :

No

Question Id : 640653906637 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (334 to 335)

Question Label : Comprehension

Consider the following functions;

- $v(t) = 4t^2 + 2t$
- $s(t) = 20 + 4t - t^2$

Let $[.]$ be the floor function (greatest integer function), e.g., $[2.34] = 2$, $[5] = 5$.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 334 Question Id : 640653906638 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

If A and B are the areas under the curves $v(t)$ and $s(t)$ respectively, from $t = 0$ to $t = 1$ then what is the value of $[A] + [B]$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

23

Question Number : 335 Question Id : 640653906639 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

If α and β are the Y -coordinates of the points of intersection of the curves $v(t)$ and $s(t)$ then what is the value of $10(\alpha + \beta)$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Sub-Section Number : 7

Sub-Section Id : 640653134694

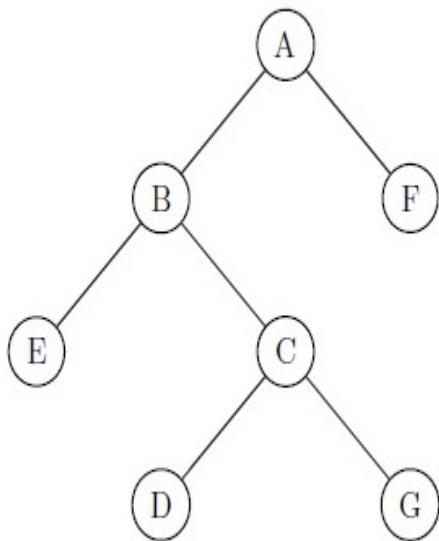
Question Shuffling Allowed : Yes

Question Number : 336 **Question Id :** 640653906636 **Question Type :** MCQ **Calculator :** Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Suppose we obtain the following BFS tree rooted at node A for an undirected graph with vertices $\{A, B, C, D, E, F, G\}$.



Which of the following cannot be an edge in the original graph?

Options :

640653051872. ✓ (A,D)

640653051873. ✗ (E,C)

640653051874. ✗ (D,G)

640653051875. ✗ (B,F)

Question Number : 337 **Question Id :** 640653906642 **Question Type :** MCQ **Calculator :** Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Choose the correct option(s).

Options :

640653051886. ✓ $\lim_{x \rightarrow 0} [x \times \sin(\frac{1}{x})] = 0$

6406533051887. ✳ $\lim_{x \rightarrow 0} \frac{e^{(1/x)}}{e^{(1/x)} + 1} = 0$

6406533051888. ✳ $\lim_{x \rightarrow 0} [x \times \sin(\frac{1}{x})] = 1$

6406533051889. ✳ $\lim_{x \rightarrow 0} \frac{e^{(1/x)}}{e^{(1/x)} + 1} = 1$

Sub-Section Number :

8

Sub-Section Id :

640653134695

Question Shuffling Allowed :

Yes

Question Number : 338 Question Id : 640653906645 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

Points $A(4, 3)$, $B(-3, -4)$ and $C(m, n)$ are collinear. If points $D(-1, 2)$, $E(5, -4)$ and C are also collinear, the value of $\frac{4m + 9n}{2m + 3n}$ is.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Sub-Section Number :

9

Sub-Section Id :

640653134696

Question Shuffling Allowed :

Yes

Question Number : 339 Question Id : 640653906643 Question Type : MCQ Calculator : Yes

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the functions $f(x) = \sqrt{x+4}$ and $g(x) = \log(1+x^2)$. Which of the following options is/are true?

Options :

6406533051890. ✳ $(f \circ g)(x) = \log(2x+5)$ on its domain of definition.

6406533051891. ✳

The domain of the function $(g \circ f)(x)$ is $(-5, \infty)$.

6406533051892. ❌ The domain of the function $(g \circ f)(x)$ is $[-6, -1]$.

6406533051893. ✓ $(g \circ f)(x) = \log(x + 5)$ on its domain of definition.

Sub-Section Number : 10

Sub-Section Id : 640653134697

Question Shuffling Allowed : Yes

Question Number : 340 Question Id : 640653906647 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider two polynomials $p(x) = -x^5 + 5x^4 - 7x - 2$ and $q(x) = -x^5 + 5x^4 - x^2 - 2$.

Which of the following options is/are true?

Options :

6406533051900. ✓ $p(x)$ and $q(x)$ intersect at two points.

6406533051901. ❌ $p(x) \rightarrow \infty$ as $x \rightarrow \infty$.

6406533051902. ❌ $p(x)$ has 5 turning points.

6406533051903. ✓ $q(x) \rightarrow -\infty$ as $x \rightarrow \infty$.

Sem2 Maths2

Section Id : 64065364217

Section Number : 14

Section type : Online

Mandatory or Optional : Mandatory

Number of Questions : 17

Number of Questions to be attempted : 17

Section Marks : 50

Display Number Panel : Yes

Section Negative Marks : 0

Group All Questions : No

Enable Mark as Answered Mark for Review and No

Clear Response :

Maximum Instruction Time :

0

Sub-Section Number :

1

Sub-Section Id :

640653134698

Question Shuffling Allowed :

No

Question Number : 341 Question Id : 640653906648 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

**THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : SEMESTER II:
MATHEMATICS FOR DATA SCIENCE II (COMPUTER BASED EXAM)"**

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

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

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

Options :

6406533051904. ✓ YES

6406533051905. ✗ NO

Sub-Section Number :

2

Sub-Section Id :

640653134699

Question Shuffling Allowed :

Yes

Question Number : 342 Question Id : 640653906649 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the two statements given below:

Statement-P: There exists a square matrix of order 2 such that $A^2 = 0$, $A^T = A$ and $A \neq 0$.

Statement-Q: There exists a square matrix of order 2 such that $A^2 = 0$ and $A \neq 0$.

Options :

6406533051906. ✗ Statement-P is true, but statement-Q is false.

6406533051907. ✓ Statement-P is false, but statement-Q is true.

6406533051908. ✗ Both statements are true.

6406533051909. ✗ Both statements are false.

Question Number : 343 Question Id : 640653906650 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the following system of equations:

$$2x_1 - x_2 + x_3 = b_1$$

$$x_1 + x_2 - 2x_3 = b_2$$

$$-3x_2 + 5x_3 = b_3$$

Under which of the following conditions is the system consistent?

Options :

6406533051910. ✘ $b_2 = 0$

6406533051911. ✘ $b_1 = 2b_2$

6406533051912. ✓ $b_3 = b_1 - 2b_2$

6406533051913. ✘ $b_1 + b_2 + b_3 = 0$

Question Number : 344 Question Id : 640653906651 Question Type : MCQ Calculator : Yes

Correct Marks : 3

Question Label : Multiple Choice Question

Which of the following is an orthonormal basis for $\text{span}\{(1, 1, -1), (1, 2, 0)\}$?

Options :

6406533051914. ✓ $\left\{ \frac{1}{\sqrt{3}}(1, 1, -1), \frac{1}{\sqrt{2}}(0, 1, 1) \right\}$

6406533051915. ✘ $\left\{ \frac{1}{\sqrt{3}}(1, 1, -1), \frac{1}{\sqrt{5}}(1, 2, 0) \right\}$

6406533051916. ✘ $\left\{ \frac{1}{\sqrt{2}}(1, 0, 1), \frac{1}{\sqrt{2}}(-1, 0, 1) \right\}$

6406533051917. ✘ $\left\{ \frac{1}{\sqrt{2}}(0, 1, 1), \frac{1}{\sqrt{2}}(0, -1, 1) \right\}$

Sub-Section Number :

3

Sub-Section Id :

640653134700

Question Shuffling Allowed :

Yes

Question Number : 345 Question Id : 640653906652 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Let $S = \{u_1, u_2, u_3, u_4, u_5\}$ be a linearly independent subset of a vector space V . Select all true statements.

Options :

6406533051918. ✓ There exists a basis B for V such that $S \subseteq B$

6406533051919. ✓ $\dim(V) \geq 5$

6406533051920. ✗ $\text{span}(S) = V$

6406533051921. ✗ S is a subset of every basis B

Question Number : 346 Question Id : 640653906653 Question Type : MSQ Calculator : Yes

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the function f :

$$f(x, y) = \begin{cases} \frac{y^4}{x^2 + y^2}, & (x, y) \neq (0, 0) \\ 0, & (x, y) = (0, 0) \end{cases}$$

If f_x, f_y denote the partial derivatives, select all true statements from the options given below.

Options :

6406533051922. ✗ $f_x(0, 0)$ does not exist.

6406533051923. ✗ $f_y(0, 0)$ does not exist.

6406533051924. ✓ $f_x(0, 0) = 0$

6406533051925. ✓ $f_y(0, 0) = 0$

Sub-Section Number :

4

Sub-Section Id :

640653134701

Question Shuffling Allowed :

Yes

Question Number : 347 Question Id : 640653906654 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

Find the dimension of the affine subspace corresponding to the set of all solutions to the following system:

$$\begin{bmatrix} 1 & 2 & 0 & 1 \\ 0 & 1 & 1 & 2 \\ 1 & 3 & 1 & 3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Question Number : 348 **Question Id :** 640653906655 **Question Type :** SA **Calculator :** None

Correct Marks : 3

Question Label : Short Answer Question

Let $v = (\sqrt{2}, -\sqrt{2}, 6) \in \mathbb{R}^3$. (a, b, c) is the vector obtained from v after rotating the XY-plane anti-clockwise by 45° about the Z-axis. Find the value of $a+b+c$. Enter the nearest integer as your answer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

8

Question Number : 349 **Question Id :** 640653906656 **Question Type :** SA **Calculator :** None

Correct Marks : 3

Question Label : Short Answer Question

Evaluate $\lim_{(x,y) \rightarrow (0,0)} \frac{\sin(4x^2 + 4y^2)}{x^2 + y^2}$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Question Number : 350 Question Id : 640653906657 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

Consider the following function:

$$f(x, y) = \begin{cases} \frac{x^2 - xy}{\sqrt{x} - \sqrt{y}} & , \quad x \neq y \text{ and } x \geq 0 \text{ and } y \geq 0 \\ c & , \quad \text{otherwise} \end{cases}$$

For what value of c is the function f continuous at $(0, 0)$?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

0

Question Number : 351 Question Id : 640653906658 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

If the directional derivative of $f(x, y) = x^3y + xy^2 + 8$ at the point $(1, 2)$ in the direction $\left(\frac{1}{\sqrt{2}}, \frac{-1}{\sqrt{2}}\right)$ is $\frac{p}{\sqrt{2}}$, find the value of p .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

5

Question Number : 352 Question Id : 640653906659 Question Type : SA Calculator : None

Correct Marks : 3

Question Label : Short Answer Question

The equation of the tangent plane to the function $f(x, y) = e^x(x + y)$ at the point $(1, 0)$ is given by $Ax + By + C = z$. Find the value of $\frac{A + B + C}{e}$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Sub-Section Number : 5

Sub-Section Id : 640653134702

Question Shuffling Allowed : Yes

Question Number : 353 **Question Id :** 640653906660 **Question Type :** SA **Calculator :** None

Correct Marks : 4

Question Label : Short Answer Question

If $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 5 \\ -4 & 9 & 5 \end{bmatrix}$, find the determinant of $A^3 - 3A^2 + 2A$.

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 : 640653134703

Question Shuffling Allowed : No

Question Id : 640653906672 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Question Pattern Type :** NonMatrix

Calculator : None

Question Numbers : (354 to 356)

Question Label : Comprehension

Consider a linear transformation $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$:

$$T(x, y, z) = (x - y + z, x + z, y - 2z)$$

Use the given standard basis for both domain and co-domain for matrix representation ,

Answer the sub-questions

Sub questions

Question Number : 354 **Question Id :** 640653906673 **Question Type :** MCQ **Calculator :** Yes

Correct Marks : 1

Question Label : Multiple Choice Question

What is the matrix representation of T ?

Options :

6406533051950. ✓ $\begin{bmatrix} 1 & -1 & 1 \\ 1 & 0 & 1 \\ 0 & 1 & -2 \end{bmatrix}$

6406533051951. ✗ $\begin{bmatrix} 1 & 1 & 0 \\ -1 & 0 & 1 \\ 1 & 1 & -2 \end{bmatrix}$

6406533051952. ✗ $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

6406533051953. ✗ $\begin{bmatrix} 1 & 0 & 1 \\ -1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}$

Question Number : 355 Question Id : 640653906674 Question Type : MSQ Calculator : Yes

Correct Marks : 1 Max. Selectable Options : 0

Question Label : Multiple Select Question

Select all true statements.

Options :

6406533051954. ✓ The kernel of T is $\{(0, 0, 0)\}$

6406533051955. ✗ The kernel of T is \mathbb{R}^3

6406533051956. ✗ The image of T is $\{(0, 0, 0)\}$

6406533051957. ✓ The image of T is \mathbb{R}^3

Question Number : 356 Question Id : 640653906675 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

T^{-1} is a linear transformation that is the inverse of T . That is, if $T(x, y, z) = (a, b, c)$, then $T^{-1}(a, b, c) = (x, y, z)$.

Find the matrix representation of T^{-1} ,

Options :

$$6406533051958. \checkmark \quad \frac{1}{2} \begin{bmatrix} 1 & 1 & 1 \\ -2 & 2 & 0 \\ -1 & 1 & -1 \end{bmatrix}$$

$$6406533051959. \times \quad \frac{1}{2} \begin{bmatrix} 1 & -2 & -1 \\ 1 & 2 & 1 \\ 1 & 0 & -1 \end{bmatrix}$$

$$6406533051960. \times \quad \begin{bmatrix} 1 & -1 & 1 \\ 1 & 0 & 1 \\ 0 & 1 & -2 \end{bmatrix}$$

$$6406533051961. \times \quad \begin{bmatrix} -1 & -1 & 1 \\ -1 & 0 & 1 \\ 2 & 1 & -1 \end{bmatrix}$$

Sub-Section Number :

7

Sub-Section Id :

640653134704

Question Shuffling Allowed :

No

Question Id : 640653906661 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (357 to 358)

Question Label : Comprehension

Let $f : D \rightarrow \mathbb{R}$ be defined as follows:

$$f(x, y) = \sqrt{1 - x^2 - y^2}$$

where $D \subset \mathbb{R}^2$ is the domain of f .

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 357 Question Id : 640653906662 Question Type : MCQ Calculator : Yes Correct Marks : 1

Question Label : Multiple Choice Question

Choose the largest possible D that would be a valid domain from the options given below.

Options :

6406533051933. ✘ \mathbb{R}^2

6406533051934. ✘ $\{(x, y) : |x| \leq 1 \text{ and } |y| \leq 1; x, y \in \mathbb{R}\}$

6406533051935. ✘ $\mathbb{R}^2 \setminus \{(x, y) : x^2 + y^2 < 1; x, y \in \mathbb{R}\}$

6406533051936. ✘ $\mathbb{R}^2 \setminus \{(x, y) : x^2 + y^2 \leq 1; x, y \in \mathbb{R}\}$

6406533051937. ✓ $\{(x, y) : x^2 + y^2 \leq 1; x, y \in \mathbb{R}\}$

Question Number : 358 Question Id : 640653906663 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Which of the following is the range of f using the domain chosen from the previous question? Recall that $[a, b] = \{x : a \leq x \leq b; x \in \mathbb{R}\}$

Options :

6406533051938. ✓ $[0, 1]$

6406533051939. ✘ $[-1, 1]$

6406533051940. ✘ \mathbb{R}

6406533051941. ✘ \mathbb{R}^2

Question Id : 640653906664 Question Type : COMPREHENSION Sub Question Shuffling

Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (359 to 361)

Question Label : Comprehension

Consider the function $f(x, y) = x^2 + xy + y^2 - 7x - 8y$.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 359 Question Id : 640653906665 Question Type : SA Calculator : None

Correct Marks : 1

Question Label : Short Answer Question

If f has a critical point at (a, b) ,
find $a + b$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

5

Question Number : 360 Question Id : 640653906666 Question Type : SA Calculator : None

Correct Marks : 1

Question Label : Short Answer Question

Find the determinant of the
Hessian at (a, b) .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 361 Question Id : 640653906667 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

What is the nature of the critical point?

Options :

640653051944. ✘ Local maximum

640653051945. ✓ Local minimum

640653051946. ✘ Saddle point

Question Id : 640653906668 Question Type : COMPREHENSION Sub Question Shuffling

Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (362 to 364)

Question Label : Comprehension

Find three positive numbers x, y, z whose sum is 10 such that x^2yz^2 is maximum.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 362 Question Id : 640653906669 Question Type : SA Calculator : None

Correct Marks : 1

Question Label : Short Answer Question

Enter the value of x .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Question Number : 363 Question Id : 640653906670 Question Type : SA Calculator : None

Correct Marks : 1

Question Label : Short Answer Question

Enter the value of y .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Question Number : 364 Question Id : 640653906671 Question Type : SA Calculator : None

Correct Marks : 1

Question Label : Short Answer Question

Enter the value of z .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

Industry 4.0

Section Id :	64065364218
Section Number :	15
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	22
Number of Questions to be attempted :	22
Section Marks :	45
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653134705
Question Shuffling Allowed :	No

Question Number : 365 Question Id : 640653906676 Question Type : MCQ Calculator : Yes

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DEGREE LEVEL : INDUSTRY 4.0 (COMPUTER BASED EXAM)"

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

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

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

Options :

6406533051962. ✓ YES

6406533051963. ✗ NO

Sub-Section Number :	2
Sub-Section Id :	640653134706
Question Shuffling Allowed :	Yes

Question Number : 366 Question Id : 640653906677 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

Match Column A with Column B (country of origin)

Column A	Column B
A1. 1 st revolution	B1. England
A2. 2 nd revolution	B2. USA
A3. 3 rd revolution	B3. USA/Japan
A4. 4 th revolution	B4. Germany

Options :

6406533051964. ✓ A1:B1, A2:B2, A3:B3, A4:B4

6406533051965. ✗ A1:B2, A2:B1, A3:B3, A4:B4

6406533051966. ✗ A1:B3, A2:B1, A3:B4, A4:B2

6406533051967. ✗ A1:B3, A2:B1, A3:B2, A4:B4

Sub-Section Number :

3

Sub-Section Id :

640653134707

Question Shuffling Allowed :

Yes

Question Number : 367 Question Id : 640653906679 Question Type : MCQ Calculator : Yes

Correct Marks : 1.5

Question Label : Multiple Choice Question

Geet Mobile manufactures mobile phones of various types. Their product portfolio comprises of 15 types of headsets. These headsets comprise of limited types of components. Only a few of the components need customization for different headsets. Which facility layout will best suit for Geet Mobile's production?

Options :

6406533051972. ✗ Product layout

6406533051973. ✓ Group layout

6406533051974. ✗ Fixed position layout

6406533051975. ✗ All of these

Sub-Section Number :

4

Sub-Section Id :

640653134708

Question Shuffling Allowed :

Yes

Question Number : 368 Question Id : 640653906698 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Mahesh is shopping in a departmental store. He has a list of items which he prepared at home itself. He picked a few packets of tea as part of his list. He could see coffee packets and milk-powder packets in the neighbouring shelves. He picked a few milk-powder packets, however these are not part of his list. While standing in the queue for billing, he noticed Uncle Chips packets lying nearby and grabbed a couple of packets. Now map the scenarios with the items below:

Product	Scenario
P1) Tea : Coffee	S1) Complementary
P2) Tea: Milk-powder packet	S2) Substitution
P3) Uncle chips purchase	S3) Inventory dependant demand
	S4) Impulse buying

Options :

6406533052010. ✗ P1-S1, P2-S3, P3-S4

6406533052011. ✗ P1-S2, P2-S1, P3-S3

6406533052012. ✓ P1-S2, P2-S1, P3-S4

Question Number : 369 Question Id : 640653906701 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

What is the name of the forecasting method represented by the following set of equations? The notations represent the usual meaning.

$$F_{t+1} = a_t + b_t$$

Where

$$a_t = \alpha D_t + (1 - \alpha)(a_{t-1} - b_{t-1});$$

$$b_t = \beta(a_t - a_{t-1}) + (1 - \beta)b_{t-1}$$

Options :

6406533052020. ✗ Exponential smoothing

6406533052021. ✗ Winter's model for seasonality

6406533052022. ✓ Holte's method for trend

6406533052023. ✗ None of these

Question Number : 370 Question Id : 640653906703 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Which of the following is not an example of digitization?

Options :

6406533052029. ✗ Creating the e-copy of a book using Google-Lens

6406533052030. ✓ Generating an automated daily sales report across the retail outlets in a state.

6406533052031. ✗ Converting a physical 2D sheet to CAD drawing

6406533052032. ✗ Converting physical invoice to e-copy

Question Number : 371 Question Id : 640653906704 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

Select the correct form of internet from column B corresponding to the example in Column A.

Column A	Column B
A1. Smart metering	B1. Consumer
A2. Banking system	B2. Commercial
A3. Entertainment integrated devices	B3. Industrial
	B4. Private

Options :

6406533052033. ✘ A1: B3, A2: B2, A3: B4

6406533052034. ✓ A1: B3, A2: B2, A3: B1

6406533052035. ✘ A1: B2, A2: B3, A3: B1

Sub-Section Number :

5

Sub-Section Id :

640653134709

Question Shuffling Allowed :

Yes

Question Number : 372 Question Id : 640653906683 Question Type : MSQ Calculator : Yes

Correct Marks : 1 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which are the two primary tasks of time series forecasting?

Options :

6406533051982. ✓ Identifying pattern

6406533051983. ✘ Identify variables of interest

6406533051984. ✓ Discovering relationships amongst variables of interest

Question Number : 373 Question Id : 640653906684 Question Type : MSQ Calculator : Yes

Correct Marks : 1 Max. Selectable Options : 0

Question Label : Multiple Select Question

Select the correct statements from below:

Options :

6406533051985. ✘ Optimal solution in a facility location problem using Euclidean method will result in a region

6406533051986. ✓ Optimal solution in a facility location problem using Euclidean method rarely matches the center of gravity

6406533051987. ✓ Optimal solution in a facility location problem using Euclidean method will result in a point

Question Number : 374 Question Id : 640653906699 Question Type : MSQ Calculator : Yes

Correct Marks : 1 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following example(s) can be referred as seasonal pattern?

Options :

6406533052013. ❌ Economic recession

6406533052014. ✓ Increases Ceiling Fan sales during winters

6406533052015. ✓ Increased tourist footfall towards the end of the year

Sub-Section Number :

6

Sub-Section Id :

640653134710

Question Shuffling Allowed :

Yes

Question Number : 375 Question Id : 640653906678 Question Type : MSQ Calculator : Yes

Correct Marks : 1.5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Select the appropriate purposes of facility layout from the list below:

Options :

6406533051968. ✓ Minimize delay in material handling

6406533051969. ✓ Enhance sales as appropriate in manufacturing and service facilities.

6406533051970. ✓ Provide for good maintenance

6406533051971. ❌ Funding a new project

Question Number : 376 Question Id : 640653906682 Question Type : MSQ Calculator : Yes

Correct Marks : 1.5 Max. Selectable Options : 0

Question Label : Multiple Select Question

There are four demand points at A(1,2), B(2,3), C(3,5), D(4,1). The respective demand at these points are 7, 1, 3, 5. Select the optimal location based on cross-median approach.

Options :

6406533051978. ✓ (2,2)

6406533051979. ✓ (3,2)

6406533051980. ✓ (2.5,2)

6406533051981. ❌ (2,3)

Sub-Section Number :

7

Sub-Section Id :

640653134711

Question Shuffling Allowed :

Yes

Question Number : 377 Question Id : 640653906685 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Select the demerits of outsourcing from the following list.

Options :

6406533051988. ✓ Reduced customer/supplier contact.

6406533051989. ✓ Loss of supply chain visibility.

6406533051990. ✓ Leakage of sensitive data and information.

640653051991. ✓ Loss of internal capability and growth in third-party power.

Question Number : 378 Question Id : 640653906700 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following is/are considered in the Vehicle Routing Problem but not considered in TSP?

Options :

640653052016. ✗ Subtour elimination

640653052017. ✓ Any capacity restrictions

640653052018. ✓ A specific starting point

640653052019. ✗ Distance travelled restriction

Question Number : 379 Question Id : 640653906702 Question Type : MSQ Calculator : Yes

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following supply chain costs is/are affected by distribution network structure?

Options :

640653052024. ✓ Inventory

640653052025. ✓ Transportation

640653052026. ✓ Facilities and handling

640653052027. ✓ Information

640653052028. ✗ Price

Sub-Section Number : 8

Sub-Section Id : 640653134712

Question Shuffling Allowed : Yes

Question Number : 380 Question Id : 640653906680 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

A factory works for two 8-hour shifts each day and produces a total of 24,000 electric bulbs using a set of workstations. There are 8 activities required to manufacture the bulb, such that the sum of all activity times is equal to 12 seconds. How many workstations are required to maintain the specified level of production (assuming that activities can be combined into those workstations in any order) (enter your answer in numeric value)?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

Sub-Section Number :	9
Sub-Section Id :	640653134713
Question Shuffling Allowed :	Yes

Question Number : 381 Question Id : 640653906681 Question Type : SA Calculator : None

Correct Marks : 1.5

Question Label : Short Answer Question

Calculate the Euclidean distance between two machines located at the coordinates A(5,10) and B(2,6) in a shop floor.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

4.8 to 5.3

Sub-Section Number :	10
Sub-Section Id :	640653134714
Question Shuffling Allowed :	Yes

Question Number : 382 Question Id : 640653906708 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

What is the full form of SAAS?

NOTE:Enter the exact answer without any space in the beginning or at the end.

Response Type : Alphanumeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Answers Case Sensitive : No

Text Areas : PlainText

Possible Answers :

Software as a service

Sub-Section Number :	11
Sub-Section Id :	640653134715
Question Shuffling Allowed :	No

Question Id : 640653906705 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (383 to 384)

Question Label : Comprehension

Suppose you need to accept reservation for a flight. There are total 100 seats in the aircraft. You have two classes of passengers - economy and business. One economy seat gets you 2,500 Rs of revenue while a business seat gets 7,500 Rs. From your experience, you know the demand for business travellers follows a uniform distribution in [10,20]. Then answer the given subquestions:

Sub questions

Question Number : 383 Question Id : 640653906706 Question Type : SA Calculator : None

Correct Marks : 1.5

Question Label : Short Answer Question

What is the Booking limit?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

17

Question Number : 384 Question Id : 640653906707 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

What is the protection level?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

83

Sub-Section Number :	12
Sub-Section Id :	640653134716
Question Shuffling Allowed :	No

Question Id : 640653906690 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (385 to 388)

Question Label : Comprehension

Limat Ltd. wants to determine its order quantity for one of its components. The annual

consumption for the component is 80,000 units and its purchasing price is Rs. 50 per unit. The cost of placing an order is Rs. 1,200 and carrying cost per unit is 6% of the purchasing price.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 385 Question Id : 640653906691 Question Type : SA Calculator : None

Correct Marks : 1

Question Label : Short Answer Question

Calculate the Economic Order Quantity (EOQ).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

8000

Question Number : 386 Question Id : 640653906692 Question Type : SA Calculator : None

Correct Marks : 1

Question Label : Short Answer Question

Calculate the number of orders per year.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

10

Question Number : 387 Question Id : 640653906693 Question Type : SA Calculator : None

Correct Marks : 1

Question Label : Short Answer Question

Calculate the annual order cost.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

12000

Question Number : 388 Question Id : 640653906694 Question Type : SA Calculator : None

Correct Marks : 1

Question Label : Short Answer Question

Calculate the annual inventory carrying cost.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

12000

Sub-Section Number : 13

Sub-Section Id : 640653134717

Question Shuffling Allowed : No

Question Id : 640653906686 Question Type : COMPREHENSION Sub Question Shuffling

Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Calculator : None

Question Numbers : (389 to 391)

Question Label : Comprehension

Suppose you want to invest \$4000 now and \$2000 at the start of years 2 to 4. The interest rate offered by First Bank is 8% compounded annually, and the bonuses over the next 4 years are 1.8%, 1.7%, 2.1% and 2.5%, respectively. The annual interest rate offered by Second Bank is 0.2% lower than that of First Bank, but its bonus is 0.5% higher. The objective is to maximize the accumulated capital at the end of 4 years. If you apply Dynamic Programming to this problem, answer the given subquestions:

Sub questions

Question Number : 389 Question Id : 640653906687 Question Type : MCQ Calculator : Yes

Correct Marks : 1

Question Label : Multiple Choice Question

How is a stage represented by?

Options :

6406533051992. ✓ Year

6406533051993. ✗ Capital available for investment at the start of a year

6406533051994. ✗ Amounts invested in First Bank

6406533051995. ✗ Amounts invested in First Bank and Second Bank

Question Number : 390 Question Id : 640653906688 Question Type : MCQ Calculator : Yes

Correct Marks : 1.5

Question Label : Multiple Choice Question

What are the alternatives in a stage?

Options :

6406533051996. ✘ Year
6406533051997. ✘ Capital available for investment at the start of a year
6406533051998. ✘ Amounts invested in First Bank in a year
6406533051999. ✓ Amounts invested in First Bank and Second Bank in a year

Question Number : 391 Question Id : 640653906689 Question Type : MCQ Calculator : Yes

Correct Marks : 2

Question Label : Multiple Choice Question

How state variable is defined for this problem?

Options :

6406533052000. ✘ Year
6406533052001. ✓ Capital available for investment at the start of a year
6406533052002. ✘ Amounts invested in First Bank in a year
6406533052003. ✘ Amounts invested in First Bank and Second Bank in a year

Sub-Section Number : 14

Sub-Section Id : 640653134718

Question Shuffling Allowed : No

Question Id : 640653906695 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None

Question Numbers : (392 to 393)

Question Label : Comprehension

The owner of a newsstand wants to determine the number of newspapers of USA Now to be stocked at the start of each day. The owner pays 30 cents for a copy and sells it for 75 cents. The sale of the newspaper typically occurs between 7:00 and 8:00 am. Newspaper left at the end of the day are recycled for an income of 5 cents a copy. How many copies should the owner stock every morning, assuming that the demand for the day can be described as:

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 392 Question Id : 640653906696 Question Type : SA Calculator : None

Correct Marks : 2

Question Label : Short Answer Question

A normal distribution with mean 300 copies and standard deviation 20 copies.

[Standard_Norm_inv(critical fractile)=0.643]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

307 to 308

Question Number : 393 **Question Id :** 640653906697 **Question Type :** SA **Calculator :** None

Correct Marks : 3

Question Label : Short Answer Question

A discrete distribution pdf, $f(D)$, defined as

D	200	220	300	320	340
$f(D)$	0.1	0.2	0.4	0.2	0.1

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

300