

# Indian Institute of Technology, Madras - BS in Data Science and Applications

## **Notations :**

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

<b>Question Paper Name :</b>	IIT M FOUNDATION AN EXAM QDF4 7 July 2024
<b>Subject Name :</b>	2024 July07: IIT M AN EXAM QDF4
<b>Creation Date :</b>	2024-07-01 17:32:53
<b>Duration :</b>	240
<b>Total Marks :</b>	726
<b>Display Marks:</b>	Yes
<b>Share Answer Key With Delivery Engine :</b>	Yes
<b>Actual Answer Key :</b>	Yes
<b>Calculator :</b>	Scientific
<b>Magnifying Glass Required? :</b>	No
<b>Ruler Required? :</b>	No
<b>Eraser Required? :</b>	No
<b>Scratch Pad Required? :</b>	No
<b>Rough Sketch/Notepad Required? :</b>	No
<b>Protractor Required? :</b>	No
<b>Show Watermark on Console? :</b>	Yes
<b>Highlighter :</b>	No
<b>Auto Save on Console?</b>	Yes
<b>Change Font Color :</b>	No
<b>Change Background Color :</b>	No
<b>Change Theme :</b>	No
<b>Help Button :</b>	No
<b>Show Reports :</b>	No
<b>Show Progress Bar :</b>	No

## **Group I**

<b>Group Number :</b>	1
<b>Group Id :</b>	64065319011
<b>Group Maximum Duration :</b>	0
<b>Group Minimum Duration :</b>	90

Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	726
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
Revisit Section :	Yes
Action on Revisit Section :	View and Edit
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 :	64065359310
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	14
Number of Questions to be attempted :	14
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
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653123357
Question Shuffling Allowed :	No

Question Number : 1 Question Id : 640653827133 Question Type : MCQ

**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 :**

6406532780180. ✓ YES

6406532780181. ✗ NO

**Question Number : 2 Question Id : 640653827134 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

<b>Scores</b>								
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

<b>Words</b>			
SeqNo	Word	PartOfSpeech	LetterCount
0	It	Pronoun	2
■ ■ ■			
64	cane.	Noun	4

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

# Olympics

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

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

Item List



SV Stores		Srivatsan		1
Item	Category	Qty	Price	Cost
Carrots	Vegetables/Food	1.5	50	75
Soap	Toiletries	4	32	128
Tomatoes	Vegetables/Food	2	40	80
Bananas	Vegetables/Food	8	8	64
Socks	Footwear/Apparel	3	56	168
Curd	Dairy/Food	0.5	32	16
Milk	Dairy/Food	1.5	24	36
				567

Sun General		Vignesh		14
Item	Category	Qty	Price	Cost
Phone Charger	Utilities	1	230	230
Razor Blades	Grooming	1	12	12
Razor	Grooming	1	45	45
Shaving Lotion	Grooming	0.8	180	144
Earphones	Electronics	1	210	210
Pencils	Stationery	3	5	15
				656

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

Options :

6406532780182. ✓ Useful Data has been mentioned above.

6406532780183. ✗ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number :

2

Sub-Section Id :

640653123358

Question Shuffling Allowed :

Yes

Question Number : 3 Question Id : 640653827135 Question Type : MSQ

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

The given information represents "Scores" dataset and it may have some mistakes with respect to the sanity of data. Identify all rows with such mistakes. It is a Multiple Select Question (MSQ).

Row no.	Field	Value
Row 1	Card number	1
Row 2	Name	Harish
Row 3	Gender	M
Row 4	Date of Birth	30 November
Row 5	Mathematics	62
Row 6	Physics	145
Row 7	Chemistry	91
Row 8	Total	398

**Options :**

6406532780184. ❌ Row 1: Incorrect data type of card number

6406532780185. ✓ Row 4: Invalid Date of Birth

6406532780186. ✓ Row 6: Physics score is out of range

6406532780187. ✓ Row 8: Total score is out of range

**Sub-Section Number :** 3

**Sub-Section Id :** 640653123359

**Question Shuffling Allowed :** Yes

**Question Number : 4 Question Id : 640653827136 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

The given pseudocode is executed using "Scores" dataset. Let **B** be a positive integer. What does the procedure **DoSomething** compute?

```
1 Procedure DoSomething (B)
2     C = 0, D = 101
3     while(Table 1 has more rows){
4         Read the first row X in Table 1
5         if(X.Physics > C){
6             C = X.Physics
7         }
8         if(X.Chemistry < D){
9             D = X.Chemistry
10        }
11        Move X to Table 2
12    }
13    if(C - D >= B){
14        return (False)
15    }
16    else{
17        return(True)
18    }
19 End DoSomething
```

#### Options :

6406532780188. ❌ Returns "True" if and only if the difference between the maximum Physics marks and the minimum Chemistry marks is at least **B**

6406532780189. ❌ Returns "True" if and only if the difference between the maximum Chemistry marks and the minimum Physics marks is at most **B**

6406532780190. ✓ Returns "True" if and only if the difference between the maximum Physics marks and the minimum Chemistry marks is less than **B**

6406532780191. ❌ Returns "True" if and only if the difference between the maximum Chemistry marks and the minimum Physics marks is less than **B**

**Question Number : 5 Question Id : 640653827144 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Scores" dataset. What will A represent at the end of the execution?

```
1 A = 0
2 while(Pile 1 has more cards){
3     Read the top card X from Pile 1
4     A = A + isInSeq(X)
5     Move X to Pile 2
6 }
7 Procedure isInSeq(X)
8     if(X.Physics < X.Mathematics){
9         if(X.Mathematics < X.Chemistry){
10            return(1)
11        }
12    }
13    return(0)
14 End isInSeq
```

**Options :**

6406532780214. ✓ Number of students with highest marks in Chemistry and lowest marks in Physics.

6406532780215. ✗ Number of students with highest marks in Mathematics and lowest marks in Physics.

6406532780216. ✗ Number of students with highest marks in Physics among the three subjects.

6406532780217. ✗ Number of students with lowest marks in Physics and highest marks in Mathematics.

**Question Number : 6 Question Id : 640653827146 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Library" dataset.

```
1 A = 0, count = 0
2 while(Table 1 has more rows){
3     Read the first row X from Table 1
4     if(X.Year > A){
5         A = X.Year
6     }
7     Move X to Table 2
8 }
9 while(Table 2 has more rows){
10    Read the first row Y from Table 2
11    if(Y.Year != A){
12        count = count + 1
13    }
14    Move Y to Table 1
15 }
```

What will **count** represent at the end of execution of the above pseudocode?

**Options :**

- 6406532780222. ❌ Number of books which were published after the least recent year.
- 6406532780223. ❌ Number of books which were published in the least recent year.
- 6406532780224. ✓ Number of books which were published after the most recent year.
- 6406532780225. ❌ Number of books which were published in the most recent year.

**Sub-Section Number :** 4

**Sub-Section Id :** 640653123360

**Question Shuffling Allowed :** Yes

**Question Number : 7 Question Id : 640653827137 Question Type : MSQ**

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

Question Label : Multiple Select Question

The following pseudocode is executed using the "Words" dataset. At the end of the execution, A captures the number of nouns with letter count at least four and at most eight. Choose the correct code fragment(s) to complete the pseudocode. It is a Multiple Select Question (MSQ).

```
1 A = 0
2 while(Table 1 has more cards){
3     Read the first row X from Table 1
4     if(checksomething(X, 4, 8)){
5         A = A + 1
6     }
7     Move X to Table 2
8 }
9 Procedure CheckSomething(Y, C1, C2,)
10    if(Y.PartofSpeech == "Noun"){
11        ****Fill the code*****
12    }
13    else{
14        return(False)
15    }
16 End CheckSomething
```

### Options :

```
1 if(C1 >= Y.LetterCount and Y.LetterCount <= C2){
2     return(True)
3 }
4 else{
5     return(False)
6 }
7
```

6406532780192. ❌

```
1 if(C1 <= Y.LetterCount and Y.LetterCount <= C2){
2     return(True)
3 }
4 else{
5     return(False)
6 }
7
```

6406532780193. ✓

6406532780194. ❌

```

1 if(c1 <= Y.LetterCount and Y.LetterCount <= c2){
2     return(False)
3 }
4 else{
5     return(True)
6 }
7

```

```

1 if(c1 > Y.LetterCount or Y.LetterCount > c2){
2     return(False)
3 }
4 else{
5     return(True)
6 }
7

```

6406532780195. ✓

**Question Number : 8 Question Id : 640653827138 Question Type : MSQ**

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

Question Label : Multiple Select Question

The following pseudocode is executed using the "Words" table. At the end of the execution, **count** stores the number of pairs of verbs such that both verbs have either the same letter count or both end with a full stop, but not both. Choose the correct code fragment to complete the pseudocode.

```

1 count = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     Move X to Table 2
5     if(X.Partofspeech == "Verb"){
6         while(Table 1 has more rows){
7             Read the first row Y in Table 1
8             Move Y to Table 3
9             if(X.Partofspeech == Y.Partofspeech){
10                 *****
11                 *****Fill the Code*****
12                 *****
13             }
14         }
15         Move all rows from Table 3 to Table 1
16     }
17 }

```

**Options :**

6406532780196. ✓

```
1 if(X.LetterCount == Y.LetterCount){  
2     count = count + 1  
3 }  
4 else{  
5     if(X.Word and Y.Word end with a full stop){  
6         count = count + 1  
7     }  
8 }
```

```
1 if(X.LetterCount == Y.LetterCount){  
2     count = count + 1  
3 }  
4 if(X.Word and Y.Word end with a full stop){  
5     count = count + 1  
6 }  
7  
8
```

6406532780197. ✘

```
1 if(X.Word and Y.Word end with a full stop){  
2     count = count + 1  
3 }  
4 else{  
5     if(X.LetterCount == Y.LetterCount){  
6         count = count + 1  
7     }  
8 }
```

6406532780198. ✓

```
1 if(X.LetterCount == Y.LetterCount or X.Word and Y.Word end with a full stop){  
2     count = count + 1  
3 }  
4
```

6406532780199. ✘

**Question Number : 9 Question Id : 640653827143 Question Type : MSQ**

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

Question Label : Multiple Select Question

In the "Shopping Bills" dataset, the procedure **countBills** counts the number of bills from Big Bazaar with total amount more than the average total bill amount. Assume that the variable **Avg** holds the value of the average total bill amount. Choose the correct code fragment(s) to complete the procedure. It is a Multiple Select Question (MSQ).

```
1 Procedure countBills()
2     Count = 0
3     while(Pile 1 has more cards){
4         Read the top card x from Pile 1
5         *****
6         ** Fill the code    **
7         *****
8         Move card X to Pile 2
9     }
10    return(count)
11 End countBills
```

**Options :**

```
1 if(x.ShopName == "BigBazaar"){
2     if(x.TotalBillAmount > Avg){
3         Count = Count + 1
4     }
5 }
```

6406532780210. ✓

```
1 if(x.TotalBillAmount > Avg){
2     if(x.ShopName == "BigBazaar"){
3         Count = Count + 1
4     }
5 }
```

6406532780211. ✓

```
1 if(x.TotalBillAmount > Avg or x.ShopName == "BigBazaar"){
2     Count = Count + 1
3 }
```

6406532780212. ✘

```
1 if(x.TotalBillAmount > Avg and x.ShopName == "BigBazaar"){
2     Count = Count + 1
3 }
```

6406532780213. ✓

**Sub-Section Number :**

5

**Sub-Section Id :**

640653123361

**Question Shuffling Allowed :**

Yes

**Question Number : 10 Question Id : 640653827139 Question Type : MSQ**

**Correct Marks : 5 Max. Selectable Options : 0**

Question Label : Multiple Select Question

The following pseudocode is executed using the "Words" dataset. At the end of the execution, A represent number of sentences with average letter count less than the average letter count of dataset. 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 SumT = 0, CountT = 0, B = 0
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     CountT = CountT + 1
5     SumT = SumT + X.LetterCount
6     Move X to Table 2
7 }
8 B = SumT / CountT
9 SumS = 0, Counts = 0, A = 0, C = 0
10 while(Table 2 has more rows){
11     Read the first row X in Table 2
12     Counts = Counts + 1
13     SumS = SumS + X.LetterCount
14     if(X.word ends with a full stop){
15         C = SumS / CountT
16         if(c > B){
17             A = A + 1
18         }
19         SumS = 0, Counts = 0
20     }
21     Move X to Table 1
22 }
```

**Options :**

6406532780200. ❌ Line 8: Incorrect expression for B

6406532780201. ✓ Line 15: Incorrect expression for C

6406532780202. ✓ Line 16: Incorrect conditional statement

6406532780203. ❌ No mistake

**Question Number : 11 Question Id : 640653827142 Question Type : MSQ**

**Correct Marks : 5 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Two words are said to be conjugate if they fulfill following conditions:

- They are different words.
- Number of vowels are same in both words.
- Number of consonants are different in both words.

For a row X in the "Words" dataset, assume that `vCount(X)` return the number of vowels in `X.Word`. At the end of the execution, `count` stores the number of conjugate pairs. Choose the correct code fragment(s) to complete the pseudocode. It is a Multiple Select Question (MSQ).

```
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         *****
8         * Fill the code *
9         *****
10        Move Y to Table 3
11    }
12    Move all rows from Table 3 to Table 1
13 }
```

### Options :

```
1 if(x.Word == Y.Word){
2     if(x.LetterCount == Y.LetterCount){
3         if(vCount(x) == vCount(Y)){
4             count = count + 1
5         }
6     }
7 }
```

6406532780206. ✘

```
1 if(x.Word != Y.Word){
2     if(x.LetterCount != Y.LetterCount){
3         if(vCount(x) == vCount(Y)){
4             count = count + 1
5         }
6     }
7 }
```

6406532780207. ✓

6406532780208. ✘

```

1 if(x.Word != Y.Word){
2     if(vCount(X) == vCount(Y)){
3         if(X.LetterCount - vCount(X) == Y.LetterCount - vCount(Y)){
4             count = count + 1
5         }
6     }
7 }
```

```

1 if(x.Word != Y.Word){
2     if(vCount(X) == vCount(Y)){
3         if(X.LetterCount - vCount(X) != Y.LetterCount - vCount(Y)){
4             count = count + 1
5         }
6     }
7 }
```

6406532780209. ✓

**Sub-Section Number :**

6

**Sub-Section Id :**

640653123362

**Question Shuffling Allowed :**

Yes

**Question Number : 12 Question Id : 640653827140 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Consider the procedure **mSum** as shown below.

```

1 Procedure mSum(A, B, C)
2     Sum = 0
3     if(A >= C and A >= B){
4         Sum = B + C
5     }
6     else{
7         if(B >= C and B >= A){
8             Sum = A + C
9         }
10    else{
11        Sum = A + B
12    }
13 }
14 return(Sum)
15 End mSum
```

What will be the value of **mSum(4,4,2)** ?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

6

**Sub-Section Number :** 7

**Sub-Section Id :** 640653123363

**Question Shuffling Allowed :** Yes

**Question Number :** 13 **Question Id :** 640653827141 **Question Type :** SA

**Correct Marks :** 5

**Question Label :** Short Answer Question

The following pseudocode is executed using a dataset similar to the "Words" dataset, based on the following paragraph.

"Surrounded by nature, Susan often takes a stroll, savoring the soothing sounds of chirping birds. Rustlings in the trees suggest squirrels beginning their day, searching for sustenance. Surely, the beauty of a sunrise holds unparalleled magic."

```
1 count = 0, flag = True
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     Move X to Table 2
5     if(flag){
6         if(1st letter of x.word == 's'){
7             if(2nd letter of x.word == 'u'){
8                 count = count + 1
9             }
10        }
11    }
12    if(x.word ends with full stop){
13        flag = False
14    }
15 }
```

What would be the value of **count** at the end of the execution of the above pseudocode?

Assume that upper case and lower case are ignored during comparison of letters.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

<b>Sub-Section Number :</b>	8
<b>Sub-Section Id :</b>	640653123364
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 14 Question Id : 640653827145 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Scores" dataset. What will **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         Move Y to Table 3
8         count = count + findPair(X, Y)
9     }
10    Move all rows from Table 3 to Table 1
11 }
12 Procedure findPair(X, Y)
13     A = False, B = False
14     if(X.Gender == Y.Gender){
15         A = True
16     }
17     if(X.CityTown == Y.CityTown){
18         B = True
19     }
20     if((A and B) or (not A and not B)){
21         return(1)
22     }
23     return(0)
24 End findPair

```

**Options :**

6406532780218. ❌ **count** represents the number of pairs of students having either the same gender or from the same city or both.

6406532780219. ❌ **count** represents the number of pairs of students having the same gender and from the same city.

6406532780220. ✓ **count** represents the number of student pairs who either share the same gender and come from the same city, or who share neither the same gender nor the same city.

6406532780221. ❌ **count** represents the number of pairs of students having the same gender but not from the same city.

# Sem1 English1

Section Id :	64065359311
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	24
Number of Questions to be attempted :	24
Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653123365
Question Shuffling Allowed :	No

**Question Number : 15 Question Id : 640653827147 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

**THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : SEMESTER I : ENGLISH 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 :**

6406532780226. ✓ YES

6406532780227. ✗ NO

Sub-Section Number :	2
Sub-Section Id :	640653123366
Question Shuffling Allowed :	No

**Question Id : 640653827148 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Question Numbers : (16 to 25)**

Question Label : Comprehension

**Read the following passage and answer the given subquestions.**

User traffic on Twitter has slowed since the launch of Meta's text-based platform Threads, which has already surpassed 100 million sign-ups since its debut last week.

Threads launched in the U.S. on Wednesday and is being touted by Meta executives like Instagram chief Adam Mosseri as a more positive "public square" for communities "that never really embraced Twitter." So far, users seem to be on board.

"Threads reached 100 million sign ups over the weekend. That's mostly organic demand and we haven't even turned on many promotions yet. Can't believe it's only been 5 days!" Meta CEO Mark Zuckerberg said in a post Monday.

Twitter appears to have taken a hit. Matthew Prince, CEO of Cloudflare, shared a screenshot to Twitter Sunday showing that traffic on the platform was "tanking."

According to Similarweb, a data company that specializes in web analytics, web traffic to Twitter was down 5% for the first two full days. Threads was generally available compared with the previous week. The company said Twitter's web traffic is down 11% compared with the same days in 2022.

Twitter responded to CNBC's request for comment with an automated response. Meta didn't offer additional comment beyond Zuckerberg's post.

Source: cnbc.com - Twitter traffic is 'tanking' as Meta's Threads hits 100 million users - Ashley Capoot

### **Sub questions**

**Question Number : 16 Question Id : 640653827149 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the synonym of the word *surpassed*?

**Options :**

6406532780228. ✓ Exceed

6406532780229. ✗ Pass through

6406532780230. ✗ Go under

6406532780231. ✗ Come second to

**Question Number : 17 Question Id : 640653827150 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose an appropriate option to replace the word *touted*.

**Options :**

6406532780232. ✗ Changed paths

6406532780233. ✓ Promoted

6406532780234. ✘ Criticized

6406532780235. ✘ Edited

**Question Number : 18 Question Id : 640653827151 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

*That's mostly organic demand and we haven't even turned on many promotions yet.*

What meaning do the phrases *organic demand* and *[not many] promotions* convey here?

**Options :**

6406532780236. ✘ Meta has been mindful of climate change in meeting demands.

6406532780237. ✓ The company Meta hasn't tried many marketing tactics to popularize Threads.

6406532780238. ✘ Meta has withheld any promotions to employees in its company.

**Question Number : 19 Question Id : 640653827152 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

*Twitter appears to have taken a hit.*

What is the meaning of the phrase *taken a hit*?

**Options :**

6406532780239. ✓ Be affected badly

6406532780240. ✘ Be popular among its users

6406532780241. ✘ Has made a huge profit

**Question Number : 20 Question Id : 640653827153 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the synonym of the word *tanking*?

**Options :**

6406532780242. ✘ Shooting

6406532780243. ✘ Weighing

6406532780244. ✘ Grateful

6406532780245. ✓ Failing

**Question Number : 21 Question Id : 640653827154 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

*The company said Twitter's web traffic is down 11% compared with the same days in 2022*

What is the meaning of the phrase *down 11%*?

**Options :**

6406532780246. ✘ The traffic has reduced to 11%

6406532780247. ✘ The traffic has reduced from 11%

6406532780248. ✓ The traffic has reduced by 11%

**Question Number : 22 Question Id : 640653827155 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the meaning of the phrase *automated response*?

**Options :**

6406532780249. ✓ Predetermined reply

6406532780250. ✘ Responsible driving of automobiles

6406532780251. ✘ Highly private message

**Question Number : 23 Question Id : 640653827156 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

*Meta didn't offer additional comment beyond Zuckerberg's post.*

What part of speech is the word *beyond* here?

**Options :**

6406532780252. ✘ Adjective

6406532780253. ✘ Interjection

6406532780254. ✓ Preposition

6406532780255. ✘ Adverb

**Question Number : 24 Question Id : 640653827157 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

*...users seem to be on board.*

What is the meaning of the phrase *on board* here?

**Options :**

6406532780256. ✘ Enter a vehicle

6406532780257. ✘ Be available

6406532780258. ✓ Agree with

**Question Number : 25 Question Id : 640653827158 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the meaning of the word *debut*?

**Options :**

6406532780259. ✘ Reply in opposite

6406532780260. ✓ First appearance

6406532780261. ✘ Alternative

<b>Sub-Section Number :</b>	3
<b>Sub-Section Id :</b>	640653123367
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 26 Question Id : 640653827159 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the word without an "ii" sound from the following.

**Options :**

6406532780263. ✩ Meet

6406532780264. ✩ Lead

6406532780265. ✓ Wet

6406532780266. ✩ Wheat

**Question Number : 27 Question Id : 640653827160 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the word with an "oo" sound from the following.

**Options :**

6406532780267. ✓ Court

6406532780268. ✩ Loot

6406532780269. ✩ Cat

6406532780270. ✩ Feat

**Question Number : 28 Question Id : 640653827161 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which semi-vowel occurs in the transition between the words 'me' and 'off' in the sentence 'he pushed me off the chair'?

**Options :**

6406532780271. ✩ /w/

6406532780272. ✓ /y/

**Question Number : 29 Question Id : 640653827162 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which among the following is a word without a diphthong?

**Options :**

6406532780273. ✩ Mouth

6406532780274. ✘ South

6406532780275. ✘ Pout

6406532780276. ✓ Moot

**Question Number : 30 Question Id : 640653827163 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Pick the odd one out based on the initial sound: near, dear, tear, gear.

**Options :**

6406532780277. ✘ Near

6406532780278. ✘ Dear

6406532780279. ✘ Tear

6406532780280. ✓ Gear

**Question Number : 31 Question Id : 640653827164 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Pick the odd one out based on the initial sound: peat, beat, clear, pear.

**Options :**

6406532780281. ✘ Peat

6406532780282. ✘ Beat

6406532780283. ✓ Clear

6406532780284. ✘ Pear

**Question Number : 32 Question Id : 640653827165 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Select the option which identifies the noun in the sentence:

*Raghav is going for a walk.*

**Options :**

6406532780285. ✓ Raghav

6406532780286. ✘ Going

6406532780287. ✘ For

**Question Number : 33 Question Id : 640653827166 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the part of speech of the underlined word:

They were quick to throw up their hands in surrender.

**Options :**

6406532780288. ✘ Noun

6406532780289. ✓ Pronoun

6406532780290. ✘ Verb

6406532780291. ✘ Conjunction

**Question Number : 34 Question Id : 640653827167 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Complete sentence by choosing the correct form of the verb given in brackets:

*They \_\_\_\_ (buy) the house last year.*

**Options :**

6406532780292. ✘ Buy

6406532780293. ✓ Bought

6406532780294. ✘ Will buy

6406532780295. ✘ Buying

**Question Number : 35 Question Id : 640653827168 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the part of speech of the underlined word:

*The house at the end of the street was painted yellow.*

**Options :**

6406532780296. ✓ Adjective

6406532780297. ✘ Adverb

6406532780298. ✘ Verb

6406532780299. ✘ Conjunction

**Question Number : 36 Question Id : 640653827169 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the adverb in the following sentence:

*Joseph ran faster than everyone else in the relay team.*

**Options :**

6406532780300. ✘ Joseph

6406532780301. ✘ Ran

6406532780302. ✓ Faster

**Question Number : 37 Question Id : 640653827170 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the appropriate option:

*The fruits are \_ the fridge.*

**Options :**

6406532780304. ✎ At

6406532780305. ✎ For

6406532780306. ✓ In

6406532780307. ✎ None of these

**Question Number : 38 Question Id : 640653827171 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the conjunction in the following sentence:

*'He was an excellent orator and an even better salesman.'*

**Options :**

6406532780308. ✎ He

6406532780309. ✎ Was

6406532780310. ✎ Excellent

6406532780311. ✓ And

**Question Number : 39 Question Id : 640653827172 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the correct option:

*He gave me \_ book on my birthday.*

**Options :**

6406532780312. ✎ An

6406532780313. ✓ A

6406532780314. ✎ The

6406532780315. ✎ None of these

**Question Number : 40 Question Id : 640653827173 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the correct option:

\_\_\_ Sun rises in the east.

**Options :**

6406532780316. ✘ A

6406532780317. ✘ An

6406532780318. ✓ The

6406532780319. ✘ None of these

**Question Number : 41 Question Id : 640653827174 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the correct option:

*There were \_\_\_ many people in the auditorium.*

**Options :**

6406532780320. ✘ To

6406532780321. ✘ Two

6406532780322. ✓ Too

6406532780323. ✘ Large

**Question Number : 42 Question Id : 640653827175 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

A colleague in your office tells you, '*Please keep me in the loop while I'm on my vacation.*' What does the underlined part mean?

**Options :**

6406532780324. ✘ The colleague wants you not to disturb them.

6406532780325. ✘ The colleague wants you to call them.

6406532780326. ✓ The colleague wants you to keep them updated on events at work.

6406532780327. ✘ The colleague wants you to call them for your wedding.

**Question Number : 43 Question Id : 640653827176 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the separable phrasal verb out of the following options.

**Options :**

6406532780328. ✘ Hit on

6406532780329. ✘ Keep at

6406532780330. ✘ Stand for

6406532780331. ✓ Call by

**Question Number : 44 Question Id : 640653827177 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Fill in the blank with the appropriate option.

*The meeting \_\_\_\_\_ just before dinner.*

**Options :**

6406532780332. ✘ Brought out

6406532780333. ✓ Broke up

6406532780334. ✘ Broke into

6406532780335. ✘ Broke out

**Question Number : 45 Question Id : 640653827178 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the correct option.

*\_\_\_\_\_ I ask a question? (Context: permission and formal)*

*Yes, of course.*

**Options :**

6406532780336. ✘ Must

6406532780337. ✓ May

6406532780338. ✘ Should

6406532780339. ✘ Will

**Sub-Section Number :**

4

**Sub-Section Id :**

640653123368

**Question Shuffling Allowed :**

No

**Question Id : 640653827179 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (46 to 50)**

Question Label : Comprehension

Match Column A with suitable options in Column B. (Hint: Word collocation)

A	B
1. Bank	a. Temper
2. Strong	b. Account
3. Lazy	c. Ruins
4. Short	d. Afternoon
5. Ancient	e. Coffee

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 46 Question Id : 640653827180 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Bank \_\_\_\_\_

#### **Options :**

6406532780340. ✘ Temper

6406532780341. ✓ Account

6406532780342. ✘ Ruins

6406532780343. ✘ Afternoon

6406532780344. ✘ Coffee

**Question Number : 47 Question Id : 640653827181 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Strong \_\_\_\_\_

#### **Options :**

6406532780345. ✘ Temper

6406532780346. ✘ Account

6406532780347. ✘ Ruins

6406532780348. ✘ Afternoon

6406532780349. ✓ Coffee

**Question Number : 48 Question Id : 640653827182 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Lazy\_\_\_\_\_

**Options :**

- 6406532780350. ✘ Temper
- 6406532780351. ✘ Account
- 6406532780352. ✘ Ruins
- 6406532780353. ✓ Afternoon
- 6406532780354. ✘ Coffee

**Question Number : 49 Question Id : 640653827183 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Short\_\_\_\_\_

**Options :**

- 6406532780355. ✓ Temper
- 6406532780356. ✘ Account
- 6406532780357. ✘ Ruins
- 6406532780358. ✘ Afternoon
- 6406532780359. ✘ Coffee

**Question Number : 50 Question Id : 640653827184 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Ancient\_\_\_\_\_

**Options :**

- 6406532780360. ✘ Temper
- 6406532780361. ✘ Account
- 6406532780362. ✓ Ruins
- 6406532780363. ✘ Afternoon
- 6406532780364. ✘ Coffee

**Question Id : 640653827185 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (51 to 55)**

Question Label : Comprehension

Read the following telephonic conversation and fill in the blanks with appropriate responses:

Jay – Hello? (i)\_\_\_\_\_

Prateek - Hello. Yes, I am Prateek Agarwal. (ii)\_\_\_\_\_

Jay - Prateek, it's me Jay Roy from college. Remember?

Prateek - Hey Jay, (iii)\_\_\_\_\_ It has been such a long time.

Jay - I am doing good. Yes, four long years after college. I got your contact number from Piyush.  
(iv)\_\_\_\_\_

Prateek - Yes, yes, I do remember him. Wasn't he the one who topped our engineering batch last year?

Jay - Yes, that's him! He's in Boston working for a big MNC now.

Prateek- (v)\_\_\_\_\_

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 51 Question Id : 640653827186 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Complete blank (i) with an appropriate response.

#### **Options :**

6406532780365. ✘ Is this Prateek Agarwal's house?

6406532780366. ✘ Is this Prateek Agarwal's family?

6406532780367. ✓ Am I talking to Prateek Agarwal?

6406532780368. ✘ Is this Prateek Agarwal's son?

**Question Number : 52 Question Id : 640653827187 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Complete blank (ii) with an appropriate response.

#### **Options :**

6406532780369. ✘ May I come in?

6406532780370. ✘ May I drop you home?

6406532780371. ✓ May I ask who is speaking?

6406532780372. ✘ May I know why you are here?

**Question Number : 53 Question Id : 640653827188 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Complete blank (iii) with an appropriate response.

#### **Options :**

6406532780373. ✘ Could you bring me the office file?

6406532780374. ✘ Is it a new project?

6406532780375. ✘ Where are you going?

6406532780376. ✓ How are you?

**Question Number : 54 Question Id : 640653827189 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Complete blank (iv) with an appropriate response.

**Options :**

6406532780377. ❌ When will you come home?

6406532780378. ✓ Do you remember him?

6406532780379. ❌ Did you have dinner?

6406532780380. ❌ Did you meet him?

**Question Number : 55 Question Id : 640653827190 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Complete blank (v) with an appropriate response.

**Options :**

6406532780381. ✓ That is amazing news!

6406532780382. ❌ Thank you!

6406532780383. ❌ You are welcome!

6406532780384. ❌ I am sorry!

## Sem1 Maths1

<b>Section Id :</b>	64065359312
<b>Section Number :</b>	3
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	10
<b>Number of Questions to be attempted :</b>	10
<b>Section Marks :</b>	40
<b>Display Number Panel :</b>	Yes
<b>Section Negative Marks :</b>	0
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	No
<b>Section Maximum Duration :</b>	0
<b>Section Minimum Duration :</b>	0
<b>Section Time In :</b>	Minutes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	640653123369

**Question Shuffling Allowed :**

No

**Question Number : 56 Question Id : 640653827191 Question Type : MCQ**

**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 :**

6406532780385. ✓ YES

6406532780386. ✗ NO

**Question Number : 57 Question Id : 640653827192 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

**Instructions:**

- There are some questions which have functions with discrete valued domains (such as day, month, year etc).
- For NAT type question, 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 :**

6406532780387. ✓ Instructions has been mentioned above.

6406532780388. ✗ This Instructions is just for a reference & not for an evaluation.

**Sub-Section Number :**

2

**Sub-Section Id :**

640653123370

**Question Shuffling Allowed :**

No

**Question Id : 640653827193 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (58 to 60)**

Question Label : Comprehension

Suppose  $A$  is the set of even positive integers less than or equal to 20 and  $B$  is the set of positive integers less than 20 which are divisible by 6.

Consider the following relations from  $A$  to  $B$ .

- $R_1 = \{(a, b) \mid a \in A, b \in B, a \text{ is a factor of } b\}$
- $R_2 = \{(a, b) \mid a \in A, b \in B, (a + b) \bmod 10 = 0\}$

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 58 Question Id : 640653827194 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

What is the cardinality of  $R_1 \cap R_2$ ?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

1

**Question Number : 59 Question Id : 640653827195 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

What is the cardinality of  $R_1$ ?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

9

**Question Number : 60 Question Id : 640653827196 Question Type : MSQ**

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

Question Label : Multiple Select Question

Which of the following statements are correct?

**Options :**

6406532780391. ✓  $R_1$  is transitive.

6406532780392. ✗  $R_2$  is transitive.

6406532780393. ✓  $R_2$  is not symmetric.

6406532780394. ✓ (2,18) is an element in  $R_2$ .

**Question Id : 640653827198 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (61 to 62)**

Question Label : Comprehension

Suppose that  $P_1$  and  $P_2$  are two different points in a Cartesian coordinate system, with  $P_1$  located at (3,-2) and  $P_2$  at (-1, 5). Let  $L_1$  and  $L_2$  be lines passing through  $P_1$  and  $P_2$  respectively.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 61 Question Id : 640653827199 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

If the  $x$ -intercept of the line  $L_1$  is 1

and the angle between  $L_1$  and  $L_2$  is  $\frac{\pi}{2}$  then

Determine the coordinates of the point where  
 $L_1$  and  $L_2$  intersect.

**Options :**

6406532780396. ✗  $(\frac{5}{2}, \frac{7}{2})$

6406532780397. ✗ (5, 11)

6406532780398. ✗ (-5, 7)

6406532780399. ✓  $(\frac{-5}{2}, \frac{7}{2})$

**Question Number : 62 Question Id : 640653827200 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

If the  $x$ -intercept of the line  $L_1$  is 1 and  $y$ -intercept of the line  $L_2$  is -1 and If  $\theta$  is the angle between  $L_1$  and  $L_2$ , then  $\tan \theta$  is equal to

**Options :**

6406532780400. ✘  $\frac{-5}{7}$

6406532780401. ✓  $\frac{5}{7}$

6406532780402. ✘  $\frac{5}{3}$

6406532780403. ✘  $\frac{4}{7}$

**Sub-Section Number :**

3

**Sub-Section Id :**

640653123371

**Question Shuffling Allowed :**

Yes

**Question Number : 63 Question Id : 640653827197 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

A company opened recruitment for the post of data analyst. 500 candidates have applied for the post. 285 candidates are proficient in Python programming, 195 candidates are proficient in C programming, 115 candidates are proficient in Java programming, 45 candidates are proficient in Python and Java, 70 candidates are proficient in C and Python, 50 candidates are proficient in C and Java and 50 candidates don't know any of the programming languages. Find the number of candidates who are proficient in exactly one of the three programming languages.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

325

**Question Number : 64 Question Id : 640653827201 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

Radhika has been tracking her monthly expenses and the corresponding number of outings she has with friends. Here's a table with two rows representing the amount spent on entertainment and the corresponding number of outings. Let's consider  $y$  to be the amount spent and  $x$  to be the corresponding number of outings. She fitted a best fit line to her data and obtained the equation  $y = 4x + 15$ . What is the value of SSE (Sum of Squared Errors) in relation to the best fit line?

Amount spent	37	44	53	50	57	64
Number of outings	5	7	9	8	10	12

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

23

**Sub-Section Number :** 4

**Sub-Section Id :** 640653123372

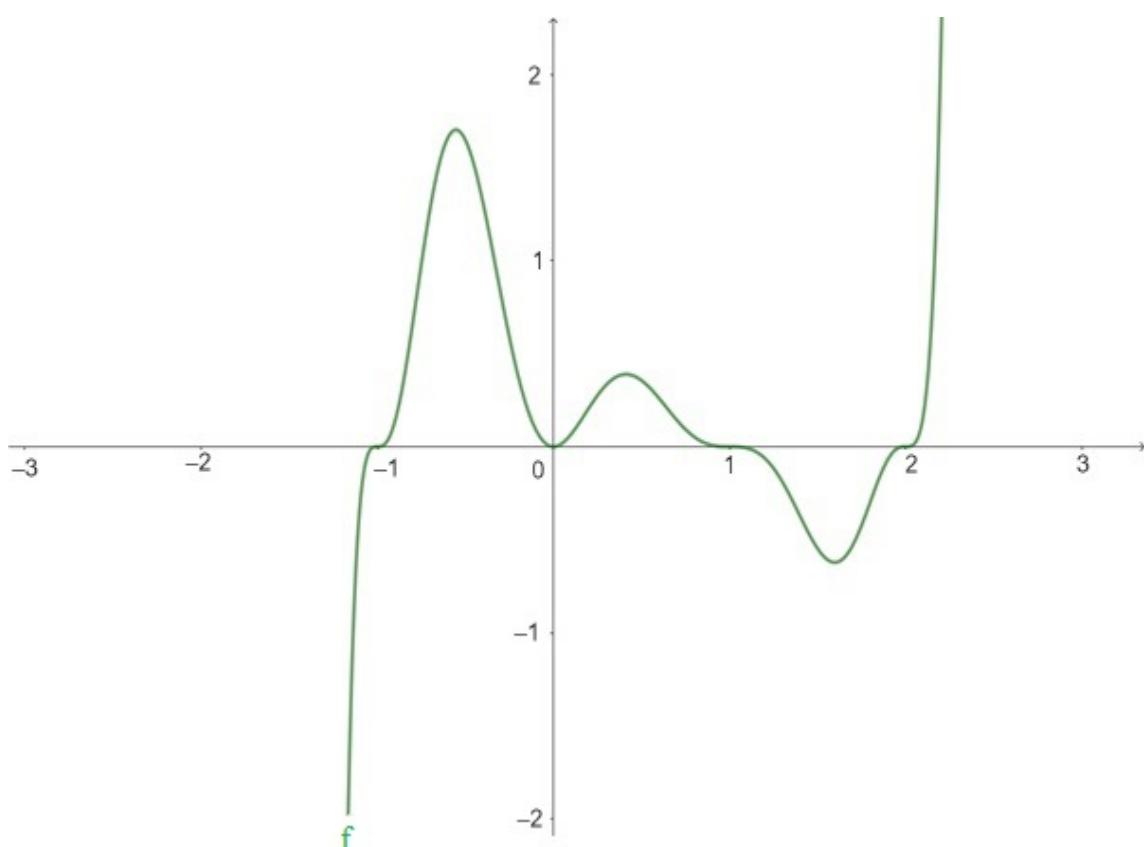
**Question Shuffling Allowed :** Yes

**Question Number :** 65 **Question Id :** 640653827202 **Question Type :** MSQ

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

**Question Label :** Multiple Select Question

Consider the following polynomial  $p(x)$  whose graph is given below:-



Which of the following options is/are correct?

**Options :**

6406532780405. ✘ Multiplicity of -1 and 1 must be the same.

6406532780406. ✓  $p(x)$  is an increasing function in the interval  $(2, \infty)$ .

6406532780407. ✓  $p(x)$  tends to infinity as  $x$  tends to infinity.

6406532780408. ✘ The number of turning points is 5.

**Question Number : 66 Question Id : 640653827203 Question Type : MSQ**

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

Question Label : Multiple Select Question

Consider the parabola  $y = x^2 + 4x + 12$ . Which of the following option(s) are true?

**Options :**

6406532780409. ✘ The co-ordinates of vertex is  $(-8, 2)$ .

6406532780410. ✓ The given equation attains its minima at  $x = -2$ .

6406532780411. ✓  $y$ -intercept of parabola is 12.

6406532780412. ✓ The minimum value for the given equation is 8

**Question Number : 67 Question Id : 640653827205 Question Type : MSQ**

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

Question Label : Multiple Select Question

Consider the polynomials  $p(x) = (2x - 1)(x - 5)q(x)$  where the zeros of  $p(x)$  with multiplicity 1 are  $\frac{1}{2}, 5, 2, \frac{3}{5}$ . Which of the following option(s) are true for  $q(x)$ ?

**Options :**

6406532780417. ✘  $q(x)$  is a cubic polynomial.

6406532780418. ✓  $q(x)$  is a quadratic polynomial.

6406532780419. ✓  $q(x)$  has two distinct zeros.

6406532780420. ✘  $q(x)$  does not have any real zeros.

**Sub-Section Number :**

5

**Sub-Section Id :**

640653123373

**Question Shuffling Allowed :**

Yes

**Question Number : 68 Question Id : 640653827204 Question Type : MCQ**

**Correct Marks : 4**

**Question Label : Multiple Choice Question**

Consider the quadratic equation  $ax^2 + bx + c = 0$  where  $a, b, c$  are integers with  $a \neq 0$ .

Which of the following option(s) are true?

**Options :**

6406532780413. ✓ If  $b^2 - 4ac > 0$  and a perfect square then there exists a rational root of the quadratic equation.

6406532780414. ✗ If  $b^2 - 4ac > 0$  and not a perfect square then there exists a rational root of the quadratic equation.

6406532780415. ✗ If  $b^2 - 4ac < 0$  and a perfect square then there exists a rational root of the quadratic equation.

6406532780416. ✗ If  $b^2 - 4ac < 0$  and not a perfect square then there exists a rational root of the quadratic equation.

## Sem1 Statistics1

<b>Section Id :</b>	64065359313
<b>Section Number :</b>	4
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	14
<b>Number of Questions to be attempted :</b>	14
<b>Section Marks :</b>	40
<b>Display Number Panel :</b>	Yes
<b>Section Negative Marks :</b>	0
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	No
<b>Section Maximum Duration :</b>	0
<b>Section Minimum Duration :</b>	0
<b>Section Time In :</b>	Minutes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	640653123374
<b>Question Shuffling Allowed :</b>	No

**Question Number : 69 Question Id : 640653827206 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

**THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : SEMESTER I : STATISTICS 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 :**

6406532780421. ✓ YES

6406532780422. ✗ NO

**Sub-Section Number :** 2

**Sub-Section Id :** 640653123375

**Question Shuffling Allowed :** Yes

**Question Number : 70 Question Id : 640653827207 Question Type : MSQ**

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

Question Label : Multiple Select Question

Figure Q.1 shows the sales distribution of the number of bottles of different types of soft drinks in a shop on a particular day.

Sales distribution of number of bottles of different soft drinks

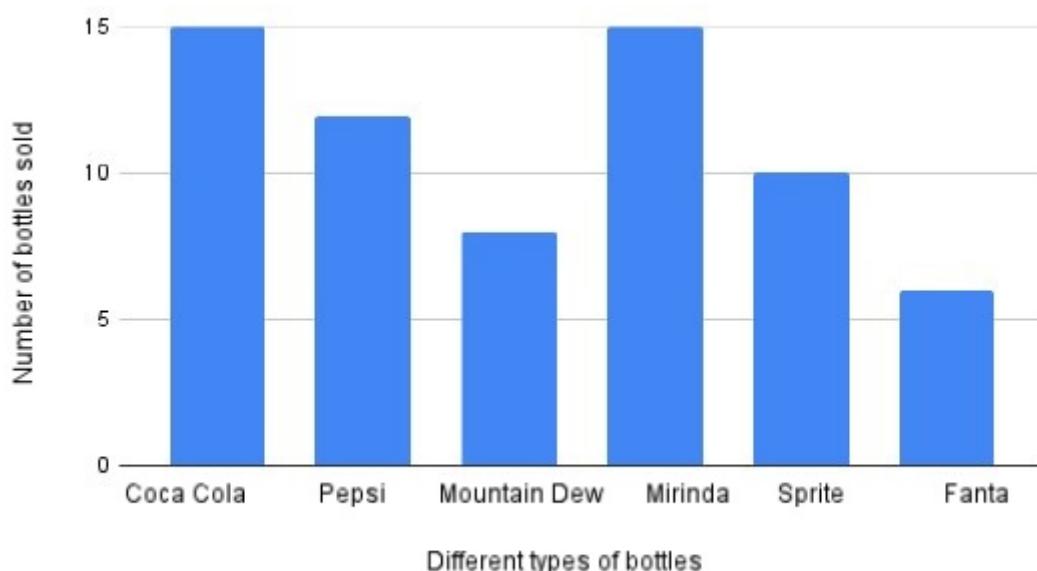


Figure Q.1: Sales Distribution of different types of bottles

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

**Options :**

6406532780423. ✗ Median of the data will be either "Mountain Dew" or "Mirinda".

6406532780424. ✓ The data is bimodal.

6406532780425. ✗ Mode is not defined for the given data.

6406532780426. ✓ Median is not defined for the given data.

**Question Number : 71 Question Id : 640653827212 Question Type : MSQ**

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

**Question Label :** Multiple Select Question

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

**Options :**

6406532780436. ❌ Structured data does not follow a predefined format, whereas unstructured data does.

6406532780437. ❌ Recording of the data over time comes under Cross Sectional data.

6406532780438. ✓ Time (in minutes) taken by a student to reach school from his home is a continuous variable.

6406532780439. ✓ Comments on a youtube video comes under the unstructured data.

**Sub-Section Number :** 3

**Sub-Section Id :** 640653123376

**Question Shuffling Allowed :** No

**Question Id : 640653827208 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (72 to 73)**

Question Label : Comprehension

Table Q.1 represents the number of books read by five students in a year.

Students	Number of books	Relative frequency
Sunil	15	$x$
Prateek		$y$
Kanika	6	0.1
Kunal	15	
Sonakshi		$z$

Table Q.1

Based on the above data, answer the given subquestions

**Sub questions**

**Question Number : 72 Question Id : 640653827209 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

What is the value of  $x$ ? Enter the answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.23 to 0.27

**Question Number : 73 Question Id : 640653827210 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

If the number of books read by Prateek is same as the number of books read by Sonakshi, then find the value of  $y + z$ .

**Options :**

6406532780428. ✘ 0.2

6406532780429. ✘ 0.24

6406532780430. ✓ 0.4

6406532780431. ✘ Insufficient information.

**Question Id : 640653827222 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (74 to 75)**

Question Label : Comprehension

Amit took a survey of a group of 32 college going students (consisting only of male and female students) to know whether they own a smartphone or not and he got to know the following information.

- (i). There are 3 males who do not own a smartphone.
- (ii). There are total 27 females.
- (iii). There are total 26 students who do not own a smartphone.

Based on the above information, answer the given subquestions.

**Sub questions**

**Question Number : 74 Question Id : 640653827223 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Create a two-way contingency table and find out the number of males in this group who own a smartphone?

**Options :**

6406532780453. ✘ 0

6406532780454. ✓ 2

6406532780455. ✘ 3

6406532780456. ✘ 4

**Question Number : 75 Question Id : 640653827224 Question Type : MSQ**

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

Question Label : Multiple Select Question

Choose the correct option(s) after making a two-way contingency table.

**Options :**

6406532780457. ✘ There are 40% of the males who do not own a smartphone.

6406532780458. ✓ There are 14.81% of the females who own a smartphone.

6406532780459. ✓ 18.75% of the total students own a smartphone.

6406532780460. ✘ We can calculate covariance to find the association between "Gender" and "Ownership of the smartphone".

**Sub-Section Number :** 4

**Sub-Section Id :** 640653123377

**Question Shuffling Allowed :** Yes

**Question Number : 76 Question Id : 640653827211 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following three statements:

Statement 1 : Election symbol is a categorical variable.

Statement 2 : Election symbol has a nominal scale of measurement.

Statement 3 : Number of votes received by a candidate is a continuous variable.

Choose the correct option from the following:

**Options :**

6406532780432. ✘ Statement-2 and statement-3 both are correct.

6406532780433. ✘ Statement-1 and statement-3 both are correct.

6406532780434. ✓ Statement-1 and statement-2 both are correct.

6406532780435. ✘ All statements are correct.

**Sub-Section Number :** 5

**Sub-Section Id :** 640653123378

**Question Shuffling Allowed :** Yes

**Question Number : 77 Question Id : 640653827213 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the correct statement from the following:

**Options :**

6406532780440. ✘ Descriptive statistics is concerned with drawing of conclusions from the sample data.

6406532780441. ✘ Inferential statistics is concerned with describing and summarizing the data.

6406532780442. ✘ Inferential statistics doesn't require sample data.

6406532780443. ✓ All statements are incorrect.

**Question Number : 78 Question Id : 640653827225 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the following four images of the Scatter plot.

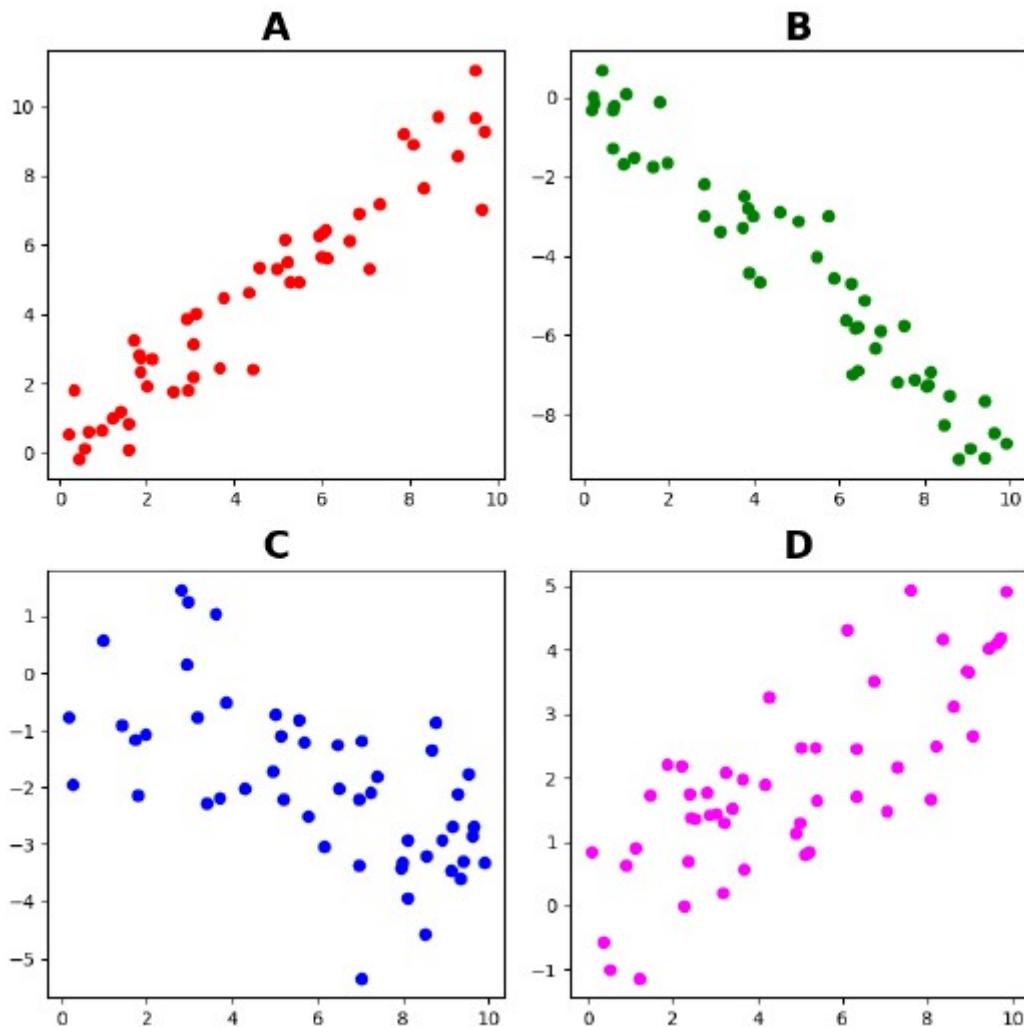


Figure Q.2 : Scatterplots

Please select the option that will represent the correlation values arranged in ascending order.

**Options :**

6406532780461. ❌  $A < B < C < D$

6406532780462. ✓  $B < C < D < A$

6406532780463. ❌  $B < A < C < D$

6406532780464. ❌  $A < D < C < B$

**Sub-Section Number :**

6

**Sub-Section Id :**

640653123379

**Question Shuffling Allowed :**

Yes

**Question Number : 79 Question Id : 640653827214 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

If the mean of the observations  $x_1, x_2, \dots, x_8$  is 6 and the mean of observations  $x_8, x_9, \dots, x_{15}$  is 13. Given that  $x_8 = 3$ , what will be the mean of the observations  $x_1, x_2, \dots, x_{15}$  ?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

9.90 to 9.96

**Question Number : 80 Question Id : 640653827226 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Find the population covariance between  $X$  and  $Y$  for the dataset given in Table Q.2.

$X$	-3	-4	-5	5	4	3
$Y$	10	5	3	3	5	10

Table Q.2

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0

**Sub-Section Number :** 7

**Sub-Section Id :** 640653123380

**Question Shuffling Allowed :** No

**Question Id : 640653827215 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (81 to 83)**

Question Label : Comprehension

The marks (out of 100) scored by Manoj in a semester exam are given as 60, 70, 65, 75, 80. If Nitin has scored 5 marks more than Manoj in each subject.

Based on the given information, answer the subquestions.

**Sub questions**

**Question Number : 81 Question Id : 640653827216 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Find the mean of the marks scored by Nitin.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

75

**Question Number : 82 Question Id : 640653827217 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

If the teacher wants to give the marks out of 50 and modify the marks for every student as

$$\text{Modified marks} = \frac{\text{Marks} \times 50}{100}$$

What is the population variance of the modified marks scored by Manoj?

**Options :**

6406532780446. ✘ 25

6406532780447. ✘ 50

6406532780448. ✓ 12.5

6406532780449. ✘ Cannot determine

**Question Number : 83 Question Id : 640653827218 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Calculate the correlation coefficient between the marks scored by Manoj and Nitin.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Sub-Section Number :** 8

**Sub-Section Id :** 640653123381

**Question Shuffling Allowed :** No

**Question Id : 640653827219 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (84 to 85)**

Question Label : Comprehension

The stem and leaf diagram below shows the ages (in years) of a group of people attending the Paradox event.

Stem	Leaf
1	4 5 8
2	1 2 4
3	1 1 2 3 3 3 4

Here, 1 | 4 represents 14 years.

Based on the above data, answer the given subquestions

**Sub questions**

**Question Number : 84 Question Id : 640653827220 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

What will be the median age for this group?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

31

**Question Number : 85 Question Id : 640653827221 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

How many people are above 23 years of Age in the given stem and leaf plot?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

8

**Sub-Section Number :**

9

**Sub-Section Id :**

640653123382

**Question Shuffling Allowed :**

Yes

**Question Number : 86 Question Id : 640653827227 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

The mode of the observations  $x_1, x_2, \dots, x_n$  is 40. What is the mode of the observations  $2x_1 + 10, 2x_2 + 10, \dots, 2x_n + 10$ ?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

90

**Sub-Section Number :** 10

**Sub-Section Id :** 640653123383

**Question Shuffling Allowed :** Yes

**Question Number : 87 Question Id : 640653827228 Question Type : MSQ**

**Correct Marks : 1 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Choose the correct option(s):

**Options :**

6406532780467. ✓ 25th percentile is known as the first quartile.

6406532780468. ✗ Median is the 60th percentile of any data.

6406532780469. ✗ Inter-quartile range is defined as the difference between third quartile and second quartile.

6406532780470. ✓ We need to arrange the data in ascending order to calculate the percentile.

## Sem2 Intro to Python

**Section Id :** 64065359314

**Section Number :** 5

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 15

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

**Section Marks :** 51

**Display Number Panel :** Yes

**Section Negative Marks :** 0

**Group All Questions :** No

<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	No
<b>Section Maximum Duration :</b>	0
<b>Section Minimum Duration :</b>	0
<b>Section Time In :</b>	Minutes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	640653123384
<b>Question Shuffling Allowed :</b>	No

**Question Number : 88 Question Id : 640653827229 Question Type : MCQ**

**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 :**

6406532780471. ✓ YES

6406532780472. ✗ NO

**Question Number : 89 Question Id : 640653827230 Question Type : MCQ**

**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 :

6406532780473. ✓ Useful Data has been mentioned above.

6406532780474. ❌ This data attachment is just for a reference & not for an evaluation.

**Sub-Section Number :**

2

**Sub-Section Id :**

640653123385

**Question Shuffling Allowed :**

Yes

**Question Number : 90 Question Id : 640653827231 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider a program that accepts a word as input from the user and prints the number of punctuation marks in it. You can assume that the input will be given in lower case.

Here we are considering only the given punctuation marks(‘‘, ‘‘, ‘‘, ‘‘, ‘‘).

### Snippet-1

```
word = input()
count = 0
punctuation_marks = [',', '-', '.', ':', ';']
for char in word:
    if char in punctuation_marks:
        count += 1
print(count)
```

### Snippet-2

```
word = input()
count = 0
for char in word:
    if char in ',.-.:;':
        count += 1
print(count)
```

Which of these two snippets is correct?

#### **Options :**

6406532780475. ❌ Only snippet-1 is correct

6406532780476. ❌ Only snippet-2 is correct

6406532780477. ✓ Both snippets are correct

6406532780478. ❌ Both snippets are wrong

**Question Number : 91 Question Id : 640653827232 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

We wish to print the following pattern:

```
00000  
01110  
01110  
01110  
00000
```

Which of these two snippets is correct?

#### Snippet-1

```
n = 5  
zero = '0' # len(zero) == 1  
one = '1' # len(one) == 1  
for i in range(n):  
    if i == 0 or i == n - 1:  
        print(zero * n)  
    else:  
        print(zero + one * (n - 2) + zero)
```

#### Snippet-2

```
n = 5  
zero = '0' # len(zero) == 1  
one = '1' # len(one) == 1  
for i in range(n):  
    for j in range(n):  
        if j == 0 or j == n - 1:  
            print(one, end = '') # end argument is an empty string  
        else:  
            print(zero, end = '') # end argument is an empty string  
    print()
```

Useful information for solving this problem:

Input

```
print('1', end = '') # end argument is an empty string
print('2', end = '') # end argument is an empty string
print()
print('3' * 5)
```

Output

```
12
33333
```

**Options :**

6406532780479. ✓ Only snippet-1 is correct  
6406532780480. ✗ Only snippet-2 is correct  
6406532780481. ✗ Both snippets are correct  
6406532780482. ✗ Both snippets are wrong

**Question Number : 92 Question Id : 640653827233 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What is the output of following snippet of code?

**Snippet-1**

```
s = 3 >= 2 >= 1
print(type(s))
```

**Options :**

6406532780483. ✓ <class 'bool'>  
6406532780484. ✗ <class 'int'>  
6406532780485. ✗ <class 'str'>  
6406532780486. ✗ <class 'list'>

**Sub-Section Number :**

3

**Sub-Section Id :**

640653123386

**Question Shuffling Allowed :**

Yes

**Question Number : 93 Question Id : 640653827234 Question Type : MSQ**

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

Question Label : Multiple Select Question

Consider the following snippet:

```
price = float(input())
if price <= 100:
    print("Affordable range")
elif price <= 500:
    print("Mid-range")
elif price <= 1000:
    print("Higher range")
else:
    print("Luxury range")
```

Select all inputs for which the output is:

Luxury range

**Options :**

6406532780487. ✘ 777

6406532780488. ✓ 1111

6406532780489. ✓ 3333

6406532780490. ✘ 999

**Question Number : 94 Question Id : 640653827235 Question Type : MSQ**

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

Question Label : Multiple Select Question

Select all inputs for which the code below prints the value True .

```
sentence = input()
space = ' ' # one space between the quotes
n = len(sentence)
# all letters in vowels are in lower case
vowels = 'aeiou'

surprise = True
for char in vowels:
    if char not in sentence:
        surprise = False
        break

print(surprise)
```

Each input is a sentence with a space between consecutive words, all of which are in lower case.

**Options :**

6406532780491. ✘ happy life

6406532780492. ✘ learn python

6406532780493. ✓ auto industries

6406532780494. ✓ quaint house

**Sub-Section Number :**

4

**Sub-Section Id :**

640653123387

**Question Shuffling Allowed :**

Yes

**Question Number : 95 Question Id : 640653827236 Question Type : SA**

**Correct Marks : 3**

**Question Label : Short Answer Question**

What is the output of the following snippet of code? Enter an integer as your answer.

```
str1 = "Paradox"  
str2 = "Celebration"  
str3 = str1 + " " + str2[:6] #There is single space in between quote  
print(len(str3))
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

14

**Question Number : 96 Question Id : 640653827237 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

What is the output of the following snippet of code? Enter an integer as your answer.

```
x = 15  
y = 20  
if x != y:  
    result = abs(x - y)  
else:  
    result = x + y  
print(result)
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

5

**Question Number : 97 Question Id : 640653827238 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Consider the following snippet of code.What will the output be?

```
val = 0
L = [7, 1, 8, 3, 10]
temp = []
for num in L:
    if num % 2 == 0:
        temp.append(num)
    else:
        val += num
print(len(temp)*val)
```

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

22

**Question Number : 98 Question Id : 640653827239 Question Type : SA****Correct Marks : 3**

Question Label : Short Answer Question

Consider the following snippet of code.

```
num = int(input("Enter a number"))
s_num = 1
while num != 0:
    digit = num % 10
    s_num = s_num + digit
    num //= 10
print(s_num)
```

Assume that 1234 is passed as input to the code.What will be the output?

**Response Type :** Numeric**Evaluation Required For SA :** Yes**Show Word Count :** Yes**Answers Type :** Equal

**Text Areas : PlainText**

**Possible Answers :**

11

**Sub-Section Number :** 5

**Sub-Section Id :** 640653123388

**Question Shuffling Allowed :** No

**Question Id : 640653827240 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (99 to 100)**

Question Label : Comprehension

Consider the following snippet of code and answer the given sub-questions that follow:

```
L = ["apple", "banana", "cherry", "date", "fig", "grape"]  
max_L = []  
maxlen = 0  
for s in L:  
    if len(s) > maxlen:  
        maxlen = len(s)  
        max_L = [s]  
    elif len(s) == maxlen:  
        max_L.append(s)  
print(max_L)  
print(len(max_L))
```

## Sub questions

**Question Number : 99 Question Id : 640653827241 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What is the first line of output?

**Options :**

6406532780499. ✘ ['banana']

6406532780500. ✘ ['cherry']

6406532780501. ✓ ['banana', 'cherry']

6406532780502. ✘ ['cherry', 'banana']

**Question Number : 100 Question Id : 640653827242 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

What is the second line of the output? Enter an integer as your answer.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

2

**Question Id : 640653827243 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (101 to 102)**

Question Label : Comprehension

Consider the following snippet of code and answer the subquestions

that follow:

```
my_list = [1, 2, 3, 4, 5]
new_list = my_list
new_list[0] = 10
print(my_list)
```

## Sub questions

**Question Number : 101 Question Id : 640653827244 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What will be the output?

**Options :**

6406532780504. ✓ [10, 2, 3, 4, 5]

6406532780505. ✘ [1, 10, 2, 3, 4, 5]

6406532780506. ✘ [1, 2, 3, 4, 5]

6406532780507. ✘ [10]

**Question Number : 102 Question Id : 640653827245 Question Type : MSQ**

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

Question Label : Multiple Select Question

Choose the correct option regarding the given code.

**Options :**

6406532780508. ✓ List is a mutable object.

6406532780509. ✗ List is an immutable object.

6406532780510. ✓ Both `my_list` and `new_list` are referring to the same list.

6406532780511. ✗ `my_list` and `new_list` are referring to different lists.

**Question Id : 640653827246 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (103 to 104)**

Question Label : Comprehension

Consider the following snippet of code.

```
a = int(input())
b = int(input())
string = 'IAmInFoundationLevel'
print(string[a:b])
```

The output of this code is Foundation .

**Sub questions**

**Question Number : 103 Question Id : 640653827247 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

What is the value of `a`, the first input entered by the user, if it is given that the user entered a positive integer?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

**Question Number : 104 Question Id : 640653827248 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

What is the value of  $b$ , the second input entered by the user, if it is given that the user entered a negative integer?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

-5

**Question Id : 640653827249 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (105 to 106)**

Question Label : Comprehension

Consider the following snippet of code and answer all  
the subquestions that follow:

```
P = [[1, 2, 3], [2, 4, 6], [3, 6, 9]]
```

```
s = 0
p = 1
for i in range(len(P)):
    for j in range(len(P)):
        if i == j:
            s = s + P[i][j]
        if j == len(P)-1:
            p = p * P[i][j]

print(s)
print(p)
```

**Sub questions**

**Question Number : 105 Question Id : 640653827250 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What is the first line of the output?

**Options :**

6406532780514. ✘ 10

6406532780515. ✓ 14

6406532780516. ✘ 6

6406532780517. ✘ 18

**Question Number : 106 Question Id : 640653827251 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What is the second line of the output?

**Options :**

6406532780518. ✘ 6

6406532780519. ✓ 162

6406532780520. ✘ 36

6406532780521. ✘ 48

## Sem2 English2

<b>Section Id :</b>	64065359315
<b>Section Number :</b>	6
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	33
<b>Number of Questions to be attempted :</b>	33
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Section Negative Marks :</b>	0
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	No

**Section Maximum Duration :** 0  
**Section Minimum Duration :** 0  
**Section Time In :** Minutes  
**Maximum Instruction Time :** 0  
**Sub-Section Number :** 1  
**Sub-Section Id :** 640653123389  
**Question Shuffling Allowed :** No

**Question Number : 107 Question Id : 640653827252 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

**THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : SEMESTER II: ENGLISH 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 :**

6406532780522. ✓ Yes

6406532780523. ✗ No

**Sub-Section Number :** 2  
**Sub-Section Id :** 640653123390  
**Question Shuffling Allowed :** No

**Question Id : 640653827253 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (108 to 112)**

Question Label : Comprehension

Read the speech segment given below and fill in the blanks with the appropriate discourse markers. Observe the tone and the punctuation of the passage and choose only the most fitting answer for every blank.

### Speech by Steve Jobs

Good morning. [i] \_\_\_\_\_ We were up till 3 o' clock last night finishing up this advertisement [ii] \_\_\_\_\_ I want to show it to you in a minute; see what you think of it. I've been back for about eight to ten weeks, and we've been working really hard. What we're trying to do is not something really highfalutin; we're trying to get back to the basics— we're trying to get back to the basics of great products, great marketing, and great distribution. I think that Apple has pockets of greatness, but in some ways it has drifted away from doing the basics really well. [iii] \_\_\_\_\_ we started with the product line— we looked at the product roadmap going out for a few years, and we said a lot of this doesn't make sense, and it's way too much stuff, and there's not enough focus, and so we [iv] \_\_\_\_\_ got rid of 70% of the stuff on the product roadmap. [v] \_\_\_\_\_, I couldn't even figure out the damn product line after a few weeks. I kept saying "What is this model? How does this fit?", and I started talking to customers and they couldn't figure it out either.

Transcribed from: "Steve Jobs' Most Innovative Speech." *YouTube*.

Based on the above data, answer the given subquestions.

#### **Sub questions**

**Question Number : 108 Question Id : 640653827254 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Fill in blank [i] with the most fitting discourse marker among the options given below.

**Options :**

6406532780524. ❌ Ouch!

6406532780525. ❌ Wow!

6406532780526. ✓ Phew!

**Question Number : 109 Question Id : 640653827255 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Fill in blank [ii] with the most fitting discourse marker among the options given below.

**Options :**

6406532780527. ✘ Still so

6406532780528. ✓ And uh

6406532780529. ✘ Right

6406532780530. ✘ Oh

**Question Number : 110 Question Id : 640653827256 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Fill in blank [iii] with the most fitting discourse marker among the options given below.

**Options :**

6406532780531. ✘ Yet

6406532780532. ✘ Ah!

6406532780533. ✓ So

6406532780534. ✘ Anyway

**Question Number : 111 Question Id : 640653827257 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Fill in blank [iv] with the most fitting discourse marker among the options given below.

**Options :**

6406532780535. ✓ Actually

6406532780536. ✘ However

6406532780537. ✘ Nah

6406532780538. ✘ Ugh!

**Question Number : 112 Question Id : 640653827258 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Fill in blank [v] with the most fitting discourse marker among the options given below.

**Options :**

6406532780539. ✘ Great!

6406532780540. ✘ Absolutely!

6406532780541. ✓ I mean

6406532780542. ✘ I see

**Sub-Section Number :**

3

**Sub-Section Id :**

640653123391

**Question Shuffling Allowed :**

Yes

**Question Number : 113 Question Id : 640653827259 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Identify the adjectival clause in the following sentence and the noun it modifies.

*She wore a beautiful dress, which she had bought on her trip to Paris, and he complimented her on her impeccable style.*

**Options :**

6406532780543. ❌ Adjectival clause: which she had bought on her trip to Paris, Noun: Paris

6406532780544. ❌ Adjectival clause: she wore a beautiful dress, Noun: beautiful

6406532780545. ✓ Adjectival clause: which she had bought on her trip to Paris, Noun: dress

6406532780546. ❌ None of these

**Question Number : 114 Question Id : 640653827260 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

In the sentence "*He is staring at the world as if he has never seen it before,*" the suffix -ing added to the verb "stare" indicates:

**Options :**

6406532780547. ❌ The progression of the action of staring in past time

6406532780548. ❌ The habituality of the action of staring in present time

6406532780549. ✓ The progression of the action of staring in present time

6406532780550. ❌ The habituality of the action of staring in past time

**Question Number : 115 Question Id : 640653827261 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

*They gave him an award.* The number of complements in this sentence is/are \_\_\_\_\_.

**Options :**

6406532780551. ❌ One

6406532780552. ✓ Two

6406532780553. ❌ Three

6406532780554. ❌ Zero

**Question Number : 116 Question Id : 640653827262 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

In the following sentence, identify the nature of the adjective. The adjective is underlined.

'*The scariest villain I have seen comes in that novel.*'

**Options :**

6406532780555. ❌ Predicative

6406532780556. ✓ Attributive

6406532780557. ✘ Indicative

6406532780558. ✘ Adverbial

**Question Number : 117 Question Id : 640653827263 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

'Technically speaking, the upcoming nuclear treatment plant will certainly invite only criticisms.' The adverbs used in this sentence are

**Options :**

6406532780559. ✘ Focus

6406532780560. ✘ Comment

6406532780561. ✘ Viewpoint

6406532780562. ✓ All of these

**Sub-Section Number :**

4

**Sub-Section Id :**

640653123392

**Question Shuffling Allowed :**

Yes

**Question Number : 118 Question Id : 640653827264 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the implied meaning of the sentence below: (Note that the word with stress is italicized and marked in bold).

I have found my **book**

**Options :**

6406532780563. ✘ I have found my book, not yours

6406532780564. ✓ I have found my book, not my pen

6406532780565. ✘ It is I who have found my book, not anyone else

6406532780566. ✘ I have found my book, not lost my book

**Question Number : 119 Question Id : 640653827265 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

'The sun rises *in the east*.' This sentence would ordinarily be spoken in a \_\_\_\_.

**Options :**

6406532780567. ✘ Rising intonation

6406532780568. ✓ Flat intonation

6406532780569. ✘ Falling intonation

6406532780570. ✘ Any of these

**Question Number : 120 Question Id : 640653827266 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

'Perhaps we have been guilty of some terminological inexactitudes' is an example of \_\_\_\_.

**Options :**

6406532780571. ✘ Hyperbole

6406532780572. ✘ Synecdoche

6406532780573. ✘ Litotes

6406532780574. ✓ Euphemism

**Question Number : 121 Question Id : 640653827267 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

"Free as a bird" is an example of?

**Options :**

6406532780575. ✓ Simile

6406532780576. ✘ Hyperbole

6406532780577. ✘ Paradox

6406532780578. ✘ Alliteration

**Question Number : 122 Question Id : 640653827268 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

'He is a pilot who's afraid of heights' is an example of \_\_\_\_.

**Options :**

6406532780579. ✓ Irony

6406532780580. ✘ Paradox

6406532780581. ✘ Oxymoron

6406532780582. ✘ Pun

**Question Number : 123 Question Id : 640653827269 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

'The city never sleeps' is an example of personification. This statement is \_\_\_\_.

**Options :**

6406532780583. ✓ TRUE

6406532780584. ✘ FALSE

**Question Number : 124 Question Id : 640653827270 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following sentences uses a discourse marker for confirmation of clarity?

**Options :**

- 6406532780585. ✘ First of all, there are no white elephants
- 6406532780586. ✘ Red meat is very healthy. That said, too much of anything is bad
- 6406532780587. ✓ You need to solve this equation and find the value of x. Did you get that?
- 6406532780588. ✘ Overall, the event was a great success

**Question Number : 125 Question Id : 640653827271 Question Type : MCQ****Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following discourse markers is used to express something not good.

**Options :**

- 6406532780589. ✓ Fine
- 6406532780590. ✘ Clearly
- 6406532780591. ✘ Contrary
- 6406532780592. ✘ None of these

**Question Number : 126 Question Id : 640653827272 Question Type : MCQ****Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following sentences uses a discourse marker to add information?

**Options :**

- 6406532780593. ✘ First of all, that's not even your book
- 6406532780594. ✘ Um, I don't know
- 6406532780595. ✘ I mean, that's not a problem at all
- 6406532780596. ✓ Fruits are very nutritious. On top of that, they're very tasty too

**Question Number : 127 Question Id : 640653827273 Question Type : MCQ****Correct Marks : 1**

Question Label : Multiple Choice Question

Intonations help in:

**Options :**

- 6406532780597. ✘ Resolving ambiguity
- 6406532780598. ✘ Imbuing the speaker's state of mind in the spoken words
- 6406532780599. ✓ Both Resolving ambiguity and Imbuing the speaker's state of mind in the spoken words
- 6406532780600. ✘ Neither Resolving ambiguity nor Imbuing the speaker's state of mind in the spoken words

<b>Sub-Section Number :</b>	5
<b>Sub-Section Id :</b>	640653123393
<b>Question Shuffling Allowed :</b>	No

**Question Id : 640653827274 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (128 to 132)**

Question Label : Comprehension

**Fill in the blanks with the appropriate options for the given subquestions.**

(1)\_\_\_\_\_, the sun is a huge ball of gases. (2)\_\_\_\_\_, it has a diameter of 1.3927 million kms. It is incomprehensibly massive, and, (3)\_\_\_\_\_, it can hold millions of planets inside it. The Sun is mainly made up of hydrogen and helium gas. The surface of the Sun is known as the photosphere. (4)\_\_\_\_\_, the photosphere is surrounded by a thin layer of gas known as the chromosphere. Without the Sun, there would be no life on Earth. There would be no plants, no animals and no human beings. (5)\_\_\_\_\_, all the living things on Earth get their energy from the Sun for their survival.

**Sub questions**

**Question Number : 128 Question Id : 640653827275 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the correct answer for blank (1).

**Options :**

6406532780601. ❌ Because

6406532780602. ✓ As a matter of fact

6406532780603. ❌ Additionally

6406532780604. ❌ But

**Question Number : 129 Question Id : 640653827276 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the correct answer for blank (2).

**Options :**

6406532780605. ❌ Because

6406532780606. ❌ Thirdly

6406532780607. ✓ Yet

6406532780608. ❌ Finally

**Question Number : 130 Question Id : 640653827277 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the correct answer for blank (3).

**Options :**

- 6406532780609. ✘ Ultimately
- 6406532780610. ✘ Intimately
- 6406532780611. ✘ Consequence
- 6406532780612. ✓ Consequently

**Question Number : 131 Question Id : 640653827278 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the correct answer for blank (4).

**Options :**

- 6406532780613. ✓ Additionally
- 6406532780614. ✘ In effect
- 6406532780615. ✘ Someday
- 6406532780616. ✘ At last

**Question Number : 132 Question Id : 640653827279 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the correct answer for blank (5).

**Options :**

- 6406532780617. ✘ Sooner or later
- 6406532780618. ✓ Basically
- 6406532780619. ✘ Sequentially
- 6406532780620. ✘ Hereafter

**Sub-Section Number :**

6

**Sub-Section Id :**

640653123394

**Question Shuffling Allowed :**

Yes

**Question Number : 133 Question Id : 640653827280 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the adverb in the following sentence.

*The slow dog played with the chirpy parrot.*

**Options :**

- 6406532780621. ✘ Slow
- 6406532780622. ✘ Chirpy
- 6406532780623. ✘ The chirpy parrot

6406532780624. ✓ This sentence does not have an adverb

**Question Number : 134 Question Id : 640653827281 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

"The tree stumps had been worn smooth and comfortable *by years of use.*"

The phrase in italics is an \_\_\_\_.

**Options :**

6406532780625. ✘ Adverb of frequency

6406532780626. ✘ Adverb of degree

6406532780627. ✓ Adverb of manner

6406532780628. ✘ Adverb of direction

**Question Number : 135 Question Id : 640653827282 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the degree adverb in the given sentence.

'The cellar is *nearly filled up, never having been either wide or deep, and the fruit of a few mossy apple-trees drop ungathered to the ground.*'

**Options :**

6406532780629. ✘ Few

6406532780630. ✘ Filled

6406532780631. ✘ Mossy

6406532780632. ✓ Nearly

**Question Number : 136 Question Id : 640653827283 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

\_\_\_\_adverbs are used to make our perspectives clearer.

**Options :**

6406532780633. ✘ Comment

6406532780634. ✓ Viewpoint

6406532780635. ✘ Focus

6406532780636. ✘ Both Viewpoint and Focus

**Question Number : 137 Question Id : 640653827284 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

I \_\_ admired his talent for painting.

**Options :**

- 6406532780637. ✘ Very
- 6406532780638. ✘ Very much
- 6406532780639. ✘ Much
- 6406532780640. ✓ Both Very much and Much

**Question Number : 138 Question Id : 640653827285 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

In the following lists of words, identify the words most likely to be adjectives based on word endings.

Foliage, farcical, fraternity, finance

**Options :**

- 6406532780641. ✓ Farcical
- 6406532780642. ✘ Foliage
- 6406532780643. ✘ Finance
- 6406532780644. ✘ Fraternity

**Question Number : 139 Question Id : 640653827286 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

'The contract will be issued by the government.' In this sentence, the verb 'will be issued' will change to \_\_\_\_\_ when converted to active voice.

**Options :**

- 6406532780645. ✘ Was issued
- 6406532780646. ✘ Is issued
- 6406532780647. ✓ Will issue
- 6406532780648. ✘ Was issuing

**Question Number : 140 Question Id : 640653827287 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose the correct type of sentence for the following sentence: 'I went to the store, but I forgot to buy milk.'

**Options :**

- 6406532780649. ✘ Simple
- 6406532780650. ✓ Compound
- 6406532780651. ✘ Complex

**Question Number : 141 Question Id : 640653827288 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following sentences contains an adverbial clause?

**Options :**

6406532780652. ✘ The dog barked loudly.

6406532780653. ✓ After the storm passed, we went outside to play.

6406532780654. ✘ She is a talented musician.

6406532780655. ✘ The cake tastes delicious.

**Question Number : 142 Question Id : 640653827289 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

*The kid who lives next door is very interesting.* The relative pronoun here is \_\_\_\_.

**Options :**

6406532780656. ✘ Very

6406532780657. ✘ Is

6406532780658. ✓ Who

6406532780659. ✘ No relative pronoun

**Question Number : 143 Question Id : 640653827290 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

In the following sentence, identify the role of the embedded clause.

*'The judge whose car we bought called our office.'*

**Options :**

6406532780660. ✘ Subject

6406532780661. ✘ Adverb

6406532780662. ✓ Adjective

6406532780663. ✘ Object

**Question Number : 144 Question Id : 640653827291 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

How many dependent clauses are there in the sentence given below:

*The cat climbed the tree, but he could not get down*

**Options :**

6406532780664. ✓ 0

6406532780665. ✗ 1

6406532780666. ✗ 2

6406532780667. ✗ 3

**Question Number : 145 Question Id : 640653827292 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

State whether the underlined is an adjunct or a complement:

*Mary helped her mother with the dishes.*

**Options :**

6406532780668. ✓ Adjunct

6406532780669. ✗ Complement

**Question Number : 146 Question Id : 640653827293 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

'Joe plays the guitar beautifully'. Here the adjunct is \_\_\_\_.

**Options :**

6406532780670. ✗ The guitar

6406532780671. ✓ Beautifully

6406532780672. ✗ Plays

6406532780673. ✗ No adjunct

**Question Number : 147 Question Id : 640653827294 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Read the following sentence and identify the adverb phrase in it.

*'The other clerk, whose name I have now forgotten, nodded and apologized while chewing on a pink lobe of kola nut.'*

**Options :**

6406532780674. ✗ Whose name I have now forgotten

6406532780675. ✓ While chewing on a pink lobe of kola nut

6406532780676. ✗ Nodded and apologized

6406532780677. ✗ The other clerk

Section Id :	64065359316
Section Number :	7
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	10
Section Marks :	25
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653123395
Question Shuffling Allowed :	No

**Question Number : 148 Question Id : 640653827295 Question Type : MCQ**

**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 :**

6406532780678. ✓ YES

6406532780679. ✗ NO

Sub-Section Number :	2
Sub-Section Id :	640653123396
Question Shuffling Allowed :	Yes

**Question Number : 149 Question Id : 640653827296 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following subsets of  $\mathbb{R}^4$ .

$$W = \text{span}\{(2, -1, 0, 4), (-1, 1, 0, 3), (1, 2, 0, 3), (2, 2, 0, 10)\}$$

$$B_1 = \{(1, 0, 0, 0), (0, 1, 0, 0), (0, 0, 0, 1)\}$$

$$B_2 = \{(2, -1, 0, 4), (-1, 1, 0, 3), (1, 2, 0, 3)\}$$

Select the correct option.

**Options :**

6406532780680. ✓ Both  $B_1$  and  $B_2$  are bases for  $W$ .

6406532780681. ✗  $B_1$  is a basis for  $W$ , but  $B_2$  is not.

6406532780682. ✗  $B_2$  is a basis for  $W$ , but  $B_1$  is not.

6406532780683. ✗ Neither  $B_1$  nor  $B_2$  is a basis for  $W$ .

**Sub-Section Number :**

3

**Sub-Section Id :**

640653123397

**Question Shuffling Allowed :**

Yes

**Question Number : 150 Question Id : 640653827297 Question Type : MSQ**

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

Question Label : Multiple Select Question

Consider the system of linear equations  $Ax = b$  where  $A \in M_{n \times n}(\mathbb{R})$ . Which of the following conditions guarantees that the system is consistent for any  $b \in \mathbb{R}^n$ ?  
Select all true statements.

**Options :**

6406532780684. ✓  $A$  is a diagonal matrix with non-zero diagonal entries.

6406532780685. ✗ At least one column of  $A$  is a linear combination of two other columns of  $A$ .

6406532780686. ✓  $b$  is one of the columns of  $A$ .

6406532780687. ✓ The reduced row echelon form of  $A$  has no zero rows.

6406532780688. ✗  $A$  has at least  $n - 1$  linearly independent rows.

**Question Number : 151 Question Id : 640653827298 Question Type : MSQ**

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

Question Label : Multiple Select Question

Let  $Ax = b$  be a system of linear equations, where  $A = \begin{bmatrix} 1 & 0 & 0 & -1 \\ 0 & 0 & 1 & 5 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ ,

$x = [x_1 \ x_2 \ x_3 \ x_4]^T$  and  $b \in \mathbb{R}^3$ . Which of the following statements are true?

**Options :**

6406532780689. ✓  $A$  is in row echelon form.

6406532780690. ✓  $x_2$  is an independent variable.

After reducing the system to reduced row echelon form, the value of  $x_3$  is  
6406532780691. ✗ dependent on the value of  $x_4$  in the solution vector.

When  $b = \begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}$ , the system has infinitely many solutions.

6406532780692. ✓

6406532780693. ✗ The system has 2 dependent and 2 independent variables.

**Question Number : 152 Question Id : 640653827299 Question Type : MSQ**

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

Question Label : Multiple Select Question

$B = \{v_1, v_2, v_3\}$  is a linearly independent subset of  $\mathbb{R}^3$ . Select all linearly independent subsets of  $\mathbb{R}^3$  from the following.

**Options :**

6406532780694. ✓  $\{v_1 + v_2, v_1 - v_2\}$

6406532780695. ✗  $\{v_1, v_2, v_3, v_4\}$ , where  $v_4$  is some vector in  $\mathbb{R}^3$

6406532780696. ✓  $\{v_1 + v_2, v_1 - v_2, v_1 + v_2 + v_3\}$

6406532780697. ✗  $\{v_1, v_1 + v_2, v_1 - v_2\}$

**Question Number : 153 Question Id : 640653827300 Question Type : MSQ**

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

Question Label : Multiple Select Question

$A$  is a square matrix of order 3. Select all subspaces of  $\mathbb{R}^3$  from the options given below.

**Options :**

6406532780698. ✓  $S = \left\{ v : Av = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \text{ and } v \in \mathbb{R}^3 \right\}$

6406532780699. ✗  $S = \left\{ v : Av = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \text{ and } v \in \mathbb{R}^3 \right\}$

6406532780700. ✗  $S = \{(x, y) : x, y \in \mathbb{R}\}$

6406532780701. ✓  $S = \{(x, y, 0) : x, y \in \mathbb{R}\}$

**Sub-Section Number :**

4

**Sub-Section Id :**

640653123398

**Question Shuffling Allowed :**

Yes

**Question Number : 154 Question Id : 640653827301 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

$A = (a_{ij}) \in M_{5 \times 5}(\mathbb{R})$  is a matrix such that  $a_{ij} + a_{ji} = 0$  for all  $1 \leq i, j \leq 5$ .  
Find the determinant of  $A$ . \_\_\_\_\_

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0

**Question Number : 155 Question Id : 640653827302 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

If determinant of  $A$  is  $-2$ , find the determinant of  $A^T A$ . \_\_\_\_\_

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Sub-Section Number :**

5

**Sub-Section Id :**

640653123399

**Question Shuffling Allowed :**

No

**Question Id : 640653827303 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (156 to 157)**

Question Label : Comprehension

Let  $A = \begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$  and  $\alpha, \beta \in \mathbb{R}$  such that  $A^2 - \alpha A + \beta I = 0$ . Note that  $I$  is the identity matrix and  $0$  is the zero matrix in this equation.

Based on the above data answer the given subquestions.

**Sub questions**

**Question Number : 156 Question Id : 640653827304 Question Type : SA**

**Correct Marks : 1.5**

Question Label : Short Answer Question

Find the value of  $\alpha$ . \_\_\_\_\_

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

5

**Question Number : 157 Question Id : 640653827305 Question Type : SA**

**Correct Marks : 1.5**

Question Label : Short Answer Question

Find the value of  $\beta$ . \_\_\_\_\_

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

**Question Id : 640653827306 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Question Numbers : (158 to 160)**

Question Label : Comprehension

Find the dimensions of the following vector spaces. The usual rules of vector addition and scalar multiplication apply for the vector spaces in each of the options.

Based on the above data answer the given subquestions.

### **Sub questions**

**Question Number : 158 Question Id : 640653827307 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

$$U = \{(a, b, c, d, e) : a+b+c+d+e = 0 \text{ and } a, b, c, d, e \in \mathbb{R}\} \quad \underline{\hspace{10cm}}$$

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

4

**Question Number : 159 Question Id : 640653827308 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

$$V = \left\{ \begin{bmatrix} a & b & 0 \\ c & 0 & a+b \end{bmatrix} : a, b, c \in \mathbb{R} \right\} \quad \underline{\hspace{10cm}}$$

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

3

**Question Number : 160 Question Id : 640653827309 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

$W = \text{span}\{(1, 1, 1), (1, 0, -1), (2, 1, 0)\}$  \_\_\_\_\_

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

## Sem2 Statistics2

<b>Section Id :</b>	64065359317
<b>Section Number :</b>	8
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	12
<b>Number of Questions to be attempted :</b>	12
<b>Section Marks :</b>	40
<b>Display Number Panel :</b>	Yes
<b>Section Negative Marks :</b>	0
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	No
<b>Section Maximum Duration :</b>	0
<b>Section Minimum Duration :</b>	0
<b>Section Time In :</b>	Minutes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	640653123400
<b>Question Shuffling Allowed :</b>	No

**Question Number : 161 Question Id : 640653827310 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

**THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : SEMESTER II: STATISTICS 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 :

6406532780709. ✓ YES

6406532780710. ✗ NO

**Question Number : 162 Question Id : 640653827311 Question Type : MCQ**

**Correct Marks : 0**

**Question Label : Multiple Choice Question**

Discrete random variables:

Distribution	PMF ( $f_X(k)$ )	CDF ( $F_X(x)$ )	$E[X]$	$\text{Var}(X)$
Uniform( $A$ ) $A = \{a, a+1, \dots, b\}$	$\frac{1}{n}, \quad x = k$ $n = b - a + 1$ $k = a, a+1, \dots, b$	$\begin{cases} 0 & x < 0 \\ \frac{k-a+1}{n} & k \leq x < k+1 \\ k = a, a+1, \dots, b-1, b \\ 1 & x \geq n \end{cases}$	$\frac{a+b}{2}$	$\frac{n^2-1}{12}$
Bernoulli( $p$ )	$\begin{cases} p & x = 1 \\ 1-p & x = 0 \end{cases}$	$\begin{cases} 0 & x < 0 \\ 1-p & 0 \leq x < 1 \\ 1 & x \geq 1 \end{cases}$	$p$	$p(1-p)$
Binomial( $n, p$ )	${}^n C_k p^k (1-p)^{n-k}, \quad k = 0, 1, \dots, n$	$\begin{cases} 0 & x < 0 \\ \sum_{i=0}^k {}^n C_i p^i (1-p)^{n-i} & k \leq x < k+1 \\ k = 0, 1, \dots, n \\ 1 & x \geq n \end{cases}$	$np$	$np(1-p)$
Geometric( $p$ )	$(1-p)^{k-1} p, \quad k = 1, \dots, \infty$	$\begin{cases} 0 & x < 0 \\ 1 - (1-p)^k & k \leq x < k+1 \\ k = 1, \dots, \infty \end{cases}$	$\frac{1}{p}$	$\frac{1-p}{p^2}$
Poisson( $\lambda$ )	$\frac{e^{-\lambda} \lambda^k}{k!}, \quad k = 0, 1, \dots, \infty$	$\begin{cases} 0 & x < 0 \\ e^{-\lambda} \sum_{i=0}^k \frac{\lambda^i}{i!} & k \leq x < k+1 \\ k = 0, 1, \dots, \infty \end{cases}$	$\lambda$	$\lambda$

Continuous random variables:

Distribution	PDF ( $f_X(k)$ )	CDF ( $F_X(x)$ )	$E[X]$	$\text{Var}(X)$
Uniform[ $a, b$ ]	$\frac{1}{b-a}, \quad a \leq x \leq b$	$\begin{cases} 0 & x \leq a \\ \frac{x-a}{b-a} & a < x < b \\ 1 & x \geq b \end{cases}$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$
Exp( $\lambda$ )	$\lambda e^{-\lambda x}, \quad x > 0$	$\begin{cases} 0 & x \leq 0 \\ 1 - e^{-\lambda x} & x > 0 \end{cases}$	$\frac{1}{\lambda}$	$\frac{1}{\lambda^2}$
Normal( $\mu, \sigma^2$ )	$\frac{1}{\sigma \sqrt{2\pi}} \exp\left(\frac{-(x-\mu)^2}{2\sigma^2}\right), \quad -\infty < x < \infty$	No closed form	$\mu$	$\sigma^2$
Gamma( $\alpha, \beta$ )	$\frac{\beta^\alpha}{\Gamma(\alpha)} x^{\alpha-1} e^{-\beta x}, \quad x > 0$		$\frac{\alpha}{\beta}$	$\frac{\alpha}{\beta^2}$
Beta( $\alpha, \beta$ )	$\frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)} x^{\alpha-1} (1-x)^{\beta-1} \quad 0 < x < 1$		$\frac{\alpha}{\alpha+\beta}$	$\frac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$

- **Markov's inequality:** Let  $X$  be a discrete random variable taking non-negative values with a finite mean  $\mu$ . Then,

$$P(X \geq c) \leq \frac{\mu}{c}$$

- **Chebyshev's inequality:** Let  $X$  be a discrete random variable with a finite mean  $\mu$  and a finite variance  $\sigma^2$ . Then,

$$P(|X - \mu| \geq k\sigma) \leq \frac{1}{k^2}$$

**Options :**

6406532780711. ✓ Useful Data has been mentioned above.

6406532780712. ✗ This data attachment is just for a reference &amp; not for an evaluation.

**Sub-Section Number :**

2

**Sub-Section Id :**

640653123401

**Question Shuffling Allowed :**

Yes

**Question Number : 163 Question Id : 640653827312 Question Type : MCQ****Correct Marks : 3**

Question Label : Multiple Choice Question

Suppose that the number of miles that a car can run before its battery wears out is exponentially distributed, with an average value of 10,000 miles. If you desire to take a 5,000-mile trip, what is the probability that you will be able to complete the trip without replacing the car battery?

**Options :**6406532780713. ✗  $\frac{1}{10000} \exp\left(\frac{-5000}{10000}\right)$ 6406532780714. ✗  $10000 \exp(-5000 * 10000)$ 6406532780715. ✗  $1 - \exp\left(\frac{-5000}{10000}\right)$ 6406532780716. ✓  $\exp\left(\frac{-5000}{10000}\right)$ **Question Number : 164 Question Id : 640653827314 Question Type : MCQ****Correct Marks : 3**

Question Label : Multiple Choice Question

Consider a random variable  $X$  that takes integer values from 1 to 10 with equal probability  $1/10$ . Define another random variable  $Y = X$  modulo 4. Find the PMF of  $Y$ .

**Options :**

$y$	0	1	2	3
$P(Y = y)$	1/5	3/10	3/10	1/5

$y$	0	1	2	3	4
$P(Y = y)$	1/5	1/5	1/5	1/10	3/10

$y$	0	1	2	3
$P(Y = y)$	1/2	1/5	1/5	1/10

6406532780720. ✘

$y$	1	2	3	4
$P(Y = y)$	3/10	3/10	1/5	1/5

6406532780721. ✘

**Question Number : 165 Question Id : 640653827315 Question Type : MCQ**

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider  $n$  bits  $X_1, \dots, X_n$ , where each bit is equally likely to be 0 or 1, and is independent of all other bits. Define  $n - 1$  bits  $Y_i = X_i X_{i+1}$ ,  $i = 1, \dots, n - 1$ . Let  $N_X$  and  $N_Y$  be, respectively, the number of 1s in  $\{X_1, \dots, X_n\}$  and  $\{Y_1, \dots, Y_{n-1}\}$ . Assuming  $n = 100$ , what is the expected value of  $N_X$  and  $N_Y$ ?

**Options :**

6406532780722. ✘  $E(N_X) = 50, E(N_Y) = 49.5$

6406532780723. ✓  $E(N_X) = 50, E(N_Y) = 24.75$

6406532780724. ✘  $E(N_X) = 100, E(N_Y) = 50$

6406532780725. ✘  $E(N_X) = 100, E(N_Y) = 99$

**Sub-Section Number :**

3

**Sub-Section Id :**

640653123402

**Question Shuffling Allowed :**

Yes

**Question Number : 166 Question Id : 640653827313 Question Type : SA**

**Correct Marks : 3**

**Question Label : Short Answer Question**

A teacher observes that the cumulative distribution function (CDF) for the scores on a mathematics test is

$$F(x) = \begin{cases} 0, & x < 0 \\ x^2, & 0 \leq x \leq 1 \\ 1, & x > 1 \end{cases}$$

for  $0 \leq x \leq 1$ , where  $x$  is the score normalized to 1. If a student scores above 0.7, what is the conditional probability that they actually score above 0.9? Enter the answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.35 to 0.39

**Sub-Section Number :** 4

**Sub-Section Id :** 640653123403

**Question Shuffling Allowed :** Yes

**Question Number :** 167 **Question Id :** 640653827316 **Question Type :** MSQ

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

Question Label : Multiple Select Question

The joint PMF of two discrete random variables  $X$  and  $Y$  is given by

$\backslash$	$X$	0	1	2	$P(Y = y)$
$Y$					
0		1/4	1/6	1/6	7/12
1		1/6	1/8	1/8	5/12
$P(X = x)$	5/12	7/24	7/24		1

Select the correct options from the following.

**Options :**

6406532780726. ✓  $P(X = Y) = \frac{3}{8}$

6406532780727. ✗  $P(X = 2, Y = 1) = \frac{1}{6}$

6406532780728. ✓  $P(X \leq 2, Y = 0) = \frac{7}{12}$

6406532780729. ✗  $P(X \leq 2, Y = 0) = \frac{1}{3}$

**Sub-Section Number :** 5

**Sub-Section Id :** 640653123404

**Question Shuffling Allowed :**

No

**Question Id : 640653827317 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (168 to 169)**

Question Label : Comprehension

Let  $X$  be a continuous random variable with the following PDF:

$$f_X(x) = \begin{cases} cx^2(1-x) & 0 \leq x \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

Based on the above data, answer the given subquestions

**Sub questions**

**Question Number : 168 Question Id : 640653827318 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Find the value of  $c$  so that  $f_X(x)$  is a valid PDF.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

12

**Question Number : 169 Question Id : 640653827319 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Calculate the CDF of  $X$ .

**Options :**

$$F_X(x) = \begin{cases} 0, & \text{for } x < 0 \\ 4x^3 - 3x^4, & \text{for } 0 \leq x < 1 \\ 1, & \text{for } x \geq 1 \end{cases}$$

6406532780731. ✓

$$F_X(x) = \begin{cases} 0, & \text{for } x < 0 \\ \frac{1}{12} \left( \frac{x^3}{3} - \frac{x^4}{4} \right), & \text{for } 0 \leq x < 1 \\ 1, & \text{for } x \geq 1 \end{cases}$$

6406532780732. ✘

$$F_X(x) = \begin{cases} 0, & \text{for } x < 0 \\ 24x - 36x^2, & \text{for } 0 \leq x < 1 \\ 1, & \text{for } x \geq 1 \end{cases}$$

6406532780733. ✎

$$F_X(x) = \begin{cases} 0, & \text{for } x < 0 \\ \frac{x}{6} - \frac{x^2}{4}, & \text{for } 0 \leq x < 1 \\ 1, & \text{for } x \geq 1 \end{cases}$$

6406532780734. ✎

**Question Id : 640653827320 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (170 to 171)**

Question Label : Comprehension

In a new game designed by a developer, players can choose between two character types: warrior and mage, with probabilities of selection being 0.4 and 0.6, respectively. Players then choose between two types of equipment: a sword or a staff. If a player chooses the warrior character, there is a 0.3 chance that they will select a sword, whereas if they choose the mage character, there is a 0.5 chance they will select a staff.

Based on this information, answer the given sub questions.

### Sub questions

**Question Number : 170 Question Id : 640653827321 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

What is the probability that a player will choose a character equipped with a sword? Enter the answer correct to two decimal places.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.39 to 0.45

**Question Number : 171 Question Id : 640653827322 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

What is the probability that a player chooses a warrior character with the staff?

Enter the answer correct to two decimal places.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.25 to 0.31

**Question Id : 640653827323 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (172 to 173)**

Question Label : Comprehension

A company has scheduled interviews for job applicants, and 40 people have confirmed their interview slots. Each applicant independently attends the interview with a probability  $p = 3/4$ . Let  $X$  denote the number of people who actually attend the interview.

Based on the above data, answer the given subquestions

**Sub questions**

**Question Number : 172 Question Id : 640653827324 Question Type : MSQ**

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

Question Label : Multiple Select Question

Using Markov inequality, find an upper bound to the probability  $P(X \geq 35)$ .

Which values below are greater than or equal to that upper bound?

**Options :**

6406532780737. ✓ 0.86

6406532780738. ✗ 0.086

6406532780739. ✗ 0.75

6406532780740. ✓ 0.90

**Question Number : 173 Question Id : 640653827325 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Using Chebyshev's inequality, find an upper bound to the probability that at least 35 people attended the interview. 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 :**

0.3

**Question Id : 640653827326 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (174 to 175)**

Question Label : Comprehension

An urn contains 20 white balls and 12 red balls. 2 balls are selected at random. Let  $X$  denote the number of red balls drawn and let  $Y$  denote the number of white balls drawn.

Based on the above data, answer the given subquestions

**Sub questions**

**Question Number : 174 Question Id : 640653827327 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Find the probability  $P(X = 1, Y = 1)$ .

Enter the answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.46 to 0.50

**Question Number : 175 Question Id : 640653827328 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Find the expected value of  $X$ .

Enter the answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.73 to 0.77

**Question Id : 640653827329 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (176 to 177)**

Question Label : Comprehension

Let  $X_1, X_2, X_3 \sim \text{i.i.d. Binomial}(5, 0.5)$ . Based on this information, answer the given subquestions.

### Sub questions

**Question Number : 176 Question Id : 640653827330 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the probability that exactly one out of the three random variables takes value greater than 4?

**Options :**

6406532780744. ❌  $3 \times {}^5 C_4(0.5)^5 [1 - {}^5 C_4(0.5)^5]^2$

6406532780745. ✓  $3 \times (0.5)^5 [1 - (0.5)^5]^2$

6406532780746. ❌  $3 \times (0.5)^5$

6406532780747. ❌  $3 \times [{}^5 C_4(0.5)^5]^3$

**Question Number : 177 Question Id : 640653827331 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Find the probability  $P(\max(X_1, X_2, X_3) > 4)$ .

Enter the 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 :**

0.089 to 0.093

## AppDev1

<b>Section Id :</b>	64065359318
<b>Section Number :</b>	9
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	17
<b>Number of Questions to be attempted :</b>	17
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Section Negative Marks :</b>	0
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	No
<b>Section Maximum Duration :</b>	0
<b>Section Minimum Duration :</b>	0
<b>Section Time In :</b>	Minutes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	640653123405
<b>Question Shuffling Allowed :</b>	No

**Question Number : 178 Question Id : 640653827332 Question Type : MCQ**

**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 :**

6406532780749. ✓ YES

6406532780750. ✘ NO

**Sub-Section Number :** 2

**Sub-Section Id :** 640653123406

**Question Shuffling Allowed :** Yes

**Question Number : 179 Question Id : 640653827333 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is not a correct perceivable accessibility principle?

**Options :**

6406532780751. ✘ Provide text alternatives for non-text content.

6406532780752. ✘ Provide captions and other alternatives for multimedia.

6406532780753. ✘ Make it easier for users to see and hear content.

6406532780754. ✓ Give users enough time to read and use content.

**Question Number : 180 Question Id : 640653827334 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the below HTTP status codes represents the client error?

**Options :**

6406532780755. ✘ 500-599

6406532780756. ✓ 400-499

6406532780757. ✘ 300-399

6406532780758. ✘ 200-299

6406532780759. ✘ 100-199

**Question Number : 181 Question Id : 640653827341 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What will be the output of the following Python code?

```

from jinja2 import Template
data = {"id": 101, "prod_name": "Groceries", "sales_amt": 5600,
"sales_bonus": 5}

def foo(amount, p):
    return amount * p / 100

a = foo(data["sales_amt"], data["sales_bonus"])
t = Template(
    "Congratulations, you got bonus {{ bonus }} by selling product
{{data['prod_name']}}"
)
output = t.render(data=data, bonus=a)
print(output)

```

**Options :**

6406532780784. ✘ Congratulations, you got bonus 70.0 by selling product Groceries

6406532780785. ✘ Congratulations, you got bonus 140.0 by selling product Groceries

6406532780786. ✓ Congratulations, you got bonus 280.0 by selling product Groceries

6406532780787. ✘ Congratulations, you got bonus 560.0 by selling product Groceries

**Question Number : 182 Question Id : 640653827347 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the below table.

Column 1	Column 2
i) Primary Key	a) Method of the request
ii) Foreign key	b) Provides additional functionality at top of original function
iii) Nullable	c) Refers to another parent table column
iv) POST	d) Unique identification of row
v) @<decorator>	e) Undefined value

Use the above table. Which of the below match is correct?

**Options :**

6406532780808. ✘ i - d, ii - b, iii - a, iv - e, v - c

6406532780809. ✓ i - d, ii - c, iii - e, iv - a, v - b

6406532780810. ✘ i - c, ii - d, iv - e, iii - a, v - b

6406532780811. ✘ i - c, ii - d, iv - e, iii - b, v - a

**Sub-Section Number :**

3

**Sub-Section Id :**

640653123407

**Question Shuffling Allowed :**

Yes

**Question Number : 183 Question Id : 640653827335 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

A certain movie with advertisements is being streamed by the client on the internet with a bandwidth of 5 Mbps. If the total data consumed only in the advertisements is 340 MB and the advertisements comprises 17% of the total duration of the streamed movie, what can be the size of the entire movie (in Megabytes) including the advertisements?

**Options :**

6406532780760. ✘ 20

6406532780761. ✘ 640

6406532780762. ✓ 2000

6406532780763. ✘ 1660

**Question Number : 184 Question Id : 640653827337 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider a document of 1000 characters written using only the characters of the character set  $L_1 = \{a, b, c, d, e, f, g, h, i, j\}$ . If the character set  $L_1$  is to be upgraded by adding all the characters of character set  $L_2 = \{0, 1, 2, 3, 4, 5, 6\}$  in it, By how many bits will the size of the original document increase?

**Options :**

6406532780768. ✘ 0 bits

6406532780769. ✓ 1000 bits

6406532780770. ✘ 4000 bits

6406532780771. ✘ 5000 bits

**Question Number : 185 Question Id : 640653827338 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

The following Python code snippet generates the output on the terminal.

```
from string import Template
s = Template('$name studies at $university')
b = {'name': 'Bob'}

out1 = Template('$name studies $subject').safe_substitute(b)
print(out1)

out2 = s.substitute(name='Alice', university='Oxford')
print(out2)

out3 = Template('$name studies $subject').substitute(b)
print(out3)
```

Which of the following is the correct output?

**Options :**

6406532780772. ✘ Bob studies at \$subject  
Alice studies at Oxford  
KeyError: 'subject'

6406532780773. ✓ Bob studies \$subject  
Alice studies at Oxford  
KeyError: 'subject'

6406532780774. ✘ Bob studies \$subject  
Alice studies at Oxford  
Bob studies \$subject

6406532780775. ✘ Bob studies  
Alice studies at Oxford  
KeyError: 'subject'

**Question Number : 186 Question Id : 640653827339 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following HTML document.

```
<!DOCTYPE html>
<html lang="en">
<head>
    <title>Span</title>
    <style>
        span{
            color: blue;
            Background-color: lime;
        }
    </style>
</head>
<body>
    <span id="my_span">MAD-I is a Diploma level course.</span>
    <span>SE is a Degree level course.</span>
</body>
</html>
```

What will be the rendered output if an additional style is added via the ID selector given below?

```
#my_span{
    width: 1200px;
    Background-color: lightpink;
}
```

**Options :**

6406532780776. ✖ MAD-I is a Diploma level course. SE is a Degree level course.
6406532780777. ✓ MAD-I is a Diploma level course. SE is a Degree level course.
6406532780778. ✖ MAD-I is a Diploma level course. SE is a Degree level course.
- MAD-I is a Diploma level course.  
6406532780779. ✖ SE is a Degree level course.

**Question Number : 187 Question Id : 640653827344 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following Python code snippet.

Filename: app.py

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

@app.route('/home', methods = sys.argv)
def my_func():
    if request.method == 'GET':
        return f"Hello from {sys.argv[1]} method"

    elif request.method == 'POST':
        return f"Hello from {sys.argv[2]} method"

    else:
        return "Please enter a valid HTTP method"

app.run(debug = True)
```

If the above flask app is run using the command `python app.py` POST GET in one terminal, what will be the output on another terminal for command;  
`curl -X POST http://127.0.0.1:5000/home` ?

**Options :**

6406532780796. ✘ Hello from POST method

6406532780797. ✓ Hello from GET method

6406532780798. ✘ Please enter a valid HTTP method

6406532780799. ✘ Method not Allowed

**Question Number : 188 Question Id : 640653827345 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following Python code snippet.

Filename: module.py

```
from pyhtml import *
import sys
var = sys.argv[1:]

def list_func(stack):
    for tech in stack:
        yield span(tech)

doc = html(
    head(title('My Document')),
    body(
        h3('Frontend technologies'),
        list_func(var[::-1])
    )
)
print(doc.render())
```

How will the browser render the output of the above code if it is run on the terminal using the command `python module.py HTML CSS JS VUE`?

Options :

**Frontend Technologies**

6406532780800. ✘ HTML CSS JS VUE

**Frontend Technologies**

6406532780801. ✓ VUE JS CSS HTML

**Frontend Technologies**

HTML

CSS

JS

6406532780802. ✘ VUE

**Frontend Technologies**

VUE

JS

CSS

HTML

6406532780803. ✘ HTML

**Sub-Section Number :** 4  
**Sub-Section Id :** 640653123408  
**Question Shuffling Allowed :** Yes

**Question Number : 189 Question Id : 640653827336 Question Type : MCQ**

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the following HTML document.

```

<!DOCTYPE html>
<html>
<head>
    <style>
        span {
            background-color: lightgray;
            color: red;
            font-weight: bold;
        }
        div{
            border: 3px solid purple;
            text-align: center;
            width:20%;
        }
        #id1 {
            color:blue ;
        }
        #id2 {
            display: block;
        }
        .class1 {
            background-color: lightgreen;
            color: blue;
            display: inline-block;
        }
        .class2 {
            background-color: skyblue;
            color: red;
        }
    </style>
</head>
<body>
    <div>
        <span class="class1" id="id1">Content 1</span>
        <span class="class2 class1" >Content 2</span>
        <span id="id2">Content 3</span>
    </div>
</body>
</html>

```

How will the browser render above HTML file?

**Options :**

Content 1	Content 2	Content 3
-----------	-----------	-----------

6406532780764. \*

6406532780765. \*

**Content 1 Content 2**

**Content 3**

**Content 1 Content 2**

**Content 3**

6406532780766. ✓

**Content 1**

**Content 2**

**Content 3**

6406532780767. ✗

**Question Number : 190 Question Id : 640653827340 Question Type : MCQ**

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider a client A that makes a request to server B that fetches the information from Datacenter C which in turn fetches other required information from the Datacenter D. The distance between the client A, server B and datacenters C and D within the network and the speed of information in the medium connecting these nodes is mentioned in the table below.

Nodes	A to B	B to C	C to D
Distance (km)	12000	8500	7500
Speed of Information(m/s)	$3 \times 10^8$	$2 \times 10^8$	$1.5 \times 10^8$

Calculate the round trip latency (in milliseconds) of the network?

**Options :**

6406532780780. ✗ 187

6406532780781. ✗ 132.5

6406532780782. ✓ 265

6406532780783. ✗ 150

**Question Number : 191 Question Id : 640653827348 Question Type : MCQ**

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the following flask app and the bodies of two index.html files shown in the figure below.

app.py

```
from flask import Flask, render_template
import sys

app = ===== app object initialization here =====

@app.route('/home')
def home():
    return render_template('index.html')

app.run()
```

app\_templates/index.html

```
<h3>Home page</h3>
<p>MAD I focuses on backend development</p>
<h5>IITM ONLINE DEGREE</h5>
```

root\_templates/index.html

```
<h3>Home page</h3>
<p>Vue JS is a frontend technology</p>
<h5>IITM BS DEGREE</h5>
```

If the app is run locally using the command

python app.py root\_templates app\_templates ,  
and the output on browser for URL http://127.0.0.1/home is:

## Home page

Vue JS is a frontend technology

## IITM BS DEGREE

How should the app be initialized to get the desired output on the browser?

Options :

- 6406532780812. ✘ app = Flask(\_\_name\_\_)
- 6406532780813. ✘ app = Flask(\_\_name\_\_, templates = sys.argv[1])
- 6406532780814. ✘ app = Flask(\_\_name\_\_, templates = sys.argv[2])
- 6406532780815. ✓ app = Flask(\_\_name\_\_, template\_folder = sys.argv[1])

6406532780816. ✘ app = Flask(\_\_name\_\_, template\_folder = sys.argv[2])

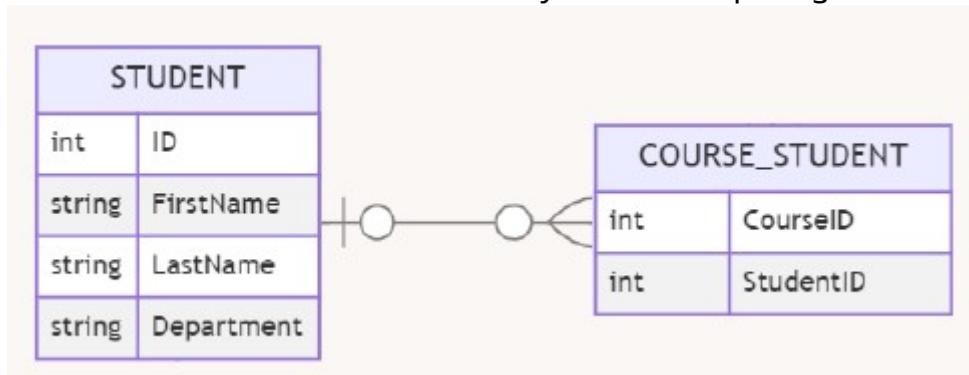
**Sub-Section Number :** 5  
**Sub-Section Id :** 640653123409  
**Question Shuffling Allowed :** Yes

**Question Number : 192 Question Id : 640653827342 Question Type : MSQ**

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

Question Label : Multiple Select Question

What can be inferred from the Entity-Relationship Diagram below:



**Options :**

6406532780788. ✓ A student can exist without enrolling to any course

6406532780789. ✓ A student can have more than one courses

6406532780790. ✘ A student needs to have at least one course

6406532780791. ✘ A course must belong to one and only one student

**Question Number : 193 Question Id : 640653827346 Question Type : MSQ**

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

Question Label : Multiple Select Question

Consider the following Flask code.

File name: sum\_args.py

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

def do_something():
    if len(sys.argv) >= 2:
        l = []
        for i in range(1, len(sys.argv)):
            l.append(int(sys.argv[i]))
        return l
    else:
        return None

@app.route("/")
def do_sum():
    result = do_something()
    if result:
        s = 0
        for e in result:
            s += int(e)
        return f"<h2>Sum is : {s}"
    else:
        return f"<h2>Sum is : {result}"

app.run(debug=True)
```

Select the command(s) to execute the above code without any error.

Options :

6406532780804. ✓ python sum\_args.py 2 8 9

6406532780805. ✓ python sum\_args.py 2

6406532780806. ✓ python sum\_args.py

6406532780807. ✗ python sum\_args.py IITM

Sub-Section Number :

6

Sub-Section Id :

640653123410

Question Shuffling Allowed :

Yes

Question Number : 194 Question Id : 640653827343 Question Type : MSQ

## Correct Marks : 4.5 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the following Python code and HTML document.

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

@app.route("/font/size/<int:size>")
def font_size(size):
    internal_css = {}
    if size < 12:
        internal_css = {"font-weight": "bold", "font-size": "12px"}
    else:
        internal_css = {"font-weight": "normal", "font-size": str(size) + "px"}

    return render_template("index.html", internal_css=internal_css)

app.run(debug=True)
```

HTML document: templates/index.html

```
<!DOCTYPE html>
<html>
    <div style="font-size:{{internal_css['font-size']}};
    font-weight:{{internal_css['font-weight']}};
    >
        IITM BS Degree Program
    </div>
</html>
```

Assume that the flask server is running on "<http://localhost:5000/>". Which of the following is/are true?

**Options :**

6406532780792. ✓ <http://127.0.0.1:5000/font/size/20> will render "IITM BS Degree Program" with font-size=20 and font-weight=normal

6406532780793. ✗ <http://127.0.0.1:5000/font/size/24> will render "IITM BS Degree Program" with font-size=24 and font-weight:bold

6406532780794. ✓ <http://127.0.0.1:5000/font/size/8> will render "IITM BS Degree Program" with font-size=12 and font-weight:bold

6406532780795. ✓ <http://127.0.0.1:5000/font/size/16> will render "IITM BS Degree Program" with font-size=16 and font-weight=normal

## MLF

Section Id :	64065359319
Section Number :	10
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	11
Number of Questions to be attempted :	11
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
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653123411
Question Shuffling Allowed :	No

**Question Number : 195 Question Id : 640653827349 Question Type : MCQ**

**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 :**

6406532780817. ✓ YES

6406532780818. ✗ NO

Sub-Section Number :	2
Sub-Section Id :	640653123412
Question Shuffling Allowed :	No

**Question Id : 640653827350 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (196 to 197)****Question Label : Comprehension**

Let  $A = \begin{pmatrix} 2 & 1 & 1 \\ a & 3 & 2 \\ 3 & b & c \end{pmatrix}$  be a  $3 \times 3$  matrix. Let  $\alpha$  be the eigenvalue corresponding

to the eigenvector  $v_1 = \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}$  and  $\beta$  is the eigenvalue corresponding

to the eigenvector  $v_2 = \begin{pmatrix} 0 \\ 1 \\ -1 \end{pmatrix}$  of matrix  $A$ . Based on this information,

answer the given sub-questions.

**Sub questions****Question Number : 196 Question Id : 640653827351 Question Type : SA****Correct Marks : 3**

Question Label : Short Answer Question

Find the value of  $\alpha + 2\beta$ .**Response Type : Numeric****Evaluation Required For SA : Yes****Show Word Count : Yes****Answers Type : Equal****Text Areas : PlainText****Possible Answers :**

3

**Question Number : 197 Question Id : 640653827352 Question Type : MSQ****Correct Marks : 4 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Which of the following options is/are true ?

**Options :**

Eigenvectors,  $v_1$  and  $v_2$  are linearly independent.

6406532780820. ✓

6406532780821. ✘ Eigenvectors,  $v_1$  and  $v_2$  are orthogonal.

A third eigenvector of  $A$  is  $\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$

6406532780822. ✓

6406532780823. ✓  $a + b + c = 9$ .

**Question Id : 640653827353 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Question Numbers : (198 to 199)**

Question Label : Comprehension

Let  $A = \begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{pmatrix}$  be a  $3 \times 3$  matrix. Use this information to answer the given subquestions

### Sub questions

**Question Number : 198 Question Id : 640653827354 Question Type : MSQ**

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

Question Label : Multiple Select Question

Which of the following options is/are true?

**Options :**

6406532780824. ✓  $A$  is a symmetric matrix.

6406532780825. ✗  $A$  is a diagonal matrix.

6406532780826. ✓  $A$  is orthogonally diagonalizable.

6406532780827. ✓ Eigenvalues of  $A$  are -1, -1 and 2.

**Question Number : 199 Question Id : 640653827355 Question Type : MSQ**

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

Question Label : Multiple Select Question

Let  $v_1$  and  $v_2$  are the eigenvectors of  $A$  corresponding to distinct eigen-values.

We construct a new matrix  $B$  using these eigenvectors as its columns, such that

$B = [v_1, v_2]$ . Based on this information, which of the following options are correct?

**Options :**

6406532780828. ✓ Null space of the matrix  $B$  is zero space.

6406532780829. ✗ Column space of the matrix  $B$  is  $\mathbb{R}^3$ .

6406532780830. ✓

Column space of the matrix  $B$  represents  
a plane in  $\mathbb{R}^3$ .

Null space of the matrix  $B$  represents  
6406532780831. ✖ a line in  $\mathbb{R}^3$ .

**Sub-Section Number :** 3  
**Sub-Section Id :** 640653123413  
**Question Shuffling Allowed :** Yes

**Question Number : 200 Question Id : 640653827356 Question Type : MSQ**

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

Question Label : Multiple Select Question

Let  $P$  be the projection matrix for a vector  $a = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$ . Which of the following options is/are true?

**Options :**

6406532780832. ✓  $P$  is orthogonally diagonalizable.

6406532780833. ✓  $P^4 = P$ .

6406532780834. ✓ Projection of  $b = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$  on the vector  $a$  is  $-\frac{1}{5}a$ .

6406532780835. ✖  $\text{Rank}(P) = 2$

**Sub-Section Number :** 4  
**Sub-Section Id :** 640653123414  
**Question Shuffling Allowed :** Yes

**Question Number : 201 Question Id : 640653827357 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Find the best-fit line for the dataset given below using the least squares method.

x	0	2	3	5
y	1	2	4	3

**Options :**6406532780836. ✓  $\hat{y} = 1.34 + 0.46x$ 6406532780837. ✗  $\hat{y} = 0.46 + 1.34x$ 6406532780838. ✗  $\hat{y} = 1.34 - 0.46x$ 6406532780839. ✗  $\hat{y} = 2.16 + 0.74x$ **Question Number : 202 Question Id : 640653827358 Question Type : MCQ****Correct Marks : 4**

Question Label : Multiple Choice Question

The function

$$f(x) = \begin{cases} ax^2 + bx + 1, & \text{if } x < 0 \\ cx + d, & \text{if } x \geq 0 \end{cases}$$

is differentiable at ( $x = 0$ ). If  $a$ ,  $b$ ,  $c$ , and  $d$  are constants, which of the following must be true?

**Options :**6406532780840. ✗  $a = c$  and  $b = 1$ 6406532780841. ✓  $b = c$  and  $d = 1$ 6406532780842. ✗  $a = c$  and  $d = 1$ 6406532780843. ✗  $b = d = 1$ **Sub-Section Number :**

5

**Sub-Section Id :**

640653123415

**Question Shuffling Allowed :**

Yes

**Question Number : 203 Question Id : 640653827359 Question Type : MCQ****Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following statements is true for a function  $f(x, y)$  that is differentiable at a point  $(a, b)$ ?**Options :**

6406532780844. ✓ The directional derivative exists in every direction.

6406532780845. ✘ The directional derivative is the same in every direction.

6406532780846. ✘ The directional derivative can only be calculated along the axes.

6406532780847. ✘ The directional derivative does not exist.

**Question Number : 204 Question Id : 640653827360 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following functions cannot be approximated linearly around  $x = 0$ ?

**Options :**

6406532780848. ✘  $f(x) = \sin(x)$

6406532780849. ✘  $f(x) = \cos(x)$

6406532780850. ✓  $f(x) = \ln(x)$

6406532780851. ✘  $f(x) = x^2$

**Sub-Section Number :**

6

**Sub-Section Id :**

640653123416

**Question Shuffling Allowed :**

Yes

**Question Number : 205 Question Id : 640653827361 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

If  $f(x, y) = x^2y + 3xy^2$ , what is the length of the gradient at the point (1,2)?

Enter the answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

20.58 to 20.64

**Question Number : 206 Question Id : 640653827362 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

In a sports analytics company, the team is interested in predicting whether a basketball player will score above 20 points in a game using classification models. They collected data on various factors  $x = [x_1, x_2, x_3]$  from past games of different players. The factors include minutes played, shots attempted, and free throw percentage. The data and corresponding labels are shown in the table below: Compute the misclassification

$x$	$y$
[1, 5, 0.8]	1
[0, 3, 0.9]	0
[1, 2, 0.7]	0
[1, 8, 0.6]	1
[0, 7, 0.5]	0

rate if they use the following step function:

$$u(z) = \begin{cases} 1, & \text{if } z \geq 3 \\ 0, & \text{otherwise} \end{cases}$$

and the linear combination  $z$  is given by:  $0.6x_1 + 0.3x_2 + 0.1x_3$ . Enter the answer correct to one decimal place.

**Note:** Here,  $x_1$  represents whether the player is a starter (1) or not (0),  $x_2$  is the number of shots attempted, and  $x_3$  is the free throw percentage. The label  $y$  indicates whether the player scored more than 20 points (1) or not (0). The misclassification rate is the number of labels misclassified.e.g. if 3 out of 5 players are mislabeled then the misclassification rate is 3/5.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0.2

**Sub-Section Number :**

7

**Sub-Section Id :**

640653123417

**Question Shuffling Allowed :**

Yes

**Question Number :** 207 **Question Id :** 640653827363 **Question Type :** MCQ

**Correct Marks :** 2

**Question Label :** Multiple Choice Question

Consider a dataset from an e-commerce company such as Flipkart that has details of customer behavior, which of the following problems can be best approached using clustering?

**Options :**

6406532780854. \* Predicting the exact number of sales for each customer segment.

6406532780855. ✨ Classifying customers into segments based on labeled customer data.

6406532780856. ✓ Identifying inherent groupings in customer data without predefined labels.

6406532780857. ✨ Reducing the number of features in the customer dataset.

## Java

<b>Section Id :</b>	64065359320
<b>Section Number :</b>	11
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	16
<b>Number of Questions to be attempted :</b>	16
<b>Section Marks :</b>	100
<b>Display Number Panel :</b>	Yes
<b>Section Negative Marks :</b>	0
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	No
<b>Section Maximum Duration :</b>	0
<b>Section Minimum Duration :</b>	0
<b>Section Time In :</b>	Minutes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	640653123418
<b>Question Shuffling Allowed :</b>	No

**Question Number : 208 Question Id : 640653827364 Question Type : MCQ**

**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 :**

6406532780858. ✓ YES

6406532780859. ✨ NO

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	640653123419

**Question Shuffling Allowed :**

Yes

**Question Number : 209 Question Id : 640653827365 Question Type : MSQ**

**Correct Marks : 6 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Which of the following statements is/are correct about activation records?

**Options :**

6406532780860. ❌ Return value link points to the start of the previous activation record.

6406532780861. ✓ An activation record is pushed into the stack when a function is called, and is popped out when the function returns.

6406532780862. ❌ The variables present in every activation record in the stack are in scope and are accessible.

6406532780863. ✓ The variables present in the topmost activation record of the stack are in scope and are accessible.

**Sub-Section Number :**

3

**Sub-Section Id :**

640653123420

**Question Shuffling Allowed :**

Yes

**Question Number : 210 Question Id : 640653827366 Question Type : MCQ**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Match the following terms with their descriptions/properties.

Terms	Properties
1. State	A. Determine the choice of method implementation at run time
2. Behaviour	B. Compatibility of interfaces
3. Subtyping	C Determined by the information in the instance variables
4. Inheritance	D. Methods that operate on an object
5. Dynamic lookup	E. Reuse of implementations

**Options :**

6406532780864. ❌ 1-B, 2-A, 3-C, 4-D, 5-E

6406532780865. ❌ 1-A, 2-B, 3-D, 4-E, 5-C

6406532780866. ✓ 1-C, 2-D, 3-B, 4-E, 5-A

6406532780867. ❌ 1-D, 2-C, 3-E, 4-A, 5-B

**Question Number : 211 Question Id : 640653827367 Question Type : MCQ**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
public class Test{
    public static void main(String[] args){
        int a[] = {10, 20};
        int x = a[0];
        for(int i : a){
            switch(i){
                case 10:
                    x = x + 10;
                    System.out.println(x);
                    break;
                case 20:
                    x = x + 20;
                    System.out.println(x);
                    break;
                default:
                    System.out.println(x);
            }
        }
    }
}
```

What will the output be?

**Options :**

6406532780868. ✘ 20

30

30

6406532780869. ✓ 20

40

6406532780870. ✘ 20

40

60

6406532780871. ✘ 10

20

40

**Question Number : 212 Question Id : 640653827368 Question Type : MCQ**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
interface Printer{
    public default void print(){
        System.out.println("Prints");
    }
}
interface Scanner{
    public default void scan(){
        System.out.println("Scans");
    }
}
class Device implements Printer, Scanner{
    public void print(){
        System.out.println("Color printing");
    }
}
public class Test {
    public static void main(String[] args) {
        Printer p1 = new Device();
        p1.print();
        p1.scan(); //LINE 1
    }
}
```

Choose the correct option.

**Options :**

This program generates the output:

Color printing

6406532780872. ✘ Scans

This program generates the output:

Prints

6406532780873. ✘ Scans

LINE 1 generates compiler error because p1 of type Printer cannot invoke

6406532780874. ✓ method scan().

This program generates compiler error because neither is class Device declared as abstract nor does it override method scan().

6406532780875. ✘

**Question Number : 213 Question Id : 640653827372 Question Type : MCQ**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class Employee {  
    public void performTasks() {  
        System.out.println("Perform tasks");  
    }  
}  
class Manager extends Employee {  
    public void plan() {  
        System.out.println("Plan tasks");  
    }  
  
    public void monitor() {  
        System.out.println("Monitor employees");  
    }  
}  
class DeliveryHead extends Manager {  
    public void plan() {  
        System.out.println("Plan delivery operations");  
    }  
}  
public class Test {  
    public static void main(String[] args) {  
        Manager obj = new DeliveryHead();  
        obj.performTasks(); // LINE 1  
        obj.monitor();  
        obj.plan(); // LINE 2  
    }  
}
```

Choose the correct option.

**Options :**

LINE 1 generates compilation error because method `performTasks()` cannot  
**6406532780888.** ❌ be invoked on `obj`.

This code generates the below output followed by runtime Error at LINE 2  
because there is ambiguity in which `plan( )` method is being invoked.

**6406532780889.** ❌  
Perform tasks  
Monitor employees

This code generates the output:

Perform tasks  
Monitor employees  
**6406532780890.** ✓ Plan delivery operations

This code generates the output:

Perform tasks  
Monitor employees  
Plan tasks

6406532780891. ✘

**Question Number : 214 Question Id : 640653827378 Question Type : MCQ**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class Bird {  
    private String species;  
    private String color;  
    public Bird(String species, String color) {  
        this.species = species;  
        this.color = color;  
    }  
    // ----- CODE SEGMENT -----  
}  
public class Test {  
    public static void main(String[] args) {  
        Bird b1 = new Bird("Parrot", "Green");  
        Bird b2 = new Bird("Sparrow", "Brown");  
        System.out.println(b1 + "\n" + b2);  
    }  
}
```

Choose the correct option to fill in the CODE SEGMENT so that the output is:

Parrot : Green

Sparrow : Brown

**Options :**

```
    public String toString(Object ob){  
        return ob.species + " : " + ob.color;  
    }
```

6406532780912. ✘ }

```
    public String toString() {  
        return species + " : " + color;  
    }
```

6406532780913. ✓ }

6406532780914. ✘ No additional code is required in place of CODE SEGMENT.

This output will not be printed because Java throws an error when an object is tried to be printed using System.out.println.

6406532780915. \*

<b>Sub-Section Number :</b>	4
<b>Sub-Section Id :</b>	640653123421
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 215 Question Id : 640653827369 Question Type : MCQ**

**Correct Marks : 7**

Question Label : Multiple Choice Question

Consider the Java code given below. Identify the correct statement to fill in the blank at LINE 1, such that the output is: Eligible for Diploma

```
interface Eligibility {  
    void printEligibility();  
}  
class Student {  
    private double cgpa;  
    //Constructor to initialize instance variable  
    public Eligibility checkEligibility() {  
        if (cgpa > 6.0)  
            return new Eligible();  
        return new NotEligible();  
    }  
    private class Eligible implements Eligibility {  
        public void printEligibility() {  
            System.out.println("Eligible for Diploma");  
        }  
    }  
    private class NotEligible implements Eligibility {  
        public void printEligibility() {  
            System.out.println("Not eligible for Diploma");  
        }  
    }  
}  
public class Test {  
    public static void main(String[] args) {  
        Student s1 = new Student(5.5);  
        Student s2 = new Student(7.5);  
        ----- //LINE 1  
    }  
}
```

**Options :**

6406532780876. ✓

```
s2.checkEligibility().printEligibility();
```

6406532780877. ✘ s2.printEligibility();

6406532780878. ✘ s1.printEligibility();

6406532780879. ✘ s1.checkEligibility().printEligibility();

**Question Number : 216 Question Id : 640653827370 Question Type : MCQ**

**Correct Marks : 7**

Question Label : Multiple Choice Question

Consider the code given below that checks whether two phones are the same. Method `equals` is overridden to compare two `Phone` objects as follows.

If two phones have the same `brand` and `imeiNumber`, then they are the same.

```
class Phone {  
    private String brand;  
    private int imeiNumber;  
  
    // Constructor to initialize instance variables  
  
    public boolean equals(Object obj) {  
        //CODE BLOCK  
    }  
}  
  
public class Test {  
    public static void main(String[] args) {  
        Phone p1 = new Phone("Samsung", 123456);  
        Phone p2 = new Phone("Samsung", 123456);  
        if (p1.equals(p2))  
            System.out.println("p1 and p2 are same");  
        else  
            System.out.println("p1 and p2 are different");  
    }  
}
```

Choose the correct option(s) to fill in place of CODE BLOCK so that the output is:  
p1 and p2 are same

**Options :**

6406532780880. ✘

```
if(obj instanceof Phone) {  
    if(this.brand == obj.brand && this.imeiNumber == obj.imeiNumber)  
        return true;  
}  
return false;  
  
if(this.brand == obj.brand && this.imeiNumber == obj.imeiNumber)  
    return true;  
6406532780881. ✘ return false;  
  
if(obj instanceof Phone) {  
    Phone p = obj;  
    if(this.brand == p.brand && this.imeiNumber == p.imeiNumber)  
        return true;  
}  
6406532780882. ✘ return false;  
  
if(obj instanceof Phone) {  
    Phone p = (Phone) obj;  
    if(this.brand == p.brand && this.imeiNumber == p.imeiNumber)  
        return true;  
}  
6406532780883. ✓ return false;
```

**Question Number : 217 Question Id : 640653827371 Question Type : MCQ**

**Correct Marks : 7**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class TravelAgency{  
    String name;  
    String[] destinations;  
  
    public TravelAgency(String n, String[] d){  
        name = n;  
        destinations = d;  
    }  
    public TravelAgency(TravelAgency t){  
        this.name = t.name;  
        this.destinations = t.destinations;  
    }  
}  
public class Test{  
    public static void main(String[] args){  
        String[] d = {"Ooty", "Bali", "Thailand"};  
        TravelAgency t1 = new TravelAgency("RoamWorld", d);  
        TravelAgency t2 = new TravelAgency(t1);  
        t2.name= "ValleyTravel";  
        t2.destinations[0] = "Goa";  
        System.out.println(t1.name + "," +t1.destinations[0]);  
        System.out.println(t2.name + "," +t2.destinations[0]);  
    }  
}
```

What will the output be?

**Options :**

6406532780884. ❌ ValleyTravel,Goa  
6406532780884. ❌ ValleyTravel,Goa

6406532780885. ✓ RoamWorld,Goa  
6406532780885. ✓ ValleyTravel,Goa

6406532780886. ❌ RoamWorld,Ooty  
6406532780886. ❌ ValleyTravel,Goa

6406532780887. ❌ RoamWorld,Ooty  
6406532780887. ❌ RoamWorld,Goa

**Question Number : 218 Question Id : 640653827373 Question Type : MCQ**

**Correct Marks : 7**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class Screen {  
    void showContent() {  
        System.out.println("Display on screen");  
    }  
}  
class TV extends Screen {  
    void showContent() {  
        super.showContent();  
        System.out.println("Display on TV");  
    }  
    void showContent(String s) {  
        System.out.println("Display on TV: " + s);  
    }  
}  
class Monitor extends TV {  
    void showContent() {  
        super.showContent();  
        System.out.println("Display on monitor");  
    }  
    void showContent(String s) {  
        System.out.println("Display on monitor: " + s);  
    }  
}  
class Test {  
    public static void main(String[] args) {  
        TV obj = new Monitor(); // LINE 1  
        obj.showContent();  
        obj.showContent("News"); // LINE 2  
    }  
}
```

**Options :**

The program generates output:

Display on screen

Display on TV

Display on monitor

Display on monitor: News

6406532780892. ✓

LINE 1 generates compilation error because a variable of type TV cannot refer

6406532780893. ✗ to an object of type Monitor.

6406532780894. ✗

This code generates the below output followed by runtime Error at LINE 2 because there is ambiguity in which `showContent()` method is being invoked.

Display on TV  
Display on monitor  
Display on monitor: News

The program generates output:

Display on screen  
Display on TV  
Display on TV: News

6406532780895. ❌

### Question Number : 219 Question Id : 640653827374 Question Type : MCQ

#### Correct Marks : 7

Question Label : Multiple Choice Question

Consider the Java code given below.

```
1 interface Coolable {  
2     public void startCooling();  
3     public void stopCooling();  
4 }  
5 interface TemperatureAdjustable {  
6     public void adjustTemperature();  
7     default void displayTemperature() {  
8         System.out.println("Temperature is adjustable.");  
9     }  
10 }  
11 class AirConditioner implements Coolable, TemperatureAdjustable {  
12     public void startCooling() {  
13         System.out.println("Cooling started.");  
14     }  
15     public void stopCooling() {  
16         System.out.println("Cooling stopped.");  
17     }  
18 }
```

Choose the correct option regarding the above code.

#### Options :

LINE 7 generates compilation error because the method `displayTemperature` is not abstract.  
6406532780896. ❌

LINE 11 generates compilation error because class `AirConditioner` cannot implement two interfaces.  
6406532780897. ❌

LINE 11 generates compilation error because class `AirConditioner` is not declared as abstract.  
6406532780898. ✓

LINE 2, LINE 3 & LINE 6 generate compilation errors because the methods `startCooling()`, `stopCooling()` and `adjustTemperature()` are not abstract.  
6406532780899. ✗

### Question Number : 220 Question Id : 640653827375 Question Type : MCQ

#### Correct Marks : 7

Question Label : Multiple Choice Question

Consider the Java code given below.

```
interface Singable {  
    default void sing() {  
        System.out.println("Sings");  
    }  
    public void perform();  
}  
abstract class Musician implements Singable {  
    public void sing() {  
        System.out.println("Sings song");  
    }  
}  
class LeadSinger extends Musician {  
    public void perform() {  
        System.out.println("Leads group");  
    }  
}  
public class Test {  
    public static void main(String[] args) {  
        Singable obj1 = new LeadSinger(); // LINE 1  
        Musician obj2 = new LeadSinger();  
        obj2.sing();  
        obj2.perform(); // LINE 2  
    }  
}
```

Choose the correct option.

#### Options :

This code generates the output:

Sings song

6406532780900. ✓ Leads group

This code generates the output:

Sings

Leads group

6406532780901. ✘

LINE 1 generates compilation error because a variable of type Singable cannot refer to an object of type LeadSinger.

6406532780902. ✘

LINE 2 generates compilation error because the method perform() cannot be invoked on obj2

6406532780903. ✘

**Question Number : 221 Question Id : 640653827377 Question Type : MCQ**

**Correct Marks : 7**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class Player {  
    private String name;  
    private int jerseyNumber;  
    public Player(String nm){  
        name = nm;  
    }  
    public Player(int number){  
        jerseyNumber = number;  
    }  
    public Player(String nm, int number) {  
        name = nm;  
        jerseyNumber = number;  
    }  
    public String toString() {  
        return "Name: " + name + ", Jersey Number: " + jerseyNumber;  
    }  
}  
  
class Captain extends Player {  
    private String team;  
    // ----- CODE BLOCK -----  
    public String toString() {  
        return super.toString() + ", Team: " + team;  
    }  
}
```

Choose the correct option to fill in place of CODE BLOCK to instantiate instance variables of class Captain

**Options :**

```
public Captain(String t) {  
    team = t;
```

6406532780908. ✘ }

```
public Captain(String nm, int number, String t) {  
    super(nm, number);  
    team = t;
```

6406532780909. ✓ }

```
public Captain(String nm, int number, String t) {  
    name = nm;  
    jerseyNumber = number;  
    team = t;
```

6406532780910. ✘ }

```
public Captain(String nm, int number, String t) {  
    team = t;  
    super(nm, number);
```

6406532780911. ✘ }

**Question Number : 222 Question Id : 640653827379 Question Type : MCQ**

**Correct Marks : 7**

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 BankAccount extends Printable {
    private String accountName;
    private double balance;
    public BankAccount(String aN, double b) {
        //initialize accountname and balance
    }
    public void print() {
        System.out.println(accountName + ", " + balance);
    }
}
class BankAccountList {
    private final int limit = 3;
    private BankAccount[] list;
    public BankAccountList(BankAccount[] accounts) {
        this.list = accounts;
    }
    private class BankAccountIter implements Iterator {
        private int indx;
        public BankAccountIter() {
            //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 BankAccountIter();
    }
}
public class Test{
    public static void main(String[] args) {
        BankAccountList.BankAccount[] accounts = {
            new BankAccountList.BankAccount("Priya", 500),
            new BankAccountList.BankAccount("Ravi", 1000),
            new BankAccountList.BankAccount("Suresh", 1500)
        };
        BankAccountList bList = new BankAccountList(accounts);
        Iterator iter = bList.getIterator();
        while(iter.has_next()) {
            -----;           //LINE 1
        }
    }
}
```

Identify the appropriate statement to fill in the blank at LINE 1, such that the output is:

Priya, 500  
Ravi, 1000  
Suresh, 1500

### Options :

6406532780916. ✓ ((Printable)iter.get\_next()).print()

6406532780917. ✗ ((BankAccount)iter.get\_next()).print()

6406532780918. ✗ ((BankAccountList)iter.get\_next()).print()

6406532780919. ✘ `iter.get_next().print();`

**Sub-Section Number :**

5

**Sub-Section Id :**

640653123422

**Question Shuffling Allowed :**

Yes

**Question Number : 223 Question Id : 640653827376 Question Type : MCQ**

**Correct Marks : 8**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class Appliance {  
    private int code;  
    private static double basePower = 100;  
    public Appliance(int c) {  
        code = c;  
    }  
    public final double electricityFare() {  
        return basePower*2;  
    }  
}  
class Cooler extends Appliance {  
    public Cooler(int x) {  
        super(x);  
    }  
    public final double electricityFare() { //LINE 1  
        return basePower*3; //LINE 2  
    }  
}  
public class Test {  
    public static void main(String[] args) {  
        Appliance d1 = new Cooler(101); // LINE 3  
        Cooler c1 = new Appliance(105); // LINE 4  
        d1.electricityFare();  
        c1.electricityFare();  
    }  
}
```

Which of the following statements is FALSE?

**Options :**

6406532780904. ✘ LINE 1 generates compilation error because the method `electricityFare()` cannot be overridden.

6406532780905. ✘

LINE 2 generates compilation error because instance variable `basePower` cannot be accessed in class `Cooler`.

LINE 3 generates compilation error because a variable of type `Appliance` cannot refer to an object of type `Cooler`.  
6406532780906. ✓

LINE 4 generates compilation error because a variable of type `Cooler` cannot refer to an object of type `Appliance`.  
6406532780907. ✗

## AppDev2

<b>Section Id :</b>	64065359321
<b>Section Number :</b>	12
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	17
<b>Number of Questions to be attempted :</b>	17
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Section Negative Marks :</b>	0
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	No
<b>Section Maximum Duration :</b>	0
<b>Section Minimum Duration :</b>	0
<b>Section Time In :</b>	Minutes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	640653123423
<b>Question Shuffling Allowed :</b>	No

**Question Number : 224 Question Id : 640653827380 Question Type : MCQ**

**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 :**

6406532780920. ✓ YES

6406532780921. ✗ NO

**Sub-Section Number :**

2

**Sub-Section Id :**

640653123424

**Question Shuffling Allowed :**

Yes

**Question Number : 225 Question Id : 640653827381 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following methods is not a valid DOM method in JavaScript?

**Options :**

6406532780922. ✗ getElementById()

6406532780923. ✓ getElementByPropertyName()

6406532780924. ✗ getElementsByTagName()

6406532780925. ✗ getElementByClassName()

**Question Number : 226 Question Id : 640653827384 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What will be the output of the following code snippet?

```
let result = "";
for (let i = 0; i < 3; i++) {
  for (let j = 0; j < 2; j++) {
    result += " " + i + j + " ";
  }
}
console.log(result);
```

**Options :**

6406532780935. ✗ 0 1 1 2 2 3

6406532780936. ✗ 0 1 1 2 2 3 3 4

6406532780937. ✘ 0 1 2 3 4 5

6406532780938. ✓ 00 01 10 11 20 21

**Question Number : 227 Question Id : 640653827387 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following statements best describes the ephemeral state?

**Options :**

6406532780949. ✘ Data that persists across browser sessions.

6406532780950. ✘ Data that is stored in a server-side database.

6406532780951. ✓ Temporary data that is not preserved across re-renders.

6406532780952. ✘ Data that is cached in the client's browser.

**Question Number : 228 Question Id : 640653827389 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the difference between v-bind and v-model directives in Vue.js?

**Options :**

6406532780957. ✓ “v-bind” is used for one-way data binding, while “v-model” is used for two-way data binding.

6406532780958. ✘ “v-bind” is used for two-way data binding, while “v-model” is used for one-way data binding.

6406532780959. ✘ Both “v-bind” and “v-model” are used for one-way data binding.

6406532780960. ✘ Both “v-bind” and “v-model” are used for two-way data binding.

**Sub-Section Number :**

3

**Sub-Section Id :**

640653123425

**Question Shuffling Allowed :**

Yes

**Question Number : 229 Question Id : 640653827382 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What will be the output of the following JavaScript code?

```
let x = undefined;
let y = null;
let z = NaN;
console.log(x == y, x === y, y == z, y === z, isNaN(z));
```

**Options :**

6406532780926. ✘ true false false true false

6406532780927. ✘ false false false false true

6406532780928. ✓ true false false false true

6406532780929. ✘ false true true false false

**Question Number : 230 Question Id : 640653827383 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the below JavaScript program.

```
const a = 15;

const obj1 = {
    a: 20,
    b: function () {
        console.log(this.a);
        this.b();
    }
}

const obj2 = {
    a: 10,
    b: () => {
        console.log(this.a);
    }
}

obj1.b.apply(obj2);
```

What will be the output of the above program, if executed?

**Options :**

20

6406532780930. ✘ 20

20

6406532780931. ✘ undefined

6406532780932. ✘

undefined  
undefined

10  
6406532780933. ✓ undefined

6406532780934. ❌ The program will crash due to maximum call stack size exceeded error.

**Question Number : 231 Question Id : 640653827385 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the below JavaScript program.

```
let users = [
  { name: "Alice", age: 25 },
  { name: "Bob", age: 22 },
  { name: "Charlie", age: 30 },
];
users.sort((a, b) => a.age - b.age);
console.log(users.map((user) => user.name).join(", "));
```

What will be the output when the code is executed?

**Options :**

6406532780939. ❌ Alice, Bob, Charlie

6406532780940. ✓ Bob, Alice, Charlie

6406532780941. ❌ Charlie, Alice, Bob

6406532780942. ❌ Charlie, Bob, Alice

**Question Number : 232 Question Id : 640653827386 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the below javascript program.

```
const words = ['apple', 'banana', 'orange', 'grape', 'kiwi'];
const result = words.map(word => word.length).filter(len => len > 5);
console.log(result);
```

What will be the output of the above program, if executed?

**Options :**

6406532780943. ✘ ['apple', 'banana', 'orange', 'grape', 'kiwi']

6406532780944. ✘ [5, 6, 6, 5, 4]

6406532780945. ✘ ['banana', 'orange']

6406532780946. ✓ [6, 6]

6406532780947. ✘ [5, 5]

6406532780948. ✘ [true, true]

**Question Number : 233 Question Id : 640653827388 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What is state management in the context of a web application?

**Options :**

6406532780953. ✘ Organizing and storing data on the server-side database.

6406532780954. ✓ Handling and updating the state of client-side components and data.

6406532780955. ✘ Managing user session data using browser cookies.

6406532780956. ✘ Coordinating the state of HTTP requests and responses between client and server.

**Question Number : 234 Question Id : 640653827390 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following JavaScript program.

```
const obj1={  
    age: 29,  
    toy: 'kite'  
}  
  
const obj2={  
    __proto__: obj1,  
    animal: 'dogs',  
    members: 45  
}  
  
console.log(obj1.toy)  
console.log(obj1.animal)  
console.log(obj2.age)  
console.log(obj2.members)  
console.log(Object.keys(obj2))
```

What will be the output of the above program, if executed?

**Options :**

kite  
undefined  
29  
45  
['animal', 'members', 'age', 'toy']  
6406532780961. ✘

kite  
dogs  
undefined  
45  
['age', 'toy', 'animal', 'members']  
6406532780962. ✘

kite  
dogs  
undefined  
45  
['age', 'toy']  
6406532780963. ✘

6406532780964. ✓

```
kite
undefined
29
45
['animal', 'members']
```

**Question Number : 235 Question Id : 640653827395 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following html.

```
<div id="app">
  <p>{{ message }}</p>
  <button @click="updateMessage">Click me</button>
</div>

<script>
new Vue({
  el: '#app',
  data: {
    message: 'Hello!'
  },
  methods: {
    updateMessage() {
      this.message += '!';
    }
  }
});
</script>
```

Assuming vue cdn has been added to the html and the html format is correct. What would be the output on the screen after clicking the button twice?

**Options :**

6406532780981. ✘ Hello

6406532780982. ✘ Hello!

6406532780983. ✘ Hello!!

6406532780984. ✓ Hello!!!

<b>Sub-Section Number :</b>	4
<b>Sub-Section Id :</b>	640653123426
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 236 Question Id : 640653827391 Question Type : MSQ**

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

Question Label : Multiple Select Question

Which of the following is/are correct definition(s) of an arrow function that accepts a number and returns its square?

**Options :**

6406532780965. ❌ let func = (num) => return num1\*num1;

6406532780966. ❌ let func = (num) => { num1\*num1; }

6406532780967. ✓ let func = (num) => num1\*num1;

6406532780968. ✓ let func = (num) => { return num1\*num1; }

<b>Sub-Section Number :</b>	5
<b>Sub-Section Id :</b>	640653123427
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 237 Question Id : 640653827392 Question Type : MCQ**

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the following JavaScript code embedded in the body of the HTML document given below.

```
<html>
<body>
    <div id="mybox">Test JS</div>
    <script>
        let count = 0;
        let change = setInterval(()=>{
            let box = document.getElementById('mybox');
            if(count % 2 == 1){
                box.style.backgroundColor = 'red';
                count++;
            }
            else if(count % 3 == 1){
                box.style.backgroundColor = 'green';
                count++;
            }
            else{
                box.style.backgroundColor = 'yellow';
                count++;
            }
        }, 1000)
    </script>
</body>
</html>
```

If the document is rendered on the browser, what will be the sequence of background colors taken by the element with id="mybox" in the first 6 seconds of execution?

**Options :**

6406532780969. ❌ Red → Green → Yellow → Red → Green → Yellow

6406532780970. ❌ Red → Green → Red → Yellow → Red → Yellow

6406532780971. ❌ Yellow → Green → Yellow → Green → Yellow → Green

6406532780972. ✓ Yellow → Red → Yellow → Red → Green → Red

**Question Number : 238 Question Id : 640653827393 Question Type : MCQ**

**Correct Marks : 4.5**

**Question Label : Multiple Choice Question**

Consider the below JavaScript program.

```
class Region{
    constructor(region){
        this.region = region;
    }
    get describe(){
        return `${this.region} is one of the major geographical regions.`
    }
}

class Country extends Region {
    constructor(region, country, nation){
        super(region)
        this.country = country;
        this.nation = nation;
    }

    get describe(){
        return `${this.country} is a ${this.nation} nation in the region of
${this.region}.`
    }
}

let Australia = new Region('Australia and NZ', 'Australia', 'developed')
let Germany = new Country('Europe', 'Germany', 'developed')
console.log(Australia.describe)
console.log(Germany.describe)
```

What will be the output of the above program, if executed?

**Options :**

Australia is a developed nation in the region of Australia and NZ.  
Germany is a developed nation in the region of Europe.

6406532780973. ✘

Australia and NZ is one of the major geographical regions.  
Germany is one of the major geographical regions.

6406532780974. ✘

Australia is a developed nation in the region of Australia and NZ.  
Germany is one of the major geographical regions.

6406532780975. ✘

6406532780976. ✓

Australia and NZ is one of the major geographical regions.  
Germany is a developed nation in the region of Europe.

**Question Number : 239 Question Id : 640653827394 Question Type : MCQ**

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the following Vue application with markup index.html and JavaScript file app.js.

File: index.html

```
<div id = "app">
    <div>Welcome to Frontend Development</div>
        <new>Vue is a Frontend Framework</new>
    </div>
    <script src="script.js"></script>
```

File: script.js

```
Vue.component('new', {
  template : `<div>
    <slot>Vue is JS Framework</slot>
    <div>Learn Vue 2 and Vue 3</div>
  </div>
`,

});

new Vue({
  el : "#app",
})
```

What will be rendered on the browser screen?

**Options :**

- Welcome to Frontend Development
- Vue is a JS Framework
- Vue is a Frontend Framework
- 6406532780977. ❌ Learn Vue 2 and Vue 3

6406532780978. ❌

Welcome to Frontend Development

Vue is a Frontend Framework

Vue is a JS Framework

Learn Vue 2 and Vue 3

Welcome to Frontend Development

Vue is a Frontend Framework

6406532780979. ✓ Learn Vue 2 and Vue 3

Welcome to Frontend Development

Vue is a JS Framework

6406532780980. ✗ Learn Vue 2 and Vue 3

**Question Number : 240 Question Id : 640653827396 Question Type : MCQ**

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the following html.

```
<div id="app">
  <parent-component :title="parentTitle">
    <template slot="header">
      <h2>{{ headerTitle }}</h2>
    </template>
  </parent-component>
</div>

<script>
Vue.component('parent-component', {
  props: ['title'],
  template: `
    <div>
      <h1>{{ title }}</h1>
      <slot name="header"></slot>
      <p>Main Content</p>
    </div>
  `
});
new Vue({
  el: '#app',
  data: {
    parentTitle: 'Parent Component Title',
    headerTitle: 'Header Content'
  }
});
</script>
```

Assuming Vue CDN has been added to the HTML and the HTML format is correct.

What would be the output on the screen?

**Options :**

Parent Component Title

Main Content

6406532780985. ❌

Parent Component Title

Header Content

6406532780986. ✓ Main Content

6406532780987. ❌

# Parent Component Title

<h2>{{ headerTitle }}</h2>

Main Content

## Header Content

6406532780988. ✖ Main Content

## DBMS

<b>Section Id :</b>	64065359322
<b>Section Number :</b>	13
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	12
<b>Number of Questions to be attempted :</b>	12
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Section Negative Marks :</b>	0
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	No
<b>Section Maximum Duration :</b>	0
<b>Section Minimum Duration :</b>	0
<b>Section Time In :</b>	Minutes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	640653123428
<b>Question Shuffling Allowed :</b>	No

**Question Number : 241 Question Id : 640653827397 Question Type : MCQ**

**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 :**

6406532780989. ✓ YES

6406532780990. ✗ NO

**Sub-Section Number :**

2

**Sub-Section Id :**

640653123429

**Question Shuffling Allowed :**

No

**Question Id : 640653827398 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (242 to 243)**

Question Label : Comprehension

Consider the table **Champions\_League** for given subquestions

Name	Age	Team	Country	Goals
De jong	26	Barcelona	Netherlands	20
Bellingham	20	Real Madrid	England	18
Haaland	23	Manchester City	Norway	18
Araujo	25	Barcelona	Uruguay	20
Martinelli	22	Arsenal	Brazil	16
Mbappe	25	PSG	France	16
Kroos	34	Real Madrid	Germany	18
Dembele	26	PSG	France	14
Saka	22	Arsenal	England	16
Cubarsi	17	Barcelona	Spain	12

Table 1: Figure 1: Champions\_League

**Sub questions**

**Question Number : 242 Question Id : 640653827399 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Choose the correct SQL statement that will return the resultant table given in Figure 2.

Goals	Team	Count
20	Barcelona	2
18	Real Madrid	2
18	Manchester City	1
16	Arsenal	2
16	PSG	1
14	PSG	1
12	Barcelona	1

Table 2: Figure 2: Result

**Options :**

6406532780991. ✓ SELECT Goals, Team, COUNT(\*)  
FROM Champions\_League GROUP  
BY Goals, Team;

6406532780992. ✗ SELECT Goals, Team, COUNT(\*)  
FROM Champions\_League WHERE  
Age > 25 ORDER BY Goals;

6406532780993. ✗ SELECT Goals, Team, COUNT(\*)  
FROM Champions\_League GROUP  
BY Team;

6406532780994. ✗ SELECT Goals, Team, COUNT(\*)  
FROM Champions\_League ORDER  
BY Team;

**Question Number : 243 Question Id : 640653827400 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

How many rows will the following query return?

```
select team
from Champions_League
where country like '%y' and goals>17 or name like '%e'
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Sub-Section Number :** 3

**Sub-Section Id :** 640653123430

**Question Shuffling Allowed :** Yes

**Question Number :** 244 **Question Id :** 640653827401 **Question Type :** MCQ

**Correct Marks :** 3

**Question Label :** Multiple Choice Question

Consider the following SQL statement:

```
Create table Cars(  
CarID varchar(8),  
CarName varchar(20),  
CarColour varchar(8),  
YearOfPurchase integer,  
Weight integer,  
primary key (CarID),  
check(YearOfPurchase in (1990, 2000, 2005, 2010)));
```

Which among the following will cause an integrity constraint violation in the Cars table?

Note: Insertions are done in the order of the options given.

**Options :**

6406532780996. ✓ INSERT INTO Cars('C1', 'Ferrari', 'Red', 2003, 500);

6406532780997. ✗ INSERT INTO Cars('C2', 'McLaren', 'Orange', 2005, 700);

6406532780998. ✗ INSERT INTO Cars('C1', 'Mercedes', 'Black', 1990, 600);

6406532780999. ✗ INSERT INTO Cars('C4', 'Alpine', 'White', 1990, 800);

**Question Number :** 245 **Question Id :** 640653827414 **Question Type :** MCQ

**Correct Marks :** 3

**Question Label :** Multiple Choice Question

Consider the following relational schema:

Passenger(P\_id, P\_name, B\_id)

Pilot(Pilot\_id, Pilot\_name, Flight\_No)

Bookings(Booking\_id, Boarding, Destination, Flight\_no, P\_id, Pilot\_id)

Choose the suitable query that will find the names of all passengers who flew from Mumbai with pilot named Raj in flight number 3005.

**Options :**

6406532781037. ✓  $\Pi_{P\_name}(Passenger \bowtie \Pi_{P\_id}(\sigma_{Boarding='Mumbai' \wedge Flight\_No='3005' \wedge Pilot\_name='Raj'}(Pilot \bowtie Bookings)))$

6406532781038. ✗  $\Pi_{P\_name}(Passenger \bowtie \Pi_{Pilot\_name}(\sigma_{Boarding='Mumbai' \wedge Flight\_No='3005' \wedge Pilot\_name='Raj'}(Pilot \bowtie Bookings)))$

6406532781039. ✗  $\Pi_{P\_name}(Passenger \bowtie \Pi_{P\_id}(\sigma_{Boarding='Mumbai' \wedge Flight\_No='3005' \wedge Pilot\_name='Raj'}(Passenger \bowtie Bookings)))$

6406532781040. ✗  $\Pi_{P\_name}(Passenger \bowtie \Pi_{P\_id}(\sigma_{Destination='Mumbai' \wedge Flight\_No='3005' \wedge Pilot\_name='Raj'}(Pilot \bowtie Passenger)))$

**Sub-Section Number :**

4

**Sub-Section Id :**

640653123431

**Question Shuffling Allowed :**

Yes

**Question Number : 246 Question Id : 640653827402 Question Type : MSQ**

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

Question Label : Multiple Select Question

Consider a table Employees with the following attributes:

Employees(ID, Name, Department, Salary)

Which of the following represent(s) the valid output(s) of the following query?

```
select salary  
from Employees  
where salary like '10%_2_%'
```

**Options :**

6406532781000. ✗ 1002

6406532781001. ✓ 101020

6406532781002. ✗ 10200

6406532781003. ✓ 10022

**Question Number : 247 Question Id : 640653827415 Question Type : MSQ**

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

## Question Label : Multiple Select Question

Consider the following relations:

*players(pid, name, age, jersey\_no)*

*teams(team\_name, matches, points, pid)*

Choose the correct TRC or DRC expression which is equivalent to the below SQL query.

```
SELECT p.name, t.points  
FROM players p natural join teams t  
WHERE p.jersey_no = 7
```

### Options :

$\{x \mid \exists p \in \text{players} \exists t \in \text{teams}(p.pid = t.pid \wedge p.jersey\_no = 7 \wedge x.name = 6406532781041. \checkmark p.name \wedge x.points = t.points)\}$

$\{x \mid \exists p \in \text{players} \exists t \in \text{teams}(p.pid = t.pid \wedge p.jersey\_no = 7 \wedge x.name = 6406532781042. \ast p.name)\}$

$\{< b, o > \mid \exists a, b, c, d (< a, b, c, d > \in \text{players} \wedge d = 7) \wedge \exists m, n, o, p (< m, n, o, p > \in 6406532781043. \checkmark \text{teams} \wedge a = p)\}$

$\{< b, o > \mid \exists a, b, c, d (< a, b, c, d > \in \text{players} \wedge d = 7) \wedge \exists m, n, o, p (< m, n, o, p > \in 6406532781044. \ast \text{teams})\}$

**Sub-Section Number :**

5

**Sub-Section Id :**

640653123432

**Question Shuffling Allowed :**

No

**Question Id : 640653827403 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (248 to 249)**

Question Label : Comprehension

Consider the following data for given subquestions:

Driver_ID	Name	Team	Salary
55	Carlos Sainz	Scuderia Ferrari	2500000
16	Charles Leclerc	Scuderia Ferrari	2300000
4	Lando Norris	McLaren	2100000
81	Oscar Piastri	McLaren	1800000
44	Lewis Hamilton	Mercedes AMG	2600000
63	George Russell	Mercedes AMG	2000000
1	Max Verstappen	RedBull Racing	2800000
11	Sergio Perez	RedBull Racing	2500000
14	Fernando Alonso	Aston Martin	2300000
18	Lance Stroll	Aston Martin	1700000

Table 4: Figure 3: F1\_Drivers

Team_ID	Team	Country	Ranking
1	Scuderia Ferrari	Italy	1
2	Mercedes AMG	Germany	4
3	McLaren	UK	2
4	RedBull Racing	Austria	5
5	Aston Martin	UK	3

Table 5: Figure 3: F1\_Teams

## Sub questions

**Question Number : 248 Question Id : 640653827404 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

What will be the output of the

following SQL query:

```
select distinct Team
from F1_Teams
where exists (select name
              from F1_Drivers
              where F1_Drivers.Team = F1_Teams.Team and salary>2000000);
```

## Options :

6406532781004. ❌ Distinct names of all such teams that have no driver with salary higher than 2000000

6406532781005. ❌ Distinct names of all such teams that have all drivers with salary higher than 2000000

6406532781006. ✓ Distinct names of all such teams that have at least one driver with salary higher than 2000000

6406532781007. ❌ Distinct names of all such teams that have exactly one driver with salary

higher than 2000000

**Question Number : 249 Question Id : 640653827405 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

How many tuples will the following query return?

```
select name
from F1_Drivers
where salary > all (select salary
                      from F1_Drivers
                      where Team = 'Mercedes AMG');
```

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

1

**Sub-Section Number : 6**

**Sub-Section Id : 640653123433**

**Question Shuffling Allowed : Yes**

**Question Number : 250 Question Id : 640653827406 Question Type : MSQ**

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

Question Label : Multiple Select Question

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

**Options :**

6406532781009. ✘ All candidate keys are primary keys

6406532781010. ✓ A primary key is also a candidate key

6406532781011. ✘ A primary key consists of exactly one attribute

6406532781012. ✓ A candidate key is a minimal super key

**Sub-Section Number : 7**

**Sub-Section Id : 640653123434**

**Question Shuffling Allowed : No**

**Question Id : 640653827408 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (251 to 253)**

Question Label : Comprehension

Consider the E-R diagram given in Figure 1 and answer the subquestions.

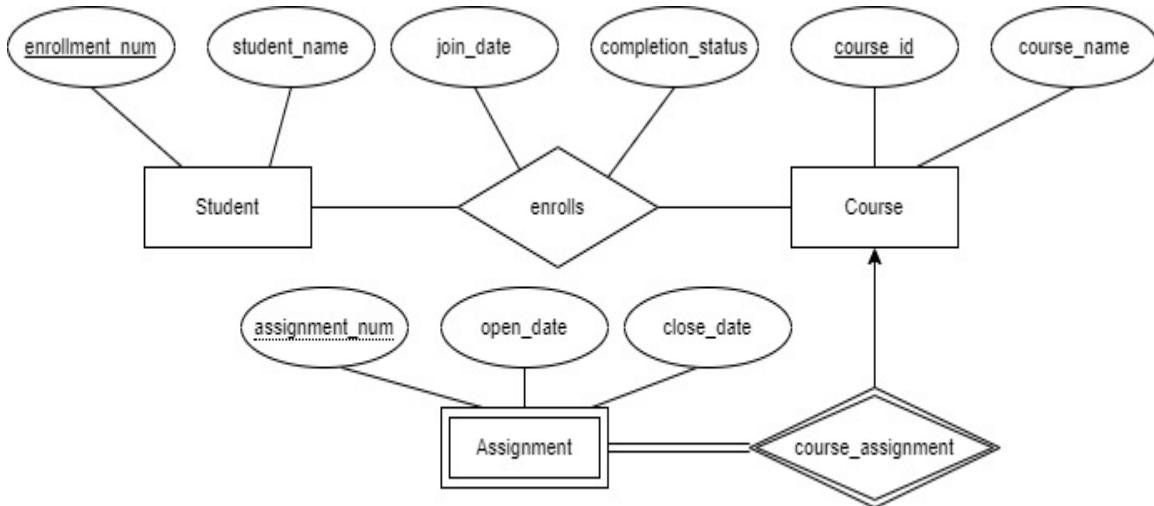


Figure 1: E-R diagram

## Sub questions

**Question Number : 251 Question Id : 640653827409 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Identify the correct relational schema for the relationship set **enrolls**.

Note: The primary key is underlined.

**Options :**

6406532781017. ✘ **enrolls(join\_date, completion\_status)**

6406532781018. ✘ **enrolls(enrollment\_num, join\_date, completion\_status)**

6406532781019. ✘ **enrolls(course\_id, enrollment\_num, join\_date, completion\_status)**

6406532781020. ✓ **enrolls(course\_id, enrollment\_num, join\_date, completion\_status)**

**Question Number : 252 Question Id : 640653827410 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Identify the correct relational schema for the entity set **Assignment**.

Note: The primary key is underlined.

**Options :**

6406532781021. ✘ **Assignment(assignment\_num, open\_date, close\_date)**

6406532781022. ✓ Assignment(course\_id, assignment\_num, open\_date, close\_date)

6406532781023. ✗ Assignment(assignment\_num, course\_id, open\_date, close\_date)

6406532781024. ✗ Assignment(assignment\_num, course\_id, open\_date, close\_date)

**Question Number : 253 Question Id : 640653827411 Question Type : MSQ**

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

Question Label : Multiple Select Question

With reference to the relationship  
between Student and Course,  
which of the statement(s) is/are  
**TRUE?**

**Options :**

6406532781025. ✗ Each course must have at least one student.

6406532781026. ✗ Each student must have enrolled for at least one course.

6406532781027. ✓ Some courses may have no students.

6406532781028. ✓ A student may enroll for many courses.

**Sub-Section Number :** 8

**Sub-Section Id :** 640653123435

**Question Shuffling Allowed :** Yes

**Question Number : 254 Question Id : 640653827407 Question Type : MSQ**

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

Question Label : Multiple Select Question

Consider the tables r and s.

A	B	C	D
p	1	p	a
q	2	r	a
r	4	q	b
p	1	r	a
s	2	q	b

Table r

B	D	E
1	a	p
3	a	q
1	a	r
2	b	s
3	b	t

Table s

A	B	D
p	1	a
s	2	b

result

Which of the following relational algebra operation(s) on tables r and s will produce table result?

**Options :**

6406532781013. ❌  $\Pi_{A,r.B,r.D}(\sigma_{((r.B=s.B) \vee (r.D=s.D))}(r \times s))$

6406532781014. ❌  $\Pi_{A,r.B,r.D}(\sigma_{(r.D=s.D)}(r \times s))$

6406532781015. ✓  $\Pi_{A,r.B,r.D}(\sigma_{((r.B=s.B) \wedge (r.D=s.D))}(r \times s))$

6406532781016. ✓  $\Pi_{A,B,D}(r \bowtie s)$

**Question Number : 255 Question Id : 640653827412 Question Type : MSQ**

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

Question Label : Multiple Select Question

Consider a relational schema:

Parts(Pid, Pname, Price, Quantity)

Vendors (Vid, Vname, Location, Pid)

Consider the SQL query:

```
SELECT Distinct Vname FROM Parts NATURAL JOIN Vendors
WHERE Price < 5000 and location = 'Mumbai'
```

Choose the correct relational algebra expression(s) which will give the same output as of the above SQL query.

**Options :**

6406532781029. ❌  $\Pi_{Vname}(\sigma_{Price < 5000}(Parts)) \cup \Pi_{Vname}(\sigma_{Location='Mumbai'}(Vendors))$

6406532781030. ✓  $\Pi_{Vname}(\sigma_{Location='Mumbai' \wedge Price < 5000}(Parts \bowtie Vendors))$

6406532781031. ✘  $\Pi_{Vname}(\sigma_{Price < 5000}(Parts)) \wedge \Pi_{Vname}(\sigma_{Location='Mumbai'}(Vendors))$

6406532781032. ✓  $\Pi_{Vname}(\sigma_{Location='Mumbai' \wedge Price < 5000 \wedge Parts.Pid = Vendors.Pid}(Parts \times Vendors))$

**Sub-Section Number :** 9

**Sub-Section Id :** 640653123436

**Question Shuffling Allowed :** Yes

**Question Number : 256 Question Id : 640653827413 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the following table which has three attributes: X, Y and Z, where X is the primary key and Z is the foreign key referencing X.

X	Y	Z
1	1	5
2	2	5
3	1	5
4	2	4
5	2	4
6	1	1
7	4	1
8	4	7

Which of the following sets of tuples are additionally deleted when the tuple (4,2,4) is deleted and ON DELETE CASCADE construct is applied over the table?

**Options :**

6406532781033. ✘ (2,2,5) and (3,1,5)

6406532781034. ✘ (5,2,4), (1,1,5), (2,2,5) and (3,1,5)

6406532781035. ✘ (6,1,1),(7,4,1) and (8,4,7)

6406532781036. ✓ All the remaining rows will be deleted

## PDSA

**Section Id :** 64065359323

**Section Number :** 14

**Section type :** Online

<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	16
<b>Number of Questions to be attempted :</b>	16
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Section Negative Marks :</b>	0
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	No
<b>Section Maximum Duration :</b>	0
<b>Section Minimum Duration :</b>	0
<b>Section Time In :</b>	Minutes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	640653123437
<b>Question Shuffling Allowed :</b>	No

**Question Number : 257 Question Id : 640653827416 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

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

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

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

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

**Options :**

6406532781045. ✓ YES

6406532781046. ✗ NO

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	640653123438
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 258 Question Id : 640653827417 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Suppose  $f$ ,  $g$ , and  $h$  are three functions. Which of the following statement(s) is/are true?

1. If  $f = O(g)$  and  $g = O(h)$  then  $f = O(h)$
2. If  $f = O(h)$  and  $g = O(h)$  then  $f + g = O(h)$ .

**Options :**

6406532781047. ✘ Only statement 1 is true.  
6406532781048. ✘ Only statement 2 is true  
6406532781049. ✓ Both Statements 1 and 2 are true  
6406532781050. ✘ Both Statements 1 and 2 are false

**Question Number : 259 Question Id : 640653827418 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following two implementations to finding the  $n^{th}$  Fibonacci number.

**Code-A**

```
1 def fib(n):
2     if n <= 1:
3         return n
4     else:
5         return fib(n-1) + fib(n-2)
```

**Code-B**

```
1 def fib(n):
2     L = [0,1]
3     for i in range(2, n):
4         L.append(L[-2] + L[-1])
5     return L[-1]
```

Let  $f(n)$  and  $g(n)$  denote the asymptotic complexity of **Code-A** and **Code-B** respectively. Which of the following statements is **true**?

**Options :**

6406532781051. ✘  $f(n) = O(g(n))$

6406532781052. ✓  $g(n) = O(f(n))$

6406532781053. ✘ Both  $f(n) = O(g(n))$  and  $g(n) = O(f(n))$  are true.

6406532781054. ✘ None of these

**Question Number : 260 Question Id : 640653827420 Question Type : MCQ**

**Correct Marks : 3**

### Question Label : Multiple Choice Question

You are given a non-empty list with  $n$  elements and the values are supposed to be 1 to  $n$ , in ascending order in the list. However, it is possible that one element is missing from the list between the first and last element (excluding the first and last element). For instance, a five elements list may contain [1, 3, 4, 5] instead of [1, 2, 3, 4, 5], here element 2 is missing from the list.

What is the time complexity of the best possible algorithm to find the missing element?

### Options :

6406532781056. ✘  $O(1)$

6406532781057. ✘  $O(\sqrt{n})$

6406532781058. ✘  $O(n)$

6406532781059. ✓  $O(\log n)$

### Question Number : 261 Question Id : 640653827421 Question Type : MCQ

### Correct Marks : 3

### Question Label : Multiple Choice Question

Consider the following Selection sort algorithm:

```
1 def selectionsort(L):
2     n = len(L)
3     if n < 1:
4         return(L)
5     for i in range(n):
6         minpos = i
7         for j in range(i+1,n):
8             if L[j] < L[minpos]:
9                 minpos = j
10            (L[i],L[minpos]) = (L[minpos],L[i])
11    return(L)
```

What will be the time complexity of selection sort if the input list of  $n$  elements is already sorted in ascending order?

### Options :

6406532781060. ✘  $O(n)$

6406532781061. ✘  $O(\log n)$

6406532781062. ✘  $O(n \log n)$

6406532781063. ✓  $O(n^2)$

**Question Number : 262 Question Id : 640653827426 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Select the most appropriate data structure for the following operations:

Application	data structure
1. Checking if a word is palindrome	i. Queue
2. Finding order in which courses should be taken	ii. Undirected Graph
3. Social media network	iii. Stack
4. Traffic Management	iv. Directed Graphs

**Options :**

6406532781077. ✘ 1 - ii, 2 - iii, 3 - iv, 4 - i

6406532781078. ✓ 1 - iii, 2 - iv, 3 - ii, 4 - i

6406532781079. ✘ 1 - i, 2 - ii, 3 - iv, 4 - iii

6406532781080. ✘ 1 - iii, 2 - ii, 3 - iv, 4 - i

**Question Number : 263 Question Id : 640653827430 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider a connected, directed graph G on which **DFS** is executed. Let for an edge  $(u, v)$  in G, the following are the *pre* and *post* numbers used in the DFS algorithm on the graph.

$\text{pre}[u] = 3, \text{post}[u] = 6$

$\text{pre}[v] = 1, \text{post}[v] = 10$

Which of the following options is correct for edge  $(u, v)$ ?

**Options :**

6406532781092. ✘ Edge  $(u, v)$  is a tree edge.

6406532781093. ✓ Edge  $(u, v)$  is a back edge.

6406532781094. ✘ Edge  $(u, v)$  is a cross edge.

6406532781095. ✪ Edge  $(u, v)$  is a forward edge.

<b>Sub-Section Number :</b>	3
<b>Sub-Section Id :</b>	640653123439
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 264 Question Id : 640653827419 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

The Tower of Hanoi problem discussed in the lecture is a classic puzzle with three rods and  $n$  disks of different sizes that can slide onto any rod. The puzzle starts with the disks neatly stacked in ascending order of size on one rod, with the smallest disk at the top. The objective is to move the entire stack to another rod, obeying the following rules:

1. Only one disk can be moved at a time.
2. Each move consists of taking the top disk from one stack and placing it on another stack.
3. No disk may be placed on top of a smaller disk.

Following is the recurrence of the recursive solution to find the minimum number of moves  $M(n)$  for the given problem with  $n$  disk.

- $M(1) = 1$
- $M(n) = 2M(n - 1) + 1$

The number of moves if  $n = 6$  is \_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

63

**Question Number : 265 Question Id : 640653827427 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

An undirected connected graph  $G$  has 46 edges. The minimum number of vertices in  $G$  is \_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas : PlainText**

**Possible Answers :**

11

**Sub-Section Number :** 4

**Sub-Section Id :** 640653123440

**Question Shuffling Allowed :** Yes

**Question Number : 266 Question Id : 640653827422 Question Type : MSQ**

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

Question Label : Multiple Select Question

Which of the following statements is/are **true** about the **Quicksort algorithm** to sort elements in ascending order? Assume that the last element in the list is selected as a pivot for partitioning each time.

**Options :**

6406532781064. ✓ The best case is when the pivot element always divides the list into two equal halves.

6406532781065. ✗ The best case is when the input list is already arranged in ascending order.

6406532781066. ✗ The best case is when the input list is arranged in descending order.

6406532781067. ✓ The worst case is when the input list is arranged in either ascending or descending order.

**Question Number : 267 Question Id : 640653827428 Question Type : MSQ**

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

Question Label : Multiple Select Question

Which of the following is/are **true** about **Breadth First Search(BFS)** in an unweighted directed graph  $G$ ?

**Options :**

6406532781082. ✓ BFS can be used to compute the number of connected components in  $G$ .

6406532781083. ✗ BFS can not check if there are any cycles in  $G$ .

6406532781084. ✓ Paths computed by BFS are the shortest paths in  $G$  in terms of the number of edges.

If the graph is represented as an adjacency matrix, then BFS can be performed in  $O(m + n)$  time, where  $m$  is the number of edges in  $G$  and  $n$  is the number of nodes in  $G$ .

Let  $T$  be a BFS Tree, let  $x$  and  $y$  be nodes in  $T$  belonging to layers  $L_i$  and  $L_j$ , and let  $(x, y)$  be an edge of  $G$ . Then  $i$  and  $j$  differ by at most 1.

**Sub-Section Number :** 5

**Sub-Section Id :** 640653123441

**Question Shuffling Allowed :**

Yes

**Question Number : 268 Question Id : 640653827423 Question Type : SA**

**Correct Marks : 4**

**Question Label : Short Answer Question**

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

Suppose each node of the linked list is an object of class Node, `head` is the first node of the linked list and the list has the following elements initially:

```
23, 21, 4, 67, 12, 6, 17, 24, 20, 33
```

Consider the following function

```
1 def operation(head):  
2     ptr1 = head  
3     ptr2 = head  
4     while (ptr2.next!= None):  
5         ptr1 = ptr1.next  
6         if ptr2.next.next != None:  
7             ptr2 = ptr2.next.next  
8         else:  
9             ptr2 = ptr2.next  
10    print(ptr1.data)
```

What will be the output of the given function if it is called on the `head` node of the given linked list?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

6

**Sub-Section Number :**

6

**Sub-Section Id :**

640653123442

**Question Shuffling Allowed :**

Yes

**Question Number : 269 Question Id : 640653827424 Question Type : MSQ**

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

**Question Label : Multiple Select Question**

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

index	k
0	70
1	20
2	32
3	41
4	
5	
6	
7	
8	48
9	58

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

**Options :**

6406532781069. ✓ 70, 32, 20, 48, 41, 58

6406532781070. ✓ 32, 48, 70, 20, 58, 41

6406532781071. ✗ 48, 32, 70, 41, 20, 58

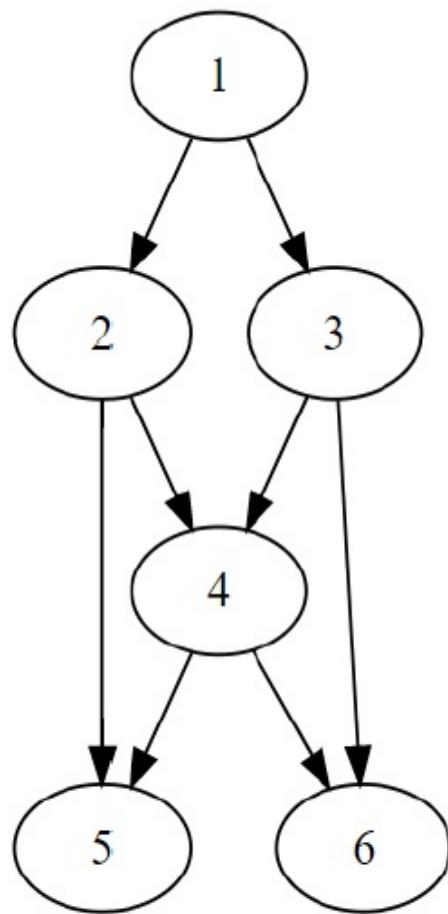
6406532781072. ✗ 70, 32, 58, 20, 41, 48

**Question Number : 270 Question Id : 640653827429 Question Type : MSQ**

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

Question Label : Multiple Select Question

Consider the following graph:



If we run **Depth First Search(DFS)** on the given graph starting from vertex 1, which of the following is/are valid order(s) of visiting the nodes?

**Note:** Assume that when a node has multiple neighbours, DFS can visit any vertex first.

**Options :**

6406532781087. ✓ 1, 2, 4, 6, 5, 3

6406532781088. ✗ 1, 2, 5, 3, 4, 6

6406532781089. ✗ 1, 3, 4, 6, 2, 5

6406532781090. ✗ 1, 2, 3, 4, 5, 6

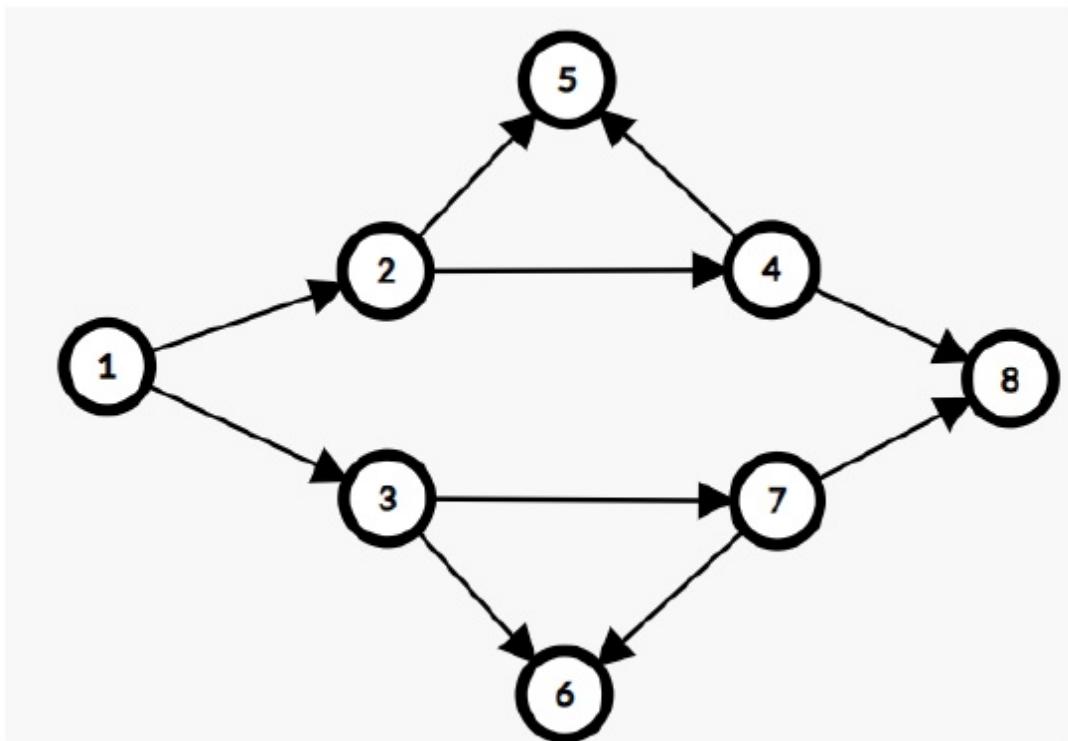
6406532781091. ✓ 1, 3, 6, 4, 5, 2

**Question Number : 271 Question Id : 640653827431 Question Type : MSQ**

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

Question Label : Multiple Select Question

Consider the following Directed Acyclic Graph(DAG).



Which of the following is/are **not** a topological ordering of the given graph  $G$ ?

**Options :**

6406532781096. ❌ [1, 2, 3, 4, 5, 7, 6, 8]

6406532781097. ❌ [1, 3, 2, 4, 7, 8, 6, 5]

6406532781098. ✓ [1, 3, 2, 7, 6, 5, 4, 8]

6406532781099. ✓ [1, 2, 3, 4, 5, 6, 7, 8]

**Sub-Section Number :**

7

**Sub-Section Id :**

640653123443

**Question Shuffling Allowed :**

Yes

**Question Number : 272 Question Id : 640653827425 Question Type : MCQ**

**Correct Marks : 4**

**Question Label : Multiple Choice Question**

Let `s` be a stack and `q` be a queue supporting the following operations:

#### Stack operation:

- `Push(d)` : Insert element `d` in stack
- `Pop()` : Remove the element from the stack and return the removed element

#### Queue Operation:

- `Enqueue(d)` : Insert element `d` in queue from rear
- `Dequeue()` : Remove the front element from the queue and return the removed element

Suppose the initial state of the queue `q` is `[26, 78, 45, 10, 19, 56]` where 26 is at the front and 56 is at the rear and the stack `s` is empty initially.

```
1 S.Push(Q.Dequeue())
2 S.Push(Q.Dequeue())
3 S.Push(Q.Dequeue())
4 Q.Enqueue(S.Pop())
5 S.Push(Q.Dequeue())
6 Q.Enqueue(S.Pop())
```

After performing the given sequence of operations, what will be the front and rear elements in queue `q`?

#### Options :

6406532781073. ✘ front: 10, rear: 78

6406532781074. ✘ front: 45, rear: 78

6406532781075. ✓ front: 19, rear: 10

6406532781076. ✘ front: 19, rear: 78

## MLT

<b>Section Id :</b>	64065359324
<b>Section Number :</b>	15
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	12
<b>Number of Questions to be attempted :</b>	12
<b>Section Marks :</b>	40
<b>Display Number Panel :</b>	Yes
<b>Section Negative Marks :</b>	0
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	No

<b>Section Maximum Duration :</b>	0
<b>Section Minimum Duration :</b>	0
<b>Section Time In :</b>	Minutes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	640653123444
<b>Question Shuffling Allowed :</b>	No

**Question Number : 273 Question Id : 640653827432 Question Type : MCQ**

**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 :**

6406532781100. ✓ YES

6406532781101. ✗ NO

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	640653123445
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 274 Question Id : 640653827433 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Let  $w_1$  and  $w_2$  be the top two principal components of the covariance matrix of a centered dataset. Let  $x \in \mathbb{R}^d$  be a data-point. Which of the following is the reconstruction error of the data-point after projecting it onto the top two principal components?

**Options :**

6406532781102. ✓  $\|x - (x^T w_1)w_1 - (x^T w_2)w_2\|^2$

6406532781103. ✗  $\|x - (x^T w_1)w_1\|^2 + \|x - (x^T w_2)w_2\|^2$

6406532781104. ✗  $(x^T w_1)^2 + (x^T w_2)^2$

6406532781105. ✘  $\|x - w_1\|^2 + \|x - w_2\|^2$

<b>Sub-Section Number :</b>	3
<b>Sub-Section Id :</b>	640653123446
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 275 Question Id : 640653827434 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Let  $x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$  and  $y = \begin{bmatrix} y_1 \\ y_2 \end{bmatrix}$  be two vectors in  $\mathbb{R}^2$ . Let  $k_1$  and  $k_2$  be two functions defined from  $\mathbb{R}^2 \times \mathbb{R}^2 \rightarrow \mathbb{R}$ :

$$k_1(x, y) = x_1y_1 + x_2y_2 + x_1x_2y_1y_2$$
$$k_2(x, y) = x_1y_1 + x_2y_2 + x_1x_2y_1y_2 + 1$$

Which of the following statements is true?

**Options :**

6406532781106. ✓ Both  $k_1$  and  $k_2$  are valid kernels.  
6406532781107. ✘  $k_1$  is a valid kernel, but  $k_2$  is not a valid kernel.  
6406532781108. ✘  $k_2$  is a valid kernel, but  $k_1$  is not a valid kernel.  
6406532781109. ✘ Neither  $k_1$  nor  $k_2$  is a valid kernel.

<b>Sub-Section Number :</b>	4
<b>Sub-Section Id :</b>	640653123447
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 276 Question Id : 640653827435 Question Type : MSQ**

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

Question Label : Multiple Select Question

Consider a covariance matrix  $C$  for a mean-centered dataset in  $\mathbb{R}^3$ . After performing

standard PCA, the three principal components turn out to be  $\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ .

Which of the following statements are true? You can assume that  $C$  is not the zero matrix.

**Options :**

6406532781110. ✓  $C$  is a diagonal matrix.  
6406532781111. ✓ The diagonal entries of  $C$  are non-negative.

6406532781112. ✖ The diagonal entries of C are strictly greater than zero.

6406532781113. ✖ C has to be the identity matrix.

6406532781114. ✖ C is a matrix of the form  $k\mathbf{I}$ , where  $k > 0$  and  $\mathbf{I}$  is the identity matrix.

**Sub-Section Number :**

5

**Sub-Section Id :**

640653123448

**Question Shuffling Allowed :**

Yes

**Question Number : 277 Question Id : 640653827436 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Kernel PCA with a polynomial kernel of degree 3 is run on a dataset of 100 data-points. Let  $\phi$  be the transformation corresponding to this kernel. If the largest eigenvalue of the centered kernel matrix is 10, find the largest eigenvalue of the covariance matrix of the transformed dataset, where  $\phi$  is used to effect the transformation.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0.1

**Question Number : 278 Question Id : 640653827439 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

The EM algorithm is run on a dataset of 100 points modeled using a GMM with three components. Let  $\lambda_k^i$  be the values obtained in the E-step in the final iteration. Here,  $i$  is the index of the data-point and  $k$  is the index of a component. Also, let  $\pi_1 = 0.3, \pi_2 = 0.5, \pi_3 = 0.2$  be the estimates of the mixture probabilities.  $x_p$  represent one of the data-points, for some constant  $p$ . If  $\lambda_1^p + \lambda_3^p = 0.2$ , what is the probability that the second component generated  $x_p$  given that we have seen the data-point?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0.8

**Sub-Section Number :**

6

**Sub-Section Id :**

640653123449

**Question Shuffling Allowed :**

Yes

**Question Number : 279 Question Id : 640653827437 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

$k : \mathbb{R}^2 \times \mathbb{R}^2 \rightarrow \mathbb{R}$  is a polynomial kernel of degree 4. Find the value of  $k \left( \begin{bmatrix} 1 \\ -1 \end{bmatrix}, \begin{bmatrix} 2 \\ 1 \end{bmatrix} \right)$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

16

**Question Number : 280 Question Id : 640653827438 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

Consider the k-means++ algorithm with  $k = 2$  for a dataset that has 7 points:

$D = \{x_1, \dots, x_7\}$ . The data-point  $x_7$  has been chosen as the first mean, that is,  $\mu_1 = x_7$ . The Euclidean distance of the remaining points from this mean is given below:

Point	$d(x_i, \mu_1)$
$x_1$	1
$x_2$	2
$x_3$	$\sqrt{2}$
$x_4$	$\sqrt{3}$
$x_5$	$\sqrt{5}$
$x_6$	1

What is the probability of choosing  $x_2$  as the second mean given that  $x_7$  has been chosen as the first mean?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0.25

**Sub-Section Number :**

7

**Sub-Section Id :**

640653123450

**Question Shuffling Allowed :**

No

**Question Id : 640653827440 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Question Numbers : (281 to 283)**

Question Label : Comprehension

Let  $\mathbf{C}$  be the covariance matrix of a mean-centered dataset:

$$\mathbf{C} = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$$

Standard PCA is performed on this dataset. The first two PCs are given below:

$$\mathbf{w}_1 = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 \\ 1 \end{bmatrix} \quad \mathbf{w}_2 = \frac{1}{\sqrt{2}} \begin{bmatrix} -1 \\ 1 \end{bmatrix}$$

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 281 Question Id : 640653827441 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Find the variance of the dataset along the first principal component.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

3

**Question Number : 282 Question Id : 640653827442 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

Find the variance of the dataset along the x-axis.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

**Question Number : 283 Question Id : 640653827443 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Find the coordinates of the point  $\begin{bmatrix} 2 \\ 2 \end{bmatrix}$

in the new coordinate system

formed by the principal components.

**Options :**

6406532781121. ✓  $\begin{bmatrix} 2\sqrt{2} \\ 0 \end{bmatrix}$

6406532781122. ✗  $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$

6406532781123. ✗  $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$

6406532781124. ✗  $\begin{bmatrix} 2 \\ 0 \end{bmatrix}$

**Sub-Section Number :**

8

**Sub-Section Id :**

640653123451

**Question Shuffling Allowed :**

No

**Question Id : 640653827444 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Question Numbers : (284 to 285)**

Question Label : Comprehension

Consider the following dataset of six points in  $\mathbb{R}^2$ :

$x$	$y$
-1	-4
5	6
-2	-2
4	5
-3	-3
3	4

K-means clustering is run on this dataset with  $k = 2$ . In this version, the means are initialized first. The mean of the first cluster is initialized to  $(-4, -4)$  and the mean of the second cluster is initialized to  $(6, 6)$ .

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 284 Question Id : 640653827445 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

If  $(x_1, y_1)$  is the mean of the first cluster after convergence, find the value of  $x_1 + y_1$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

**-5**

**Question Number : 285 Question Id : 640653827446 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

If  $(x_2, y_2)$  is the mean of the second cluster after convergence, find the value of  $x_2 + y_2$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

**9**

**Sub-Section Number :**

**9**

**Sub-Section Id :**

**640653123452**

**Question Shuffling Allowed :**

No

**Question Id : 640653827450 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Question Numbers : (286 to 287)**

Question Label : Comprehension

In the context of Bayesian estimation, consider a Beta prior for the parameter  $p$  of a Bernoulli distribution:

$$p \sim \text{Beta}(4, 3)$$

The dataset has 8 ones and 5 zeros.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 286 Question Id : 640653827451 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the posterior?

**Options :**

6406532781132. ✓ Beta(12, 8)

6406532781133. ✗ Beta(11, 7)

6406532781134. ✗ Br(0.5)

6406532781135. ✗ Beta(8, 5)

**Question Number : 287 Question Id : 640653827452 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

If we use the expected value of the posterior as a point-estimate for the parameter of the Bernoulli distribution, what is  $\hat{p}$ ?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

0.6

**Sub-Section Number :**

10

**Sub-Section Id :**

640653123453

**Question Shuffling Allowed :**

No

**Question Id : 640653827447 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Question Numbers : (288 to 289)**

Question Label : Comprehension

Consider a dataset of  $n$  data-points all of which are non-negative integers.

These data-points are sampled from a Poisson distribution, whose probability mass function is given below:

$$f(x; \lambda) = \frac{e^{-\lambda} \lambda^x}{x!}, \lambda > 0$$

Here  $\lambda$  is a parameter.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 288 Question Id : 640653827448 Question Type : MCQ**

**Correct Marks : 2.5**

Question Label : Multiple Choice Question

Find the log-likelihood of the dataset under this distribution.

**Options :**

6406532781127. ✓  $\sum_{i=1}^n [-\lambda + x_i \log \lambda - \log (x_i!)]$

6406532781128. ✗  $\prod_{i=1}^n \frac{e^{-\lambda} \lambda^{x_i}}{x_i!}$

6406532781129. ✗  $\sum_{i=1}^n [-\lambda + \lambda \log x_i - \log (x_i!)]$

6406532781130. ✗  $\prod_{i=1}^n [-\lambda + x_i \log \lambda - \log (x_i!)]$

**Question Number : 289 Question Id : 640653827449 Question Type : SA**

**Correct Marks : 2.5**

Question Label : Short Answer Question

Consider a dataset that has 25 data-points. The data-point  $x_i$  and its frequency is given in the following table:

$x_i$	Frequency
0	1
1	4
2	6
3	9
4	5

In case the table is not clear: the value 0 appears once in the dataset, the value 1 appears four times in the dataset, and so on. Find the maximum likelihood estimate for the parameter  $\lambda$  of the Poisson distribution given this dataset.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2.52