Question Paper Preview

Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

Question Paper Name :	IITM Online Foundation Qualifier Q1QP1 22 Nov 2020
Duration :	210
Number of Questions :	48
Total Marks :	200

English

Number of Questions :	6
Section Marks :	50

Mark As Answered Required? : Yes

Question Numbers : (1 to 5)

Question Label : Comprehension

READING

Read the poem and answer the given subquestions.

A Bird Came Down the Walk by Emily Dickinson

A Bird came down the Walk -
He did not know I saw
He bit an Angle Worm in halves
And ate the fellow, raw,

And then, he drank a Dew
From a convenient Grass -
And then hopped sidewise to the Wall
To let a Beetle pass –

He glanced with rapid eyes,
That hurried all abroad -
They looked like frightened Beads, I thought,
He stirred his Velvet Head. –

Like one in danger, Cautious,
I offered him a Crumb,
And he unrolled his feathers,
And rowed him softer Home -

Than Oars divide the Ocean,
Too silver for a seam,

Or Butterflies, off Banks of Noon,

Leap, plashless as they swim.

Sub questions

Question Number : 1

Correct Marks : 1

Question Label : Multiple Choice Question

What is the poem about?

Options :

1. ✖ A fight between a bird and a poet.

2. ✖ A bird eating a beetle.

3. ✖ A bird teaching others how to eat a worm.

4. ✔ A normal occurrence in nature of a bird searching for its food and its interaction.

Question Number : 2

Correct Marks : 1

Question Label : Multiple Choice Question

The antonym for the word careless given in the poem is _____.

Options :

1. ✖ Frightened

2. ✖ Rapid

3. ✔ Cautious

4. ✖ Crumb

Question Number : 3

Correct Marks : 1

Question Label : Multiple Choice Question

What did the bird do with its feathers?

Options :

1. ✖ The bird cleaned its feathers

2. ✔ The bird spread out its feathers and flew

3. ✖ The bird used the feathers to protect itself

4. ✖ The bird used the feathers to push the beetles

Question Number : 4

Correct Marks : 1

Question Label : Multiple Choice Question

How did the poet describe the eyes of the bird?

Options :

1. ✖ Watery like dew

2. ✖ Grass

3. ✔ Frightened beads

4. ✖ Butterflies

Question Number : 5

Correct Marks : 1

Question Label : Multiple Choice Question

How do you explain the 'plashless' in the last lines?

Options :

1. ✖ The bird cannot swim.

2. ✖ Since the bird does not have oars, it could not splash in the water.

3. ✖ Since dew was on the water, it could not make a splash.

4. ✔ The poet compares the flight of the bird as though it was a 'swim' in the air without the accompanying splashes on water.

Question Numbers : (6 to 10)

Question Label : Comprehension

READING

Read the passage and answer the given subquestions.

(Source : https://www.aplustopper.com/ ICSE Question Paper 2014)

A panther was terrorizing the Khulna district of Bangladesh, just outside the Sundarbans. It has recently carried off a little girl. She was the seventh person killed in two months by the animal. And it was growing bolder. The previous victim was a man who had been attacked in broad daylight in his field. The beast dragged him off into the forest, and his corpse was later found hanging from a tree. The villagers kept a watch nearby that night, hoping to surprise the panther and kill it, but it never appeared.

The Forest Department hired a professional hunter. He set up a small, hidden platform in a tree near a river where two of the attacks had taken place. A goat was tied to a stake on the River's bank. The hunter waited several nights. He assumed that the panther would be an old, wasted male with worn teeth, incapable of catching anything more difficult than a human. But it was a sleek tiger that stepped into the open one night: a female with a single cub. The goat bleated. Oddly, the cub, who looked to be about three months old, paid little attention to the goat. It raced to the water's edge, where it drank eagerly. Its mother followed it. Of hunger and thirst, thirst is the greater urge. When the tiger had quenched her thirst she turned to the goat to satisfy her hunger.

The hunter had two rifles with him: one with real bullets, the other with immobilizing darts. This animal was not a man-eater but was so close to human habitation that she might pose a threat to the villagers, especially as she was with cub. He picked up the gun with the darts. He fired as the tiger was about to attack the goat. The tiger reared up and snarled and raced away. However, immobilizing darts do not bring on sleep gently; they knock the creature out without warning. A burst of activity on the animals' part makes it act all the faster.

Sub questions

Question Number : 6

Correct Marks : 1

Question Label : Multiple Choice Question

The forest department hired a professional hunter because _____.

Options :

1. ✖ The tiger killed a man.

2. ✖ The villagers requested the forest department for help.

3. ✖ The villagers tried to kill the tiger.

4. ✔ The panther had killed 7 people in 2 months; and was getting bolder.

Question Number : 7

Correct Marks : 1

Question Label : Multiple Choice Question

The word from the passage that means the same as a dead body is _____.

Options :

1. ✖ Carcass

2. ✖ Cadaver

3. ✔ Corpse

4. ✖ Cops

Question Number : 8

Correct Marks : 1

Question Label : Multiple Choice Question

Which among the following is the meaning of 'dart' in the context of the passage?

Options :

1. ✖ The act of running somewhere suddenly or rapidly.

2. ✖ Shoot an animal.

3. ✔ A small, pointed missile that can be thrown or fired.

Question Number : 9

Correct Marks : 1

Question Label : Multiple Choice Question

The synonym of the word 'wasted' (used in para 2) is _____.

Options :

1. ✖ Free

2. ✔ Weak

3. ✖ Lavish

4. ✖ Spendthrift

Question Number : 10

Correct Marks : 1

Question Label : Multiple Choice Question

The animal was _____.

Options :

1. ✖ A sleek male panther

2. ✖ An old weak male panther

3. ✖ An old sleek female panther

4. ✔ A sleek tigress

Question Numbers : (11 to 15)

Question Label : Comprehension

LISTENING

The Bangle Sellers by Sarojini Naidu

Listen to the audio sample and answer the given subquestions.


885_388245_0_1984128_e100a2.mp3

Sub questions

Question Number : 11

Correct Marks : 1

Question Label : Multiple Choice Question

_____ coloured bangles are not mentioned in the poem.

Options :

1. ✖ Blue

2. ✖ Green

3. ✔ Black

4. ✖ Purple

5. ✖ Gold flecked grey

Question Number : 12

Correct Marks : 1

Question Label : Multiple Choice Question

The golden bangles are compared to the rich and ripe fields of maize.

Options :

1. ✔ TRUE

2. ✖ FALSE

Question Number : 13

Correct Marks : 1

Question Label : Multiple Choice Question

The fire coloured bangles are denotative of the desires and passion in the heart of the bride.

Options :

1. ✔ TRUE

2. ✖ FALSE

Question Number : 14

Correct Marks : 1

Question Label : Multiple Choice Question

The gold and grey colour worn by the maidens mark the fullness of their life.

Options :

1. ✖ TRUE

2. ✔ FALSE

Question Number : 15

Correct Marks : 1

Question Label : Multiple Choice Question

'Shining loads' refer to _____.

Options :

1. ✖ The stages of a woman's life

2. ✔ The various types of colourful bangles

3. ✖ The bride's clothes

4. ✖ The bangle sellers

Question Number : 16

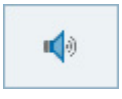
Correct Marks : 5

Question Label : Multiple Select Question

LISTENING

A Face in the Dark by Ruskin Bond

Listen to the audio sample and choose the right answer.

 885_388245_0_1984128_e100a1.mp3

Options :

1. ✖ The scene was set in a mangrove forest in Shimla.

2. ✔ Mr.Oliver was an Anglo-Indian Teacher.

3. ✖ When there was rain, the forest made a strange and frightening sound.

4. ✖ Mr.Oliver carried a lantern with him.

5. ✖ Mr.Oliver noticed a boy sitting like a statue on a rock.

6. ✔ The boy had no eyes, ears, nose and mouth.

7. ✖ The watchman carried a torch.

8. ✔ The watchman had no eyes, ears, nose and mouth.

9. ✔ The meaning of the word 'stroll' (in the context of this story) is to walk leisurely.

10. ✔ Watchman is a compound word.

Question Numbers : (17 to 31)

Question Label : Comprehension

GRAMMAR AND USAGE

Fill in the blanks from the options given in the subquestions.

Angry River by Ruskin Bond

(Source - http://www.gutenberg.us/)

The story is about Sita, 1._____ girl who lives with her grandparents in a hut on an island. Her grandfather is a fisherman. Their hut is made partly of mud with one of the walls leaning 2. _____ a rock and the other three walls 3. _____ of mud. At the beginning of 4. _____ story, Sita's grandmother is too ill, and Sita's grandfather plans to take her grandmother 5._____ the hospital in the town. He leaves in a boat with three of his goats and tells Sita that he will be back in a few days. He also warns her of the rain saying that the rain might cause a flood and that if the level of the water goes very high, she must climb the *peepal* tree on the island.

Soon, the rain 6. _____ to pour. Sita 7. _____ outside and realizes that there is a flood that looks like a raging river. She sees a few things floating around in the water. She hurriedly packs some spices, fish, her grandmother's saree, and grandfather's *hookah* in a trunk. She then climbs up the *peepal* tree 8. _____ she forgets her doll, Mumta. The flood soon 9. _____the level of the *peepal* tree and she almost gives up hope when she sees a boy in a boat trying to rescue 10._____. The boy rescues her, and she forgets about Mumta. Once the two are out of danger, the boy introduces 11. _____ as Krishan. 12. _____ eat mangoes that were there in the boat. Never before did Sita eat mangoes that 13. _____ as sweet as the ones Krishan 14. _____ offered. Sita later comes to know that her grandmother had died and she returns to the island with her grandfather to 15. _____ a new house and start living normally but without her doll Mumta and her grandmother.

Sub questions

Question Number : 17

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 1 _____.

Options :

1. ✖ an

2. ✔ a

3. ✖ single

4. ✖ sole

Question Number : 18

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 2 _____.

Options :

1. ✖ in

2. ✖ out

3. ✖ from

4. ✔ against

Question Number : 19

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 3 _____.

Options :

1. ✖ is

2. ✔ are

Question Number : 20

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 4 _____.

Options :

1. ✖ a

2. ✖ an

3. ✔ the

Question Number : 21

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 5 _____.

Options :

1. ✔ to

2. ✖ from

3. ✖ for

Question Number : 22

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 6 _____.

Options :

1. ✖ begin

2. ✔ begins

Question Number : 23

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 7 _____.

Options :

1. ✖ go

2. ✖ goed

3. ✔ goes

Question Number : 24

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 8 _____.

Options :

1. ✔ but

2. ✖ as

3. ✖ when

4. ✖ through

Question Number : 25

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 9 _____.

Options :

1. ✖ reach

2. ✔ reaches

Question Number : 26

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 10 _____.

Options :

1. ✖ she

2. ✔ her

3. ✖ herself

Question Number : 27

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 11 _____.

Options :

1. ✔ himself

2. ✖ her

3. ✖ his

Question Number : 28

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 12 _____.

Options :

1. ✖ He

2. ✖ She

3. ✔ They

Question Number : 29

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 13 _____.

Options :

1. ✖ was

2. ✔ were

Question Number : 30

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 14 _____.

Options :

1. ✔ had

2. ✖ was

3. ✖ were

Question Number : 31

Correct Marks : 1

Question Label : Multiple Choice Question

Enter your answer for blank 15 _____.

Options :

1. ✔ Build

2. ✖ Built

Question Numbers : (32 to 46)

Question Label : Comprehension

SOUNDS,WORDS AND SENTENCES

Choose the right answer from the options given in the subquestions.

Sub questions

Question Number : 32

Correct Marks : 1

Question Label : Multiple Choice Question

How many consonant sounds are there in the word 'scream'?

Options :

1. ✖ 1

2. ✖ 2

3. ✖ 3

4. ✔ 4

Question Number : 33

Correct Marks : 1

Question Label : Multiple Choice Question

/p/, /t/, /k/ are known as _____ sounds.

Options :

1. ✖ dental

2. ✔ stop

Question Number : 34

Correct Marks : 1

Question Label : Multiple Choice Question

A cluster of three consonant sounds is possible **only** in the final position of a word.

Options :

1. ✖ True

2. ✔ False

Question Number : 35

Correct Marks : 1

Question Label : Multiple Choice Question

/p/ in the word 'pan' is an aspirated sound.

Options :

1. ✔ True

2. ✖ False

Question Number : 36

Correct Marks : 1

Question Label : Multiple Choice Question

Comprehension begins with first understanding the sounds.

Options :

1. ✔ True

2. ✖ False

Question Number : 37

Correct Marks : 1

Question Label : Multiple Choice Question

More obstruction to the exhaling flow of air leads to the production of vowel sounds.

Options :

1. ✖ True

2. ✔ False

Question Number : 38

Correct Marks : 1

Question Label : Multiple Choice Question

The 26 alphabets in English do not capture all the sounds in English.

Options :

1. ✔ True

2. ✖ False

Question Number : 39

Correct Marks : 1

Question Label : Multiple Choice Question

The word 'month' is monosyllabic.

Options :

1. ✔ True

2. ✖ False

Question Number : 40

Correct Marks : 1

Question Label : Multiple Choice Question

The vowel sound present in words "room" is /uu/ and "look" is /u/.

Options :

1. ✔ True

2. ✖ False

Question Number : 41

Correct Marks : 1

Question Label : Multiple Choice Question

Rekha and Amala _____ like ice-creams.

Options :

1. ✔ do not

2. ✖ does not

Question Number : 42

Correct Marks : 1

Question Label : Multiple Choice Question

'I am a doctor.' This sentence is an indicator of _____ tense.

Options :

1. ✔ Present

2. ✖ Past

Question Number : 43

Correct Marks : 1

Question Label : Multiple Choice Question

In the agreement in English sentences, number and _____ play a critical role.

Options :

1. ✖ Gender

2. ✔ Person

Question Number : 44

Correct Marks : 1

Question Label : Multiple Choice Question

In English, the verb is not on the final position in a sentence.

Options :

1. ✔ True

2. ✖ False

Question Number : 45

Correct Marks : 1

Question Label : Multiple Choice Question

In the sentence, 'Baasma loves to dance', identify the main verb.

Options :

1. ✔ Loves

2. ✖ Dance

Question Number : 46

Correct Marks : 1

Question Label : Multiple Choice Question

The plural marking sound in the word 'shoes' is /z/.

Options :

1. ✔ True

2. ✖ False

Computational thinking

Number of Questions :	14
Section Marks :	50
Mark As Answered Required? :	Yes

Question Number : 47

Correct Marks : 0

Question Label : Multiple Choice Question

Library

RowNo	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

Scores

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

Words

RowNo	Word	PartOfSpeech	LetterCount
0	It	Pronoun	2
▮ ▮ ▮			
64	cane.	Noun	4

Options :

1. ✔ Useful Data has been mentioned above.

2. ✖ This data attachment is just for a reference & not for an evaluation.

Question Number : 48

Correct Marks : 3

Question Label : Multiple Choice Question

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

```
A = 0
while (Table 1 has more rows) {
    Read the first row X in Table 1
    if (X.Gender == "M" and X.CityTown == "Chennai") {
        A = A + X.Mathematics
    }
    Move X to Table 2
}
```

Options :

1. ✖ Sum of Mathematics marks of students from Chennai

2. ✔ Sum of Mathematics marks of male students from Chennai

3. ✖ Sum of Mathematics marks of male students

4. ✖ Sum of Mathematics marks of male students not from Chennai

Question Number : 49

Correct Marks : 3

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Library" table. At the end of the execution, the variable **A** captures the maximum number of pages of a book which is written in a language other than English. Choose the correct code fragment to complete the pseudocode.

```
A = 0
while (Table 1 has more rows) {
    Read the first row X in Table 1
    **********************
    *      Fill the code      *
    **********************
    Move X to Table 2
}
```

Options :

1. ✖
```
if (X.Language == "English" and X.Pages > A) {
    A = X.Pages
}
```

2. ✔
```
if (X.Language ≠ "English" and X.Pages > A) {
    A = X.Pages
}
```

3. ✖
```
if (X.Language ≠ "English" and X.Pages < A) {
    A = X.Pages
}
```

4. ✖
```
if (X.Language == "English" and X.Pages < A) {
    A = X.Pages
}
```

Question Number : 50

Correct Marks : 3

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Scores" table. At the end of the execution, **A** captures the second highest mark in Mathematics. Assume that the variable **Max** holds the value of the highest mark in Mathematics. Choose the correct code fragment to complete the pseudocode.

```
A = 0
while (Table 1 has more rows) {
    Read the first row X in Table 1
    **********************
    *      Fill the code      *
    **********************
    Move the row X to Table 2
}
```

Options :

```
    if (X.Mathematics > A) {
        A = X.Mathematics
1. ✖ }
```

```
    if (X.Mathematics > Max and X.Mathematics < A) {
        A = X.Mathematics
2. ✖ }
```

```
    if (X.Mathematics < Max and X.Mathematics > A) {
        A = X.Mathematics
3. ✔ }
```

```
    if (X.Mathematics < Max) {
        A = X.Mathematics
4. ✖ }
```

Question Number : 51

Correct Marks : 3

Question Label : Multiple Choice Question

Let **X** be a row in the "Words" table. Let **isShortVerb** be a procedure to find whether the word in the row **X** is a verb with letter count at most five. Choose the correct code fragment to complete the pseudocode.

```
Procedure isShortVerb (X)
    **********************
    *      Fill the code      *
    **********************
End isShortVerb
```

Options :

1. ✖
```
if (X.PartOfSpeech == "Verb") {
    return (True)
}
else {
    return (False)
}
```

2. ✖
```
if (X.PartOfSpeech == "Verb" and X.LetterCount ≤ 5) {
    return (False)
}
else {
    return (True)
}
```

3. ✖
```
if (X.PartOfSpeech == "Verb" or X.LetterCount ≤ 5) {
    return (True)
}
else {
    return (False)
}
```

4. ✔
```
if (X.PartOfSpeech == "Verb" and X.LetterCount ≤ 5) {
    return (True)
}
  else{
    return (False)
}
```

Question Number : 52

Correct Marks : 3

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Words" table. What will the value of **A** represent at the end of execution?

```
A = 0
while (Table 1 has more rows) {
    Read the first row X in Table 1
    i = 1, B = True
    while (i ≤ X.LetterCount) {
        if (i^th letter of X.Word is a vowel) {
            B = False
        }
        i = i + 1
    }
    if (B) {
        A = A + 1
    }
    Move X to Table 2
}
```

Options :

1. ✖ Number of words with at most one vowel
2. ✖ Number of words with exactly one vowel
3. ✖ Number of words with vowel count at most 2
4. ✔ Number of words without vowels
5. ✖ None of these

Question Number : 53

Correct Marks : 3

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Library" table. At the end of the execution, **A** is set to True if and only if there is a pair of books with same genre and same year of publication. Choose the correct code fragment to complete the pseudocode.

```
A = False
while (Table 1 has more rows) {
    Read the first row X in Table 1
    Move X to Table 2
    while (Table 1 has more rows) {
        Read the first row Y in Table 1
        Move Y to Table 3
        **********************
        *      Fill the code      *
        **********************
    }
    Move all rows from Table 3 to Table 1
}
```

Options :

1. ✖
```
if (X.Genre == Y.Genre or X.Year == Y.Year) {
    A = True
}
```

2. ✔
```
if (X.Genre == Y.Genre and X.Year == Y.Year) {
    A = True
}
```

3. ✖
```
if (X.Genre == Y.Genre or X.Year == Y.Year) {
    A = False
}
```

4. ✖
```
if (X.Genre == Y.Genre and X.Year == Y.Year) {
    A = False
}
```

Question Number : 54

Correct Marks : 3

Question Label : Multiple Select Question

The following pseudocode is executed using the "Library" table. At the end of the execution, **A** captures the number of books which are published after 2010 or have less than the average number of pages. Assume that the variable **Avg** holds the value of the average number of pages of the books in the table. The pseudocode may have mistakes. Identify all such mistakes (if any).

```
1    A = 0
2    while (Table 1 has more rows) {
3        Read the first row X in Table 1
4        C = False
5        if (X.Year > 2010) {
6            C = True
7        }
8        if (X.Pages > Avg) {
9            C = True
10       }
11       if (C) {
12           A = 1
13       }
14       Move X to Table 2
15   }
```

Options :

1. ✖ Error in Line 5

2. ✔ Error in Line 8

3. ✖ Error in Line 9

4. ✔ Error in Line 12

5. ✖ No error

Question Number : 55

Correct Marks : 4

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Library" table. What will the values of the variables **A** and **B** represent at the end of the execution?

```
A = 0, B = 0
while (Table 1 has more rows) {
    Read the first row X in Table 1
    if (X.Pages == A) {
        B = B + 1
    }
    if (X.Pages > A) {
        A = X.Pages
        B = 1
    }
    Move X to Table 2
}
```

Options :

1. ✖ **A** = Number of books with maximum number of pages

B = Maximum number of pages across all books

2. ✔ **A** = Maximum number of pages across all books

B = Number of books with maximum number of pages

3. ✖ **A** = Minimum number of pages across all books

B = It is always one

4. ✖ **A** = Maximum number of pages across all books

B = It is always one

Question Number : 56

Correct Marks : 4

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Words" table. What will the value of **C** represent at the end of the execution?

```
C = 0
while (Table 1 has more rows) {
    Read the first row X from Table 1
    Move X to Table 2
    if (X.Word ends with a full stop) {
        C = C + GetSomething(Table 2)
        Clear all rows in Table 2
    }
}

Procedure GetSomething (Table 2)
    A = 0
    While (Table 2 has more rows) {
        Read the first row X in Table 2
        Move X to Table 3
        while (Table 2 has more rows) {
            Read the first row Y in Table 2
            if (X.LetterCount ≠ Y.LetterCount and X.PartOfSpeech == Y.PartOfSpeech) {
                A = A + 1
            }
            Move Y to Table 4
        }
        Move all rows from Table 4 to Table 2
    }
    return (A)
End GetSomething
```

Options :

1. ✖ Number of pairs of words with the same part of speech and letter count

2. ✖ Number of pairs of words with the same part of speech and different letter count

3. ✖ Number of pairs of words with the same part of speech and letter count, that occur in the same sentence

4. ✔ Number of pairs of words with same part of speech and different letter count, that occur in the same sentence

Question Number : 57

Correct Marks : 5

Question Label : Multiple Choice Question

Let **A** be an author who had written a book in the "Library" table and **B** be a positive integer value. What does the procedure **DoSomething** compute?

```
Procedure DoSomething (A, B)
    C = 1900, D = 2022
    while (Table 1 has more rows) {
        Read the first row X in Table 1
        if (X.Author == A) {
            if (X.Year > C) {
                C = X.Year
            }
            if (X.Year < D) {
                D = X.Year
            }
        }
        Move X to Table 2
    }
    if (C – D ≥ B) {
        return (True)
    }
    else {
        return (False)
    }
End DoSomething
```

Options :

1. ✖ Outputs "True" if and only if the second book of the author **A** was published at least **B** years after their first book was published

2. ✔ Outputs "True" if and only if the last book of the author **A** was published at least **B** years after their first book was published

3. ✖ Outputs "True" if and only if the last book of the author **A** was published at least **B** years after their second-last book was published

4. ✖ Outputs "True" if and only if the last book of the author **A** was published at least **B** years before their first book was published

5. ✖ None of these

Question Number : 58

Correct Marks : 5

Question Label : Multiple Select Question

The following pseudocode is executed using the "Scores" table. At the end of the execution, **A** captures the number of female students who are above average in at least one subject. Assume

that the variables **M**, **P** and **C** hold the average marks of the subjects Mathematics, Physics and Chemistry respectively. The pseudocode may have mistakes. Identify all such mistakes (if any).

```
1   A = 0
2   while (Table 1 has more cards) {
3       Read the first row X from Table 1
4       if (CheckSomething(X, M, P, C)) {
5           A = 1
6       }
7       Move X to Table 2
8   }

9   Procedure CheckSomething (Y, C1, C2, C3)
10      if (Y.Gender == "F") {
11          if (Y.Mathematics > C1 and Y.Physics > C2 and Y.Chemistry > C3) {
12              return (True)
13          }
14          else {
15              return (False)
16          }
17      }
18      else {
19          return (False)
20      }
21  End CheckSomething
```

Options :

1. ✖ Error in Line 4

2. ✔ Error in Line 5

3. ✖ Error in Line 10

4. ✔ Error in Line 11

5. ✖ Multiple *return(False)* in procedure **CheckSomething**

6. ✖ No error

Question Number : 59

Correct Marks : 5

Question Label : Multiple Select Question

The following pseudocode is executed using the "Words" table. At the end of the execution, **A** captures the number of sentences with at least two nouns that have at most 2 vowels. The

pseudocode may have mistakes. Identify all such mistakes (if any).

```
1   A = 0, C = 0
2   while (Table 1 has more cards) {
3       Read the first row X from Table 1
4       if (X.PartOfSpeech == "Noun" and CountVowels(X) ≤ 2) {
5           C = C + 1
6       }
7       if (X.Word ends with a full stop) {
8           if (C ≥ 2) {
9               A = A + 1
10              C = 0
11          }
12      }
13      Move X to Table 2
14  }

15  Procedure CountVowels (Y)
16      i = 1
17      B = 0
18      while (i ≤ Y.LetterCount) {
19          if (i^th letter of Y.Word is a vowel) {
20              B = B + 1
21              i = i + 1
22          }
23      }
24      return (B)
25  End CountVowels
```

Options :

1. ✖ Line 5: Error in updating **C**

2. ✖ Line 9: **A** is updated in wrong place

3. ✔ Line 10: **C** is updated in wrong place

4. ✖ Line 20: **B** is updated in wrong place

5. ✔ Line 21: **i** is updated in wrong place

6. ✖ Line 24: Return value is incorrect

Question Number : 60

Correct Marks : 6

Question Label : Multiple Select Question

The following pseudocode is executed using the "Scores" table. At the end of the execution, **C** captures the number of pairs of students who have the same date of birth, or the same City/Town but different gender. Choose the correct code fragment(s) to complete the pseudocode.

```
C = 0
while (Table 1 has more rows) {
    Read the first row X in Table 1
    Move X to Table 2
    while (Table 1 has more rows) {
        Read the first row Y in Table 1
        Move Y to Table 3
        **********************
        *      Fill the code      *
        **********************
    }
    Move all rows from Table 3 to Table 1
}
```

Options :

1. ✖
```
if (X.DateOfBirth == Y.DateOfBirth) {
    C = C + 1
}
if (X.Gender ≠ Y.Gender and X.CityTown == Y.CityTown) {
    C = C + 1
}
```

2. ✔
```
if (X.DateOfBirth == Y.DateOfBirth) {
    C = C + 1
}
else {
    if (X.Gender ≠ Y.Gender and X.CityTown == Y.CityTown) {
        C = C + 1
    }
}
```

3. ✖
```
if (X.DateOfBirth == Y.DateOfBirth) {
    if (X.Gender ≠ Y.Gender and X.CityTown == Y.CityTown) {
        C = C + 1
    }
}
```

4. ✔

$$\begin{aligned}&\text{if } ((\mathrm{X}.DateOfBirth == \mathrm{Y}.DateOfBirth)\\&\quad \text{or } (\mathrm{X}.Gender \neq \mathrm{Y}.Gender \text{ and } \mathrm{X}.CityTown == \mathrm{Y}.CityTown)) \{\\&\qquad \mathrm{C} = \mathrm{C} + 1\\&\}\end{aligned}$$

Statistics for Data Science 1

Number of Questions : 14

Section Marks : 50

Mark As Answered Required? : Yes

Question Number : 61

Correct Marks : 3

Question Label : Multiple Choice Question

The mean annual college fees paid by all students in a college is ₹55 lakhs. The mean annual college fees paid by male and female students of the college are ₹40 lakhs and ₹60 lakhs respectively. Then, the percentages of male students studying in the college is

Options :

1. ✖ 60%

2. ✖ 50%

3. ✖ 20%

4. ✔ 25%

5. ✖ 30%

Question Number : 62

Correct Marks : 3

Question Label : Multiple Choice Question

If first quartile ($Q1$) = 80 and third quartile ($Q3$) = 100, which of the following must be true?

I. The median will lie in the range [80, 100].

II. The median is 90.

III. The standard deviation is at most 20.

Options :

1. ✔ I only

2. ✖ II only

3. ✖ III only

4. ✖ I and II

5. ✖ All I,II,III are true

6. ✖ None is true

Question Number : 63

Correct Marks : 3

Question Label : Multiple Choice Question

Suppose the correlation coefficient between two variables *x* and *y* is 0.45. What will be the new correlation coefficient if 0.10 is added to all values of the *x* variable, every value of the *y* variable is doubled, and the two variables are interchanged?

Options :

1. ✖ 0.55

2. ✖ 0.65

3. ✖ 0.90

4. ✔ 0.45

5. ✖ 0.80

Question Number : 64

Correct Marks : 1

Question Label : Multiple Choice Question

If the variance of a set of non-zero observations is zero, you can conclude that

Options :

1. ✖ the observations have same number of positive and negative data points.

2. ✖ the mean (average) value is zero.

3. ✔ all observations are the same value.

4. ✖ a mistake in calculation has been made.

5. ✖ none of these.

Question Number : 65

Correct Marks : 1

Question Label : Multiple Select Question

Consider various variables that describes the specifications of flats owned by a builder. These variables include price(INR Lakhs) of flat, area of flat(square meters), BHK(number of bedrooms attached with 1 hall and 1 kitchen), furnishing(furnished, semi furnished or unfurnished), and locality. The builder owns 400 flats whose specifications are then organised in a data table. Based on this information, choose the correct option(s) from below.

Options :

1. ✔ The number of variables in the data table is 5.

2. ✖ The number of cases/observations in the data table is 5.

3. ✔ Furnishing is a categorical variable.

4. ✔ Price of flat is a numerical variable.

5. ✖ Area of flat is a discrete numerical variable.

6. ✖ Locality is a numerical variable.

Question Number : 66

Correct Marks : 3

Question Label : Multiple Select Question

The bar chart given in Figure Q.1 shows the shoe sizes of a group of 70 children. Based on this information, which of the following statements is(are) true?

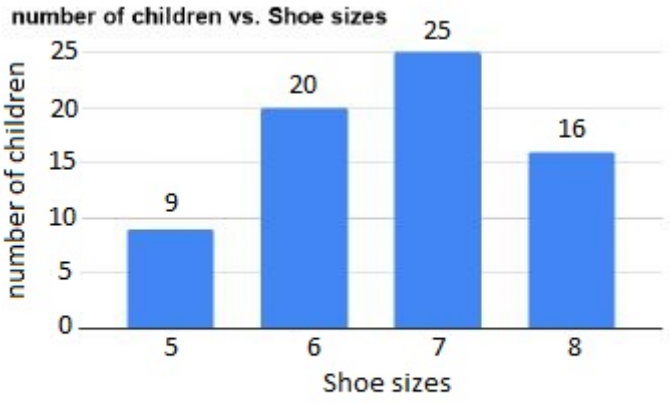


Figure Q.1: Shoe size dataset

Options :

1. ✔ 16 children wear a size 8 shoe.

2. ✖ 29 children wear a shoe size less than 8.

3. ✔ 7 is the median shoe size.

4. ✖ 35 children wear a shoe size larger than 6.

5. ✖ 6 is the mode shoe size.

6. ✖ Range of the shoe size is 4.

7. ✔ The value of first quartile (Q_1) for shoe size is 6.

Question Number : 67

Correct Marks : 3

Question Label : Multiple Select Question

In a call center, there are 75 employees and the number of calls they receive vary over the length of a day. The working hours are 9 AM to 6 PM with lunch break from 1 PM to 2 PM. The average number of calls received from 9 AM to 1 PM by an employee is 15 per hour, and the average number of calls received by the employee from 2 PM to 6 PM is 5 per hour. Based on this data, choose the correct options from below.

Options :

1. ✔ Average number of calls received by employee in working hours is 10 *calls/hour*.

2. ✖ The correlation coefficient of time and calls received is positive.

3. ✔ The correlation coefficient of time and calls received is negative.

4. ✖ The standard deviation of the calls received is equal to zero.

5. ✔ The slope of the trend line is negative.

Question Number : 68

Correct Marks : 3

Question Label : Multiple Select Question

The correlation was found to be r = 0.86 between price (x) and demand of mobile phones (y). Which of the following options could be true?

Options :

1. ✔ Given two points from the scatter plot of price and demand of mobile phones, one point has a smaller x value and a larger y value than another point.

2. ✔ Given two points from the scatter plot of price and demand of mobile phones, one point has a larger x value and a smaller y value than another point.

3. ✔ The covariance of price and demand of mobile phones is positive.

4. ✖ The covariance of price and demand of mobile phones is negative.

Question Number : 69

Correct Marks : 3

Question Label : Short Answer Question

By multiplying each of the numbers 4, 5, 7, 11, 13 by 4 and then adding 7 to each of them, we obtain a new dataset. Then, the difference between the sample variance of the new dataset and the sample variance of the old dataset is _____.

NOTE: Enter your answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

225

Question Number : 70

Correct Marks : 3

Question Label : Short Answer Question

Annual donations to a non profitable organisation is given in Table Q.2 where some data is missing. The donations given by company B is 5 crore rupees more than company D. How much did company D donate to the organisation? Enter the answer in INR crores.

Company	Donated amount in INR crores	Relative frequency
A	56	0.28
B		
C	45	0.225
D		
E	16	0.08

Table Q.2: Donations dataset

NOTE: Enter your answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

39

Question Numbers : (71 to 73)

Question Label : Comprehension

Use the following information and data given in Figure Q.2 and Figure Q.3 to answer the given subquestions

The stem and leaf plot diagrams given in Figure Q.2 and Figure Q.3 show the results of Computational thinking(CT) and English exams conducted in a college respectively. In Figure Q.3, x is an unknown value.

3	0 7
4	2 5 6 8
5	1 3 5 7 9
6	2 4 6 8
7	4 6 9
8	3 5 8 8

Figure Q.2: Stem and leaf plot of scores of CT paper, Key: $3|0 = 30$

4	3 5
5	2 4 9 9 9
6	3 5 7 9
7	4 8
8	2 4 7
9	0 x

Figure Q.3: Stem and leaf plot of scores of English paper, Key: $4|3 = 43$

Sub questions

Question Number : 71

Correct Marks : 1

Question Label : Short Answer Question

What is the difference of the modal score of Computational thinking and English?

NOTE: Enter your answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 72

Correct Marks : 3

Question Label : Short Answer Question

If the range of Computational thinking scores is greater than the range of English scores by 7, then the value of *x* is

NOTE: Enter your answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

4

Question Number : 73

Correct Marks : 1

Question Label : Short Answer Question

What is the difference between the medians of the two scores?

NOTE: Enter your answer in one decimal place.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

5.5

Question Numbers : (74 to 77)

Question Label : Comprehension

Use the following information and data given in Table Q.1 to answer the given subquestions

The placement statistics for the year 2020 of a polytechnic college that grants degrees in Computer Science Engineering (CSE) and Information Technology (IT) is given in Table Q.1.

Roll No	Gender	Score Percentage	Specialisation	Placement Status	Salary (INR lakhs)
CS18B001	M	85%	CSE	Placed	8.50
IT18B001	M	95%	IT	Placed	4.00
IT18B002	F	75%	IT	Placed	3.00
CS18B002	F	78%	CSE	Placed	4.00
CS18B003	M	85%	CSE	Not placed	
CS18B004	F	88%	CSE	Placed	5.00
IT18B003	M	85%	IT	Not placed	
CS18B005	F	75%	CSE	Placed	7.00
CS18B006	F	65%	CSE	Placed	3.00
CS18B007	M	92%	CSE	Placed	14.00
CS18B008	F	55%	CSE	Not placed	
IT18B004	M	95%	IT	Placed	3.5
CS18B009	M	82%	CSE	Placed	10.00
CS18B010	F	87%	CSE	Placed	4.00
IT18B005	M	50%	IT	Not placed	

Table Q.1: Placements dataset

Sub questions

Question Number : 74

Correct Marks : 1

Question Label : Multiple Select Question

Which of the following is (are) case(s)?

Options :

1. ✔ IT18B001

2. ✖ M

3. ✖ F

4. ✔ CS18B005

5. ✖ IT18B009

6. ✖ CSE

7. ✖ IT

Question Number : 75

Correct Marks : 1

Question Label : Multiple Select Question

Which of the following is (are) numerical variable(s)?

Options :

1. ✖ Specialisation

2. ✔ Score Percentage

3. ✖ Placement Status

4. ✔ Salary (INR lakhs)

Question Number : 76

Correct Marks : 3

Question Label : Short Answer Question

What is the population standard deviation of the salary in INR lakhs of the placed students? (Ignore the cases of students who are not placed.) Enter the answer up to 3 decimal points accuracy.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

3.2 to 3.5

Question Number : 77

Correct Marks : 5

Question Label : Short Answer Question

What is the absolute value of the point bi-serial correlation coefficient of association between

gender and salary among the students? (Ignore the cases of students who are not placed.) Enter the answer up to 3 decimal points accuracy.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

0.52 to 0.56

Question Numbers : (78 to 80)

Question Label : Comprehension

Use the following information and data given in Figure Q.4 to answer the given subquestions

The stacked bar chart given in Figure Q.4 represents the teacher course feedback of professor, associate professor, and assistant professor. Order is professor > associate professor > assistant professor. Each teacher gets only one feedback. In the dataset each value represents the designation. Positive and negative are the feedback received by the faculty.

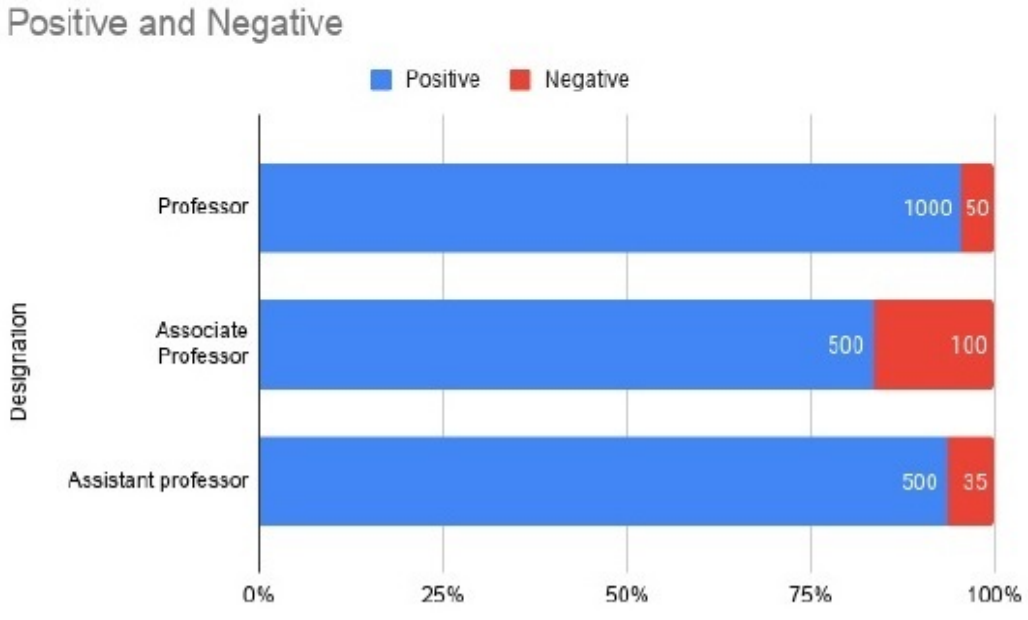


Figure Q.4: Feedback dataset

Sub questions

Question Number : 78

Correct Marks : 1

Question Label : Multiple Choice Question

What is the median value of the designation variable?

Options :

1. ✖ Professor

2. ✖ Assistant professor

3. ✔ Associate professor

4. ✖ Median is not defined for designation.

Question Number : 79

Correct Marks : 1

Question Label : Short Answer Question

What is the relative frequency of positive feedback in the overall 2185 feedback received by the faculty? Enter the answer up to 3 decimals accuracy.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

0.91 to 0.92

Question Number : 80

Correct Marks : 1

Question Label : Multiple Choice Question

What is the mode of the faculty designation?

Options :

1. ✔ Professor

2. ✖ Associate professor

3. ✖ Assistant professor

4. ✖ Mode is not defined for the loans.

Question Numbers : (81 to 82)

Question Label : Comprehension

Use the data given in Figure Q.5 to answer the given subquestions

The histogram of runs scored by a batsman in his career is given in Figure Q.5.

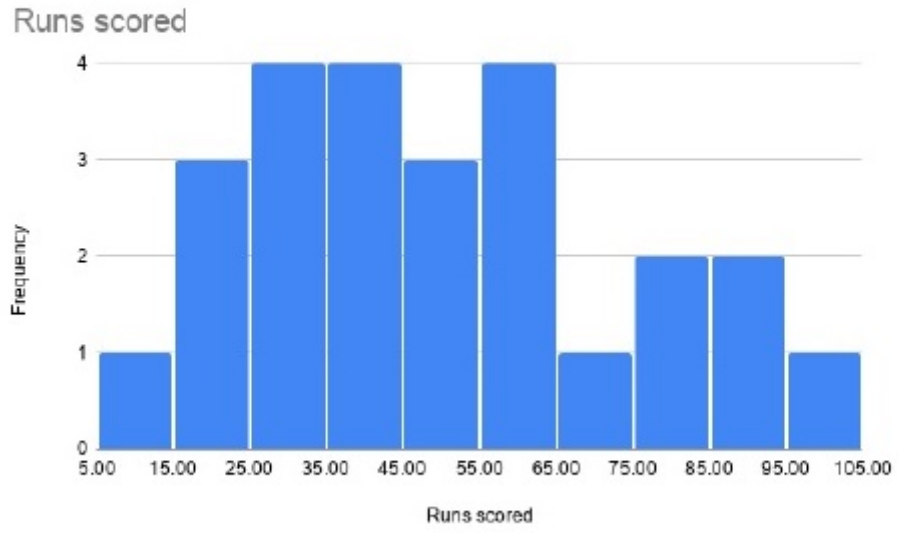


Figure Q.5: Runs dataset

Sub questions

Question Number : 81

Correct Marks : 1

Question Label : Short Answer Question

What is the approximate mean of the runs scored by the batsman?

NOTE: Enter your answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

50

Question Number : 82

Correct Marks : 5

Question Label : Short Answer Question

What is the approximate population standard deviation of the runs scored by the bats-man? Enter the answer up to 3 decimals accuracy. Hint: Use the class marks and its frequencies to solve for standard deviation.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

23.9 to 24.4

Mathematics for Data Science 1

Number of Questions :	14
Section Marks :	50
Mark As Answered Required? :	Yes

Question Number : 83

Correct Marks : 0

Question Label : Multiple Choice Question

Set of instructions
Qualifier examination
Mathematics for Data Science - 1

- There are some questions which have functions with discrete valued domains (such as day, month, year etc). For simplicity, we treat them as continuous functions.
- 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.
- Standard acronyms:
  - m - metres
  - cm - centimetres
  - kg - kilograms
  - kcal- kilocalorie

Options :

1. ✔ Useful Data has been mentioned above.

2. ✖ This data attachment is just for a reference & not for an evaluation.

Question Number : 84

Correct Marks : 2

Question Label : Short Answer Question

A study conducted at a factory manufacturing chemicals C_1 and C_2 yielded the following results. If a worker is exposed to either C_1 or C_2 (but not both), then the worker is at a low risk of developing a skin disorder. However, if the worker is exposed to both C_1 and C_2, then he is at a high risk of contracting the skin disorder. If out of 150 workers in the factory, 120 are exposed to C_1 and 90 are exposed to C_2, then how many workers are at high risk of developing the skin disorder? (Assume that every worker is exposed to at least one of the two chemicals C_1, C_2.)

NOTE: Enter your answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

60

Question Number : 85

Correct Marks : 4

Question Label : Short Answer Question

A sponsor organized a cricket tournament consisting of exactly 56 matches in which each participating teams played with every other team exactly 2 times. How many teams participated?

NOTE: Enter your answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

8

Question Number : 86

Correct Marks : 5

Question Label : Short Answer Question

The cable of a uniformly loaded suspension bridge hangs in the form of a parabola. The roadway which is horizontal and 150m long is supported by vertical wires attached to the cable, the longest wire being 50m long and the shortest being 5m long (as shown in Figure 3). Find the length (in m) of a supporting wire attached to the roadway 50m from the middle (assuming there is a supporting wire attached to the roadway 50m from the middle).

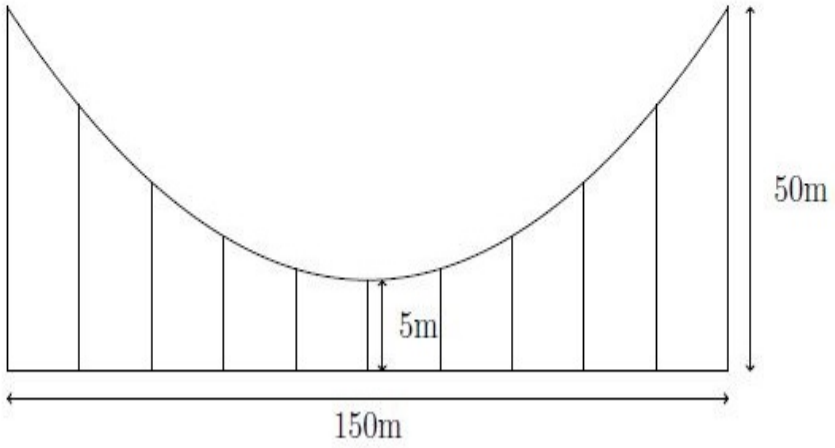


Figure 3

NOTE: Enter your answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

25

Question Number : 87

Correct Marks : 2

Question Label : Multiple Select Question

A voracious reader wants to arrange her books according to the language of the book and the binding (paperback or hardcover). She keeps all books of one language in the same shelf. Further, within a shelf, she keeps all books with the same kind of binding in the same row. Which of the following statements is (are) true?

Options :

1. ✔ English paperback and Bengali paperback cannot be in same book shelf.

2. ✖ English paperback and English hardcover cannot be in same book shelf.

3. ✔ English paperback and English hardcover cannot be in same row of a bookshelf.

4. ✖ Suppose the arrangement is done in the opposite order, i.e. books with similar binding are kept in the same shelf. And in a shelf, books of the same language are kept in the same row. Then, the books will be in exactly the same arrangement as before.

Question Number : 88

Correct Marks : 4

Question Label : Multiple Select Question

Define the following three sets.

- $S_1 = \{x \mid x \in \mathbb{R}, x^2 + 2 = 0\}$
- $S_2 = \{x \mid x \in \mathbb{R}, x^2 - 2 = 0\}$
- $S_3 = \{x \mid x \in \mathbb{R} \setminus \mathbb{Q}, (x^2 - 2)(x^2 - 4) = 0\}$

Which of the following statements is (are) correct?

Options :

1. ✔ S_1 is null set

2. ✖ $S_2 \cap S_3$ is null set

3. ✔ $S_2 \setminus S_3$ is null set

4. ✔ $S_2 = S_3$

Question Number : 89

Correct Marks : 3

Question Label : Multiple Select Question

Which of the following pairs of straight lines are perpendicular to each other?

Options :

1. ✔ $x + y = 1, x - y = 1$

2. ✖ $\frac{x}{3}+\frac{y}{5}=1, \frac{x}{3}-\frac{y}{5}=1$

3. ✔ $x=0, y=0$

4. ✔ $4x+5y=9, \frac{y}{10}-\frac{x}{8}=3$

Question Number : 90

Correct Marks : 2

Question Label : Multiple Choice Question

Find the midpoint of the line segment joining the origin and the point of intersection of the straight lines $\frac{x}{2}+\frac{y}{4}=1$ and $\frac{x}{4}+\frac{y}{2}=1$.

Options :

1. ✖ $(\frac{4}{3}, \frac{4}{3})$

2. ✔ $(\frac{2}{3}, \frac{2}{3})$

3. ✖ $(\frac{4}{3}, \frac{2}{3})$

4. ✖ $(\frac{2}{3}, \frac{4}{3})$

Question Number : 91

Correct Marks : 2

Question Label : Multiple Choice Question

The points $(\lambda, \lambda+1)$, $(2\lambda, \lambda)$ and $(2\lambda+1, \lambda-1)$ are collinear if

Options :

1. ✖ $\lambda=\frac{3}{2}$

2. ✖ $\lambda = 0$

3. ✔ $\lambda = 1$

4. ✖ $\lambda = \frac{1}{2}$

Question Number : 92

Correct Marks : 2

Question Label : Multiple Choice Question

For each given situation in Table 2 identify the line diagram from Figure 2 that best describes it.

	X-axis	Y-axis
1	Number of tickets of movie M sold	Box-office collection
2	Number of tickets of movie M sold	Total budget of the movie M
3	Number of tickets of movie M sold	Loss of the producer of the movie M

Table 2

Box-office collection of a movie is the term used to describe the money collected from selling the tickets for that movie.

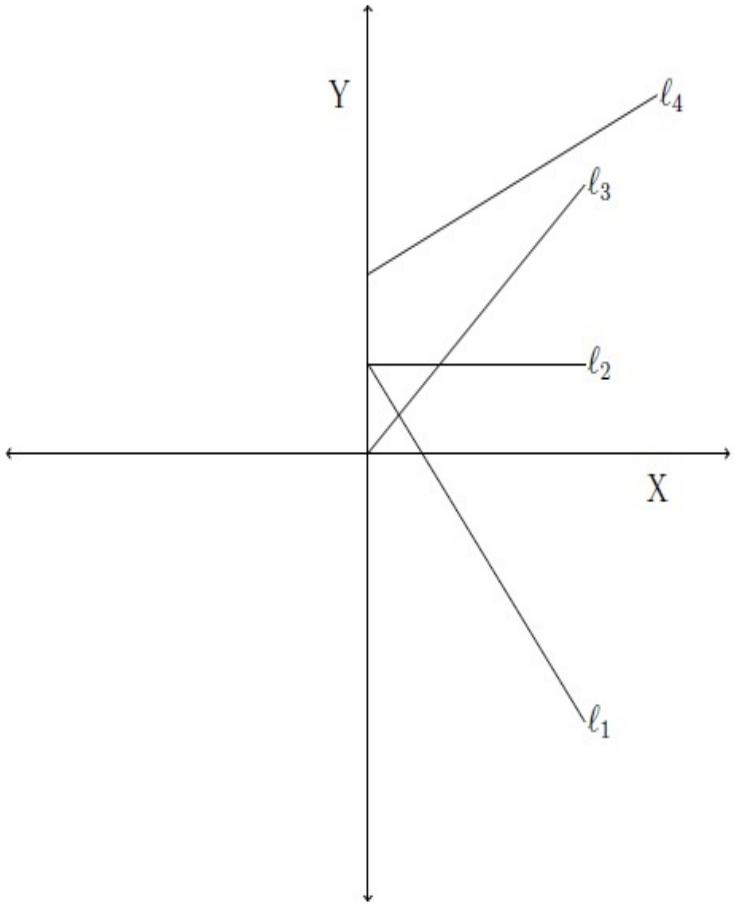


Figure 2

Choose the correct option.

Options :

1. ✖ 1 is ℓ_1, 2 is ℓ_3, 3 is ℓ_2

2. ✖ 1 is ℓ_3, 2 is ℓ_2, 3 is ℓ_4

3. ✔ 1 is ℓ_3, 2 is ℓ_2, 3 is ℓ_1

4. ✖ 1 is ℓ_4, 2 is ℓ_2, 3 is ℓ_3

Question Number : 93

Correct Marks : 3

Question Label : Multiple Choice Question

A square park of side 40m is to be renovated. At the centre of the park, a square flower bed is being prepared leaving a gravel path around the flower bed as shown in the Figure 1. If the total cost of laying the flower bed and gravelling the path, at the rates of Rs. 5 per square metre and Rs. 2 per square metre respectively, is Rs. 5900, then find the width(w) of the resulting gravel path.

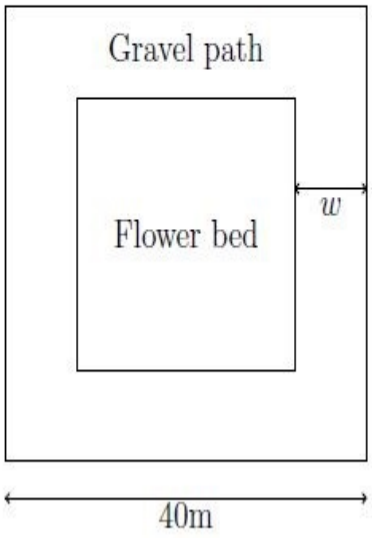


Figure 1

Options :

1. ✖ 10m

2. ✔ 5m

3. ✖ 35m

4. ✖ 30m

Question Number : 94

Correct Marks : 3

Question Label : Multiple Choice Question

There are four employees in a company. Their salaries (₹ in lakhs) for the year 2010 are given in Table 1. Further, the table also gives their respective increments in salary (₹ in lakhs) per year for all employees except Sonia.

Employee	Salary in 2010	Increment in salary per year
Hemant	8	0.4
Natasha	8	0.4
Sonia	10	-
Kunal	10	0.8

Table 1: Incomplete table of salaries and increments

If Sonia's salary is ₹20 lakhs for the year 2020, which option gives the correct relationship between the number of years since 2010 (y) and the total salary (C) given away by the company for the same year?

Options :

1. ✖ $C = 2.4y + 36$

2. ✖ $C = 0.8y + 10$

3. ✔ $C = 2.6y + 36$

4. ✖ $C = 2.6y + 10$

5. ✖ $C = 2.4y + 10$

6. ✖ $C = 2.4y + 20$

Question Numbers : (95 to 96)

Question Label : Comprehension

Let L be the set of all lines in the XY plane. Define the relations R_1 and R_2 as follows:

- $R_1 = \{(\ell_1, \ell_2) \mid \ell_1, \ell_2 \in L \text{ and } \ell_1 \text{ is parallel to } \ell_2\}$.
- $R_2 = \{(\ell_1, \ell_2) \mid \ell_1, \ell_2 \in L \text{ and } \ell_1 \text{ is perpendicular to } \ell_2\}$.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 95

Correct Marks : 4

Question Label : Multiple Select Question

If $\ell_1 \neq \ell_2 \neq \ell_3$, then choose the correct option(s)

Options :

1. ✔ If (ℓ_1, ℓ_2) and (ℓ_2, ℓ_3) are in R_2, then $(\ell_1, \ell_3) \in R_1$

2. ✔ If $(\ell_1, \ell_2) \in R_1$ and $(\ell_2, \ell_3) \in R_2$, then $(\ell_1, \ell_3) \in R_2$

3. ✔ If $(\ell_1, \ell_2) \in R_2$ and $(\ell_2, \ell_3) \in R_1$, then $(\ell_1, \ell_3) \in R_2$

4. ✖ R_2 is an equivalence relation

Question Number : 96

Correct Marks : 3

Question Label : Multiple Select Question

Which of the following is (are) correct?

Options :

1. ✔ $(2x + 3y = 4, 4x + 6y = 9) \in R_1$

2. ✖ $(y = -\frac{x}{2} + \frac{5}{2}, 2x + y = 7) \in R_2$.

3. ✖ $(3x - 5y = 7, y = \frac{5}{3}x + \frac{4}{3}) \in R_2.$

4. ✔ $(\sqrt{2}x + \sqrt{3}y = 1, \sqrt{3}x - \sqrt{2}y = 1) \in R_2$

Question Numbers : (97 to 99)

Question Label : Comprehension

Figure 4 shows the known values and future predictions of the amount of municipal solid waste (in million metric tons) generated across India from 2001 to 2041 for every 10 years. Use this information for the given subquestions.

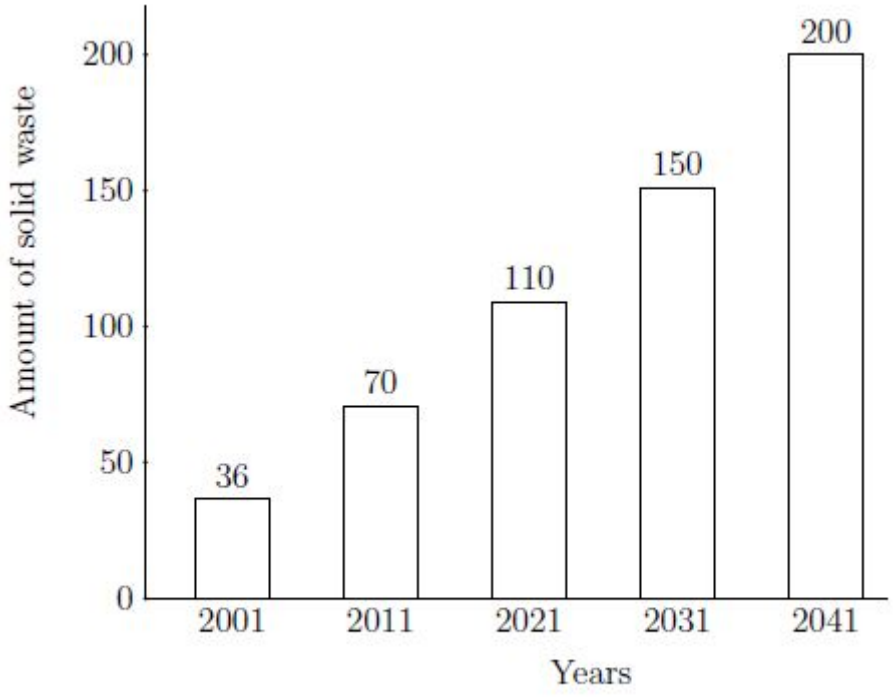


Figure 4

Sub questions

Question Number : 97

Correct Marks : 5

Question Label : Multiple Select Question

Two organisations A and B have fitted a line for the given data as $y = 4x + 36$ and $y = 4.1x + 36$ respectively, where y is the waste generated, and x is the number of years since 2001

(i.e., we are considering $x = 0$ for the year 2001, $x = 1$ for the year 2002 and so on). Choose the correct set of options.

Options :

1. ✔ Line fit predicted by organisation *A* is better than that predicted by *B*.

2. ✖ Line fit predicted by organisation *B* is better than that predicted by *A*.

3. ✖ Both fit are same in terms of Sum Squared Error (SSE).

4. ✖ SSE calculated by organisation *A* is 154.

5. ✔ SSE calculated by organisation *B* is 194.

6. ✖ SSE calculated by both the organisations is 176.

Question Number : 98

Correct Marks : 4

Question Label : Multiple Choice Question

An organisation has come up with an idea to predict the line for the data given in Figure 4 as $y = mx + c$, where m is calculated as the arithmetic mean of slopes taken at each 10 year interval, and the line is assumed to pass through the first point. What will the predicted line be?

Options :

1. ✖ $y = 3.8x + 36$

2. ✖ $y = 3.7x + 36$

3. ✖ $y = 4x + 36$

4. ✔ $y = 4.1x + 36$

5. ✖ $y = 4x$

6. ✖ $y = 4.1x$

Question Number : 99

Correct Marks : 2

Question Label : Short Answer Question

If the most accurate model is $y = 4x + 31.6$, what will be the increment in waste generated (in million metric ton) from year 2021 to year 2031?

NOTE: Enter your answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

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