Indian Institute of Technology, Madras - Centre for Continuing Education

Notations :

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

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

Question Paper Name :	IIT M DAD DS QUALIFIER EXAM QPC 07 Aug 2022 IBA
Subject Name :	2022 Aug: IIT M DAD DS QUALIFIER EXAM QPC
Creation Date :	2022-08-03 15:46:10
Duration :	240
Total Marks :	150
Display Marks:	Yes
Share Answer Key With Delivery Engine :	Yes
Actual Answer Key :	Yes
Calculator :	Scientific
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console?	Yes
Change Font Color :	No

Change Background Color :	No
Change Theme :	No
Help Button :	No
Show Reports :	No
Show Progress Bar :	No

Group I

Group Number :	1
Group Id :	6406538820
Group Maximum Duration :	0
Group Minimum Duration :	90
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	150
Is this Group for Examiner? :	No
Examiner permission :	Cant View
Show Progress Bar? :	No
Revisit allowed for group Instructions? :	Yes
Maximum Instruction Time :	0
Minimum Instruction Time :	0
Group Time In :	Minutes
Navigate To Group Summary From Last Question? :	No
Disable Submit Button During Assessment? :	No

English

Section Id :	64065322241

Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	14
Number of Questions to be attempted :	14
Section Marks :	25
Display Number Panel :	Yes
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065351095
Question Shuffling Allowed :	No

Question Number : 1 Question Id : 640653353927 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "QUALIFIER: ENGLISH"

MANDATORILY YOU HAVE TO ATTEND ALL THE SECTIONS.

Options :

6406531173944. ✔ Yes

6406531173945. ✖ No

Sub-Section Number :	2
Sub-Section Id :	64065351096
Question Shuffling Allowed :	No

Question Id : 640653353928 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A

Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (2 to 3)

Question Label : Comprehension

Read the following passage and answer the given subquestions:

On weekends, there is hardly any elbow room on Shanghumugham Beach in Kerala's capital, Thiruvananthapuram. The smell of roasted corn hangs in the air, vendors mill around the walkway that leads to the beach, families lounge around a 35m-long sculpture of a reclining naked woman — 'Jalakanyaka' by Kanaayi Kunhiraman — that seems to strain against Kerala's conservative ethos yet has come to be one of the most recognised landmarks in the city. It is a familiar beach scene.

The only problem is — there isn't much beach left.

"Every year, I feel the sea is drawing closer," says Indu, a 44-year-old Thiruvananthapuram resident who has been coming to Shanghumugham since her childhood. "The beach is so much smaller than it used to be. We would come here to get away from the congestion in the city, and now look how congested the beach has become."

She points to a row of fishing boats lined up along a part of the shore usually reserved for people. The boats were moved after vast tracts of the Shangumugham shoreline were eroded following Cyclone Ockhi, which hit the Kerala coast in December 2017. A nearby road, which runs parallel to the beach, bears testimony to Ockhi's fury — rope and traffic cones cordon off the traffic from long sections of the road that were washed away by the waves.

Even now, the waves are visibly rough — but they do not deter visitors. Beach-goers play a game of racing back to the shore before the water reaches their ankles, laughing aloud when the wave beats them to it. Others try to venture into the water, holding hands with their friends but lose balance when the wave pulls back into the sea. The whistles of coastguards pierce the air, instructing the crowds to move away from the water. Families with toddlers are turned away from the water.

—Rihan Najib, *The Hindu Business Line*

Sub questions

Question Number : 2 Question Id : 640653353929 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Multiple Choice Question

"A nearby road, which runs parallel to the beach, bears testimony to Ockhi's fury — rope and traffic cones cordon off the traffic from long sections of the road that were washed away by the waves." What does this sentence mean?

Options :

6406531173946. ✖ Cyclone Ockhi has completely destroyed the road running parallel to the beach.

6406531173947. ✖ The road running parallel to the beach is closed and no vehicles are allowed.

6406531173948. ✔ Long parts of the road that were washed away by Ockhi are restricted to vehicles and traffic.

6406531173949. ✖ The impact of Ockhi has forced the authorities to close off a road near the beach.

Question Number : 3 Question Id : 640653353930 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Multiple Choice Question

"There is hardly any elbow room..." What does this mean?

Options :

6406531173950. ✔ There is almost no room.

6406531173951. ✖ There is some room.

6406531173952. ✖ There are a few rooms.

6406531173953. ✖ There is not much scope.

Sub-Section Number : 3

Sub-Section Id : 64065351097

Question Shuffling Allowed : No

Question Id : 640653353931 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (4 to 6)

Question Label : Comprehension

Listen to the audio sample and answer the given subquestions:


885_640653_0_1984128_dir100endaanaudio.mp3

Sub questions

Question Number : 4 Question Id : 640653353932 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Multiple Choice Question

Listen to the audio. *"You have been stranded thousands of miles from home"* What is the meaning of the word *'stranded'*?

Options :

6406531173954. ✔ Left alone

6406531173955. ✖ Tortured

6406531173956. ✖ Confused

Question Number : 5 Question Id : 640653353933 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Multiple Choice Question

Listen to the audio and fill in the blank: "Such a _____ would make many people despair and

curse their awful fate.”

Options :

6406531173957. ✖ Prediction

6406531173958. ✔ Predicament

6406531173959. ✖ Predatory

Question Number : 6 Question Id : 640653353934 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Multiple Choice Question

Listen to the audio. *“It became the foundation of his life’s work and legacy”*. What is the meaning of the word legacy?

Options :

6406531173960. ✔ A set of property or values left after one’s departure.

6406531173961. ✖ A treat by a leader.

6406531173962. ✖ An unseen treasure.

Sub-Section Number :	4
Sub-Section Id :	64065351098
Question Shuffling Allowed :	Yes

Question Number : 7 Question Id : 640653353935 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

Nobody ____ an exclusive right to common property.

Options :

6406531173963. ✔ Has

6406531173964. ✖ Have

Question Number : 8 Question Id : 640653353936 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

She _____ working here since 2015.

Options :

6406531173965. ✔ Has been

6406531173966. ✖ Have been

Question Number : 9 Question Id : 640653353937 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

Siva bought _____ new car.

Options :

6406531173967. ✔ A

6406531173968. ✖ The

6406531173969. ✖ An

Question Number : 10 Question Id : 640653353938 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

My balcony _____ half a dozen plants.

Options :

6406531173970. ✔ Accommodates

6406531173971. ✖ Accommodate.

Question Number : 11 Question Id : 640653353939 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

Fill in the blank. Begin, Began, ____.

Options :

6406531173972. ✖ Begin

6406531173973. ✖ Beginned

6406531173974. ✖ Began

6406531173975. ✔ Begun

Question Number : 12 Question Id : 640653353940 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

Fill in the box (☐) in the following sentence with the appropriate punctuation mark.
"Today may not be the best day. However ☐ there is always a tomorrow."

Options :

6406531173976. ✖ Full stop

6406531173977. ✖ Ellipsis

6406531173978. ✔ Comma

6406531173979. ✖ Colon

Question Number : 13 Question Id : 640653353941 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

India is a large country, _____?

Options :

6406531173980. ✖ Aren’t they

6406531173981. ✔ Isn’t it

6406531173982. ✖ Didn’t it

6406531173983. ✖ Don’t you

Question Number : 14 Question Id : 640653353942 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

Which of the following two options is grammatically correct?

Options :

6406531173984. ✔ I have several huge wooden boxes

6406531173985. ✖ I have huge wooden several boxes.

Question Number : 15 Question Id : 640653353943 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

State whether the following sentence is grammatically correct.

She gave me a number of informations, when I returned home from London.

Options :

6406531173986. ✖ Yes

6406531173987. ✔ No

Question Number : 16 Question Id : 640653353944 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

State whether the following sentence is grammatically correct.

I saw a small boy carrying a big umbrella.

Options :

6406531173988. ✔ Yes

6406531173989. ✖ No

Sub-Section Number :	5
Sub-Section Id :	64065351099
Question Shuffling Allowed :	Yes

Question Number : 17 Question Id : 640653353945 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 5

Question Label : Short Answer Question

You have received an offer from your preferred graduate school. Draft your acceptance email with your academic plan in 200 words.

Response Type : Alphanumeric

Evaluation Required For SA : No

Max Word Count : 200

Show Word Count : Yes

Min Word Count : 0

Highlight min word : Yes

Single Line Response : No

Number of Rows : 10

Number Of Columns : 70

Text Areas : PlainText

Programming in Python

Section Id :	64065322242
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	11
Number of Questions to be attempted :	11
Section Marks :	25
Display Number Panel :	Yes
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065351100
Question Shuffling Allowed :	No

Question Number : 18 Question Id : 640653353946 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "QUALIFIER: PROGRAMMING IN PYTHON"

MANDATORILY YOU HAVE TO ATTEND ALL THE SECTIONS.

Options :

6406531173991. ✔ Yes

6406531173992. ✖ No

Question Number : 19 Question Id : 640653353947 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction

Time : 0

Correct Marks : 0

Question Label : Multiple Choice Question

Useful Data

Presentation

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

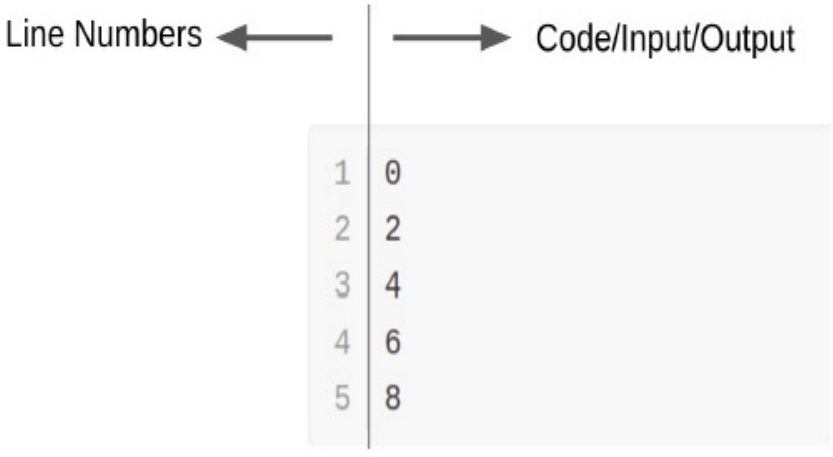
Code

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

Input or Output

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

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



Useful information

range

Sample behaviour of the `range` function:

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

// operator

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

NAT → integer

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

Options :

6406531173993. ✔ Useful Data has been mentioned above.

6406531173994. ✖ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number : 2

Sub-Section Id : 64065351101

Question Shuffling Allowed : Yes

Question Number : 20 Question Id : 640653353951 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Multiple Choice Question

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

```
char = input()
words = ['fray', 'than', 'plank', 'black',
         'flask', 'snack', 'grand', 'place']

count = 0
for word in words:
    if char in word:
        count += 1

if count == len(words):
    print('common')
else:
    print('not common')
```

Options :

6406531174001. ✔ a

6406531174002. ✖ k

6406531174003. ✖ n

6406531174004. ✖ f

Question Number : 21 Question Id : 640653353954 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Multiple Choice Question

What is the output of the following snippet of code?

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

Options :

6406531174010. ✔

```
*
**
***
****
*****
```

6406531174011. ✖

```
*
**
***
****
```

6406531174012. ✖

```
    *
   **
  ***
 ****
*****
```

6406531174013. ✖

```
*
**
***
****
*****
******
```

Sub-Section Number : 3

Sub-Section Id : 64065351102

Question Shuffling Allowed : Yes

Question Number : 22 Question Id : 640653353949 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

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

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

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

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

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

Code-1

```
def equality(P, Q):
    if len(P) != len(Q):
        return False
    if len(P) == 0:
        return True
    if P[0] != Q[0]:
        return False
    return equality(P[1: ], Q[1: ])
```

Code-2

```
def equality(P, Q):
    if len(P) != len(Q):
        return False
    for elem in P:
        if elem not in Q:
            return False
    return True
```

Which of these two implementations is correct?

Options :

6406531173996. ✔ Only code-1 is a correct implementation.

6406531173997. ✖ Only code-2 is a correct implementation.

6406531173998. ✖ Both code-1 and code-2 are correct implementations.

6406531173999. ✖ Both code-1 and code-2 are **not** correct implementations.

Question Number : 23 Question Id : 640653353952 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Choice Question

What is the output of the following snippet of code?

```
def do_something(A, x):
    m, n = len(A), len(x)
    out = [ ]
    for i in range(m):
        val = 0
        for j in range(n):
            val += A[i][j] * x[j]
        out.append(val)
    return out

A = [[1, 0, 1, 1],
     [2, 1, 0, 1],
     [1, 0, 1, 0],
     [0, 1, 2, 1]]

x = [1, 4, 2, 1]

print(do_something(A, x))
```

Options :

6406531174005. ✔

```
[4, 7, 3, 9]
```

6406531174006. ✖

```
[4, 7, 3, 1]
```

6406531174007. ✖

```
[9, 3, 7, 4]
```

6406531174008. ✖

```
23
```

Sub-Section Number : 4

Sub-Section Id : 64065351103

Question Shuffling Allowed : Yes

Question Number : 24 Question Id : 640653353955 Question Type : MSQ Is Question

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

Correct Marks : 2

Question Label : Multiple Select Question

Consider the following snippets of code:

Code-1

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

Code-2

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

Code-3

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

Select all true statements.

Options :

6406531174014. ✔ Code-1 will throw an error in line-2

6406531174015. ✔ Code-2 will throw an error in line-4

6406531174016. ✖ Code-3 will throw an error in line-3

6406531174017. ✔ Code-3 will run without any error

Sub-Section Number :	5
Sub-Section Id :	64065351104
Question Shuffling Allowed :	Yes

Question Number : 25 Question Id : 640653353948 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Short Answer Question

What is the output of the following snippet of code?

```
def some_fun(x):
    if x < 3:
        return 0
    return 1 + some_fun(x // 3)

print(some_fun(59049))
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

10

Question Number : 26 Question Id : 640653353950 Question Type : SA Calculator : None

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

Correct Marks : 3

Question Label : Short Answer Question

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

```
def status(M):
    n = len(M)
    for i in range(n):
        index = i
        for j in range(n):
            if M[i][j] != M[i][0]:
                index = -1
                break
        if index >= 0:
            break
    return index

board = [['X', 'X', 'O', 'X', 'O', 'X'],
         ['O', 'X', 'O', 'O', 'X', 'X'],
         ['O', 'X', 'O', 'O', 'O', 'X'],
         ['O', 'O', 'O', 'O', 'O', 'O'],
         ['X', 'O', 'O', 'X', 'X', 'X'],
         ['X', 'X', 'O', 'X', 'O', 'O']]
print(status(board))
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 27 Question Id : 640653353953 Question Type : SA Calculator : None

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

Correct Marks : 3

Question Label : Short Answer Question

What is the output of the following snippet of code?

```
n = 1203040

x = 0
while n > 0:
    if n % 10 == 0:
        n = n // 10
        continue
    x = x * 10 + (n % 10)
    n = n // 10

print(x)
```

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4321

Sub-Section Number :	6
Sub-Section Id :	64065351105
Question Shuffling Allowed :	No

Question Id : 640653353956 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (28 to 29)

Question Label : Comprehension

Consider the following code:

```
temp = str(i) # i is an integer greater than 10
l = len(temp)//2
flag = True
for j in range(l):
    if temp[j] != temp[-j - 1]:
        flag = False
        break
if flag:
    print("special")
else:
    print("Not special")
```

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 28 Question Id : 640653353957 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Multiple Select Question

Which of the following options is/are correct for the given piece of code?

Options :

6406531174018. ✖ The code will print `special` if `i=2372`.

6406531174019. ✔ The code will print `special` if and only if the number is a palindrome.

6406531174020. ✖ The code will print `special` for numbers other than the palindromes.

6406531174021. ✔ The code will print `Not special` if `i=2372`.

Question Number : 29 Question Id : 640653353958 Question Type : SA Calculator : None

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

Correct Marks : 2

Question Label : Short Answer Question

How many times does the code print `special` for all integers in the range [10,100], endpoints inclusive?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

9

Mathematics

Section Id :	64065322243
Section Number :	3
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
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065351106

Question Shuffling Allowed : No

Question Number : 30 Question Id : 640653353959 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "QUALIFIER: MATHEMATICS"

MANDATORILY YOU HAVE TO ATTEND ALL THE SECTIONS.

Options :

6406531174023. ✔ Yes

6406531174024. ✖ No

Question Number : 31 Question Id : 640653353960 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 0

Question Label : Multiple Choice Question

Instructions:

- 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.
- 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

Options :

6406531174025. ✔ Useful Data has been mentioned above.

6406531174026. ✖ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number : 2

Sub-Section Id : 64065351107

Question Shuffling Allowed : Yes

Question Number : 32 Question Id : 640653353961 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 5

Question Label : Multiple Select Question

Let $f(x) = e^{a\left(x^2-7x+6\right)}$, $a \in \mathbb{R}$ then choose the set of correct options.

Options :

6406531174027. ✔ $f(x)$ will be positive for $x \in (-20, 10)$ if $a > 0$.

6406531174028. ✔ $f(x)$ will be positive for $x \in (10, 20)$ if $a < 0$.

6406531174029. ✖ $f(x)$ is a one-to-one (injective) function.

6406531174030. ✖ If $a = 1$, then $f(x)$ will have two X-intercepts.

Sub-Section Number : 3

Sub-Section Id : 64065351108

Question Shuffling Allowed : Yes

Question Number : 33 Question Id : 640653353963 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 7

Question Label : Multiple Select Question

Choose the set of correct options.

Options :

6406531174032. ✔ There is no asymptote for the function $\log\left(x^2 - x + 20\right)$

6406531174033. ✔ $f(x) = \dfrac{1}{x^4+3}$ is a bounded function.

6406531174034. ✖ The inverse of $f(x) = x^2 - 9$ is $g(x) = \pm\sqrt{(x+9)}$

6406531174035. ✔ The domain of the function $f(x) = \frac{3}{9-x^2} + \log(x^3 - x)$ is $(-1,0) \cup (1,3) \cup (3,\infty)$.

Sub-Section Number : 4

Sub-Section Id : 64065351109

Question Shuffling Allowed : Yes

Question Number : 34 Question Id : 640653353966 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 6

Question Label : Multiple Select Question

Choose the set of correct options.

Options :

6406531174038. ✔ The derivative of the function $f(x) = \sin(2\cos 3x)$ is $f'(x) = -6\sin(3x)\cos(2\cos 3x)$

6406531174039. ✖ If $h(x) = x^2 + \sin(\pi x) + e^x$ is the derivative of the function f then the value of $\lim\limits_{m\to 0} \dfrac{f(3+m) - f(3)}{m}$ is $9 - e^3$.

6406531174040. ✖ If product of two functions f and g is differentiable, then both f and g are differentiable.

6406531174041. ✔ The function $f(x) = \dfrac{x+9}{e^{2x}}$ is differentiable on $\mathbb{R}$.

Sub-Section Number : 5

Sub-Section Id : 64065351110

Question Shuffling Allowed : Yes

Question Number : 35 Question Id : 640653353968 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Select Question

Consider a relation R defined on the set $A = \{4, 6, 8, 10, 12\}$ as R= $\{(x, y) : y = x + 2\}$.
Which among the following is(are) correct?

Options :

6406531174043. ✔ R is neither reflexive, nor symmetric and nor transitive.

6406531174044. ✔ R is an anti-symmetric relation.

6406531174045. ✖ R is an identity relation.

6406531174046. ✖ R is an equivalence relation.

Sub-Section Number : 6

Sub-Section Id : 64065351111

Question Shuffling Allowed : Yes

Question Number : 36 Question Id : 640653353973 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Multiple Select Question

Consider the function $f(x) = 5\,|x| - 20$

Options :

6406531174050. ✔ Slope of the function $f(x)$ at every point is -5 for $x < 0$.

6406531174051. ✔ The minimum value of $f(x)$ is -20.

6406531174052. ✔ The $y-$intercept of $f(x)$ is -20.

6406531174053. ✖ The minimum value of $f(x)$ is 0.

Sub-Section Number : 7

Sub-Section Id : 64065351112

Question Shuffling Allowed : Yes

Question Number : 37 Question Id : 640653353962 Question Type : SA Calculator : None

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

Correct Marks : 4

Question Label : Short Answer Question

On an average, a video lecture in our online degree course has 200 views on the same day that it is posted. It is verified that the total number of views increases exponentially according to the function $y = 200 \times 5^{0.1t}$, where t represents the number of days since the video was posted ($t = 0$ on the day of posting the video). How many days does it take for 1000 people to view the video?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

10

Question Number : 38 Question Id : 640653353964 Question Type : SA Calculator : None

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

Correct Marks : 4

Question Label : Short Answer Question

Consider the function

$$f(x) = \begin{cases} \dfrac{4x}{(x+3)^2} & x \leq -1 \\ -4x - 5 & -1 < x \leq 1 \\ \dfrac{-9}{x+1} & x > 1. \end{cases}$$

Find the total number of points in $(-3, \infty)$ at which $f(x)$ is not continuous.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 39 Question Id : 640653353965 Question Type : SA Calculator : None

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

Correct Marks : 4

Question Label : Short Answer Question

Consider a function defined as,

$$f(x) = \begin{cases} 2x^3 + 7x + 3 & x \leq 0 \\ m\sin(x) + n\cos(x) & x > 0. \end{cases}$$

If f is differentiable at $x = 0$ then the value of $m + n$ is

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

10

Sub-Section Number : 8

Sub-Section Id : 64065351113

Question Shuffling Allowed : Yes

Question Number : 40 Question Id : 640653353967 Question Type : SA Calculator : None

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

Correct Marks : 3

Question Label : Short Answer Question

Let $f(x) = 4x^3 + 3x^2 + 2x + 1$, then find the value of the integral $\int_0^2 f(x)\,dx$ using limit of Riemann sums as $n \to \infty$, for the given partition $P = \{0 = x_0, x_1 = \frac{2}{n}, \ldots, x_i = \frac{2\times i}{n}, \ldots, x_n = 2\}, i = 1, 2, \ldots, n$ and $x_i^* \in [x_{i-1}, x_i]$, where $x_i^* = \frac{2\times i}{n}$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

30

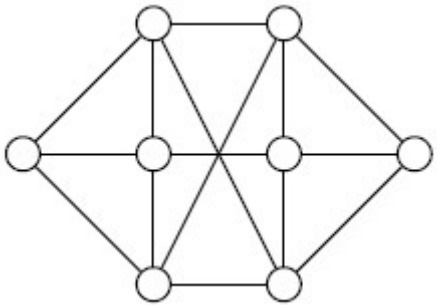
Question Number : 41 Question Id : 640653353974 Question Type : SA Calculator : None

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

Correct Marks : 3

Question Label : Short Answer Question

The cardinality of the maximum independent set of the graph given below is



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

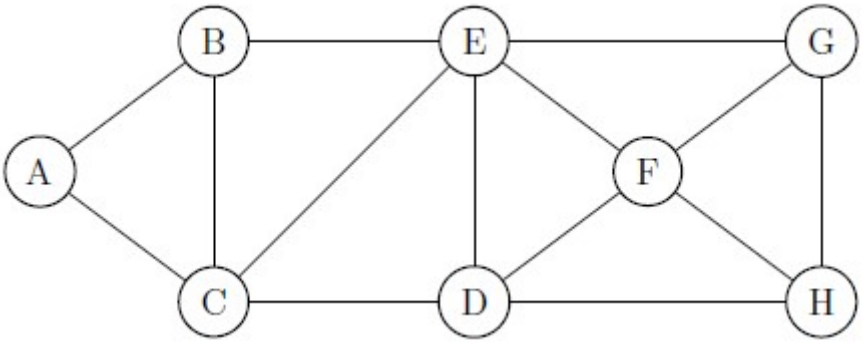
Question Number : 42 Question Id : 640653353975 Question Type : SA Calculator : None

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

Correct Marks : 3

Question Label : Short Answer Question

What is the minimum number of colours required to colour the graph given below?



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Sub-Section Number :	9
Sub-Section Id :	64065351114
Question Shuffling Allowed :	No

Question Id : 640653353969 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (43 to 45)

Question Label : Comprehension

The polynomial $p(x) = a(x-4)(x-6)(x-8)(x-10)$ passes through the vertex of the quadratic function $q(x) = -(x-7)^2 - 18$.
Based on this information, answer the given sub-questions.

Sub questions

Question Number : 43 Question Id : 640653353970 Question Type : SA Calculator : None

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

Correct Marks : 1

Question Label : Short Answer Question

Enter the x−coordinate of the vertex of $q(x)$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

7

Question Number : 44 Question Id : 640653353971 Question Type : SA Calculator : None

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

Correct Marks : 1

Question Label : Short Answer Question

Enter the y−coordinate of the vertex of $q(x)$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

-18

Question Number : 45 Question Id : 640653353972 Question Type : SA Calculator : None

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

Correct Marks : 3

Question Label : Short Answer Question

Enter the value of α.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

-2

Statistics

Section Id :	64065322244
Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	13
Number of Questions to be attempted :	13
Section Marks :	50
Display Number Panel :	Yes
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065351115
Question Shuffling Allowed :	No

Question Number : 46 Question Id : 640653353976 Question Type : MCQ Is Question

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

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "QUALIFIER: STATISTICS"

MANDATORILY YOU HAVE TO ATTEND ALL THE SECTIONS.

Options :

6406531174056. ✔ Yes

6406531174057. ✖ No

Sub-Section Number :	2
Sub-Section Id :	64065351116
Question Shuffling Allowed :	Yes

Question Number : 47 Question Id : 640653353985 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Ram has to choose a t-shirt for his outfit from a collection of 6 yellow t-shirts, 2 black t-shirts and 4 blue t-shirts. If a t-shirt is chosen randomly, then what is the chance that a black or a blue t-shirt is chosen by Ram for his outfit ?

Options :

6406531174077. ✖ $\frac{1}{6}$

6406531174078. ✔ $\frac{1}{2}$

6406531174079. ✖ $\frac{1}{3}$

6406531174080. ✖ $\frac{2}{3}$

Question Number : 48 Question Id : 640653353990 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Kanika has to catch a train to go to her hometown, and the time to pass the security screening at the railway station follows exponential distribution. It is noted that the mean time to pass through the security screening is 10 minutes. To catch the train, Kanika must clear the security screening within 10 minutes. What is the probability that Kanika will miss the train?

Options :

6406531174084. ✔ e^{-1}

6406531174085. ✖ $1 - e^{-1}$

6406531174086. ✖ e^{-10}

6406531174087. ✖ $1 - e^{-10}$

Sub-Section Number :	3
Sub-Section Id :	64065351117
Question Shuffling Allowed :	Yes

Question Number : 49 Question Id : 640653353977 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Select Question

The scores of Namita in first five weekly assignments are 50, 50, 65, 60, 55. If she scored 51 marks in the sixth week assignment, then how does it affect her overall performance?

Options :

6406531174058. ✖ The mean score of weekly assignment increases.

6406531174059. ✖ The modal score of weekly assignment increases.

6406531174060. ✖ The median score of weekly assignment increases.

6406531174061. ✔ None of these

Question Number : 50 Question Id : 640653353978 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Select Question

There is a strong positive correlation between the marks obtained by students of class 10^{th} and class 12^{th} in Statistics. If the population standard deviation of the marks obtained by students of class 10^{th} and 12^{th} is 2 and 5 respectively, then which of the following is/are could be a possible value(s) of the population covariance between the marks obtained by the students of class 10^{th} and 12^{th} in Statistics?

Options :

6406531174062. ✖ 7

6406531174063. ✔ 8

6406531174064. ✔ 9.5

6406531174065. ✖ 11

Question Number : 51 Question Id : 640653353992 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Select Question

An urn contains four tickets marked with numbers 557, 575, 755 and 777. One ticket is drawn at random. Let E_i, (i=1,2,3) be the event that i^{th} digit of the number on the ticket drawn is 5. Then which of the following statement(s) is/are true?

Options :

6406531174092. ✔ E_1 and E_2 are independent

6406531174093. ✔ E_1 and E_3 are independent

6406531174094. ✖ E_1, E_2 and E_3 are independent

6406531174095. ✖ E_2 and E_3 are dependent

6406531174096. ✖ E_1 and E_3 are dependent

Sub-Section Number : 4

Sub-Section Id : 64065351118

Question Shuffling Allowed : Yes

Question Number : 52 Question Id : 640653353979 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Select Question

Choose the incorrect statement(s):

Options :

6406531174066. ✖ Battery life of laptop is numeric and continuous variable.

6406531174067. ✖ Number of deliveries faced by a batsman has a ratio scale of measurement.

6406531174068. ✔ Soccer positions (i.e. Defender, Midfielder, Forward) has an ordinal scale of measurement.

6406531174069. ✖ The marital status of a person has a nominal scale of measurement.

Question Number : 53 Question Id : 640653353991 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Select Question

An administrator at IIT Madras campus wants to conduct a survey to rate the tiffin services offered by the campus's cafeteria to the final year students, for which the administrator selects 100 final year students randomly from the campus. Identify the sample and population.

Options :

6406531174088. ✖ The population is all the students at IIT Madras campus.

6406531174089. ✖ The sample is all the final year students at IIT Madras campus.

6406531174090. ✔ The sample is 100 randomly selected final year students at IIT Madras campus.

6406531174091. ✔ The population is all the final year students at IIT Madras campus.

Sub-Section Number : 5

Sub-Section Id : 64065351119

Question Shuffling Allowed : Yes

Question Number : 54 Question Id : 640653353983 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Short Answer Question

From a box containing 5 dark chocolates and 3 milk chocolates, 3 chocolates are to be selected randomly without replacement. In how many ways can the chocolates be selected such that at least one dark chocolate is selected?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

55

Question Number : 55 Question Id : 640653353989 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Short Answer Question

In a manufacturing company, which produces medicine bottles, the chance that the bottles are of good quality is 60%, independent of each other. A sample of 5 bottles is selected for a quality inspection. If the random variable X denotes the number of good quality bottles selected, then calculate the Var(X)? (Enter the answer correct to 2 decimal accuracy)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

1.19 to 1.21

Sub-Section Number :	6
Sub-Section Id :	64065351120
Question Shuffling Allowed :	Yes

Question Number : 56 Question Id : 640653353984 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

In how many ways a necklace of 3 beads can be formed using 5 beads of different colour?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

10

Sub-Section Number :	7
Sub-Section Id :	64065351121
Question Shuffling Allowed :	No

Question Id : 640653353980 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (57 to 58)

Question Label : Comprehension

Figure Q.2 shows the pie chart representation of the weightage distribution of 5 different subjects in an exam. Based on this information, answer the given subquestions.

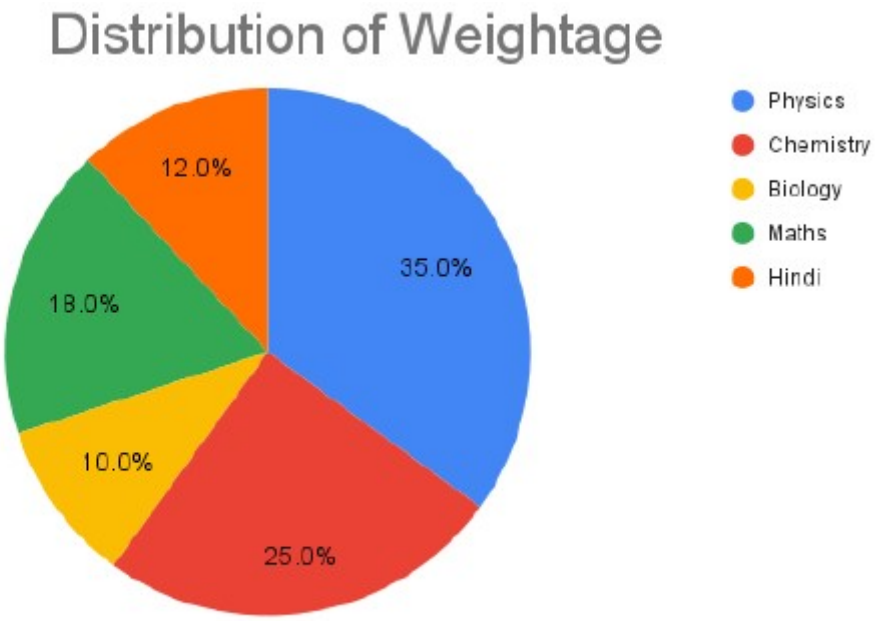


Figure Q.2: Weightage distribution of 5 different subjects

Sub questions

Question Number : 57 Question Id : 640653353981 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

If the exam is of 200 marks, then what is the aggregate distribution of marks in Maths and Biology?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

56

Question Number : 58 Question Id : 640653353982 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Multiple Select Question

Choose the correct statement(s):

Options :

6406531174071. ✖ The pie chart is misleading because it does not obey the area principle.

6406531174072. ✖ The pie chart has round off errors.

6406531174073. ✔ The pie chart is not a misleading graph.

6406531174074. ✔ The slices of pie chart adds up to 100%.

Question Id : 640653353986 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (59 to 60)

Question Label : Comprehension

In a hospital, 40% of the patients are male. It is known that 15% of male patients are suffering from cancer and 10% of female patients are suffering from cancer. Based on the given information, answer the subquestions.

Sub questions

Question Number : 59 Question Id : 640653353987 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3

Question Label : Short Answer Question

If a patient is selected randomly, then what is the probability that the selected patient is suffering from cancer? (Enter the answer correct to 2 decimal accuracy)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

0.09 to 0.15

Question Number : 60 Question Id : 640653353988 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

If the selected patient is suffering from cancer, then what is the probability that the patient is a female? (Enter the answer correct to 2 decimal accuracy)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

0.47 to 0.53