# IIT M FOUNDATION DIPLOMA ENDTERM AN1

**Notations :**

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

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

| | |
|---|---|
| **Question Paper Name :** | IIT M FOUNDATION DIPLOMA ENDTERM AN1 3 Apr 2022 |
| **Total Marks :** | 1130 |

# Sem1 Eng1

**Number of Questions :** 27

**Section Marks :** 100

**Question Number : 1 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL: SEMESTER 1: ENGLISH 1"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Type : COMPREHENSION**

**Question Numbers : (2 to 11)**

Question Label : Comprehension

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

Except for the Marabar Caves and they are twenty miles off the city of Chandrapore presents nothing extraordinary. Edged rather than washed by the river Ganges, it trails for a couple of miles

along the bank, scarcely distinguishable from the rubbish it deposits so freely. There are no bathing-steps on the riverfront, as the Ganges happens not to be holy here; indeed there is no river front and bazaars shut out the wide and shifting panorama of the stream. The streets are mean, the temples ineffective and though a few fine houses exist they are hidden away in gardens or down alleys whose filth deters all but the invited guest. Chandrapore was never large or beautiful, but two hundred years ago it lay on the road between Upper India, then imperial and the sea and the fine houses date from that period. The zest for decoration neither continued in the eighteenth century, nor was it ever democratic. There is no painting and scarcely any carving in the bazaars. The very wood seems made of mud, the inhabitants of mud moving. So abased, so monotonous is everything that meets the eye, that when the Ganges comes down it might be expected to wash the excrescence back into the soil. Houses do fall, people are drowned and left rotting, but the general outline of the town persists, swelling here, shrinking there, like some low but indestructible form of life.

~ A Passage to India - E M Foster

**Sub questions**

**Question Number : 2 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is extraordinary in the city of Chandrapore?

**Options :**

A. ✖ Ganges

B. ✖ Gardens

C. ✔ Marabar caves

D. ✖ Palaces

**Question Number : 3 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

There are no bathing-steps in Chandrapore because ____.

**Options :**

A. ✔ Ganges is not holy there

B. ✖ It is polluted

C. ✖ Bazars covered the river banks

D. ✖ Of drought

**Question Number : 4 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

*The streets are mean.* What is the meaning of the underlined word?

**Options :**

A. ✖ Cruel

B. ✖ Narrow

C. ✔ Shabby

D. ✖ Good

**Question Number : 5 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose an appropriate substitute for the word *deter.*

**Options :**

A. ✖ Determine

B. ✔ Discourage

C. ✖ Disseminate

D. ✖ Detach

**Question Number : 6 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The author gives a __ mood about Chandrapore.

**Options :**

A. ✖ Exciting

B. ✖ Rustic

C. ✔ Disappointing

D. ✖ Optimistic

**Question Number : 7 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

An appropriate substitute for the word *zest* would be ____.

**Options :**

A. ✖ Rest

B. ✖ Implementation

C. ✔ Enthusiasm

D. ✖ Effort

**Question Number : 8 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

An appropriate substitution for the word *excrescence* would be ___.

**Options :**

A. ✔ Protrusion

B. ✖ Extravaganza

C. ✖ Pollutants

D. ✖ Undesirable

**Question Number : 9 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The fine houses at Chandrapore is about ____.

**Options :**

A. ✖ 400 years old

B. ✖ 100 years old

C. ✔ 200 years old

D. ✖ 50 years old

**Question Number : 10 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The word *wood* here signifies _____.

**Options :**

A. ✖ Forest

B. ✖ Part of a tree

C. ✔ An area of land

D. ✖ Both Forest and Part of a tree

**Question Number : 11 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

An appropriate substitute for the word *monotonous* would be ____.

**Options :**

A. ✔ Dull

B. ✖ Single

C. ✖ Run by a single owner

D. ✖ Vibrant

**Question Type : COMPREHENSION**

**Question Numbers : (12 to 21)**

Question Label : Comprehension

**Listen to the audio sample and answer the given subquestions.**

885_640653_0_1984128_22hs1001fd1q11mq.mp3

**Sub questions**

**Question Number : 12 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Antibodies are a type of _____.

**Options :**

A. ✔ Proteins

B. ✖ Vitamins

C. ✖ Viruses

D. ✖ Minerals

**Question Number : 13 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Our immune system remembers the threat from a virus that has entered our body. True or false?

**Options :**

A. ✔ TRUE

B. ✖ FALSE

**Question Number : 14 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What do vaccines do?

**Options :**

A. ✖ They make us sick with the disease so that we don't have to get sick again.

B. ✖ They encourage the immune system to make antigens.

C. ✔ They encourage the immune system to make antibodies without us having to go through the illness.

D. ✖ They introduce antibodies into the infected body.

**Question Number : 15 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the principle that mRNA vaccines are based on?

**Options :**

A. ✖ They inject a weakened live virus into the body to prompt an immune response.

B. ✖ They inject an inactivated virus into the body to prompt an antibody response.

C. ✔ They incorporate the genetic blueprint of the key spike protein of the virus into the body.

D. ✖ They incorporate a vector virus into the body to prompt a strong immune response.

**Question Number : 16 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following materials can be involved in the making of a traditional vaccine?

**Options :**

A. ✔ Live-attenuated virus samples.

B. ✔ Large amounts of spike protein from the virus.

C. ✖ Subunits of virus antibodies.

D. ✔ Inactivated virus samples.

**Question Number : 17 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Preclinical tests are usually conducted in _____, on _____.

**Options :**

A. ✖ Hospitals, Humans

B. ✖ Laboratories, Volunteer humans

C. ✔ Laboratories, Animals

D. ✖ Hospitals, Volunteer humans

**Question Number : 18 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

To pass the preclinical stage, the vaccine needs to be proven _____, and _____.

**Options :**

A. ✔ Effective, Safe

B. ✖ Effective, Fast

C. ✖ Fast, Safe

D. ✖ Versatile, Safe

**Question Number : 19 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

During the clinical trials, the vaccines are tested on:

**Options :**

A. ✖ Rats

B. ✔ Humans

C. ✖ Whales

D. ✖ Guinea pigs

**Question Number : 20 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

You want to take a vaccine for COVID-19, and you can choose between an mRNA vaccine, and a traditional vaccine. You want to take the vaccine that introduces a weakened version of the virus to prompt an antibody response in your body. Which one would you choose?

**Options :**

A. ✔ Traditional vaccine

B. ✖ mRNA vaccine

C. ✖ Subunit vaccine

D. ✖ None of these

**Question Number : 21 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is NOT one of the checkpoints that a vaccine has to pass before it is administered to humans?

**Options :**

A. ✖ Preclinical trials

B. ✖ Clinical trials

C. ✔ Research and development

D. ✖ Distribution

**Question Type : COMPREHENSION**

**Question Numbers : (22 to 26)**

Question Label : Comprehension

**Listen to the audio and answer the given subquestions**

885_640653_0_1984128_22hs1001fd1q21mq.mp3

**Sub questions**

**Question Number : 22 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the appropriate pause for the following sentence as you hear in the audio.

You in the years ahead are going to be leaders of this country and shaping the destiny of this country

**Options :**

A. ✖ You in the years ahead are/ going to be leaders of this/ country and shaping the destiny of this country//

B. ✔ You/ in the years ahead /are going to be leaders of this country and shaping the destiny of this country//

C. ✖ You/ in the years/ ahead are going to be leaders/ of this country and shaping the destiny of this country//

**Question Number : 23 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the appropriate pause for the following sentence as you hear in the audio.

In many ways we have been critical of and saddened by what has or has not happened in our country

**Options :**

A. ✖ In many ways/ we have been critical of/ and saddened by what has/ or has not happened in our country//

B. ✖ In many ways we have been critical of/ and saddened by what has/ or has not happened in our country//

C. ✔ In many ways we have/ been critical of/ and saddened by/ what has or has not happened in our country//

**Question Number : 24 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

How many syllables are there in the word **environment**?

**Options :**

A. ✖ 2

B. ✖ 3

C. ✔ 4

D. ✖ 5

**Question Number : 25 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

How many syllables are there in the word **moment**?

**Options :**

A. ✔ 2

B. ✖ 3

C. ✖ 4

D. ✖ 5

**Question Number : 26 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

How many syllables are there in the word **country**?

**Options :**

A. ✔ 2

B. ✖ 3

C. ✖ 4

D. ✖ 5

**Question Type : COMPREHENSION**

**Question Numbers : (27 to 31)**

Question Label : Comprehension

**Read the following telephone conversation and answer the given subquestions:**

Steve: Hello! Can I get Mili with us?

George: Wait a second, let me (i) _____ Mili into this call.

Steve: Was she not here already?

George: Yes. Her call was (ii) _____.

Steve: I see.

George: Hi Mili. Am I audible to you? Steve, please (iii) _____ line.

Steve: Sure. Please take your time. I can wait.

**Sub questions**

**Question Number : 27 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which expression would complete the conversation in **(i)**?

**Options :**

A. ✖ Rope off

B. ✖ Pull on

C. ✔ Rope in

**Question Number : 28 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which expression would complete the conversation in **(ii)**?

**Options :**

A. ✖ Cut back

B. ✖ Cut out

C. ✔ Cut off

**Question Number : 29 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which expression would complete the conversation in **(iii)**?

**Options :**

A. ✖ Stay up

B. ✔ Stay on

C. ✖ Stay over

**Question Number : 30 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following means ‘to stop or wait’?

**Options :**

A. ✖ Put out

B. ✖ Stay out

C. ✔ Hold on

**Question Number : 31 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following means ‘to connect’?

**Options :**

A. ✖ Patch up

B. ✖ Patch together

C. ✔ Patch through

**Question Type : COMPREHENSION**

**Question Numbers : (32 to 36)**

Question Label : Comprehension

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

| Column A | Column B |
|---|---|
| Added | i) Fight |
| Sound | ii) Area |
| Tacit | iii)Advice |
| Endless | iv) Agreement |
| Built-up | v) Advantage |

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 32 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Select the correct answer for **Added**

**Options :**

A. ✖ i

B. ✖ ii

C. ✖ iii

D. ✖ iv

E. ✔ v

**Question Number : 33 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Select the correct answer for **Sound**

**Options :**

A. ✖ i

B. ✖ ii

C. ✔ iii

D. ✖ iv

E. ✖ v

**Question Number : 34 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Select the correct answer for **Tacit**

**Options :**

A. ✖ i

B. ✖ ii

C. ✖ iii

D. ✔ iv

E. ✖ v

**Question Number : 35 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Select the correct answer for **Endless**

**Options :**

A. ✔ i

B. ✖ ii

C. ✖ iii

D. ✖ iv

E. ✖ v

**Question Number : 36 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Select the correct answer for **Built-up**

**Options :**

A. ✖ i

B. ✔ ii

C. ✖ iii

D. ✖ iv

E. ✖ v

**Question Type : COMPREHENSION**

**Question Numbers : (37 to 41)**

Question Label : Comprehension

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

1) _____ the house had appeared enormous. 2)____, beside the new grey buildings towering above it like unfriendly giants, it seemed like a miserable shack. The old Naga tree 3) _____ its dry branches towards eternity, covering the roof with sickly yellow leaves. A funereal crow 4) _____ croaking on a wire. It flew away as I approached. 5)_____ shadows stared.

**Sub questions**

**Question Number : 37 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the appropriate option for **blank (1)**.

**Options :**

A. ✖ Now

B. ✔ Once

C. ✖ Stretched

D. ✖ Perched

E. ✖ Furtive

**Question Number : 38 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the appropriate option for **blank (2)**.

**Options :**

A. ✔ Now

B. ✖ Once

C. ✖ Stretched

D. ✖ Perched

E. ✖ Furtive

**Question Number : 39 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the appropriate option for **blank (3)**.

**Options :**

A. ✖ Now

B. ✖ Once

C. ✔ Stretched

D. ✖ Perched

E. ✖ Furtive

**Question Number : 40 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the appropriate option for **blank (4)**.

**Options :**

A. ✖ Now

B. ✖ Once

C. ✖ Stretched

D. ✔ Perched

E. ✖ Furtive

**Question Number : 41 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the appropriate option for **blank (5)**.

**Options :**

A. ✖ Now

B. ✖ Once

C. ✖ Stretched

D. ✖ Perched

E. ✔ Furtive

**Question Number : 42 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

One of my colleagues are a dancer. This sentence has the correct subject - verb agreement.

**Options :**

A. ✖ True

B. ✔ False

**Question Number : 43 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Sneha _____ not present in the meeting.

**Options :**

A. ✔ Was

B. ✖ Were

**Question Number : 44 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

"I can't believe Raksha told the management about Rashi's plans of eventually quitting the company – I didn't think she was someone who would _____.

**Options :**

A. ✖ Sneak on someone

B. ✔ Sell someone out

C. ✖ Cheat on someone

D. ✖ Hurl abuses on someone

**Question Number : 45 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

'*Since last month, there has been a decrease in the amount of cereals sold for the same price.*'

Choose the appropriate stress for the usage of the word '*decrease*' in the sentence.

**Options :**

A. ✔ DEcrease

B. ✖ deCREASE

**Question Number : 46 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following has an aspirated stop?

**Options :**

A. ✖ Strength

B. ✖ Participate

C. ✖ Impose

D. ✔ Both Participate and Impose

**Question Number : 47 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

*Jogging is good for your health*. Here the subject is _____.

**Options :**

A. ✔ Jogging

B. ✖ Jogging is

C. ✖ Good for your health.

**Question Number : 48 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the direct object in the following sentence:

*"My father gave me a present."*

**Options :**

A. ✖ Me

B. ✔ Present

C. ✖ Father

D. ✖ Gave

**Question Number : 49 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

In the sentence '*Close the door*', the negation is added _____.

**Options :**

A. ✔ Before 'close'

B. ✖ Before 'the'

C. ✖ Before 'door'

D. ✖ After 'door'

**Question Number : 50 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

My friends and I ____ want to go out.

**Options :**

A. ✖ Does not

B. ✖ Not

C. ✖ Doesn't

D. ✔ Do not

**Question Number : 51 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

In the words '*abdomen*', '*barber*', and '*governor*', the stressed syllable is:

**Options :**

A. ✖ In the final position

B. ✖ In the middle position

C. ✔ In the initial position

D. ✖ In different places in each word

**Question Number : 52 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify whether the consonant sound (in bold) in the following word is voiced or voiceless:

F**l**ow

**Options :**

A. ✖ Voiceless

B. ✔ Voiced

**Question Number : 53 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

'*I called out to him, but he did not reply*.' is a complex sentence with a ____.

**Options :**

A. ✖ Adjectival clause

B. ✖ Adverbial clause

C. ✖ Noun clause

D. ✔ It is not a complex sentence

**Question Number : 54 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

My parents are abroad. Most probably, they will come to visit me _____ December.

**Options :**

A. ✖ On

B. ✖ At

C. ✔ In

D. ✖ With

**Question Number : 55 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

*'The reporters asked insightful questions during the interview'*. The word insightful qualifies _____.

**Options :**

A. ✖ Interview

B. ✖ Reporters

C. ✔ Questions

D. ✖ None of these

**Question Number : 56 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the subject in the following sentence.

*The lost child ran across the street to the police station.*

**Options :**

A. ✖ Street

B. ✖ Police station

C. ✔ Lost child

D. ✖ Ran across

**Question Number : 57 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

*Payasam is one of the most favourite delicacy of Tamil Nadu.* Spot the error in this sentence.

**Options :**

A. ✖ Is

B. ✔ Delicacy

**Question Number : 58 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

"*Boiling tomato soup is cooled off later.*" Find the subject here:

**Options :**

A. ✖ Boiling tomato

B. ✔ Boiling tomato soup

C. ✖ Boiling

**Question Number : 59 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Consider the following sentences:

(1) I sleep.

(2) I work out every day.

(3) I love mangoes.

Which of the above sentences has an object?

**Options :**

A. ✖ All (1),(2) and (3)

B. ✖ (1) only

C. ✖ (1) and (2)

D. ✔ (3) only

**Question Number : 60 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

In the sentence 'Shyam goes to college', the tense and agreement is in the word _____.

**Options :**

A. ✖ College

B. ✖ Shyam

C. ✔ Goes

D. ✖ To college

**Question Number : 61 Question Type : MSQ**

**Correct Marks : 1**

Question Label : Multiple Select Question

*"If you want to get work done, you should approach Suhas – you're just barking up the wrong tree by begging Jani."* Which of the following options are true?

**Options :**

A. ✖ Suhas does not get any work done

B. ✔ Jani usually does not get any work done

C. ✖ Jani is not the right person to approach in case work needs to be done

D. ✔ Suhas is a kind person

# Sem1 Maths1

**Number of Questions :** 18

**Section Marks :** 50

**Question Number : 62 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL: SEMESTER 1: MATHEMATICS FOR DATA SCIENCE 1"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 63 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

## Instructions:

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

A. ✔ Useful Data has been mentioned above.

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

**Question Number : 64 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Consider the function $f(x) = \log_{10}(\sin x)$ to be well defined in its domain. Also, consider the set $A = \{x \mid f(x) = 0\}$. Choose the set of correct options.

**Options :**

A. ✔ $A$ is an infinite set.

B. ✔ There are an infinite number of vertical asymptotes.

C. ✔ The maximum value of $f(x)$ is zero.

D. ✔ $f(x)$ is not invertible in its domain.

**Question Number : 65 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Choose the set of correct options

**Options :**

A. ✖ A relation $R$ defined on a set $A$ will either be symmetric or antisymmetric.

B. ✔ The domain and range are same for the function $f(x) = x$.

C. ✔ Identity relation is always a subset of any reflexive relation which is defined on a set $A$.

D. ✔ Consider three well defined sets $A,\ B,\ C$, then $A - (B \cup C) = (A - B) \cap (A - C)$.

**Question Number : 66 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Suppose $f(x) = x^2 - 16, g(x) = 1 + log_{10}x$, and $h(x) = g(f(x))$ are functions defined on their respective domains. Choose the set of correct options.

**Options :**

A. ✔ The domain of $h(x)$ will be $(-\infty, -4) \cup (4, \infty)$.

B. ✖ The function $g(x)$ is well defined in the domain of $h(x)$.

C. ✔ $h(x)$ is a one to one function in the restricted domain $x \in (4, \infty)$.

D. ✔ The range of $g(x)$ and $h(x)$ are equal.

**Question Number : 67 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Define a function

$$f(x) = \begin{cases} \frac{x^2-25}{|x-5|} & \text{if } x \neq 5 \\ 10 & \text{if } x = 5 \end{cases}$$

Which of the following option(s) is(are) correct?

**Options :**

A. ✔ $\lim_{x \to 5^+} f(x) = f(5)$.

B. ✖ $f$ is continuous but not differentiable at $x = 5$.

C. ✔ $f'(0) = -1$.

D. ✔ $\lim_{x \to 5^-} f(x)$ exists.

**Question Number : 68 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Sandhya launches her new company in the year 2010, which makes yearly profit in lakhs as the polynomial function $p(x) = -0.1x^2(x-1)(x-2)(x-3)^2(x-4)(x-9)$ for the first 12 years since the launch, where $x$ is the number of years since 2010 (i.e., $x = 0$ denotes the year 2010, $x = 1$ denotes the year 2011, and so on). Let the loss be represented as $-ve$ of profit. Which of the following options are correct?

**Options :**

A. ✔ Including the year in which the company was launched, it neither made profit nor loss six times in 12 years.

B. ✔ The company made profit in years $x \in \{5, 6, 7, 8\}$.

C. ✖ The company made loss ($-ve$ profit) in years $x \in \{1, 10, 11\}$.

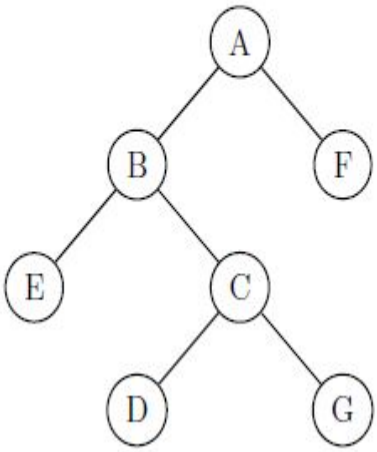
D. ✔ In the year 2022 (i.e., $x = 12$) the company made loss.

**Question Number : 69 Question Type : MSQ**

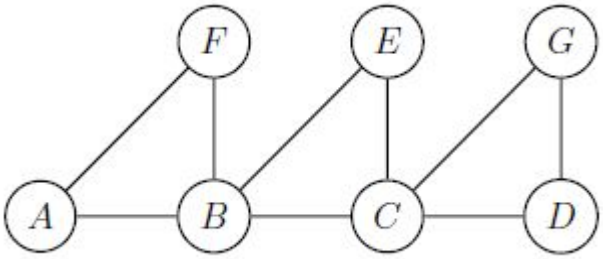
**Correct Marks : 3**

Question Label : Multiple Select Question

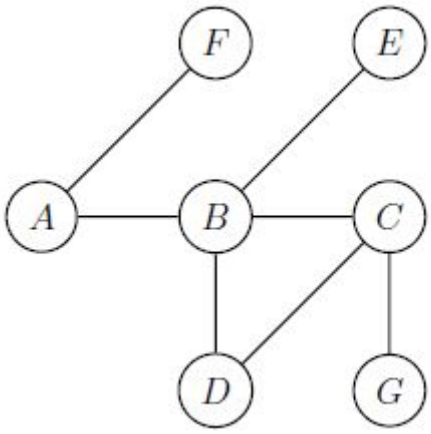
The DFS (Depth First Search) tree of a graph that starts with vertex $A$ is shown below. Choose the options which might be the original graph.

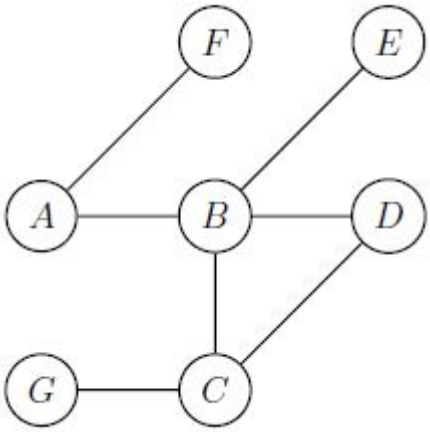



**Options :**

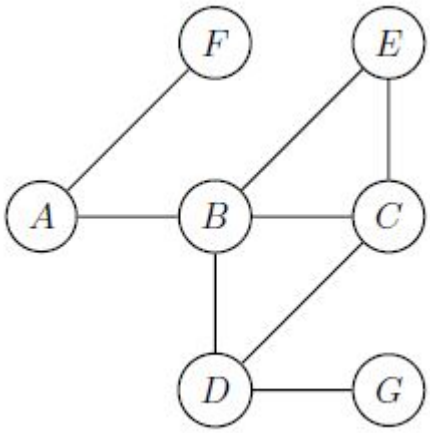
A. ✖ 


B. ✔




C. ✔




D. ✖

**Question Number : 70 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Suppose $G$ is a graph with 6 vertices $0, 1, 2, 3, 4, 5$ and the adjacency matrix of the graph

$G$ is $A = \begin{bmatrix} 0 & 0 & 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \end{bmatrix}$. Which of the following statements is True?

**Options :**

A. ✔ The graph *G* is a directed acyclic graph.

B. ✔ A possible topological sequence of the graph *G* is 1,0,3,5,2,4.

C. ✔ From vertex 1, every other vertex is reachable.

D. ✖ The longest path in the graph *G* has length 5, in terms of number of edges.

**Question Number : 71 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

Choose the set of correct option(s).

**Options :**

A. ✔ The function $p(x) = \log\left((x-1)(x-2)(x-3)^2\right)$ is well defined in the restricted domain $(-\infty, 1) \cup (2, 3) \cup (3, \infty)$.

B. ✖ The inverse of $f(x) = x^3 + 1$ is $g(x) = \sqrt[3]{1-x}$.

C. ✔ The number of asymptotes for the function $\log(x^2+1)$ is zero.

D. ✔ The function $\frac{1}{x^2+2}$ is differentiable on $\mathbb{R}$.

**Question Number : 72 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Let $\{a_n\}$ be a sequence defined as $a_n = \dfrac{\sin n\pi + \cos n\pi}{n^3}$, then which of the following option(s) is (are) true?

**Options :**

A. ✖ $\{a_n\}$ is divergent.

B. ✔ $\{a_n\}$ is convergent.

C. ✔ Limit of $\{a_n\}$ is 0.

D. ✖ Limit of $\{a_n\}$ is $\pi$.

**Question Number : 73 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following statements are correct?

**Options :**

A. ✖ Dijkstra's algorithm can be used to find the minimum weight spanning tree in a graph.

B. ✔ Bellmann Ford algorithm can be used to indicate whether a graph has negative weight cycles or not.

C. ✔ Bellmann Ford algorithm provides a solution for the single source shortest path problem.

D. ✖ Floyd Warshall algorithm is applicable for graphs that contain negative cycles.

**Question Type : COMPREHENSION**

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

Question Label : Comprehension

Define a function $f$ in the interval $[-2, 10]$ as follows:

$$f(x) = \begin{cases} 2x^2 & \text{if } -2 \le x < 2 \\ (x-2)^3 & \text{if } 2 \le x < 4 \\ \frac{1}{2}(x-4)+2 & \text{if } 4 \le x \le 10 \end{cases}$$

Figure 1 represents the graph of the function $f$. The solid points denote the value of the function at the points, and the values denoted by the hollow points are not taken by the functions.

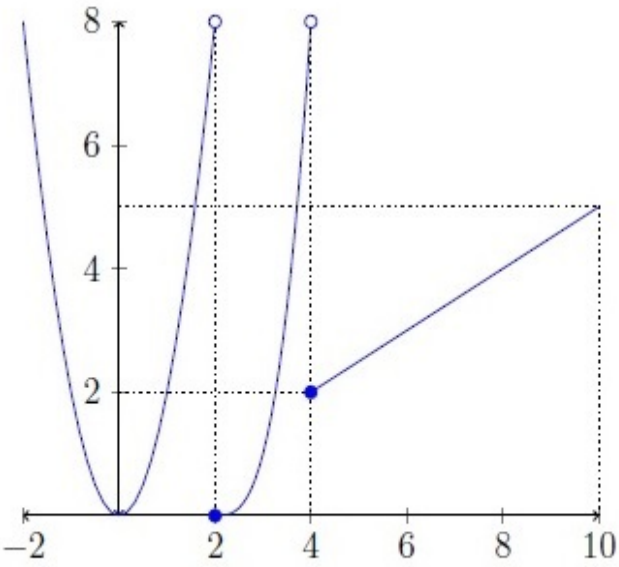



Figure: 1

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 74 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

Choose the set of correct options about estimating the area of the region bounded by the graph of the function f, above the interval [**0,10**] using Riemann sums.

**Options :**

A. ✖ Estimated area will be 16 sq unit, by taking 5 subintervals of equal length and the left end points of the subintervals for the height of the rectangles.

B. ✔ Estimated area will be 18 sq unit, by taking 5 subintervals of equal length and the left end points of the subintervals for the height of the rectangles.

C. ✔ Estimated area will be 28 sq unit, by taking 5 subintervals of equal length and the right end points of the subintervals for the height of the rectangles.

D. ✖ Estimated area will be 44 sq unit, by taking 5 subintervals of equal length and the right end points of the subintervals for the height of the rectangles.

**Question Number : 75 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Match the properties of the function mentioned in Column A with the appropriate numerical values given in Column B:

| | Properties (Column A) | | Numerical values (Column B) |
|---|---|---|---|
| a) | Number of critical points in $(-2, 10)$ | 1) | 3 |
| b) | In $[-2, 10]$, the global maximum is attained at | 2) | 2 |
| c) | In $(0, 10]$, the global minimum is attained at | 3) | 0 |
| d) | Number of points where $f$ is not differentiable in $(-2, 10)$ | 4) | -2 |

Table: 1

**Options :**

A. ✔ $a \to 1,\ b \to 4,\ c \to 2,\ d \to 2.$

B. ✖ $a \to 2,\ b \to 1,\ c \to 3,\ d \to 4.$

C. ✖ $a \to 1,\ b \to 4,\ c \to 3,\ d \to 2.$

D. ✖ $a \to 2,\ b \to 3,\ c \to 4,\ d \to 1.$

**Question Number : 76 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Consider two quadratic polynomials $p(x)$ and $q(x)$ whose roots are shown in the Figure 2. The leading coefficient of $p(x)$ and $q(x)$ is $+1$ and the $y-$coordinate of the vertex point of $p(x)$ is equal to the $y-$coordinate of the vertex point of $q(x)$. Find the value of $d$ (See Figure 2)

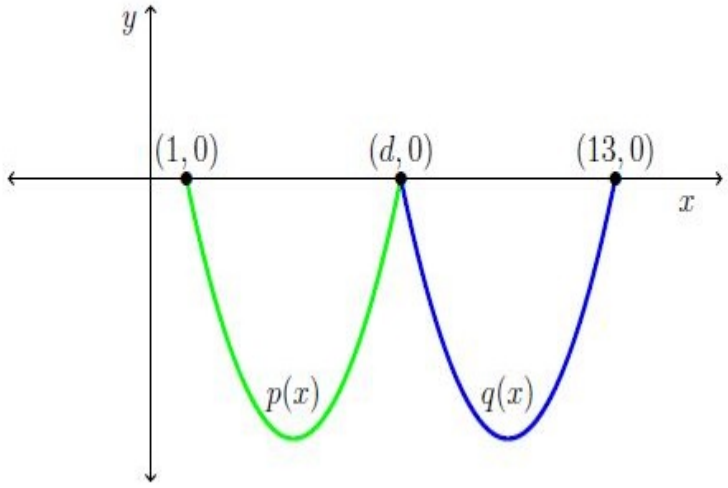



Figure 2

**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

**Possible Answers :**

7

**Question Number : 77 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Let $A^2 = A \times A$. What is the value of $2\alpha + \beta$?

| $A$ | $i$ | $j$ | $k$ | $l$ | $m$ |
|---|---|---|---|---|---|
| $i$ | 0 | 0 | 0 | 0 | 1 |
| $j$ | 0 | 0 | 1 | 0 | 1 |
| $k$ | 0 | 0 | 0 | 1 | 0 |
| $l$ | 0 | 0 | 0 | 0 | 1 |
| $m$ | 0 | 0 | 0 | 0 | 0 |

| $A^2$ | $i$ | $j$ | $k$ | $l$ | $m$ |
|---|---|---|---|---|---|
| $i$ | 0 | $\alpha$ | 0 | 0 | 0 |
| $j$ | 0 | 0 | 0 | 1 | 0 |
| $k$ | 0 | 0 | 0 | 0 | $\beta$ |
| $l$ | 0 | 0 | 0 | 0 | 0 |
| $m$ | 0 | 0 | 0 | 0 | 0 |

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Question Number : 78 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Amruta threw a ball from a window whose location is at (27, 5).The ball touched the ground and bounced forward making an angle of 90 degrees with the line segment connecting the coordinates of the window and the point where the ball touched the ground. Abdullah caught the ball whose current location is at (0, 10). What will be the $x$−coordinate of the point on the ground where the ball touches? Consider the ground to be on the $x$−axis.

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Set

**Text Areas :** PlainText

**Possible Answers :**

2

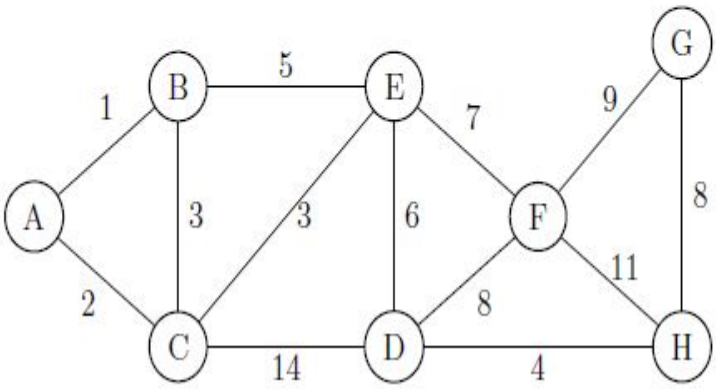
25

**Question Number : 79 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

A railway network connecting 8 towns $(A, B, C, D, E, F, G, H)$ is to be set up. In the graph given below, each vertex represents a town and the weighted edge between two vertices $v_i$ and $v_j$ represents the cost of constructing a direct railway track between the towns $v_i$ and $v_j$. If we design a railway network in which we can travel between any pair of towns such that the total cost of construction is minimum, then find the total cost of the designed railway network.




**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

31

**Question Number : 80 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

A company manufactures 9 chemicals $c_1, c_2, c_3, ....c_9$. A relation $R$ is defined as

$$R = \{(c_i, c_j) \mid i, j \in \{1, 2, \ldots, 9\},\ c_i \text{ and } c_j \text{ are incompatible chemicals}\}$$

Given that,
$(c_1, c_5)$, $(c_2, c_6)$, $(c_4, c_9)$, $(c_3, c_7)$, $(c_3, c_8)$, $(c_1, c_8)$, $(c_5, c_6)$, $(c_2, c_5)$, $(c_8, c_9)$ and $(c_5, c_8)$ are elements of $R$.
Storing incompatible chemicals together creates a hazardous reaction and would cause explosion. As a precautionary measure the company wishes to partition its warehouse into compartments, and store incompatible chemicals in different compartments. What is the least number of compartments into which the warehouse should be partitioned?

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3

# Sem2 Eng2

| | |
|---|---|
| **Number of Questions :** | 35 |
| **Section Marks :** | 100 |

**Question Number : 81 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL: SEMESTER 2: ENGLISH 2"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Type : COMPREHENSION**

**Question Numbers : (82 to 91)**

Question Label : Comprehension

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

The term “data science” has attracted a lot of attention. Much of this attention is in business, in government, and in the academic areas of statistics and computer science. Here, we discuss data science from the perspective of scientific research. What is data science? Why might scientists care about it?

Our perspective is that data science is the child of statistics and computer science. While it has inherited some of their methods and thinking, it also seeks to blend them, refocus them, and develop them to address the context and needs of modern scientific data analysis. This perspective is not new. Over 50 years ago, Tukey defined “data analysis” as a broad endeavour, much broader than traditional mathematical statistics. In a sense, today’s data science, although set against a modern backdrop, is cast from Tukey’s original mould.

In modern research, scientists from diverse disciplines are confronting abundant datasets and

are confident that there is value in the data for advancing their scientific goals. We give three examples at genomic, social, and galactic scales. First, modern sequencing technology has enabled high-resolution genetic sequencing at massive scale, and geneticists have connected the genetic data to large databases of individuals' behaviours and diseases. These data can potentially aid researchers in studying the human genome, helping them understand how it evolves, and how it governs observed traits. Second, social scientists now have the opportunity to study large archives of digitised texts, often with rich information about human behaviour and interactions. These data could help them more effectively navigate and understand the contours of society, finding relevant sources to their work and identifying hard to spot patterns of language that suggest new interpretations and theories. Third, modern telescopes create digital sky surveys that have transformed observational astronomy, generating hundreds of terabytes of raw image data about billions of sky objects. A catalogue of these objects, if available, would give astronomers an unprecedented window into the structure of the cosmos.

**Reference:**

Blei, David M., and Padhraic Smyth. 'Science and Data Science'. *Proceedings of the National Academy of Sciences* 114, no. 33 (15 August 2017): 8689.

**Sub questions**

**Question Number : 82 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following statements best summarises the gist of this passage?

**Options :**

A. ✖ The passage is about how data science can help us understand the structure of the cosmos.

B. ✔ The passage is about how data science can be useful in scientific research across various fields.

C. ✖ The passage is about how data science is an interdisciplinary endeavour between statistics and computer science.

D. ✖ The passage is about the history and definition of data science.

**Question Number : 83 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

How did Tukey define “data analysis”?

**Options :**

A. ✖ As a child of statistics and computer science

B. ✔ As a broad endeavour encompassing many disciplines

C. ✖ As a field operating within mathematical statistics

D. ✖ As a method central to modern data science

**Question Number : 84 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following statements is/are true about today’s data science?

**Options :**

A. ✔ It draws from Tukey’s definition of data analysis.

B. ✔ It inherits and blends methods from statistics and computer science.

C. ✖ It is no longer related to traditional mathematical statistics.

D. ✔ It can help geneticists study the human genome.

**Question Number : 85 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Data science is most frequently talked about in the following fields:

**Options :**

A. ✔ Government

B. ✔ Business

C. ✔ Statistics

D. ✔ Computer science

**Question Number : 86 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The authors give particular examples of three fields of scientific research where data science can be of use. What are they?

**Options :**

A. ✖ Statistics, computer science, informatics

B. ✖ Genetics, social sciences, technology

C. ✖ Astrology, genetics, statistics

D. ✔ Genetics, social sciences, astronomy

**Question Number : 87 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following statements is/are TRUE?

**Options :**

A. ✖ Massive scale and high-resolution genome sequencing is not yet possible; data science will make it possible.

B. ✔ Massive scale and high-resolution genome sequencing is possible today, due to modern technology.

C. ✖ Data science can help geneticists sequence human DNA.

D. ✔ Data science can help geneticists connect genetic data with individuals' behaviours and diseases.

**Question Number : 88 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the meaning of the word "*unprecedented* "?

**Options :**

A. ✖ Shocking

B. ✔ Never before seen or done

C. ✖ Greatly distressing

D. ✖ Something that is impossible

**Question Number : 89 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Match the following scientific disciplines with the adjectives that the authors use to describe these fields:

| Column A | Column B |
|---|---|
| A. Genetics | 1. Galactic |
| B. Social sciences | 2. Ascetic |
| C. Astronomy | 3. Statistical |
| | 4. Social |
| | 5. Genomic |

**Options :**

A. ✖ A-1; B-5; C-4

B. ✖ A-5; B-4; C-2

C. ✔ A-5; B-4; C-1

D. ✖ A-2; B-4; C-1

**Question Number : 90 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following words (from the passage given) is the closest opposite of the word "*avoid*"?

**Options :**

A. ✖ Aid

B. ✖ Navigate

C. ✖ Govern

D. ✔ Confront

**Question Number : 91 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the odd one out among the following.

**Options :**

A. ✔ Blended

B. ✖ Discrete

C. ✖ Separate

D. ✖ Distinct

**Question Type : COMPREHENSION**

**Question Numbers : (92 to 101)**

Question Label : Comprehension

Listen to the audio and answer the given subquestions:

885_640653_0_1984128_hs1002fd1q1e1s1q11mq.mp3

**Sub questions**

**Question Number : 92 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What does the phrase "*being in the thick of something*" mean?

**Options :**

A. ✖ Being behind something

B. ✔ Being in the most active part of something

C. ✖ Being lost in thought

D. ✖ Being extremely depressed

**Question Number : 93 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the meaning of the word "*armageddon*" in the context of the audio?

**Options :**

A. ✖ The place where a battle is fought.

B. ✖ A massive fire that cannot be extinguished.

C. ✖ The name of an ancient mountain in Greece.

D. ✔ A dramatic or catastrophic conflict.

**Question Number : 94 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What does consecutive interpretation mean?

**Options :**

A. ✔ When the speaker pauses to allow the interpreter to speak.

B. ✖ When the speaker and interpreter speak almost in tandem.

C. ✖ When the speaker finishes his speech, and the interpreter relays the same in a different

language.

D. ✖ When the interpreter comes prepared, using the script given by the speaker.

**Question Number : 95 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

When was the simultaneous interpretation system developed?

**Options :**

A. ✖ Right around the time of WWI.

B. ✔ Around the time when WWII was about to begin.

C. ✖ In 1945, when WWII ended.

D. ✖ In 1925, when WWI was about to end.

**Question Number : 96 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the meaning of "*keeping aplomb*"?

**Options :**

A. ✔ Being composed and self-assured.

B. ✖ Being attentive and active.

C. ✖ Being extremely competitive.

D. ✖ Being alert and watchful.

**Question Number : 97 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Approximately how many years of training does it take fluent bilinguals to become skilled simultaneous interpreters?

**Options :**

A. ✖ 3 years

B. ✖ 4 years

C. ✔ 2 years

D. ✖ not mentioned

**Question Number : 98 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the meaning of something becoming "*second nature*" to someone?

**Options :**

A. ✖ A tendency that has turned into an addiction.

B. ✖ A capability that one is born with.

C. ✔ A habit that has become instinctive to someone.

D. ✖ An artificial entity that has come to look realistic and natural.

**Question Number : 99 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following strategies do simultaneous interpreters use to make their job easier?

**Options :**

A. ✔ Shorten long words to acronyms.

B. ✔ Use visual aides and slides.

C. ✖ Skip over certain sentences.

D. ✔ Use generic terms instead of specific ones.

**Question Number : 100 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following is true about simultaneous interpreters?

**Options :**

A. ✔ They usually work in pairs.

B. ✖ Their work is easier than that of consecutive interpreters.

C. ✔ They have to be well-versed in the subject matter beforehand.

D. ✖ They often perform in very closed settings, interpreting for only two-person exchanges.

**Question Number : 101 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following words is closest in meaning to the word "*pertinent*"?

**Options :**

A. ✖ Related

B. ✔ Relevant

C. ✖ Close

D. ✖ Tied

**Question Type : COMPREHENSION**

**Question Numbers : (102 to 106)**

Question Label : Comprehension

Listen to the audio and answer the given subquestions:

885_640653_0_1984128_hs1002fd1q1e1s1q21mq.mp3

**Sub questions**

**Question Number : 102 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The word *aggregate* is stressed on the_____.

**Options :**

A. ✔ First syllable

B. ✖ Second syllable

C. ✖ Fifth syllable

D. ✖ Third syllable

**Question Number : 103 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The word *civilization* is stressed on the_____.

**Options :**

A. ✖ First syllable

B. ✔ Fourth syllable

C. ✖ Second syllable

D. ✖ Third syllable

**Question Number : 104 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Identify the number of syllables in the word *suffering*.

**Options :**

A. ✖ 5

B. ✖ 2

C. ✖ 4

D. ✔ 3

**Question Number : 105 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The vowel in the first syllable of the word *hunter* is _____.

**Options :**

A. ✖ Long

B. ✔ Short

**Question Number : 106 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the appropriate pause for the following sentence as you hear in the audio:

That's here that's home that's us on it everyone you love everyone you know everyone you ever heard of every human being who ever was lived out their lives.

**Options :**

A. ✖ That's here that's/ home that's us on it everyone/ you love everyone/ you know everyone/ you ever heard of every/ human being who ever was lived/ out their lives

B. ✖ That's here/ that's home that's us on it everyone/ you love everyone/ you know everyone/ you ever heard of every human/ being who ever was lived/ out their lives

C. ✖ That's here that's home/ that's us on it/ everyone you love everyone/ you know everyone you ever heard of every/ human being who ever/ was lived out their/ lives

D. ✔ That's here/ that's home/ that's us/ on it/ everyone you love/ everyone you know/ everyone you ever heard of/ every human being who ever was/ lived out their lives

**Question Type : COMPREHENSION**

**Minimum Instruction Time : 0**

**Question Numbers : (107 to 111)**

Question Label : Comprehension

**Read the following conversation and answer the subquestions.**

**Anisha:** Min, it's so nice to meet you in this setting. Thank you for taking the time to interview for the role of instructional designer at Bridgespan Education. I'm curious to hear more about your interest in the learning design industry. Why are you in this industry?

**Min:** Nice to meet you too! I'm so excited to be here today and thankful to you for having given me this opportunity. So, I've been a curriculum developer in various educational and corporate settings for the past 10 years. I'm very passionate about creating data-driven and aesthetically appealing learning solutions in different formats — be it instructor-led, e-learning, and blended learning. I applied for this role because I watched a news piece on how your CEO Mr. Raul brought in an indoor mapping tool that made hybrid work possible for employees working from anywhere — I thought that was quite amazing, and I'd be thrilled to meet him sometime.

**Anisha:** We can definitely have you meet him if things work out! It's great that you've been following our company for some time now. I'd like to follow up with another question — why this role and this company, in particular?

**Min:** Well, there are three reasons I applied for this role in particular — I'd love to dive into them if you'd like to know more about that!

**Anisha:** *nods enthusiastically*

**Min:** The first is that your company is known to put a strong emphasis on innovations and research, and I'd love to be a part of a company that wants to constantly develop their products. Secondly, I'm also huge on teamwork and collaboration, and given that the role and your company's values emphasise teamwork, it sounded like the perfect fit for me. Thirdly, the position matches my prior experience, but is also challenging enough that I know I'll have the space to pick up new skills and grow.

**Anisha:** That's great, thanks so much!

**Sub questions**

**Question Number : 107 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following is NOT true about Min?

**Options :**

A. ✖ She has very well researched the company she is applying to.

B. ✔ She is entirely new to the world of instructional design.

C. ✔ She wants to work on projects that give her complete autonomy.

D. ✖ She is polite and organised in her answers.

**Question Number : 108 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What effect does Min's mentioning the CEO of the company have on the interviewer?

**Options :**

A. ✖ She feels that Min is being over-enthusiastic.

B. ✖ She is suspicious of Min.

C. ✖ She promises that she would introduce Min to their CEO.

D. ✔ She is open to introducing Min to the CEO.

**Question Number : 109 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following sentences is/are incorrect?

**Options :**

A. ✖ Alisha is an intimidating interviewer.

B. ✖ Min is quite calm and answers questions to the point.

C. ✔ Min is unprofessional because she uses casual phrases such as “dive right in...”.

D. ✖ Min shows that she is open to challenging work.

**Question Number : 110 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the meaning of the phrase “*follow up*”?

**Options :**

A. ✖ Follow someone

B. ✖ Fall behind on something

C. ✖ Compromise on something

D. ✔ Ask for details on something

**Question Number : 111 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following sentences uses the word “quite” correctly?

**Options :**

A. ✔ I was quite scared about the interview.

B. ✔ The meal wasn’t quite as good as the dessert.

C. ✖ She was so quite that night.

D. ✖ It was a beautiful, quite morning.

**Question Number : 112 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Context :At a job fair, an interviewer to an interviewee.

A question about her hobbies.

**Options :**

A. ✔ Do you mind sharing with us what your hobbies are?

B. ✖ If you could tell us what your hobbies are, we can understand what sort of an energy revolves around you as a person by calculating the weightage of what you consider as worthy of your free time, and thereby see if you are a worthy candidate or not.

C. ✖ Tell me what your hobbies are. We don't have much time, so make it quick.

D. ✖ Do you think you can let us into the sacred space of your personal life and share with us what engages you in your free time? With this, we mean your hobbies, if you don't mind.

**Question Number : 113 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Context :At a job fair, an interviewer to an interviewee.

About her professional qualifications.

**Options :**

A. ✖ I don't see any work experience here in your resume. Get out.

B. ✖ We were wondering if you could elaborate on the lack of work experience in your case, and were strikingly bothered. Could you please let us know if we should continue this interview?

C. ✔ It shows here that you do not have previous work experience in this field. Is this your first job? Would you mind elaborating?

D. ✖ None of these.

**Question Number : 114 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

*He won the battle against the pesticide company in court*. The meaning of this sentence is _____.

**Options :**

A. ✖ He fought a war against the pesticide company

B. ✔ He won the case against the pesticide company

C. ✖ He fought a war at court

D. ✖ He defeated the pesticide company in a war

**Question Number : 115 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Identify the independent clause in the following sentence.

*Last weekend we went to several antique shops, though we didn't make any large purchases.*

**Options :**

A. ✖ Last weekend we went

B. ✔ Last weekend we went to several antique shops

C. ✖ though we didn't make any large purchases.

D. ✖ No independent clause

**Question Number : 116 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Identify the number of suffixes in the following sentence.

*This new device is a fabulous piece of technical craftsmanship and its performance is supremely impressive.*

**Options :**

A. ✖ 2

B. ✔ 6

C. ✖ 3

D. ✖ 5

**Question Number : 117 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Identify the number of prefixes in the following sentence.

*That movie is touted as the first desi superhero movie to be made at this scale.*

**Options :**

A. ✖ 2

B. ✖ 3

C. ✔ 1

D. ✖ 4

**Question Number : 118 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Imagine that you are in a formal meeting with a client. In such a context, you are asking her whether she would like to review a file. From the options below, which would be the most appropriate way to ask this question?

**Options :**

A. ✖ Will you like to take a look at the file?

B. ✖ You will like to take a look at the file?

C. ✔ Would you like to take a look at the file?

D. ✖ Do you want this file?

**Question Number : 119 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Convert the following sentence to active voice.

*The defender was tackled by Ronaldo.*

**Options :**

A. ✖ The defender was tackling Ronaldo.

B. ✖ Ronaldo was tackled by the defender.

C. ✖ Ronaldo is tackling the defender.

D. ✔ Ronaldo tackled the defender.

**Question Number : 120 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

These people are so slow, _____?

**Options :**

A. ✖ Don't they

B. ✖ Didn't they

C. ✖ Isn't they

D. ✔ Aren't they

**Question Number : 121 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

How many relative clauses does the following sentence have?

*The college examinations which had been cancelled were rescheduled for later by a government official who was a former teacher.*

**Options :**

A. ✖ 0

B. ✖ 1

C. ✔ 2

D. ✖ More than 2

**Question Number : 122 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

For the following sentence, choose whether the type of sentence is simple, compound, or complex.

*The child is hungry, therefore it is crying.*

**Options :**

A. ✖ Simple

B. ✔ Compound

C. ✖ Complex

**Question Number : 123 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the adjectival clauses in the following sentence.

*Our teacher told us the reason why we should study grammar.*

**Options :**

A. ✖ Our teacher told us the reason

B. ✔ why we should study grammar.

**Question Number : 124 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the verb tense and aspect in the following sentence.

*Poonguzhali was rowing the boat.*

**Options :**

A. ✖ Simple present

B. ✖ Present continuous

C. ✔ Past continuous

D. ✖ Simple past

**Question Number : 125 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

*My dog, who is very friendly, loves to play around with me* is a compound sentence.

**Options :**

A. ✖ TRUE

B. ✔ FALSE

**Question Number : 126 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the adverb in the following sentence.

*The lazy dog ran into a lovely wolf.*

**Options :**

A. ✖ Lazy

B. ✖ Lovely

C. ✖ A lovely wolf

D. ✔ This sentence does not have an adverb

**Question Number : 127 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

In the following sentence, fill in the blank with the most appropriate modal verb.

If she owned a car, she _____ have travelled around the world: although she is quite a reckless driver.

**Options :**

A. ✔ Would

B. ✖ Will

C. ✖ Could

D. ✖ Can

**Question Number : 128 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

In the following sentence, fill in the blank with the most appropriate modal verb.

She _____ try putting on some formal clothes. (suggestion)

**Options :**

A. ✖ Must

B. ✖ Would

C. ✔ Could

D. ✖ Will

**Question Number : 129 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the adjective(s) in the following sentence.

*Ayurveda is an ancient system of medicine.*

**Options :**

A. ✔ Ancient

B. ✖ Ayurveda

C. ✖ Medicine

D. ✖ System

**Question Number : 130 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Identify the indirect object in the following sentence.

*Our boss sent the document to the client by email.*

**Options :**

A. ✖ Sent

B. ✖ Our boss

C. ✖ The document

D. ✔ The client

**Question Number : 131 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Mumbai is always full of people, _____?

**Options :**

A. ✔ Isn't it

B. ✖ Aren't it

C. ✖ Doesn't it

D. ✖ Wasn't it

**Question Number : 132 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

"*Asoka was a great emperor*." The interrogative form of this sentence is _____.

**Options :**

A. ✖ Will Asoka be a great emperor?

B. ✖ Did Asoka become a great emperor?

C. ✖ Why is Asoka a great emperor?

D. ✔ Was Asoka a great emperor?

**Question Number : 133 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

For the direct question "*When does the registration begin?*", identify a possible embedded question from the options given below.

**Options :**

A. ✖ I'd like to know when does the registration begin.

B. ✔ I'd like to know when the registration begins.

C. ✖ I was wondering if the registration will begin.

D. ✖ I wanted to know when does the registration begin.

**Question Number : 134 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Will they inform us _____ or not the convocation will take place?

**Options :**

A. ✖ If

B. ✔ Whether

C. ✖ Either *if* or *whether* can be used

**Question Number : 135 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

For the matrix clause “He teaches”, the direct object is the clause “that there is virtue in sharing”, and the indirect object is “them”. Identify the correct order of the sentence.

**Options :**

A. ✖ He teaches that there is virtue in sharing them.

B. ✔ He teaches them that there is virtue in sharing.

**Question Number : 136 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

From the options given below, identify a transitive verb.

**Options :**

A. ✖ Die

B. ✔ Take

C. ✖ Sleep

D. ✖ Smile

**Question Number : 137 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

'All of the cake ___ been eaten by Shyam!'

**Options :**

A. ✖ Have

B. ✔ Has

C. ✖ Are

D. ✖ Is

**Question Number : 138 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Pick the odd one out

In theory, technically speaking, morally speaking, in political terms

**Options :**

A. ✔ In theory

B. ✖ Technically speaking

C. ✖ Morally speaking

D. ✖ In political terms

**Question Number : 139 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

*He rejected their proposals despite of their wonderful marketing*. This sentence is grammatically correct.

**Options :**

A. ✖ TRUE

B. ✔ FALSE

**Question Number : 140 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Choose an appropriate salutation for a professional email.

**Options :**

A. ✔ Dear

B. ✖ Hey

C. ✖ Howdy

D. ✖ Hi

**Question Number : 141 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

*He liked her very much*. The negative of this sentence is: He ___ like her very much.

**Options :**

A. ✖ Does not

B. ✖ Do not

C. ✔ Did not

D. ✖ Was not

# Sem2 Intro to Python

| | |
|---|---|
| **Number of Questions :** | 12 |
| **Section Marks :** | 50 |

**Question Number : 142 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL: SEMESTER 2: INTRODUCTION TO PYTHON"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 143 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

## Presentation

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

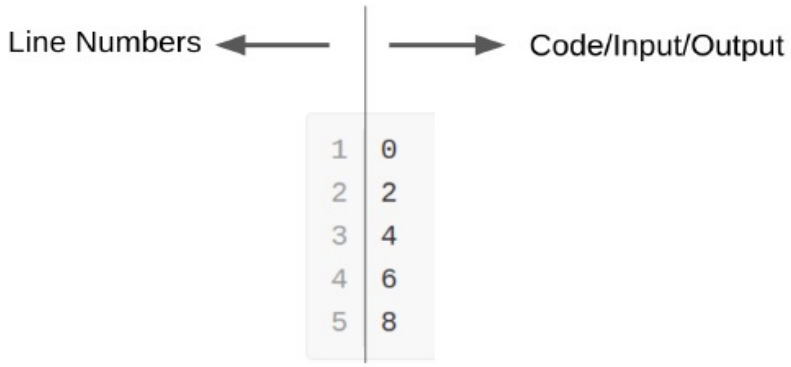
**Code**

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

**Input or Output**

```
0
2
4
6
8
```

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




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 $\rightarrow$ 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 :**

A. ✔ Useful Data has been mentioned above.

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

**Question Number : 144 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the output of the following snippet of code?

```
def log(x, y):
    if x < y:
        return 0
    return 1 + log(x // y, y)

log1 = log(256, 16)
log2 = log(16, 2)
log3 = log(27, 3)

print(log1, log2, log3)
```

**Options :**

A. ✔
```
2 4 3
```

B. ✖
```
1 3 0
```

C. ✖
```
2 4 1
```

D. ✖
```
1 3 2
```

**Question Number : 145 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

You need to write a function named `mat_mul` that accepts two **rectangular** matrices (list of lists) `A` and `B` as arguments. It should return the matrix `C` which is the product (matrix multiplication) of `A` and `B`, that is $C = A \times B$. Assume that both matrices can be multiplied. Consider the following snippets of code that could implement the function `mat_mul` and choose the correct option from below.

## Code 1

```
def mat_mul(A,B):
    C = []
    m = len(A)
    p = len(B)
    n = len(B[0])
    for i in range(m):
        temp = []
        for j in range(n):
            temp.append(0)
        C.append(temp)
    for i in range(m):
        for j in range(n):
            for k in range(p):
                C[i][j] += A[i][k] * B[k][j]
    return C
```

## Code 2

```
def mat_mul(A,B):
    C = []
    m = len(A)
    p = len(B)
    n = len(B[0])
    for i in range(m):
        temp = []
        for j in range(p):
            temp.append(0)
        C.append(temp)
    for i in range(m):
        for j in range(p):
            for k in range(n):
                C[i][j] += A[i][k] * B[k][j]
    return C
```

**Options :**

A. ✖ Both Code 1 and Code 2 implements the function `mat_mul` correctly.

B. ✔ Definition of `mat_mul` function in Code 1 is correct but Code 2 is wrong.

C. ✖ Definition of `mat_mul` function in Code 2 is correct but Code 1 is wrong.

D. ✖ Definition of `mat_mul` function in both Code 1 and Code 2 are wrong.

**Question Number : 146 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

What is the output of the following snippet of code?

```
def some_fun(D1, D2):
    #### Step-1 ####
    C = set()
    for k1 in D1.keys():
        for k2 in D2.keys():
            if k1 == k2:
                C.add(k1)
    #### Step-2 ####
    D = dict()
    for k in C:
        D[k] = D1[k] if D1[k] < D2[k] else D2[k]
    #### Return the dict ####
    return D

D1 = {'a': 5, 'b': 2, 'c': 3}
D2 = {'a': 1, 'b': 6, 'd': 10, 'e': 14}
D = some_fun(D1, D2)

try:
    print(D['a'])
    print(D['d'])
except KeyError:
    print('Key not found')
```

**Options :**

A. ✖

```
1
10
```

B. ✖

```
2
1
```

C. ✖

```
5
2
```

D. ✖

```
1
6
```

E. ✔

```
1
Key not found
```

**Question Number : 147 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Consider the following function.

```
def interesting(word):
    out = ''    # there is no space between the quotes
    for char in word:
        flag = True
        for i in range(len(out)):
            if out[i] >= char:
                out = out[: i] + char + out[i: ]
                flag = False
                break
        if flag:
            out = out + char
    return out == word
```

Select all function calls that return the value `True`.

Useful Information

- When comparing strings, note that `'a' < 'b' < 'c' < ... < 'z'`
- If `word = 'abcd'`, then:
  - `word[: 0]` is the empty string `''`
  - `word[: 2]` is the string `'ab'`
  - `word[2: ]` is the string `'cd'`

**Options :**

A. ✔
```
interesting('floor')
```

B. ✖
```
interesting('emptier')
```

C. ✔
```
interesting('effort')
```

D. ✖
```
interesting('done')
```

**Question Number : 148 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

What is the output of the following snippet of code? Your answer should be an integer.

```
def func(n):
    place = 0
    val = 0
    while n > 0:
        last = n % 10
        if place % last != 0:
            val = val + last
        n = n // 10
        place = place + 1
    return val
print(func(123456))
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

9

**Question Number : 149 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

Consider the following snippet of code:

```
# L is a list of integers
while len(L) > 2:
    # Process-1
    val_1 = L[0]
    for x in L:
        if x > val_1:
            val_1 = x
    L.remove(val_1)
    # Process-2
    val_2 = L[0]
    for x in L:
        if x < val_2:
            val_2 = x
    L.remove(val_2)
# sum(L) gives sum of all elements of list L
# sum([1,2,3,4]) = 10
print(sum(L) // len(L))
```

What will be the output of the code given above for `L = [1, 4, 2, 8, 3, 7, 5, 4, 6, 5, 9, 4]`?

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Question Type : COMPREHENSION**

**Question Numbers : (150 to 151)**

Question Label : Comprehension

Consider the following definition of class.

```python
class Car():
    def __init__(self, pos, speed, a):
        self.pos = pos
        self.speed = speed
        self.a = a

    def getpos(self, t):
        p = self.pos + self.speed * t + 0.5 * (t ** 2) * self.a
        return p

    def setpos(self, pos):
        self.pos = pos

    def setspeed(self, speed):
        self.speed = speed

    def seta(self, a):
        self.a = a

    def stop(self):
        self.speed = 0
        self.a = 0
        self.gear = 0

    def getspeed(self, t):
        speed = self.speed + self.a * t
        return speed
```

**Sub questions**

**Question Number : 150 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What will be the output of following snippet of code?

```python
Audi = Car(10, 20, 2)
Audi.setspeed(10)
print(Audi.getpos(2))
Audi.setpos(0)
```

**Options :**

A. ✔

```
34.0
```

B. ✖
```
54.0
```

C. ✖
```
44.0
```

D. ✖
```
None
```

E. ✖
```
24.0
```

**Question Number : 151 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What will be the output of following snippet of code:

```
Tata = Car(10,10,5)
print(Tata.seta(10))
print(Tata.getspeed(6))
print(Tata.getpos(6))
```

**Options :**

A. ✖
```
None
40
160.0
```

B. ✖
```
None
60
100.0
```

C. ✖

```
60
240.0
```

D. ✔

```
None
70
250.0
```

**Question Type : COMPREHENSION**

**Question Numbers : (152 to 153)**

Question Label : Comprehension

A number of students from different schools in a city have participated in a coding challenge. `scores` is a dictionary where each key is the name of a school and value corresponding to a key is a list of marks of students from that school who participated in the coding challenge.

For example, a sample `scores` dictionary is given below:

```
scores = {
            'JNV': [100, 20, 78, 90, 25, 80],
            'DPS': [25, 90, 75, 80],
            'VVS': [25, 100, 80, 75]
          }
```

Note that actual `scores` dictionary is longer than above mentioned sample. Based on this data, answer the given subquestions.

**Sub questions**

**Question Number : 152 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Write a function named `toppers` that accepts `scores` dictionary as argument and return a dictionary `top` where each key is the name of a school and the corresponding value is the marks of the topper from that school.
Consider the following snippets of code that could implement the function `toppers` and choose the correct option from below.

## Code 1

```
def toppers(scores):
    top = dict()
    for school in scores:
        max_score = 0
        for score in scores[school]:
            if score > max_score:
                max_score = score
        top[school] = max_score
        break
    return top
```

## Code 2

```
def toppers(scores):
    top = dict()
    for school in scores:
        max_score = 0
        for score in scores[school]:
            if score > max_score:
                max_score = score
                top[school] = max_score
    return top
```

**Options :**

A. ✖ Both Code 1 and Code 2 implements the function `toppers` correctly.

B. ✖ Definition of `toppers` function in Code 1 is correct but Code 2 is wrong.

C. ✔ Definition of `toppers` function in Code 2 is correct but Code 1 is wrong.

D. ✖

Definition of `toppers` function in both Code 1 and Code 2 are wrong.

**Question Number : 153 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the dictionary `top` that is returned by the function `toppers` from the previous question. Write a function named `top_school` that accepts `top` as an argument and returns the school name that contains student with top marks. If more than two schools have same highest mark, then you should return school name that occurs first in alphabetical order. Consider the following snippets of code that could implement the function `top_school` and choose the correct option from below.

## Code 1

```
def top_school(top):
    max_school = ''
    max_val = 0
    for school in top:
        if top[school] > max_val:
            max_val = top[school]
            max_school = school
    return max_school
```

## Code 2

```
def top_school(top):
    max_school = ''
    max_val = 0
    for school in top:
        if top[school] > max_val:
            max_val = top[school]
            max_school = school
        elif top[school] == max_val:
            if school < max_school:
                max_school = school
    return max_school
```

**Options :**

A. ✖ Both Code 1 and Code 2 implements the function `top_school` correctly.

B. ✖ Definition of `top_school` function in Code 1 is correct but Code 2 is wrong.

C. ✔ Definition of `top_school` function in Code 2 is correct but Code 1 is wrong.

D. ✖ Definition of `top_school` function in both Code 1 and Code 2 are wrong.

**Question Type : COMPREHENSION**

**Question Numbers : (154 to 155)**

Question Label : Comprehension

Answer the subquestions based on the functions `shift` and `blocks`.

**Sub questions**

**Question Number : 154 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What is the output of the following snippet of code?

```python
def shift(c1, c2):
    # z is in lower case for the below if block
    if ('a' <= c1 <= 'z' and
        'a' <= c2 <= 'z'):
        return False

    # Z is in upper case for the below if block
    if ('A' <= c1 <= 'Z' and
        'A' <= c2 <= 'Z'):
        return False
    return True

print(shift('A', 'b'))
```

**Options :**

A. ✔ True

B. ✖ False

**Question Number : 155 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

What is the output of the following snippet of code?

```python
def blocks(word):
    n = len(word)
    count = 1
    for i in range(1, n):
        if shift(word[i - 1], word[i]):
            count += 1
    return count

print(blocks('thisISaGOODproblemTOsolve'))
```

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

7

**Question Type : COMPREHENSION**

**Question Numbers : (156 to 158)**

Question Label : Comprehension

`careers.csv` is a file that has the details of the careers of some cricketers. The first column is the name of the player, the second column is the number of runs player made in international cricket, the third column is the number of centuries player made, the fourth column is number of wickets player has taken, and the last fifth column is number of five wicket hauls. A sample file is given below for your reference.

```
Player,Runs,Centuries,Wickets,FiveWicketHauls
Tendulkar,33000,100,210,2
Ponting,25500,71,0,0
Kallis,20000,68,560,7
Dravid,23000,60,4,0
Jadeja,4800,2,480,11
Ashwin,7500,4,600,20
```

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 156 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Create a list of tuples named `careers` that has the following form:

```
[
    ('Tendulkar', 33000, 100, 210, 2),
    ('Ponting', 25500, 71, 0, 0),
    ... # fill the remaining entries
    ('Jadeja', 4800, 2, 480, 11),
    ('Ashwin',7500,4,600,20)
]
```

Each entry in the list is a tuple that corresponds to one line in the file. The header has to be ignored. The type of each element within a tuple should be `(str, int, int, int, int)`. Consider the following two snippets of code that could create `careers` list of tuples as mentioned above and choose the correct option from below. Look at the following snippet of code that could create list `great_batsman`.

## Code 1

```
f = open('careers.csv', 'r')
f.readline()  # ignore header
careers = [ ]
for line in f:
    player, runs, centuries, wickets, five = line.strip().split(',')
    runs = int(runs)
    centuries = int(centuries)
    wickets = int(wickets)
    five = int(five)
    careers.append((player, runs,centuries, wickets, five))
f.close()
```

## Code 2

```
f = open('careers.csv', 'r')
careers = [ ]
for line in f:
    player, runs, centuries, wickets,five = line.strip().split(',')
    runs = int(runs)
    centuries = int(centuries)
    wickets = int(wickets)
    five = int(five)
    careers.append((player, runs, centuries, wickets, five))
f.close()
```

**Options :**

A. ✖ Both Code 1 and Code 2 implements `careers` list correctly.

B. ✔ `careers` list in Code 1 is correct but Code 2 is wrong.

C. ✖ `careers` list in Code 2 is correct but Code 1 is wrong.

D. ✖ `careers` list in both Code 1 and Code 2 are wrong.

**Question Number : 157 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Using the list `careers` obtained from the previous question, create a list named `great_batsman` that contains the names of players who have been scored at least 5000 runs and had at least one century. Select all correct implementations.

### Code 1

```
great_batsman = [elem[0] for elem in careers if elem[1] >= 5000 and elem[2]
>= 1]
```

### Code 2

```
great_batsman = [ ]
for elem in careers:
    if elem[1]>=5000 and elem[2] >= 1:
        great_batsman.append(elem[0])
```

**Options :**

A. ✔ Both Code 1 and Code 2 implements `great_batsman` list correctly.

B. ✖ `great_batsman` list in Code 1 is correct but Code 2 is wrong.

C. ✖ `great_batsman` list in Code 2 is correct but Code 1 is wrong.

D. ✖ `great_batsman` list in both Code 1 and Code 2 are wrong.

**Question Number : 158 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Using the list `careers` that we have been working with, what is the output of the following snippet of code? Assume that data is only the sample six players shown.

```
def all_rounders(careers):
    count = 0
    for elem in careers:
        player, runs,centuries,wickets,five = elem
        if runs > 4000 and wickets > 200:
            count += 1
    return count

print(all_rounders(careers))
```

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

# Sem2 Maths2

| | |
|---|---|
| **Number of Questions :** | 12 |
| **Section Marks :** | 50 |

**Question Number : 159 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL: SEMESTER 2: MATHEMATICS FOR DATA SCIENCE 2"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 160 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Choose the correct options from the following:

**Options :**

A. ✖ Consider two matrices $A$ and $B$. If both the matrix multiplications $AB$ and $BA$ are well-defined then $A$ and $B$ are square matrices.

B. ✔ Consider two matrices $A$ and $B$ of order $n$. If $A$ is not invertible, then $AB$ is not invertible.

C. ✖ Consider two matrices $A$ and $B$ of order $n$. If $AB = B$, then $B = I$, where $I$ is the identity matrix of order $n$.

D. ✔ There exists a $2 \times 2$ matrix $A \neq I$ such that $A^3 = I$, where $I$ is the identity matrix of order $2 \times 2$.

**Question Number : 161 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Match the vector subspaces of $\mathbb{R}^3$ (with the usual scalar multiplication and vector addition) in column A with their bases in column B and the dimensions of the vector spaces in column C in Table : M2D1.

| | Vector space (Column A) | | Basis (Column B) | | Dimension of the vector space (Column C) |
|---|---|---|---|---|---|
| a) | $W = \{(x, y, z) \mid x - 3y + 2z = 0, x, y, z \in \mathbb{R}\}$ | 1) | $\{(1, 3, 0), (3, 1, 0)\}$ | i) | 2 |
| b) | $W = \{(x, y, z) \mid z = 0, x, y \in \mathbb{R}\}$ | 2) | $\{(1, 0, 0), (1, 0, 1), (0, 1, 1)\}$ | ii) | 2 |
| c) | $W = \text{Span}\{(1, 1, 1), (1, 0, 3), (2, 2, 3)\}$ | 3) | $\{(2, 0, -1), (-3, -1, 0)\}$ | iii) | 3 |

Table : M2D1

**Options :**

A. ✔ a → 3 → i.

B. ✖ b → 2 → iii.

C. ✖ c → 2 → i.

D. ✖ a → 1 → ii.

E. ✔ b → 1 → i.

F. ✔ c → 2 → iii.

**Question Number : 162 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Choose the correct options from the following:

**Options :**

A. ✖ Suppose $W$ is a 3-dimensional subspace of $\mathbb{R}^4$. Then every basis of $\mathbb{R}^4$ can be reduced to a basis for $W$ by removing one vector.

B. ✖ If the columns of a matrix are linearly independent, then rows are also linearly independent.

C. ✔ If $A$ is an $m \times n$ matrix, then sum of dimension of column space and dimension of nullspace of $A$ is $n$.

D. ✖ If $A$ is an $m \times n$ matrix, then sum of dimension of column space and dimension of nullspace of $A$ is $m$.

E. ✔ If the columns of a matrix $A$ are linearly independent, then nullity of $A$ is 0.

**Question Number : 163 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Choose the set of correct options.

**Options :**

A. ✔ Consider a linear transformation $T : \mathbb{R}^n \to \mathbb{R}^m$ such that $T(v_1) = w_1$ and $T(v_2) = w_2$. If $w_1$ and $w_2$ are linearly independent, then $v_1$ and $v_2$ are linearly independent.

B. ✖ Consider a linear transformation $T : \mathbb{R}^n \to \mathbb{R}^m$ such that $T(v_1) = w_1$ and $T(v_2) = w_2$, where $\mathbb{R}^n$ and $\mathbb{R}^m$ are inner product spaces. If $w_1$ and $w_2$ are orthogonal, then $v_1$ and $v_2$ are orthogonal.

C. ✔ Let $u$ and $v$ be two vectors of an inner product space $V$. If $u + v$ and $u - v$ are orthogonal to each other, then $||u|| = ||v||$.

D. ✔ Let $A$ be an $n \times n$ matrix. The null space of $A$ is the orthogonal complement of the row space of $A$ when both are viewed as subspaces of $\mathbb{R}^n$ with the usual inner product.

**Question Number : 164 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Choose the correct statements for the function

$$f(x,y) = \begin{cases} \dfrac{x^2y}{x^4+y^2} & (x,y) \neq (0,0) \\ 0 & (x,y) = (0,0) \end{cases}$$

**Options :**

A. ✖ $\lim_{(x,y)\to(0,0)} f(x,y) = 0$

B. ✔ $f$ is not continuous at $(0,0)$.

C. ✔ The directional derivative of $f$ at $(0,0)$ in the direction of $(1,1)$ is $\frac{1}{\sqrt{2}}$.

D. ✖ The directional derivative of $f$ at $(0,0)$ in the direction of $(1,1)$ does not exist.

**Question Number : 165 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the following system of linear equations

$$\text{System:} \quad \begin{aligned} x+y+z &= 2 \\ y-3z &= 1 \\ 2x+y+5z &= 3 \end{aligned}$$

The number of solutions of the above system is

**Options :**

A. ✖ 0

B. ✖ 1

C. ✖ 2

D. ✔ infinite

**Question Number : 166 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Suppose $T : \mathbb{R}^3 \to \mathbb{R}^3$ is a linear transformation defined by

$$T(x, y, z) = (x + y + z, x + 2y, y + z).$$

Let $A$ denote the matrix representation of $T$ with respect to the ordered bases $\beta = \{(1, 1, 0), (2, 3, 4), (1, -1, 1)\}$ for the domain and $\gamma = \{(0, 1, 0), (0, 0, 1), (1, 0, 0)\}$ for the codomain. Then the sum of the elements in the first row of $A$ is

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

10

**Question Number : 167 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

The number of local minima of the function $f(x, y) = 2x^2 - 4xy + y^4 + 2$ is _____.

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number : 168 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

A potter wants to make a rectangular box of volume 17 cubic units such that its total surface area is minimum. He successfully creates one of dimensions $x$, $y$, and $z$ units. Find the value of $x^3 + z^3$.

[**Note:** If the dimensions of a rectangular box are $l$, $b$, and $h$ units, then volume of the box is $V = lbh$ cubic units and the total surface area of the rectangular box is $S = 2(lb + bh + lh)$ square units.]

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

34

**Question Type : COMPREHENSION**

**Minimum Instruction Time : 0**

**Question Numbers : (169 to 172)**

Question Label : Comprehension

From the list of given terms find out the best possible options for each of the given subquestions:

1) Rank
2) Limit
3) Determinant
4) Closure with respect to addition and scalar multiplication
5) Existence of zero element
6) Existence of additive inverse
7) Commutativity of addition
8) Associativity of addition
9) Elements
10) Local maxima
11) Local minima
12) Saddle points
13) Gradient
14) Directional derivative
15) Partial derivative
16) Set of orthonormal vectors
17) Standard ordered basis
18) Affine subspace.

**Sub questions**

**Question Number : 169 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Critical points can be _____. (Enter 3 best possible options. Enter only the serial numbers of those options in increasing order without adding any comma or space in between them.) [Suppose your answer is 7, 14 and 17, then you should enter 71417]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

101112

**Question Number : 170 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Similar matrices have the same _____. (Enter 2 best possible options. Enter only the serial numbers of those options in increasing order without adding any comma or space in between them.) [Suppose your answer is 7, 14 and 17, then you should enter 71417]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

13

**Question Number : 171 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

Gram-Schmidt algorithm generates a _____. (Enter the best possible option (only one). Enter only the serial number of that option.) [Suppose your answer is 7, 14 and 17, then you should enter 71417]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

16

**Question Number : 172 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

The conditions that need to be checked to identify a subspace $W$ of a vector space $V$ :_____. (Enter 2 best possible options. Enter only the serial numbers of those options in increasing order without adding any comma or space in between them.) [Suppose your answer is 7, 14 and 17, then you should enter 71417]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

45

**Question Type : COMPREHENSION**

**Question Numbers : (173 to 179)**

Question Label : Comprehension

- Consider the function $f : \mathbb{R}^2 \to \mathbb{R}$ defined as

$$f(x, y) = x^2y + xy^2$$

- The tangent plane to the function $f$ at the point (1,1) is given by $T_1$.
  Let $A_1$ denote the affine subspace of $\mathbb{R}^3$ formed by the set of points on $T_1$.
  Let $V_1$ denote the corresponding vector subspace associated with $A_1$.
- Let $A$ denote the Hessian matrix of the function $f$ at the point $(1, 1)$.
- Consider the affine subspace of $\mathbb{R}^3$ given by

$$A_2 = \{(x, y, z) \mid x - y + z = 1, \text{ where } x, y, z \in \mathbb{R}\}$$

  Let $V_2$ denote the corresponding vector subspace associated with $A_2$.

Using the above information answer the given subquestions.

**Sub questions**

**Question Number : 173 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which one of the following represents the equation of the tangent lines to the function ƒ at the point (1, 1) in the direction of the unit vector (1, 0)?

**Options :**

A. ✖ $x(t) = 1 - t, y(t) = 1, z(t) = 2 + 3t.$

B. ✖ $x(t) = 1 + t, y(t) = 1, z(t) = 2 - 3t.$

C. ✔ $x(t) = 1 + t, y(t) = 1, z(t) = 2 + 3t.$

D. ✖ $x(t) = 1 + t, y(t) = 0, z(t) = 2 + 3t.$

**Question Number : 174 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The unit vector along which the rate of change of the function ƒ at (1, 1) is the maximum is

**Options :**

A. ✖ $\left(\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$

B. ✔ $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

C. ✖ $\left(-\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$

D. ✖ $\left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

**Question Number : 175 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

The number of critical points of the function $f$ is _____.

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Question Number : 176 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

What is the rank of $A$?

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number : 177 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following sets forms a basis $\beta$ of $V_1$?

**Options :**

A. ✖ {(1, 0, 1), (0, 1, 1)}

B. ✔ {(−1, 0,−3), (0, 1, 3)}

C. ✖ {(1, 0,−3), (0, 1, 3)}

D. ✖ {(1, 0,−1), (0, 1,−1)}

**Question Number : 178 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following sets forms a basis $\gamma$ of $V_2$?

**Options :**

A. ✔ {(1, 0,−1), (0, 1, 1)}

B. ✖ {(1, 0, 3), (0, 1, 3)}

C. ✖ {(1, 0,−3), (0, 1, 3)}

D. ✖ {(1, 0,−1), (0, 1,−1)}

**Question Number : 179 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Let $T$ denote the linear transformation from $V_1$ to $V_2$, whose matrix representation with respect to the ordered bases $\beta$ and $\gamma$ (mentioned in the previous questions 19 & 20 ), respectively for $V_1$ and $V_2$ is the identity matrix, i.e., $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$. Which of the following functions denotes an affine mapping from $A_1$ to $A_2$ corresponding to $T$?

**Options :**

A. ✖ $f(x, y, z) = (-x, -y, x + y + 1)$

B. ✖ $f(x, y, z + 4) = (x, y, -x + y + 1)$

C. ✖ $f(x, y, z - 4) = (x, y, x + y + 1)$

D. ✔ $f(x, y, z - 4) = (-x, y, x + y + 1)$

# BDM

**Number of Questions :** 33

**Section Marks :** 120

**Question Number : 180 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL: BUSINESS DATA MANAGEMENT"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 181 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is not a source of survey data? (select all that is applicable)

**Options :**

A. ✔ Stock market data

B. ✖ Market research data

C. ✖ Consumer pyramid data

D. ✖ None of these

**Question Number : 182 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The price of a product has changed from Rs.200 per unit to Rs. 50 per unit. If the price elasticity must remain constant at |+1.2|, then which of the following statements are true?

**Options :**

A. ✔ The new quantity must be approximately 0.1 times the old quantity

B. ✖ The new quantity must be approximately 60% of the old quantity

C. ✖ The increase in quantity must be approximately 3.6 times the old quantity

D. ✖ The percentage change in quantity must be approximately 60%

**Question Number : 183 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

An increase in Malolan's income decreases his demand for chocolate milk. Then, for Malolan, chocolate milk is

**Options :**

A. ✖ A complement to any good

B. ✖ A normal good

C. ✔ An inferior good

D. ✖ A substitute to any good

**Question Number : 184 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is not a product of the FMCG industry?

**Options :**

A. ✖ Toothpaste

B. ✖ Biscuits

C. ✖ Corn flakes

D. ✖ Soap

E. ✔ None of these

**Question Number : 185 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Match the following:

| | |
|---|---|
| 1. Iron and Steel industry | a. Labour-intensive industry |
| 2. Airline industry | b. Basic industry |
| 3. Tea industry | c. Capital-intensive industry |

**Options :**

A. ✔ 1 – b, 2 – c, 3 – a

B. ✖ 1 – a, 2 – b, 3 – c

C. ✖ 1 – b, 2 – a, 3 – c

D. ✖ 1 – a, 2 – c, 3 – b

**Question Number : 186 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Match the following:

| | |
|---|---|
| 1. Grain grinding | a. Ancillary industry |
| 2. Leather work | b. Consumer good industry |
| 3. Textiles | c. Village industry |
| 4. Manufacturing tractors | d. Cottage industry |

**Options :**

A. ✔ 1 – c, 2 – d, 3 – b, 4 – a

B. ✖ 1 – a, 2 – d, 3 – b, 4 – c

C. ✖ 1 – d, 2 – c, 3 – b, 4 – a

D. ✖ 1 – b, 2 – d, 3 – c, 4 – a

**Question Number : 187 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

In designing a ledger for the e-commerce analysis, can the Open Stock of Mother DC be negative when we accept backorders?

**Options :**

A. ✔ TRUE

B. ✖ FALSE

**Question Number : 188 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is NOT true about the Pareto Principle?

**Options :**

A. ✖ It helps to identify top root causes.

B. ✖ Helps to prioritize the top issue for a problem and try to eliminate it first.

C. ✖ Gives an idea of the cumulative impact of issues

D. ✔ It can be applied to all cases.

**Question Number : 189 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

In which e-commerce category would you place Flipkart.in?

**Options :**

A. ✔ Platform

B. ✖ Speciality

C. ✖ Niche

D. ✖ Consumer 2 Consumer

**Question Number : 190 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Increase in which of the following items reduces the Gross Margin?

a. Sales

b. Direct Material Cost

c. Direct Labour Cost

d. Shipping Cost

e. Tax on the Manufactured Product

**Options :**

A. ✖ a, b, and c only

B. ✖ a, b, c, and e only

C. ✔ b, c, and d only

D. ✖ all of these

**Question Number : 191 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

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

a) Sales and Marketing

b) Operations

c) Human Resources

d) Logistics

**Options :**

A. ✖ a and b only

B. ✖ a, b, and c only

C. ✖ b, c, and d only

D. ✔ all of these

**Question Number : 192 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What are the components of Overall Equipment Effectiveness (OEE)?

a) availability,

b) effectiveness,

c) performance,

d) excellence,

e) objectivity,

f) quality

**Options :**

A. ✖ Objectivity, effectiveness, and Excellence

B. ✖ Objectivity, Performance, and Quality

C. ✖ Availability, effectiveness, and Quality

D. ✔ Availability, Performance, and Quality

**Question Number : 193 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Match the Following

| Value of the Product | Ordering Strategy |
|---|---|
| a) High | 1) Planned Order |
| b) Medium | 2) Economic Order Quantity |
| c) Low | 3) Just in Time |

**Options :**

A. ✖ a – 1, b – 2, c – 3

B. ✖ a – 1,2, b – 1, c – 3

C. ✔ a – 1, 3, b – 1, c – 2

D. ✖ a – 2, b – 1, c – 3

**Question Type : COMPREHENSION**

**Question Numbers : (194 to 195)**

Question Label : Comprehension

A product is sold in a competitive market where its price is fixed at Rs. 13 per unit. If the product is to be made, a fixed cost of Rs. 12 is incurred. Additionally, based on the volume, the cost per unit is different and this is provided in Table-1 below. Given this information, answer the subquestions

| Variable Cost (Rs./ unit) | Number of Units Produced (units) |
|---|---|
| 0 | 0 |
| 2 | 10 |
| 4 | 14 |
| 4.5 | 22 |
| 5 | 28 |
| 7 | 32 |

*Table-1: Cost per unit for different number of units produced*

**Sub questions**

**Question Number : 194 Question Type : MCQ**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Using the Figure-1 and Table-2 given, match the curve in “column-A” to what it correctly “represents” in column-B

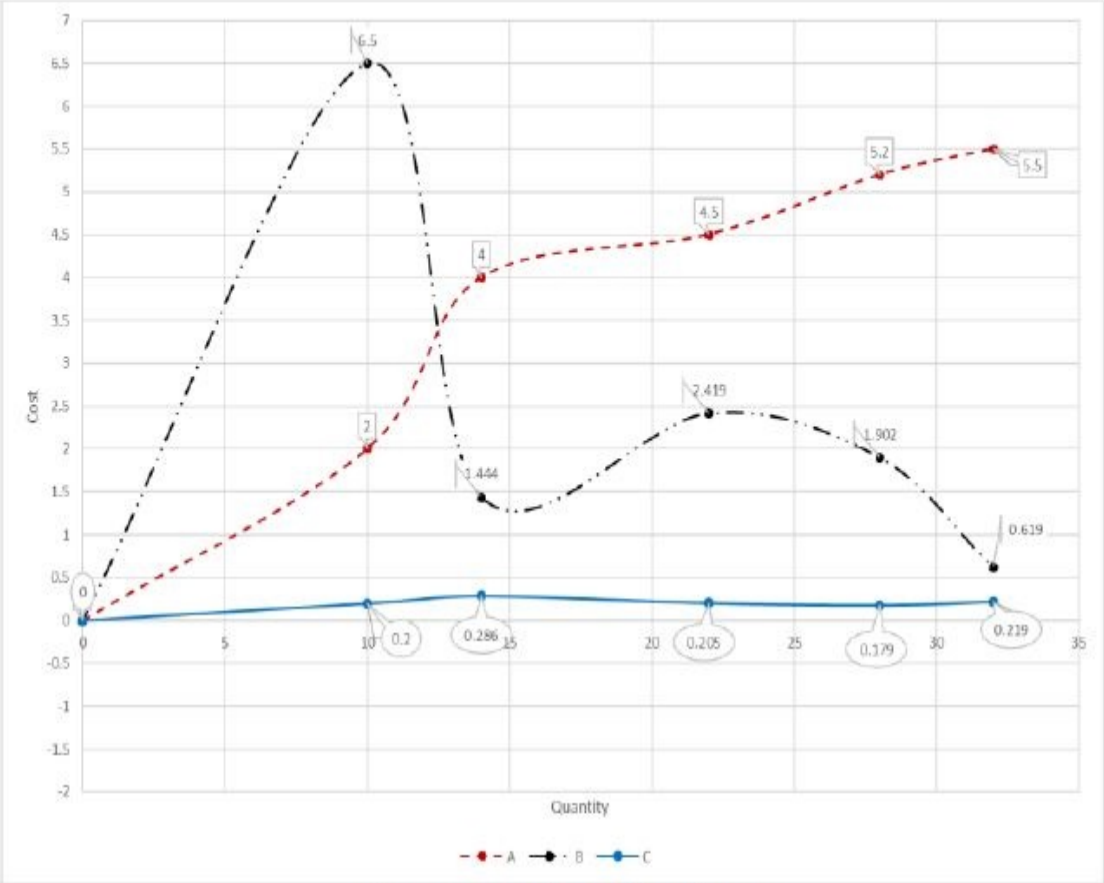



*Figure-1: Graph of different curves*

| Column-A | Column-B |
|---|---|
| I. Curve-A | A. Average total cost |
| II. Curve-B | B. Average variable cost |
| III. Curve-C | C. Change in profit<br>(Marginal Revenue - Marginal Cost) |
| | D. None of the mentioned |

*Table-2: Curves and the possible representations*

**Options :**

A. ✖ I-(A), II-(C), III-(D)

B. ✖ I-(C), II-(A), III-(B)

C. ✔ I-(D), II-(C), III-(B)

D. ✖ I-(A), II-(C), III-(B)

**Question Number : 195 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Upto what number of units can a company that aims to produce the product at given in the main question mentioned cost structure go? (answer with a number provided in the “Number of Units Produced (units)” column in Table-1)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

32

**Question Number : 196 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

When computing price elasticity, the slope of the demand curve depends on

**Options :**

A. ✖ The units used to measure quantity but not the units used to measure price

B. ✔ The units used to measure quantity and the units used to measure price

C. ✖ The units used to measure price but not the units used to measure quantity

D. ✖ Neither the units used to measure quantity nor the units used to measure price

**Question Number : 197 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

From the table, calculate the revenue growth on 12 September 2022 with respect to 11 Sep 2022 and select the closest option given below.

| Date | Sum of Revenue |
|---|---|
| 01-09-2022 | ₹ 23,86,300 |
| 02-09-2022 | ₹ 22,85,500 |
| 03-09-2022 | ₹ 23,45,600 |
| 04-09-2022 | ₹ 25,06,800 |
| 05-09-2022 | ₹ 25,82,200 |
| 06-09-2022 | ₹ 25,42,500 |
| 07-09-2022 | ₹ 24,00,000 |
| 08-09-2022 | ₹ 23,52,300 |
| 09-09-2022 | ₹ 24,74,700 |
| 10-09-2022 | ₹ 22,97,100 |
| 11-09-2022 | ₹ 23,99,300 |
| 12-09-2022 | ₹ 23,19,100 |
| 13-09-2022 | ₹ 24,10,800 |
| 14-09-2022 | ₹ 23,72,200 |
| 15-09-2022 | ₹ 23,07,300 |

**Options :**

A. ✖ 5%

B. ✖ -7%

C. ✖ 4%

D. ✔ -3%

**Question Number : 198 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following principles are widely used in propensity models?

**Options :**

A. ✖ Microeconomics

B. ✖ Macroeconomics

C. ✔ Nudge economics

D. ✖ Working capital

E. ✖ Credit economics

**Question Number : 199 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following describes A/B test?

**Options :**

A. ✔ 2 small counties in the US shown 2 different layouts of a website to browse

B. ✖ Entire US shown 2 different layouts of a website to browse

C. ✖ US is shown one version of the website and UK is shown another version of the website to browse

D. ✖ Both US and UK are shown both the versions of the website to the same people one after the other

E. ✖ All of these

**Question Number : 200 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

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

**Options :**

A. ✔ Increase approval cutoff of credit score

B. ✖ Decrease approval cutoff of credit score

C. ✖ Increase interest rate

D. ✖ Increase approval limit for loans

E. ✖ Give more loans

**Question Number : 201 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What correctly describes Nudge Economics?

**Options :**

A. ✖ Forcing a customer to buy something by constant nagging and notifications

B. ✔ positive reinforcement and indirect suggestions as ways to influence the behaviour and

decision-making of groups or individuals.

C. ✖ Giving out free merchandise

D. ✖ Enabling Credit for smaller values based on the credit score

**Question Number : 202 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

If the current ratio is 2:1 and the Quick ratio is 1.5:1, then which of the following is/are true? (Select all that are applicable)

**Options :**

A. ✔ Current assets are 2 times the liability

B. ✔ Stocks is 0.5 times the liability

C. ✔ Current assets are greater than stocks

D. ✖ None of these

**Question Number : 203 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following is/are not a “head” in which an Industry is classified in the Indian context? (Multiple Select)

**Options :**

A. ✖ Labour

B. ✖ Raw Material

C. ✖ Ownership

D. ✔ Agro based

E. ✔ Consumer

**Question Number : 204 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following options is/are correct? (Multiple Select)

If you increase the production volume:

**Options :**

A. ✔ The capacity utilization is increased

B. ✖ The capacity utilization is decreased

C. ✖ ROCE is decreased

D. ✔ ROCE is increased

**Question Number : 205 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

Calculate the concentration ratio for first four firms for the following industry data:

**Hint: (round off to two decimal and enter answer with '%' symbol)**

**Herfindahl index: 2231 (round off to integer value)**

| Firm | Sales in 2019 |
|---|---|
| Firm A | 10,000 |
| Firm B | 7,000 |
| Firm C | 1,000 |
| Firm D | 8,000 |
| Firm E | 5,000 |
| Firm F | 2,000 |

**Response Type :** Alphanumeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Set

**Answers Case Sensitive :** No

**Text Areas :** PlainText

**Possible Answers :**

90.91%

90.91 %

**Question Number : 206 Question Type : MCQ**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Match the following.

| | | | |
|---|---|---|---|
| 1 | Pareto Principle | a | Current Assets - Current Liabilities |
| 2 | Working Capital | b | With the available Open Stock, how many days of demand can be met? |
| 3 | Service Level | c | Average Open Stock divided by Average Sales |
| 4 | Backorder | d | The percentage of customers that do not face a stockout. |
| 5 | Average Days of Sale of Inventory | e | 80:20 Analysis |
| 6 | Average Days of Inventory Cover | f | Accepting an order that is temporarily out of stock |

**Options :**

A. ✔ 1: e; 2: a; 3: d; 4: f; 5: c; 6: b.

B. ✖ 1: b; 2: a; 3: d; 4: f; 5: c; 6: e.

C. ✖ 1: a; 2: e; 3: d; 4: f; 5: c; 6: b.

D. ✖ 1: d; 2: a; 3: e; 4: f; 5: c; 6: b.

**Question Number : 207 Question Type : MCQ**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Calculate the OEE of the Gear Manufacturing Equipment

| Parameters | Week 1 |
|---|---|
| Planned Production Hours (PPH) | 80 |
| Lost time (LOT) | 16 |
| Designed Gear Output Speed from Equipment (DO) per Hour | 60 |
| Actual Gear Output Speed from Equipment (AO) per Hour | 54 |
| Total Products Made (TP) | 3600 |
| Scrap (S) | 143 |

**Options :**

A. ✖ 0.79

B. ✔ 0.69

C. ✖ 0.90

D. ✖ Insufficient Information

**Question Number : 208 Question Type : MCQ**

**Correct Marks : 6**

Question Label : Multiple Choice Question

A customer makes a transaction through an online payments platform 'PayTM' using 'ICICI Bank Credit Card' in Flipkart to buy a shoe. Which of the following is true chronologically?

**Options :**

A. ✖ Customer pays ICICI, ICICI pays Flipkart

B. ✖ Customer pays ICICI, ICICI pays PayTM, PayTM pays Flipkart

C. ✔ ICICI pays PayTM, PayTM pays Flipkart, Customer pays ICICI

D. ✖ Customer pays PayTM, PayTM pays ICICI, ICICI pays Flipkart

E. ✖ Customer pays Flipkart

**Question Type : COMPREHENSION**

**Question Numbers : (209 to 212)**

Question Label : Comprehension

Find the missing details (A,B,C,D) in the following table by using Inventory Movement and Sales Data

| Table 1 – Inventory Movement for Quarter - I | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1st April 2021 | April – 2021 | | May – 2021 | | Jun - 2021 | |
| | Beg. Invt. | Prdn. Oty | End Invt. | Prdn. Oty | End Invt. | Prdn. Oty | End Invt. |
| Laptop – 1 | 3210 | 7000 | 1250 | 9000 | 2290 | 9000 | 330 |
| Laptop – 2 | 2230 | 6000 | A | 6000 | 1170 | 10000 | 190 |
| Laptop – 3 | 1760 | 8000 | 3400 | 8000 | 360 | 2000 | 1400 |
| Laptop – 4 | 3360 | 6000 | 2400 | 8000 | B | 10000 | 1177 |
| Laptop – 5 | 970 | 3000 | 1090 | 4000 | 1135 | 4000 | 1580 |
| Laptop – 6 | 5630 | 12000 | 3930 | 12000 | 6930 | C | 9830 |
| Laptop – 7 | 2400 | 7000 | 2248 | 7000 | 1540 | 6000 | 934 |
| Laptop – 8 | 860 | 3000 | 1940 | 4000 | 1380 | 4000 | 340 |

| Sales for Quarter I | | | |
|---|---|---|---|
| Sales | April – 2021 | May – 2021 | Jun - 2021 |
| | Quantity | Quantity | Quantity |
| Laptop – 1 | 8960 nos | 7960 nos | 10960 nos |
| Laptop – 2 | 7000 nos | 6150 nos | 10980 nos |
| Laptop – 3 | 6360 nos | 11040 nos | 960 nos |
| Laptop – 4 | 6960 nos | 7748 nos | 11475 nos |
| Laptop – 5 | 2880 nos | 3955 nos | 3555 nos |
| Laptop – 6 | 13700 nos | 9000 nos | 9100 nos |
| Laptop – 7 | 7152 nos | 7708 nos | D |
| Laptop – 8 | 1920 nos | 4560 nos | 5040 nos |

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 209 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Enter the correct answer for A: _____

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1230

**Question Number : 210 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Enter the correct answer for B: _____

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2652

**Question Number : 211 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Enter the correct answer for C:_____

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

12000

**Question Number : 212 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Enter the correct answer for D:_____

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

6606

**Question Number : 213 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

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

**Options :**

A. ✔ Strategic Plan – Capacity Requirement Plan – Purchase Plan – Production Plan – Shift Operation Plan

B. ✖ Shift Operation Plan – Production Plan – Purchase Plan – Capacity Requirement Plan – Strategic Plan

C. ✖ Shift Operation Plan – Production Plan – Purchase Plan – Strategic Plan - Capacity Requirement Plan

D. ✖ Shift Operation Plan – Purchase Plan – Production Plan – Capacity Requirement Plan – Strategic Plan

**Question Number : 214 Question Type : MCQ**

**Correct Marks : 8**

Question Label : Multiple Choice Question

Consider the following dataset:

| Candidates | Year of experience | Count Skill | Count_key_projects | Duration in the current role |
|---|---|---|---|---|
| Partha | 5.0 | 2 | 2 | 2 |
| Siva | 5.0 | 1 | 1 | 2 |
| Akanksha | 5.5 | 1 | 2 | 2 |
| Lavanya | 6.0 | 1 | 1 | 3 |

Here all the factors are "more the better". You can combine all the criteria as:

Composite Score= Sum of all criteria on the same scale

Rank the above candidates and choose the correct ranking from the below options

**Options :**

A. ✔ Partha > Akanksha > Lavanya > Siva

B. ✖ Akanksha > Lavanya > Siva> Partha

C. ✖ Partha < Akanksha < Lavanya < Siva

D. ✖ Akanksha < Lavanya < Siva< Partha

**Question Type : COMPREHENSION**

**Question Numbers : (215 to 218)**

Question Label : Comprehension

Match the following

| | |
|---|---|
| 1. A form created by HR that outlines the budgetary details, skills and capabilities required etc. | a. Appraisal |
| 2. Organization source talent by asking their existing employees to recommend candidates from their existing networks. | b. Indent |
| 3. The process of evaluating an employee's current and/or past performance | c. Job description |
| 4. A quick summary of what the role is expected to do, key responsibilities etc | d. Employee referral |

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 215 Question Type : MCQ**

**Correct Marks : 1.5**

Question Label : Multiple Choice Question

Select the correct answer for 1:

**Options :**

A. ✖ a

B. ✔ b

C. ✖ c

D. ✖ d

**Question Number : 216 Question Type : MCQ**

**Correct Marks : 1.5**

Question Label : Multiple Choice Question

Select the correct answer for 2:

**Options :**

A. ✖ a

B. ✖ b

C. ✖ c

D. ✔ d

**Question Number : 217 Question Type : MCQ**

**Correct Marks : 1.5**

Question Label : Multiple Choice Question

Select the correct answer for 3:

**Options :**

A. ✔ a

B. ✖ b

C. ✖ c

D. ✖ d

**Question Number : 218 Question Type : MCQ**

**Correct Marks : 1.5**

Question Label : Multiple Choice Question

Select the correct answer for 4:

**Options :**

A. ✖ a

B. ✖ b

C. ✔ c

D. ✖ d

**Question Type : COMPREHENSION**

**Question Numbers : (219 to 222)**

Question Label : Comprehension

In the table below, the first column shows the operation to be performed on an Excel spreadsheet while the second column shows some excel feature. Match these two columns:

| Operation to be performed | Excel Feature |
|---|---|
| a. Split a single column of text into multiple columns | i. VLOOKUP() |
| b. a function that makes Excel search for a certain value in a column (the so called 'table array'), to return a value from a different column in the same row. | ii. COUNTA() |
| c. To return the rank of a number in a list of numbers | iii. Text to Columns |
| d. To count the number of cells in a range that are not empty | iv. RANK() |

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 219 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Select the correct answer for a:

**Options :**

A. ✖ i

B. ✖ ii

C. ✔ iii

D. ✖ iv

**Question Number : 220 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Select the correct answer for b:

**Options :**

A. ✔ i

B. ✖ ii

C. ✖ iii

D. ✖ iv

**Question Number : 221 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Select the correct answer for c:

**Options :**

A. ✖ i

B. ✖ ii

C. ✖ iii

D. ✔ iv

**Question Number : 222 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Select the correct answer for d:

**Options :**

A. ✖ i

B. ✔ ii

C. ✖ iii

D. ✖ iv

# Business Analytics

**Number of Questions :** 26

**Section Marks :** 110

**Question Number : 223 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL: BUSINESS ANALYTICS"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 224 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Suppose you conduct a chi-squared test of independence on the categorical variables cities and brand preferences at the significance level of 0.05. You obtain a p-value of 0.03. What will you conclude?

**Options :**

A. ✖ Reject the null hypothesis and conclude that the categorical variables are independent

B. ✔ Reject the null hypothesis and conclude that the categorical variables are not independent

C. ✖ Fail to reject the null hypothesis and conclude that the categorical variables are independent

D. ✖ Fail to reject the null hypothesis and conclude that the categorical variables are not independent

**Question Number : 225 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

You have estimated the demand to follow the following relationship: $D(p)= 100-5*p$. Now, you intend to maximize the revenue $R(p) = D(p) *p$. You find the first derivative of $R(p)$ with respect to $p$, equate it to 0 and find $p*$. What is the value of $p*$?

**NOTE:** Enter your answer in one decimal place.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

9.9 to 10.1

**Question Number : 226 Question Type : SA**

**Correct Marks : 5**

Question Label : Short Answer Question

There are 6 business units. There are two outputs and one input under consideration. You are solving the optimization problem for business unit 3 and find that the efficiency is 0.7. You find that the dual variables corresponding to the constraints of business units 4 and 5 are non-zero and the dual variables corresponding to the constraints of other units are zero. The dual variables

corresponding to the constraints of business units 4 and 5 are 0.3 and 0.4 respectively. You are given the following table where sales and number of leads are the two outputs.

| | Sales | Number of leads |
|---|---|---|
| Business unit 4 | 9000 | 10 |
| Business unit 5 | 8000 | 12 |

What is the sales in HCU 3?

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

8420 to 8440

**Question Number : 227 Question Type : SA**

**Correct Marks : 5**

Question Label : Short Answer Question

In a multiple linear regression with 4 explanatory variables, you find that R-squared value is 0.74. The number of observations is 25. What is the value of adjusted R-squared?

**NOTE:** Enter your answer in two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.66 to 0.74

**Question Number : 228 Question Type : SA**

**Correct Marks : 5**

Question Label : Short Answer Question

You are conducting a multiple linear regression with sales as the dependent variable. Price, quantity and rating score are the independent variables. In order to calculate the VIF for the variable quantity, you implement linear regression with quantity as the dependent variable and other variables as independent variables and obtain an R-squared of 0.5. What is the VIF for the variable quantity?

**NOTE:** Enter your answer in one decimal place.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

1.9 to 2.1

**Question Number : 229 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

You are conducting a multiple linear regression with sales as the dependent variable. Price, quantity and rating score are the independent variables. In the multiple linear regression, you find that the direct effect of price on sales is 0.3, the direct effect of quantity on sales is 0.2 and the direct effect of rating score on sales is 0.4. And, you also know that the effect of price on quantity is 0.2 and the effect of price on rating score is 0.1. What is the total effect of price on sales?

**NOTE:** Enter your answer in two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.40 to 0.44

**Question Number : 230 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

The price of an envelop was Rs. 3/ piece yesterday and Aditya bought 10 envelopes. Today, the price is Rs. 3.75/ piece and Aditya is willing to buy only 8 envelopes. What is the elasticity of Aditya's demand?

**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

**Possible Answers :**

0.8

**Question Number : 231 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

There are 7 business units and you are using the DEA to compare them. You solve the LP for business unit 5. You find from the constraint expression that the business unit 3 has obtained an efficiency of 0.9 and the business unit 7 has obtained an efficiency of 1 with the optimal weights of business unit 5. Which of the following statements are correct?

**Options :**

A. ✔ Business unit 3 may be inefficient

B. ✖ Business unit 3 will be efficient

C. ✖ Business unit 7 may be inefficient

D. ✔ Business unit 7 will be efficient

**Question Number : 232 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

The table below provides the summary statistic for a random variable. Then what distribution could be a good fit for this random variable? (select all that is/are applicable)

| Summary Statistic | Value |
|---|---|
| Number of observations | 300 |
| Mean | 12 |
| Median | 13 |
| Mode | 12 |
| Std. Deviation | 2 |
| Minimum | 11 |
| Maximum | 15 |
| Skewness | 0.01 |

**Options :**

A. ✖ Poisson distribution

B. ✖ Standard normal distribution

C. ✔ Uniform distribution

D. ✖ Exponential distribution

**Question Number : 233 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

A distribution is left tailed if (select all that is applicable)

**Options :**

A. ✖ Coefficient of variation is positive

B. ✖ Skewness is positive

C. ✔ Skewness is negative

D. ✖ Cannot say without the histogram

**Question Number : 234 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

There are 4 business units. Using the DEA, you solve the LP for all four business units and find the efficiencies for these units. The efficiency is denoted by E. For these units, E1 = 0.83, E2 = 1, E3 = 1, E4 = 0.91. Which of these units are efficient?

**Options :**

A. ✖ 1

B. ✔ 2

C. ✔ 3

D. ✖ 4

**Question Number : 235 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

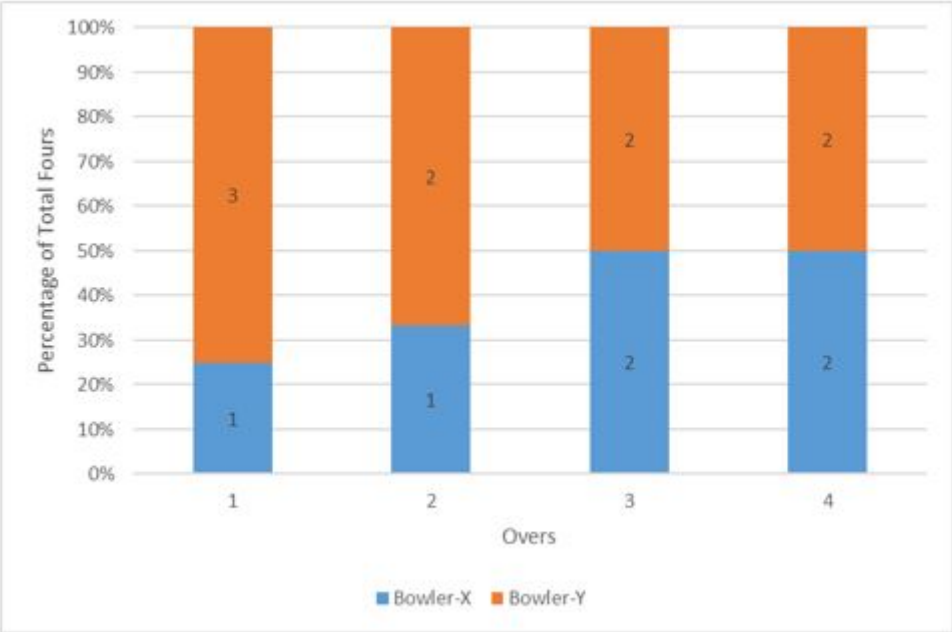
A cricket analyst is interested in comparing two bowlers (X and Y) based on the number of fours conceded by them in a match. Given that both bowlers have bowled their full quota of 4 overs in a 20 over match, which of the following graphs would be the best to identify that Bowler-X has performed better than Bowler-Y (choose all that is applicable)

**Options :**

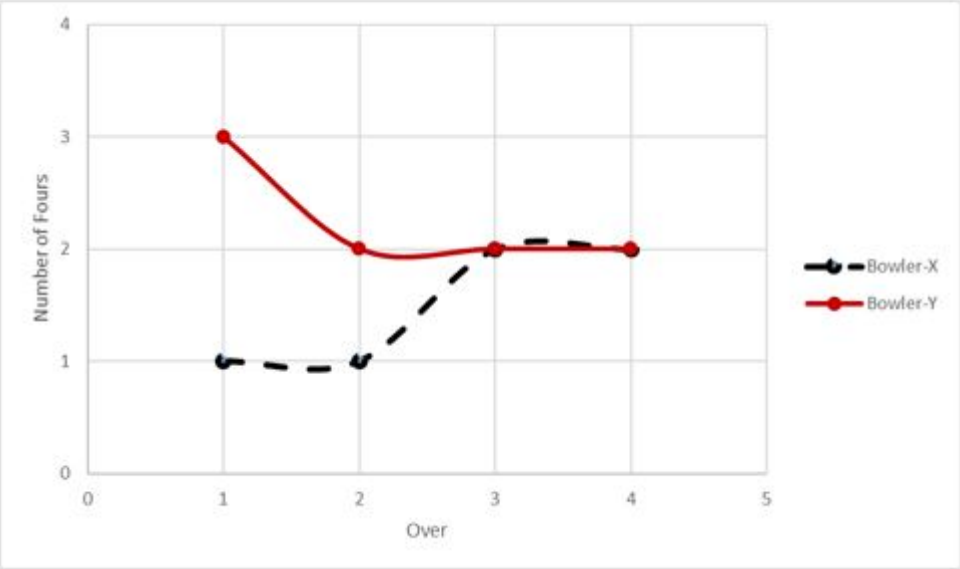
A. ✔

| Over | Bowler-X | Bowler-Y |
|---|---|---|
| 1 | 1 | 3 |
| 2 | 1 | 2 |
| 3 | 2 | 2 |
| 4 | 2 | 2 |
| Total | 6 | 9 |

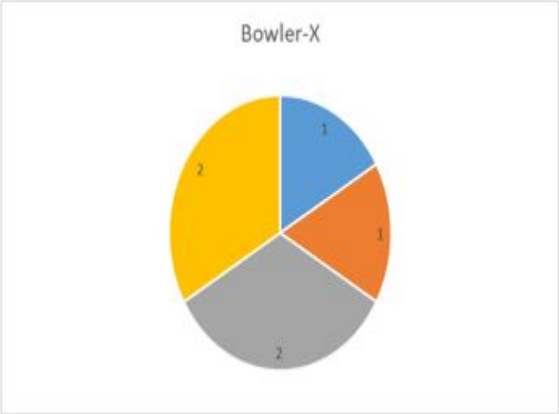
B. ✖

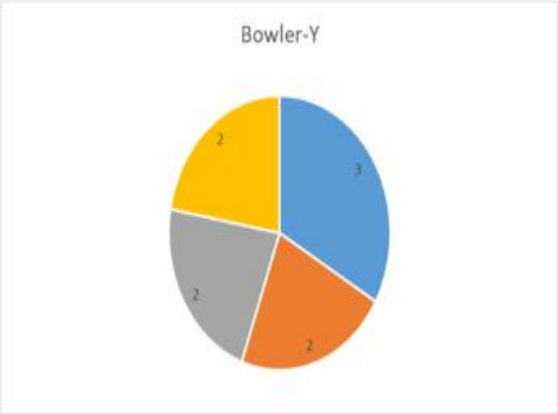



C. ✖




D. ✖




**Question Number : 236 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

You solve the primal of a linear program with maximization objective, three decision variables and two constraints of the less than or equal to type. Non-negativity restrictions apply to the decision variables. After solving the linear program, you find that the first constraint is not binding (lhs < rhs) and the second constraint is binding (lhs = rhs). Which of the following statements are correct?

**Options :**

A. ✖ There are three decision variables in the dual

B. ✖ The dual variable corresponding to the second constraint is zero

C. ✔ There are two decision variables in the dual

D. ✔ The dual variable corresponding to the second constraint is non-zero

**Question Number : 237 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

Which of the following is not a standard format used for collecting data in order to perform the conjoint analysis?

**Options :**

A. ✖ Ranking

B. ✖ Pairwise preferences

C. ✖ Rating

D. ✔ None of these

**Question Number : 238 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

Correctly interpret the terms from the regression equation below:

**Demand = 5843 - 158 × Price**

**Options :**

A. ✔ 5483 is the demand when price is zero

B. ✔ if the price is increased by 1 Rs, demand will reduce by 158 unit

C. ✖ 158 is the demand when price is zero

D. ✖ if the price is increased by 1 Rs, demand will reduce by 5843 units

**Question Number : 239 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

What is the purpose of doing a conjoint analysis?

**Options :**

A. ✖ To find the attribute values for an ideal product

B. ✖ To understand the importance of each attribute from the customer's point of view

C. ✔ To find the attribute values for an ideal product & To understand the importance of each attribute from the customer's point of view

D. ✖ None of these

**Question Number : 240 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

For 4 options (4 products) and 2 attributes conjoint problem, how many pairwise options will the customer have? Example: (1,2) says that option one is preferred over 2 & (1,3)

**Options :**

A. ✖ 4

B. ✖ 12

C. ✖ 8

D. ✔ 6

**Question Number : 241 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

In the pairwise comparison, which of the following is true:

**Options :**

A. ✖ We want to minimize the violation with regard to wrong preferences

B. ✖ Objective function is to maximize the goodness of fit

C. ✔ We want to minimize the violation with regard to wrong preferences & Objective function is to maximize the goodness of fit

D. ✖ We neither want to minimize the violation with regard to wrong preferences nor the Objective function is to maximize the goodness of fit

**Question Number : 242 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

What is the satiating price for a Constant-elasticity price response function?

**Options :**

A. ✖ Zero

B. ✔ Does not exist

C. ✖ Equal to the Market size ($D_0$)

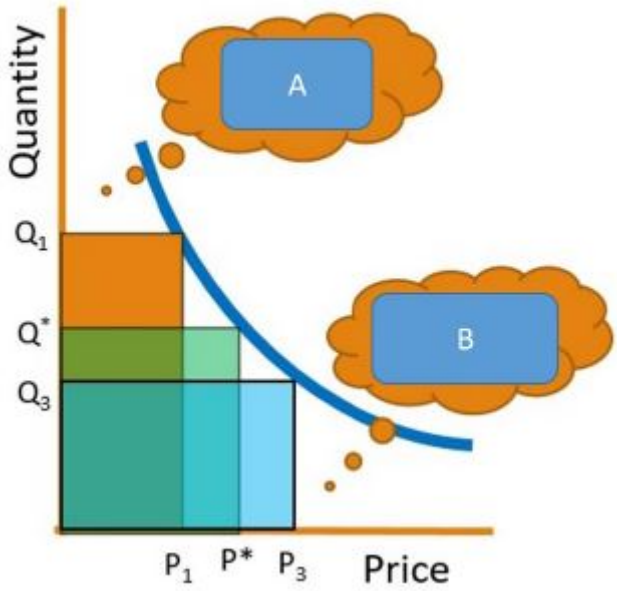
D. ✖ Can be anything

**Question Number : 243 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Correctly identify the description for the regions depicted as "A" and "B" in the picture below from the given options




**Options :**

A. ✔ A: Latent Demand, B: Consumer Surplus

B. ✖ B: Latent Demand, A: Consumer Surplus

C. ✖ A: Latent Demand, B: Seller Surplus

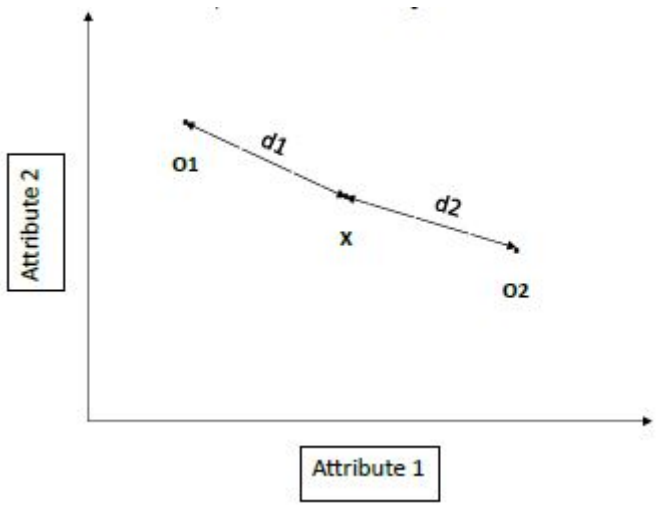
D. ✖ None of these

**Question Number : 244 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

A customer is trying to choose between two products O1 and O2. In the diagram below, points O1, O2 represent the coordinates of the two products on two attributes. “X” represents the coordinates of the ideal product. Which of the following are true?




**Options :**

A. ✔ Customers will prefer O1 when d2>d1

B. ✖ Customers will prefer O2 when d1<d2

C. ✖ Customers will prefer O1 when d2>d1 & Customers will prefer O2 when d1<d2

D. ✖ Customers will not prefer O1 when d2>d1 & Customers will not prefer O2 when d1<d2

**Question Number : 245 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

How do we capture the latent demand?

**Options :**

A. ✖ Increasing price

B. ✔ Reducing price

C. ✖ Both Increasing and Reducing price

D. ✖ None of these

**Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group**

**Comprehension Questions : No**

**Question Numbers : (246 to 249)**

Question Label : Comprehension

The daily sales of choco-chip ice-creams in an ice-cream parlour is assumed to follow a Normal distribution with a mean of 5 and a variance of 4. To check the assumption of normal distribution, the sales of choco-chip ice-creams at the ice-cream parlour for 7 days was collected (Table-1). On all 7 days, the total number of ice-creams (of all flavours) sold per day was 100. With this data, answer the given subquestions.

*{Note: Round all your calculations (intermediate and final) to one decimal place}*

| Day | The actual number of choco-chip ice-creams sold |
|---|---|
| Day-1 | 12 |
| Day-2 | 14 |
| Day-3 | 12 |
| Day-4 | 13 |
| Day-5 | 12 |
| Day-6 | 11 |
| Day-7 | 12 |

Table-1

**Sub questions**

**Question Number : 246 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

For the given data in Table-1. What is the expected number of choco-chip ice-creams that are sold on Day-2?

**Options :**

A. ✖ 5

B. ✖ 14

C. ✔ 12.3

D. ✖ 14.3

**Question Number : 247 Question Type : SA**

**Correct Marks : 5**

Question Label : Short Answer Question

What is the value for the Chi-Square Goodness of Fit Test statistic?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.3 to 0.5

**Question Number : 248 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

How many degrees of freedom does that Chi-Square Goodness of Fit Test statistic have?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Question Number : 249 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following is the **correct null hypothesis** for the Goodness of fit test for this problem (with data in Table-1)?

**Options :**

A. ✔ The distribution of sale of choco-chip ice-creams at the ice-cream parlour is normal

B. ✖ The distribution of sale of choco-chip ice-creams is normal

C. ✖ The distribution of choco-chip ice-creams at the ice-cream parlour is normal

D. ✖ The distribution of choco-chip ice-creams is normal

**Question Type : COMPREHENSION**

**Question Numbers : (250 to 252)**

Question Label : Comprehension

The health parameters of 100 patients are used to develop a logistic model that predicts if a given patient has CORONA (Y=1) or not (Y=0). It is seen that the model correctly predicts the presence of CORONA in 23 patients and correctly predicted the absence of CORONA in 11 patients. The threshold set to obtain these results was 0.6, and the variable of focus was to identify the patients with CORONA (Y=1). Then answer the given subquestions

**Sub questions**

**Question Number : 250 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

What is the accuracy (in percentage) of predicting CORONA patients correctly? (round to two decimal places)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

16.90 to 17.01

**Question Number : 251 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

The number of data points that contribute to the “Type-1 Error” of the model is _____

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

77

**Question Number : 252 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

With what precision (in percentage) are patients without CORONA identified by the model? (round to two decimal places)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

12.5 to 13.5

**Question Type : COMPREHENSION**

**Question Numbers : (253 to 256)**

Question Label : Comprehension

Given the below regression output, calculate the cell values highlighted in yellow:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SUMMARY OUTPUT | | | | | | | | |
| | | | | | | | | |
| Regression Statistics | | | | | | | | |
| Multiple R | 0.856678246 | | | | | | | |
| R Square | 0.733897617 | | | | | | | |
| Adjusted R Square | 0.724721673 | | | | | | | |
| Standard Error | 1290.448208 | | | 79.98060985 | | | | |
| Observations | 31 | | | | | | | |
| | | | | | | | | |
| ANOVA | | | | | | | | |
| | df | SS | MS | F | Significance F | | | |
| Regression | 1 | 133188236.7 | 133188236.7 | Q3 | 7.80618E-10 | | | |
| Residual | Q1 | 48292440.76 | Q2 | | | | | |
| Total | 30 | 181480677.4 | | | | | | |
| | | | | | | | | |
| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Lower 95.0% | Upper 95.0% |
| Intercept | 5842.836198 | 400.6837789 | 14.58216306 | 6.94552E-15 | 5023.345856 | 6662.326539 | 5023.345856 | 6662.326539 |
| Price | -157.7008739 | 17.63363083 | -8.943187902 | 7.80618E-10 | -193.7656983 | -121.6360494 | -193.7656983 | -121.6360494 |

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 253 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

What is the value of **Q1**?

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

29

**Question Number : 254 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

What is the value of **Q2**?

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

1665255 to 1665257

**Question Number : 255 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

What is the value of **Q3**?

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

77 to 82

**Question Number : 256 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What is the conclusion from the given result?

**Options :**

A. ✖ Accept the Null Hypothesis

B. ✔ Reject the Null Hypothesis

C. ✖ P-value cannot be found

D. ✖ Cannot say insufficient data

# DBMS

| | |
|---|---|
| **Number of Questions :** | 26 |
| **Section Marks :** | 50 |

**Question Number : 257 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL: DATABASE MANAGEMENT SYSTEMS"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 258 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Consider a relation $R(W, X, Y, Z)$ that holds the following functional dependencies:

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

Which among the Armstrong's axioms is/are applied to $\mathcal{F}$, in order to obtain the following functional dependency?

$$WZ \rightarrow YZ$$

**Options :**

A. ✖ Reflexivity

B. ✖ Reflexivity and Augmentation

C. ✔ Augmentation and Transitivity

D. ✖ Union and Reflexivity

**Question Number : 259 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Consider a transaction in which ₹200 is transferred from account P to account Q.

Which among the following ACID properties ensure that the sum of the amounts in account P and account Q will be the same before and after the transaction?

**Options :**

A. ✖ Atomicity

B. ✔ Consistency

C. ✖ Isolation

D. ✖ Durability

**Question Number : 260 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following statement(s) is/are correct regarding the third normal form in normalization?

1. Non-prime attributes are not allowed to functionally determine non-prime attributes.
2. The proper subset of any candidate key functionally determines non-prime attributes.
3. Multivalued attributes are allowed in third normal form.
4. Proper subset of any candidate key is not allowed to functionally determine the non-prime attributes.

**Options :**

A. ✖ Statements 1,2 & 3 are correct.

B. ✖ Statements 3 & 4 are correct.

C. ✔ Statements 1 & 4 are correct.

D. ✖ All the statements are correct.

**Question Number : 261 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which among the following layers provides a user interface to translate tasks and results to something that the user can understand?

**Options :**

A. ✔ Presentation Layer

B. ✖ Data Layer

C. ✖ Logic Layer

D. ✖ Business Logic Layer

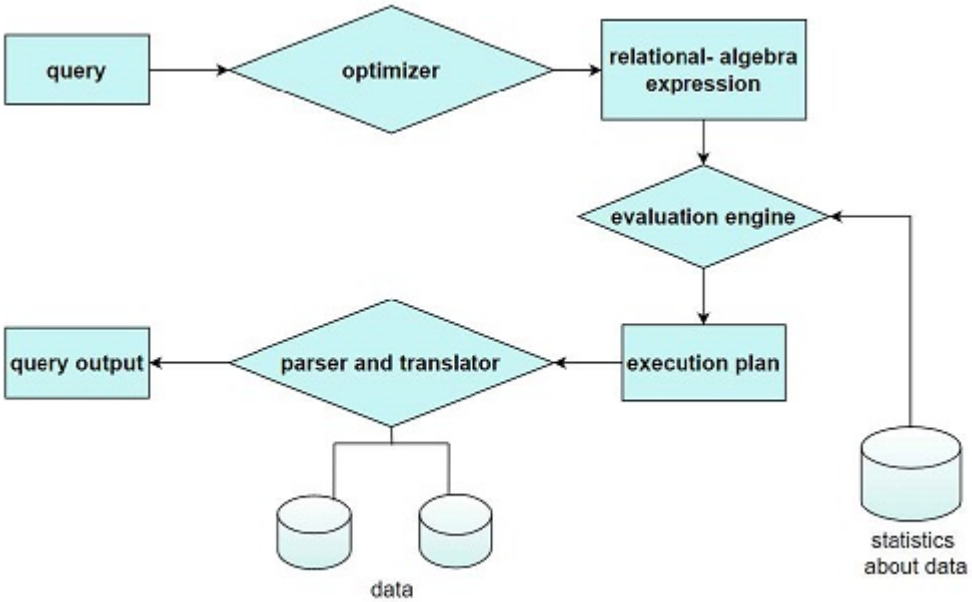
**Question Number : 262 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

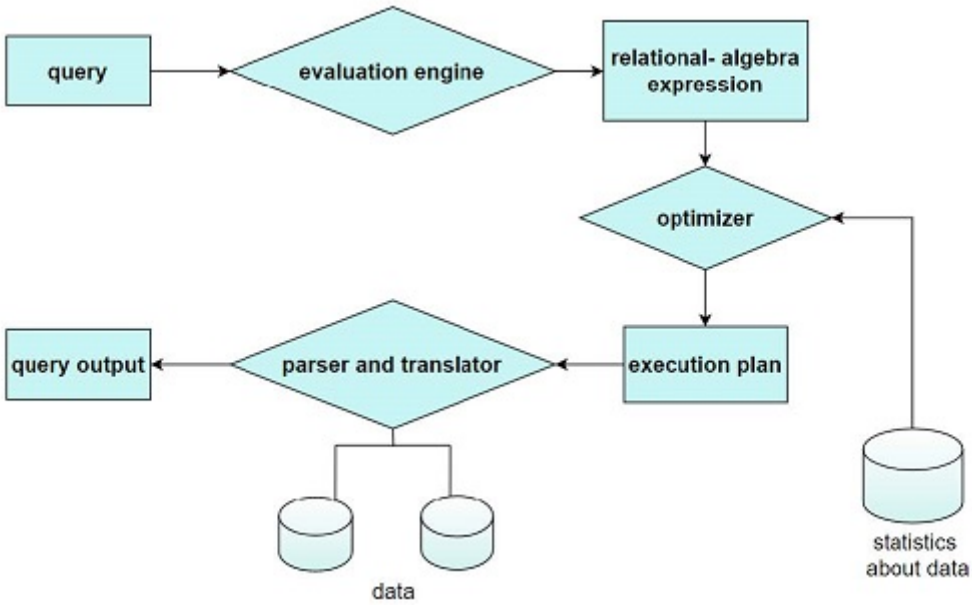
Choose the option that depicts the correct order of steps in Query Processing.

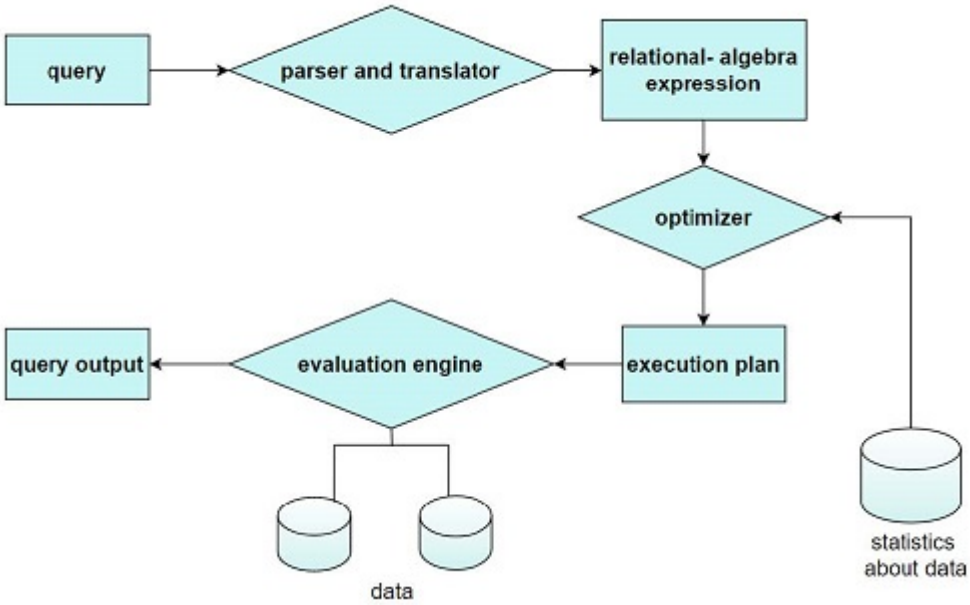
**Options :**




A. ✖

B. ✖




C. ✔

D. ✖ None of these.

**Question Number : 263 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Consider a RAID-0 and a RAID-1 system, both having 12 data disks in total. What is the storage efficiency (or effective space utilization) for these two systems?

**Options :**

A. ✖ RAID-0 = 50% and RAID-1 = 100%

B. ✖ RAID-0 = 100% and RAID-1 = 91.67%

C. ✖ RAID-0 = 91.67% and RAID-1 = 50%

D. ✔ RAID-0 = 100% and RAID-1 = 50%

**Question Number : 264 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider table **emp_info** shown in Table 1.

| id | name | salary |
|---|---|---|
| E001 | Oliver | 45000 |
| E002 | Jack | 70000 |
| E003 | Harry | 65000 |
| E004 | Thomas | 55000 |
| E005 | Jacob | 30000 |
| E006 | Tommy | 60000 |
| E007 | Joseph | 35000 |

Table 1: emp_info

What will the output of the following query be?

```
SELECT id
FROM emp_info AS a
WHERE( SELECT COUNT(*)
       FROM emp_info b
       WHERE b.salary>a.salary)<2
```

**Options :**

A. ✔

| id |
|---|
| E002 |
| E003 |

B. ✖

| id |
| --- |
| E005 |
| E007 |

C. ✖

| id |
| --- |
| E007 |

D. ✖

| id |
| --- |
| E003 |

**Question Number : 265 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

In a college database named **student**, there exists a table named **marks**, the content of which is shown in Table 2:

| Student_id | Name | Mathematics | Science |
| --- | --- | --- | --- |
| 1 | Sheena | 40 | 50 |
| 2 | John | 60 | 43 |
| 3 | Jack | 66 | 66 |
| 4 | Danny | 70 | 80 |

Table 2: **marks**

Based on the table, what will the output of the below given Python code be?

```
# Import library
import psycopg2

# Define function
def connectDb(dbname, username, pwd, address, portnum):
    try:
        connection = psycopg2.connect(database = dbname,
                                      user = username,
                                      password = pwd,
                                      host = address,
                                      port = portnum)
        cursor = connection.cursor()
        query = "select * from marks;"
        cursor.execute(query)
        result = cursor.fetchmany(2)
        print(cursor.rowcount)
        cursor.close()

    except (Exception, psycopg2.DatabaseError) as error:
        print(error)
    finally:
        connection.close()
#function call
connectDb("student", "postgres", "root", "127.0.0.1", "5432")
```

**Options :**

A. ✖ 1

B. ✖ 2

C. ✖ 3

D. ✔ 4

**Question Number : 266 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

A telecom company has $2^{16}$ customer records in a table **T** in their database. These records are sorted in ascending order of the attribute *customer_id*, which is also the primary key of **T**. The data file is stored in a disk with a block size of 512 bytes. Assume that, in each block, the records are unspanned and are of fixed-length. Each record is of size 32 bytes, the size of the primary key field is 10 bytes and the size of the block pointer is 6 bytes.

If a primary (sparse index with an index entry for every block in the file) index is created on the data file, what is the minimum number of blocks required for the index file?

**Options :**

A. ✖ 64

B. ✔ 128

C. ✖ 256

D. ✖ 512

**Question Number : 267 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the relational schema as shown in Figure 1.

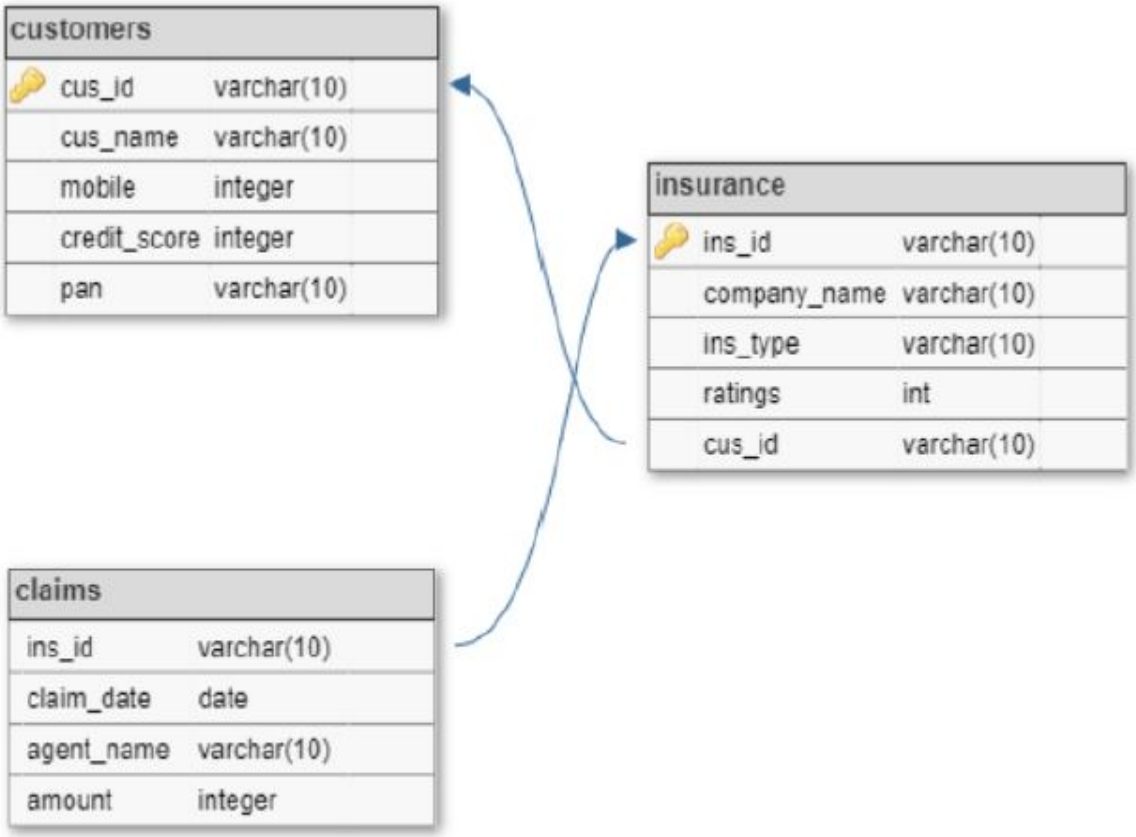



Figure 1: Insurance Policy

What does the following query return?

```
SELECT cus_name FROM customers WHERE cus_id IN
(SELECT cus_id FROM insurance WHERE ins_id IN
((SELECT ins_id FROM insurance WHERE ins_type = 'Health'
EXCEPT
( SELECT ins_id FROM claims )))
```

**Options :**

A. ✔ The names of customers who have taken at least one insurance policy of type 'Health', but have not claimed any policy.

B. ✖ The names of customers who have taken any 'Health' insurance policy.

C. ✖ The names of customers who have claimed any type of insurance policy.

D. ✖ None of these.

**Question Number : 268 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the relation R shown in Figure 4.

| A | B | C | D |
|---|---|---|---|
| 2 | 3 | 4 | x |
| 2 | 3 | 6 | 7 |
| 2 | y | 6 | 5 |
| 2 | y | 4 | 7 |

Figure 4: Relation R

Choose the correct value of x and y such that $C \rightarrow B$ and $AB \rightarrow\rightarrow D$ hold true.

**Options :**

A. ✖ x = 7 and y = 3

B. ✔ x = 5 and y = 3

C. ✖ x = 3 and y = 6

D. ✖ x = 5 and y = 4

**Question Number : 269 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider a disk with 5 double-sided platters, 100 tracks/surface, 32 sectors/track, 60 bytes/sector. Find the capacity of each surface, and the number of cylinders that the disk has.

**Options :**

A. ✖ Capacity of surface = 960 KB, Number of cylinders = 100.

B. ✖ Capacity of surface = 1920 KB, Number of cylinders = 500.

C. ✔ Capacity of surface = 187.5 KB, Number of cylinders = 100.

D. ✖ Capacity of surface = 1920 KB, Number of cylinders = 60.

**Question Number : 270 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the correct ER Diagram based on the given information.

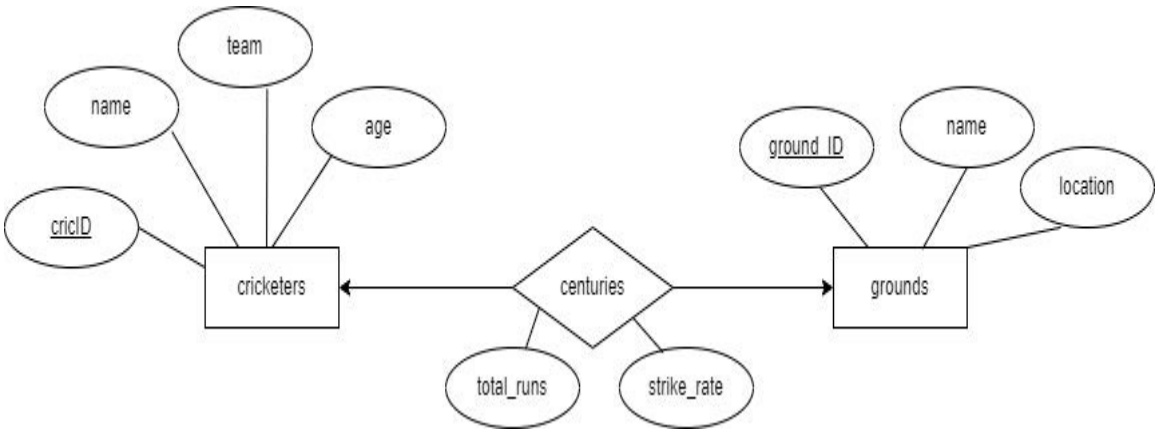
• Cricketers are identified by cricID. For each cricketer, name, team and age are recorded.

• Cricket grounds are identified by ground_ID. For each ground, name and location are recorded.

• For each century scored, total runs and strike rate are recorded.

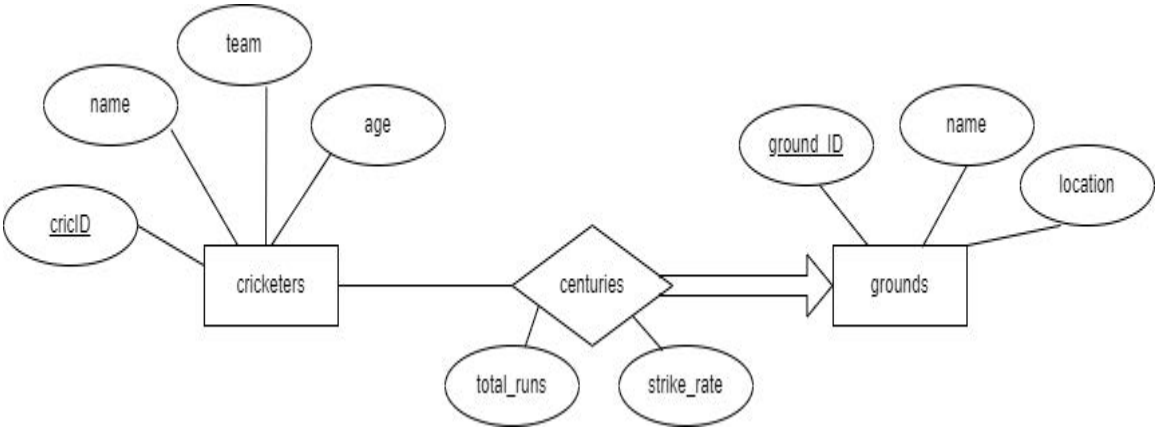
• Assume that cricketers played the matches on several grounds and scored centuries.

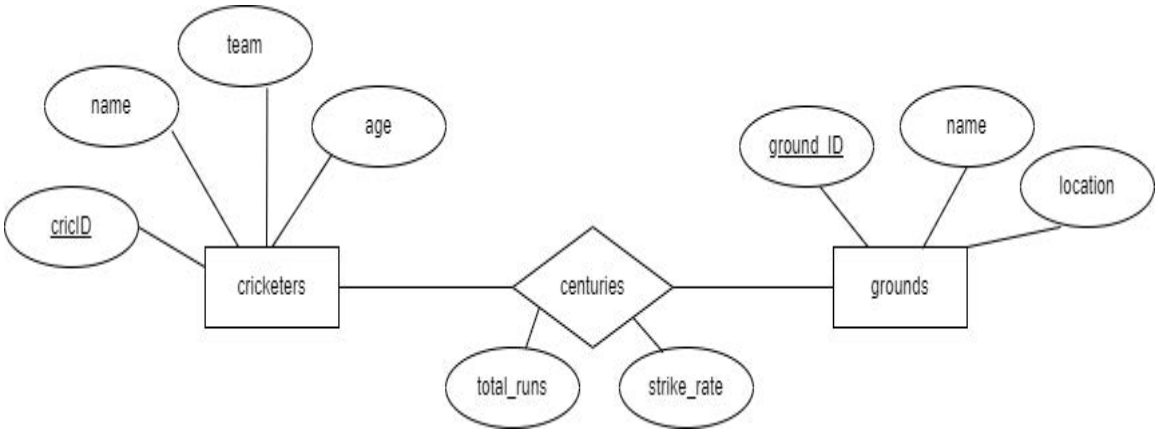
**Options :**



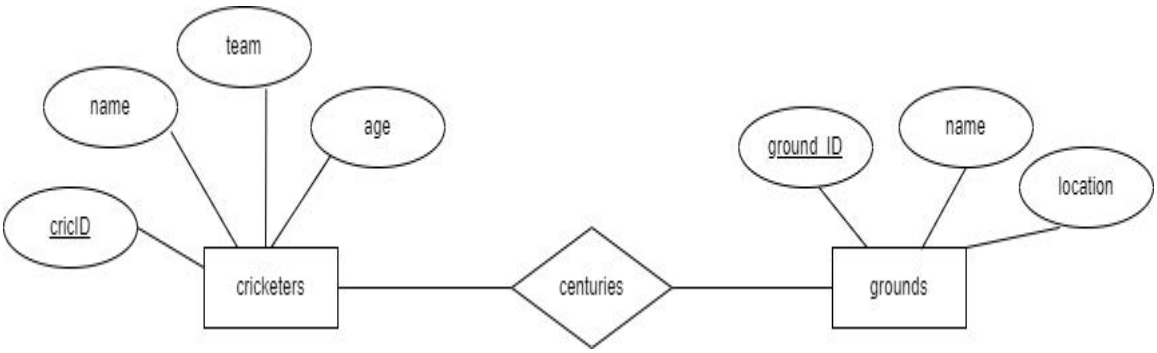

A. ✖

B. ✖




C. ✔




D. ✖

**Question Number : 271 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the relational schema **R**(*A*,*B*,*C*,*D*,*E*) and the set of functional dependencies

$$\mathcal{F} = \{$$
$$A \rightarrow B,$$
$$AB \rightarrow C,$$
$$D \rightarrow AC,$$
$$DE \rightarrow AB$$
$$\}$$

Which of the following functional dependency sets is equivalent to the given set of functional dependencies?

**Options :**

A. ✖ $\mathcal{F} = \{A \rightarrow C, D \rightarrow A, E \rightarrow B\}$

B. ✖ $\mathcal{F} = \{A \rightarrow C, D \rightarrow A, D \rightarrow B\}$

C. ✖ $\mathcal{F} = \{A \rightarrow B, A \rightarrow C, D \rightarrow B, DE \rightarrow B\}$

D. ✔ $\mathcal{F} = \{A \rightarrow B, A \rightarrow C, D \rightarrow A, DE \rightarrow B\}$

**Question Number : 272 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Insert the following key values 10, 14, 11, 16, 17, 7, 12, 13, 15, 9, 8, in the given order, into an empty 2 - 3 - 4 tree. Which key value(s) is(are) on the root node of the 2 - 3 - 4 tree?

(Note: Using early splitting strategy)

**Options :**

A. ✖ 9,11

B. ✖ 9,11,13

C. ✖ 8

D. ✔ 13

**Question Number : 273 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following two schedules **S1** and **S2** and three transactions $T_1$, $T_2$, $T_3$:

$$\mathbf{S1}: R_1(X);\ R_3(Y);\ W_1(X);\ R_2(X);\ W_3(Y);\ W_2(X);\ R_1(Y);\ W_1(Y);$$
$$\mathbf{S2}: R_3(Y);\ R_1(X);\ W_1(X);\ R_2(X);\ W_3(Y);\ R_1(Y);\ W_1(Y);\ W_2(X);$$

Where $R_i(X)$ denotes a read operation by transaction $T_i$ on a data item X, $W_i(X)$ denotes a write operation by transaction $T_i$ on a data item X, $C_i$ denotes a commit by $T_i$, and $A_i$ denotes an abort by $T_i$.

Consider the following statements:

1. **S1** and **S2** are not conflict equivalent.
2. **S1** and **S2** are conflict equivalent.
3. **S1** and **S2** are view equivalent.
4. **S1** and **S2** are not view equivalent.

Which among the following statements is/are correct?

**Options :**

A. ✖ Statements 1 and 4 are correct.

B. ✖ Statements 1 and 3 are correct.

C. ✔ Statements 2 and 3 are correct.

D. ✖ Statements 2 and 4 are correct.

**Question Number : 274 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the relational schema $R(P, Q, S, T)$ and the set of functional dependencies $\mathcal{F} = \{PQ \rightarrow T, SQ \rightarrow T, P \rightarrow Q, S \rightarrow Q, T \rightarrow S\}$.

Identify the correct statement about R.

**Options :**

A. ✔ **R** is in 2NF, but not in 3NF.

B. ✖ **R** is in 3NF, but not in BCNF.

C. ✖ **R** is in 1NF, but not in 2NF.

D. ✖ **R** is in BCNF.

**Question Number : 275 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following statements and assume that you have to back up some files from Monday to Thursday.

- **Monday**: You have 100 files and perform a full backup. 100 files were backed up.
- **Tuesday**: You have made no changes. No files are backed up.
- **Wednesday**: You have added 100 new files, and 200 files are backed up.
- **Thursday**: You have made no changes, and 200 files are backed up.

Which among the following types of backups take place on Wednesday and Thursday?

**Options :**

A. ✖ **Wednesday** : Differential Backup, **Thursday** : Incremental Backup.

B. ✖ **Wednesday** : Full Backup, **Thursday** : Incremental Backup.

C. ✖ **Wednesday** : Incremental Backup, **Thursday** : Differential Backup.

D. ✔ **Wednesday** : Full Backup, **Thursday** : Full Backup.

**Question Number : 276 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the information provided about relations **employee** and **project** in Table 3.

| Relation | Number of records | Number of blocks |
|---|---|---|
| employee | 2,000 | 200 |
| project | 6,000 | 600 |

Table 3: Information about relations employee and project

Consider worst-case memory availability and assume **project** as the outer relation.

Let **A** be the number of block transfers for **nested-loop join** of **employee** and **project**, and **B** be the number of block transfers for **block nested-loop join** of **employee** and **project**.

Choose the correct values of **A** and **B**.

**Options :**

A. ✖ A: 120,600 & B: 1,200,600

B. ✖ A: 1,200,200 & B: 120,200

C. ✖ A: 120,200 & B: 1,200,200

D. ✔ A: 1,200,600 & B: 120,600

**Question Number : 277 Question Type : MSQ**

**Correct Marks : 1**

Question Label : Multiple Select Question

Consider the relations shown in Figure 2.

| MUMBAI_INDIANS | |
|---|---|
| Player_Name | Jersey_No |
| RS | 45 |
| SKY | 63 |
| JB | 93 |
| IK | 32 |
| RC | 28 |
| HP | 33 |
| KP | 24 |

| TEAM_INDIA | |
|---|---|
| Player_Name | Jersey_No |
| VK | 18 |
| KLR | 1 |
| SKY | 63 |
| SI | 41 |
| HP | 33 |
| JB | 93 |
| RC | 28 |

Figure 2: Relations MUMBAI_INDIANS and TEAM_INDIA

Choose the correct expression(s) that return(s) the output shown in Figure 3.

| Jersey_ No |
|---|
| 45 |
| 32 |
| 24 |

Figure 3: Output

**Options :**

A. ✔ $\Pi_{Jersey_No}(MUMBAI_INDIANS) - \Pi_{Jersey_No}(TEAM_INDIA)$

B. ✖ $\Pi_{Jersey_No}(TEAM_INDIA) - \Pi_{Jersey_No}(MUMBAI_INDIANS)$

C. ✖ $\Pi_{Jersey_No}(TEAM_INDIA - MUMBAI_INDIANS)$

D. ✔ $\Pi_{Jersey_No}(MUMBAI_INDIANS - TEAM_INDIA)$

**Question Number : 278 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Consider the following relations:

mobile($\underline{imei}$, $company_id$, $ram$, $price$)
manufacturer($\underline{company_id}$, $name$, $location$)

Choose the correct relational algebra query/queries to find the names of companies that manufacture mobile phones having 8 GB RAM and are located in INDIA.

**Options :**

A. ✖ $\Pi_{name}(mobile \bowtie manufacturer) \wedge \sigma_{ram=8 \wedge location='INDIA'}(mobile)$

B. ✔ $\Pi_{name}(\sigma_{ram=8}(mobile) \bowtie (\sigma_{location='INDIA'}(manufacturer)))$

C. ✖ $\Pi_{name}(\sigma_{ram=8 \wedge location='INDIA'}(mobile \times manufacturer))$

D. ✔ $\Pi_{name}(\sigma_{ram=8 \wedge location='INDIA'}(mobile \bowtie manufacturer))$

**Question Number : 279 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Consider a state of transactions as shown in Figure 5.

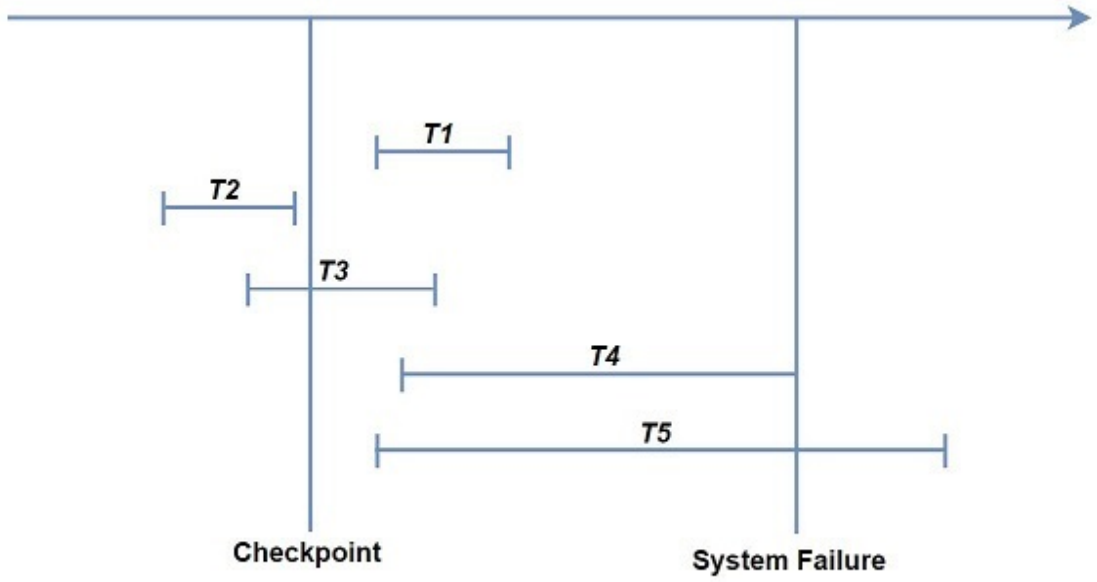



Figure 5: State of Transactions

Which of the following statement(s) is/are correct according to the given figure?

**Options :**

A. ✔ T2 can be ignored and T3 needs to be redone.

B. ✖ T4 needs to be undone and T5 needs to be redone.

C. ✔ T1 needs to be redone and T4 can be undone.

D. ✖ T3 needs to be undone and T4 needs to be redone.

**Question Number : 280 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

Construct a BST for the following sequence:

41,69,30,36,79,32,53,91,72,38,27. Find the number of leaf nodes in the resultant BST.

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

6

**Question Number : 281 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Consider the following relations.

order($\underline{o_id}$, $\underline{c_id}$, *amount*)
customer($\underline{c_id}$, *c_name*, *address*, *mail_id*)

In table **order**, (*o_id*, *c_id*) is the primary key, *c_id* is the foreign key referencing *c_id* in table **customer**.

Table **order** contains 68 tuples and table **customer** contains 96 tuples.
What is the maximum number of tuples possible in the natural join **customer** $\bowtie$ **order**?

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

68

**Question Number : 282 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Consider a $B^+$ tree of order 3, having 4 levels. What is the maximum number of block pointers at

level 2?

Note : Consider that the root node is at level 0.

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

27

# Java

**Number of Questions :** 23

**Section Marks :** 100

**Question Number : 283 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL: JAVA "

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 284 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.io.*;
import java.util.*;

public class FClass{
    static boolean writeToFile(String filename) {
        try {
            FileOutputStream fos = new FileOutputStream(filename);
            PrintStream bos = new PrintStream(fos);
            bos.println("2 numbers are");
            bos.println("3.14 and");
            bos.println("10");
            return true;
        }catch(IOException e) {
            return false;
        }
    }
    static boolean readFromFile(String filename) {
        try {
            FileInputStream fis = new FileInputStream(filename);
            Scanner sc = new Scanner(fis);
            System.out.println(sc.nextInt());
            System.out.println(sc.nextLine());
            System.out.println(sc.nextDouble());
            System.out.println(sc.nextLine());
            return true;
        }catch(IOException e) {
            return false;
        }
    }
    public static void main(String[] args) throws IOException{
        if(writeToFile("E:\\myfile.txt") == false)
            System.out.println("write failed");
        if(readFromFile("E:\\myfile.txt") == false)
            System.out.println("read failed");
    }
}
```

Suppose the file `E:\\myfile.txt` is written successfully by the program. What will the output be?

**Options :**

A. ✖ `read failed`

B. ✔
```
2
 numbers are
3.14
 and
```

C. ✖
```
2
2 numbers are
3.14
3.14 and
```

D. ✖
```
2
2 numbers are
3.14
and 10
```

**Question Number : 285 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

The Java code given below produces a checkbox. The initial color of panel `pnlColor` is blue. If the checkbox is selected, the color of panel `pnlColor` should become red. Again, if the checkbox is deselected, the color of panel `pnlColor` should become blue.

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
public class FClass extends JFrame implements ActionListener{
    JCheckBox cbColor;
    JPanel pnlColor, pnlBtn;
    public FClass(){
        setSize(200, 200);
        cbColor = new JCheckBox("Red Panel");
        cbColor.addActionListener(this);
        pnlColor = new JPanel();
        pnlBtn = new JPanel();
        pnlBtn.add(cbColor);
        add(pnlBtn, "South");
        add(pnlColor, "Center");
        pnlColor.setBackground(Color.blue);
        setVisible(true);
    }
    public void actionPerformed(ActionEvent e) {
        /*--------------------*/
        /*****CODE SEGMENT*****/
        /*--------------------*/
    }
    public static void main(String[] args){
        new FClass();
    }
}
```

Choose the correct code segment inside method `actionPerformed()` such that the execution of the code results in the expected behaviour.

**Options :**

A. ✖
```
JCheckBox cb = (JCheckBox)e.getSource();
if(cb.isSelected() == true)
    pnlColor.setBackground(Color.red);
```

B. ✔
```
JCheckBox cb = (JCheckBox)e.getSource();
if(cb.isSelected() == true)
    pnlColor.setBackground(Color.red);
else
    pnlColor.setBackground(Color.blue);
```

```
JCheckBox cb = (JCheckBox)e.getActionCommand();
if(cb.isSelected() == true)
    pnlColor.setBackground(Color.red);
else
    pnlColor.setBackground(Color.blue);
```

C. ✖

```
JCheckBox cb = (JCheckBox)e.getActionCommand();
if(cb.isSelected() == true)
    pnlColor.setBackground(Color.red);
```

D. ✖

**Question Number : 286 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class Employee{
    String name;
    int salary;
    public Employee(String n, int s){
        name = n;
        salary = s;
    }
    public Employee(Employee e){
        this.name = e.name;
        this.salary = e.salary;
    }
    public double bonus(){
        return salary * 0.1;
    }
}
public class Test {
    public static void main(String[] args) {
        Employee e1 = new Employee("raju",12000);
        var e2 = new Employee(e1);
        e2.salary = 10000;
        System.out.println(e1.bonus());
        System.out.println(e2.bonus());
    }
}
```

Choose the correct option.

**Options :**

A. ✖ It generates the output:
1200.0
1200.0

B. ✔ It generates the output:
1200.0
1000.0

C. ✖ It generates the output:
1000.0
1000.0

D. ✖ It produces compilation error due to illegal reference to `var`

**Question Number : 287 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class Vegetable{
    public void hasSeeds(){
        System.out.println("Not sure if it has seeds.");
    }
    public void eatenRaw(){
        System.out.println("Not sure if it can be eaten raw.");
    }
}
class LadiesFinger extends Vegetable{
    public void hasSeeds(){
        System.out.println("It has seeds.");
    }
    public void eatenRaw(){
        System.out.println("It cannot be eaten raw.");
    }
}
class Cabbage extends Vegetable{
    public void hasSeeds(){
        System.out.println("It has no visible seeds.");
    }
}
public class VClass{
    static void property(Vegetable s){
        s.hasSeeds();
        s.eatenRaw();
    }
    public static void main(String[] args){
        Vegetable lf = new LadiesFinger();
        Vegetable cb = new Cabbage();
        property(lf);
        property(cb);
    }
}
```

What will the output be?

**Options :**

A. ✖
```
It has seeds.
Not sure if it can be eaten raw.
It has no visible seeds.
It cannot be eaten raw.
```

B. ✖
```
It has seeds.
It cannot be eaten raw.
It has no visible seeds.
It cannot be eaten raw.
```

C. ✖
```
It has seeds.
Not sure if it can be eaten raw.
It has no visible seeds.
Not sure if it can be eaten raw.
```

D. ✔
```
It has seeds.
It cannot be eaten raw.
It has no visible seeds.
Not sure if it can be eaten raw.
```

**Question Number : 288 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.util.*;
import java.util.stream.Stream;
public class Test {
    public static void main(String[] args) {
        var results = new ArrayList<Double>();
        results.add(15.8);
        results.add(20.2);
        results.add(22.9);
        results.add(30.5);
        Stream<Double> s = results.stream();
        Optional<Double> value = s.filter(n -> n > 20).min(Double::compareTo);
        value.ifPresentOrElse(v -> System.out.println(v),
                    () -> System.out.println("No value found"));
    }
}
```

Choose the correct option

**Options :**

A. ✖ It generates the output:
No value found

B. ✖ It generates the output:
15.8

C. ✔ It generates the output:
20.2

D. ✖ It generates the output:
22.9

**Question Number : 289 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.util.*;
class Flowers{
    ArrayList<String> opList = new ArrayList<String>();
    public void iterateFlowers(ArrayList<String> ipList) {
        Iterator<String> it = ipList.iterator();
        while(it.hasNext()) {
            String element = it.next();
            if(opList.contains(element))
                it.remove();
            else
                opList.add(element);
        }
        System.out.println(opList);
        System.out.println(ipList);
    }
}
public class TestIterator {
    public static void main(String[] args) {
        ArrayList<String> fList = new ArrayList<String>();
        fList.add("Hibiscus");
        fList.add("Pansy");
        fList.add("Pansy");
        fList.add("Lotus");
        fList.add("Frangipani");
        fList.add("Lotus");
        Flowers obj = new Flowers();
        obj.iterateFlowers(fList);
    }
}
```

What will the output be?

**Options :**

A. ✖
```
[Hibiscus, Pansy, Lotus, Frangipani]
[Hibiscus, Pansy, Pansy, Lotus, Frangipani, Lotus]
```

B. ✖
```
[Hibiscus, Pansy, Pansy, Lotus, Frangipani, Lotus]
[Hibiscus, Pansy, Lotus, Frangipani]
```

C. ✔
```
[Hibiscus, Pansy, Lotus, Frangipani]
[Hibiscus, Pansy, Lotus, Frangipani]
```

D. ✖ [Hibiscus, Pansy, Lotus, Frangipani]
[]

**Question Number : 290 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the code given below.

```
import java.io.*;
class Ebanking implements Serializable{
    int userId;
    transient String password;
    Ebanking(int uid,String p){
       userId = uid;
       password = p;
    }
    private void writeObject(ObjectOutputStream oos) throws Exception{
        oos.defaultWriteObject();
        String encrypt = password;
        oos.writeObject(encrypt);
    }
    private void readObject(ObjectInputStream ois) throws Exception{
        ois.defaultReadObject();
        String decrypt = (String)ois.readObject();
        password = decrypt.toUpperCase();
    }
}
public class Test{
    static void login(Ebanking eb){
        System.out.println("ID: "+eb.userId+"\nPassword: "+eb.password);
    }
    public static void main(String[] args) throws Exception{
        Ebanking user1 = new Ebanking(1,"Hello");
        FileOutputStream fos = new FileOutputStream("File.ser");
        ObjectOutputStream oos = new ObjectOutputStream(fos);
        oos.writeObject(user1);
        FileInputStream fis = new FileInputStream("File.ser");
        ObjectInputStream ois = new ObjectInputStream(fis);
        Ebanking eb = (Ebanking)ois.readObject();
        Test.login(eb);
    }
}
```

Choose the correct option.

**Options :**

A. This program generates output:
ID: 1
Password: null

B. This program generates output:
ID: 1
Password: NULL

C. ✖ This program generates NullPointerException.

D. ✔ This program generates output:
ID: 1
Password: HELLO

**Question Number : 291 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

Consider the following two .java files.

```
//DataUtility.java
package cliutility;
public class DataUtility{
    private int iData;
    double dData;
    protected float fData;
    public String sData;
    public DataUtility(){}
    //some methods
}
//MyData.java
import cliutility.DataUtility;
class CliDataUtility extends DataUtility{
    public int op1(){ return iData; }       //LINE 1
    public double op2(){ return dData; }    //LINE 2
    public float op3(){ return fData; }     //LINE 3
    public String op4(){ return sData; }    //LINE 4
}
public class MyData{
    public static void main(String[] args){
        CliDataUtility cd = new CliDataUtility();
        //some code
    }
}
```

Among the following lines, which generate(s) compiler error(s)?

**Options :**

A. ✔ LINE 1

B. ✔ LINE 2

C. ✖ LINE 3

D. ✖ LINE 4

**Question Number : 292 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

Consider the following code.

```
import java.util.*;
import java.util.concurrent.*;
public class Test extends Thread{
    static Map<Integer, Integer> mp = new LinkedHashMap();

    public void run(){
        Integer[] prime_no = {3, 5, 7, 11, 13, 17, 19, 23};
        for(int i = 0; i < prime_no.length; i++){
            mp.put((i+2), prime_no[i]);
        }
    }
    public static void main(String[] args) throws InterruptedException{
        mp.put(1, 2);
        Test t = new Test();
        t.start();
        for (Object o : mp.entrySet()){
            System.out.println(o);
            Thread.sleep(20);
        }
    }
}
```

Which of the following is/are true about the given code?

**Options :**

A. ✔ This code may generate `ConcurrentModificationException`

B. ✔ This code may generate the output
1=2
2=3

C. ✖ This code may generate the output
2=3
3=5
4=7
1=2

D. ✖ Assuming that no exception occurred during execution, this code may still generate blank output.

**Question Number : 293 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

A captcha is a strong captcha if it a combination of upper case and lower case alphabets, numbers and special characters. Consider the Java code given below that generates 10 captcha randomly. If the generated captcha is a strong captcha, then it adds it to a list. Else, it converts it to a strong captcha (symbolically, here it is converted to lower case), and then adds it to the list.

Method Signature:
`static <T> Stream<T> concat(Stream<? extends T> a, Stream<? extends T> b)`:
Creates a concatenated stream whose elements are all the elements of Stream a followed by all the elements of Stream b.

```
class Producer{
    public String produceCpt() {
        //Generate and return a random captcha
    }
}
public class CptGen {
    static boolean isStrong(String capt) {
        //return true if and only if capt is a strong captcha
    }
    public static void main(String[] args) {
        Producer p = new Producer();
        List<String> cptList = new ArrayList<String>();
        List<String> strCpt = new ArrayList<String>();

        for (int i=0;i<10;i++) {
            String s = new String(p.produceCpt());
            cptList.add(s);
        }
        //CODE SEGMENT BEGINS
        strCpt = Stream.concat(
                cptList.stream().filter(cpt -> CptGen.isStrong(cpt)),
                cptList.stream().filter(cpt -> !CptGen.isStrong(cpt))
                                .map(cpt -> cpt.toLowerCase()))
                                .collect(Collectors.toList());
        Collections.sort(strCpt);

        //CODE SEGMENT ENDS
        System.out.println("Strong captcha list: "+strCpt.toString());
    }
}
```

Choose the code segments each of which can replace the code inside `CODE SEGMENT` such that the program generates the same output.

## Options :

A. ✖

```
cptList.stream()
    .takewhile( cpt ->
        {    if (CptGen.isStrong(cpt)) {
                strCpt.put(cpt);
            }
            else {
                strCpt.put(cpt.toLowerCase());
            }
        }
    );
Collections.sort(strCpt);
```

B. ✖
```
cptList.stream().takewhile( cpt -> strCpt.put(cpt););
cptList.stream().dropwhile( cpt -> strCpt.put(cpt.toLowerCase()););
Collections.sort(strCpt);
```

C. ✔
```
cptList.stream()
    .forEach( cpt ->
        {    if (CptGen.isStrong(cpt)) {
                strCpt.add(cpt);
            }
            else {
                strCpt.add(cpt.toLowerCase());
            }
        }
    );
Collections.sort(strCpt);
```

D. ✖
```
cptList.stream()
    .filter( if (CptGen.isStrong(cpt)) {
                strCpt.add(cpt);
            }
            else {
                strCpt.add(cpt.toLowerCase());
            }
    );
Collections.sort(strCpt);
```

**Question Number : 294 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the code given below.

```
class Hobby implements Cloneable{
    private String str;
    public Hobby(String s) {
        str = s;
    }
    public void updateHobby(String s) {
        str = s;
    }
    public Hobby clone() throws CloneNotSupportedException {
        return (Hobby)super.clone();
    }
    public String toString() {
        return str;
    }
}
class Student implements Cloneable{
    private String name;
    private Hobby hb;
    public Student(String n, String s) {
        name = n;
        hb = new Hobby(s);
    }
    public void updateStudent(String n, String s) {
        name = n;
        hb.updateHobby(s);
    }
    public Student clone() throws CloneNotSupportedException {
        return (Student)super.clone();
    }
    public String toString() {
        return name + " : " + hb;
    }
}
public class FClass{
    public static void main(String[] args) throws CloneNotSupportedException {
     Student s1 = new Student("Akash", "stamp collection");
     Student s2 = s1.clone();
        s2.updateStudent("Bikash", "gardening");
        System.out.println(s1 + ", " + s2);
    }
}
```

What will the output be?

**Options :**

A. ✖ `Bikash : gardening, Bikash : gardening`

B. ✖ `Akash : stamp collection, Bikash : stamp collection`

C. ✔ `Akash : gardening, Bikash : gardening`

D. ✖ `Akash : stamp collection, Bikash : gardening`

**Question Number : 295 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the Java code given below.

```java
import java.util.*;
public class Tournament {
    public static void main(String[] args) {
        var ashes = new LinkedHashMap<String,String>();
        var asia = new LinkedHashMap<String,String>();

        var sl = new LinkedHashMap<String,String>();
        sl.put("SL Asia", "Thrice");
        asia.put("SL Asia", sl.getOrDefault("SL Asia", "N/A"));
        ashes.put("SL Ashes", sl.getOrDefault("SL Ashes", "N/A"));

        var eng = new LinkedHashMap<String,String>();
        eng.put("ENG Ashes", "Thrice");
        asia.put("ENG Asia", eng.getOrDefault("ENG Asia", "N/A"));
        ashes.put("ENG Ashes", eng.getOrDefault("ENG Ashes", "N/A"));

        for(Map.Entry<String, String> obj1:ashes.entrySet())
            System.out.println(obj1.getKey()+" "+obj1.getValue());

        for(Map.Entry<String, String> obj2:asia.entrySet())
            System.out.println(obj2.getKey()+" "+obj2.getValue());
    }
}
```

What will the output be?

**Options :**

A. ✔
```
SL Ashes N/A
ENG Ashes Thrice
SL Asia Thrice
ENG Asia N/A
```

B. ✖
```
SL Ashes N/A
ENG Asia N/A
ENG Ashes Thrice
SL Asia Thrice
```

C. ✖
```
ENG Ashes Thrice
SL Asia Thrice
ENG Asia N/A
SL Ashes N/A
```

D. ✖

```
ENG Ashes Thrice
ENG Asia N/A
SL Asia Thrice
SL Ashes N/A
```

**Question Number : 296 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class MemoryCard{
    public void portable() {
        System.out.println("Portable");
    }
}
class Mobile{
    private InternalMemory obj;
    public InternalMemory getObj() {
        return obj;
    }
    public void createInternalMemoryObj() {
        this.obj = new InternalMemory();
    }
    private class InternalMemory extends MemoryCard{
        public void portable() {
            System.out.println("Not portable");
        }
    }
}
public class PrivateClassTest {
    public static void main(String[] args) {
        Mobile mobileObj=new Mobile();
        mobileObj.createInternalMemoryObj();
        //LINE-1
        innerObj.portable();
    }
}
```

Choose the correct option for LINE-1 such that the program generates the following output.

```
Not portable
```

**Options :**

A. ✖ `InternalMemory innerObj = mobileObj.getObj();`

B. ✔ `MemoryCard innerObj = mobileObj.getObj();`

C. ✖ `Mobile.InternalMemory innerObj = mobileObj.getObj();`

D. ✖ `MemoryCard.InternalMemory innerObj = mobileObj.getObj();`

**Question Number : 297 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
interface Permit1{
    public void travelWithInState();
}
interface Permit2{
    public void travelSpecificStates();
}
interface Permit3 extends Permit1, Permit2{
    public void travelToAnyState();
}
class Permit implements Permit3{
    public void travelWithInState() {
        System.out.println("You can travel within the state");
    }
    public void travelSpecificStates() {
        System.out.println("You can travel to the specific states");
    }
    public void travelToAnyState() {
        System.out.println("You can travel to any state");
    }
}
class Driver {
    public void travel(_____________) {    //LINE-1
        obj.travelWithInState();
        obj.travelSpecificStates();
        obj.travelToAnyState();
    }
}
public class InterfaceTest {
    public static void main(String[] args) {
        Driver obj=new Driver();
        obj.travel(new Permit());
    }
}
```

Choose the correct option to fill in the blank at LINE-1 such that the program generates the following output.

```
You can travel within the state
You can travel to the specific states
You can travel to any state
```

**Options :**

A. ✔ `Permit3 obj`

B. ✖ `Permit2 obj`

C. ✖ `Permit1 obj`

D. ✖ All of these.

**Question Number : 298 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.util.*;
public class ConcreteTest {
    ArrayList<String> list = new ArrayList<String>();
    TreeSet<String> set = new TreeSet<String>();
    public boolean property(String element) {
        if(element.contains(" "))
            return false;
        return true;
    }
    public void segregate(ArrayList<String> li) {
        Iterator<String> it = li.iterator();
        while (it.hasNext()) {
            String e = it.next();
            if(!property(e)) {
                set.add(e);
            }
            else {
                if(!list.contains(e))
                    list.add(e);
            }
        }
        System.out.println(list);
        System.out.println(set);
    }
    public static void main(String[] args) {
        ArrayList<String> al = new ArrayList<String>();
        al.add("India");
        al.add("West Indies");
        al.add("South Africa");
        al.add("Australia");
        al.add("India");
        al.add("Australia");
        al.add("South Africa");
        al.add("West Indies");
        ConcreteTest test = new ConcreteTest();
        test.segregate(al);
    }
}
```

What will the output be?

**Options :**

A. ✖ [India, Australia, India, Australia]
[South Africa, West Indies, South Africa, West Indies]

B. ✔

```
[India, Australia]
[South Africa, West Indies]
```

C. ✖ [South Africa, West Indies]
[India, Australia]

D. ✖ [Australia, India]
[South Africa, West Indies]

**Question Number : 299 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the following Java code.

```
import java.util.*;
import java.util.stream.*;
class Student{
    String name;
    int score;
    Student(String name, int score){
        this.name = name;
        this.score = score;
    }
    public String toString() {
     return name;
    }
}
public class PartitionStream{
    public static void main(String[] args){
        var studArr = new ArrayList<Student>();
        studArr.add(new Student("Ernest", 56));
        studArr.add(new Student("Andrew", 91));
        studArr.add(new Student("Louis", 32));
        studArr.add(new Student("Carl", 39));
        Map<Boolean, List<Student>> studMap = studArr.stream()
                  .collect(Collectors.partitioningBy(i -> i.score < 40));
        System.out.println(studMap.get(false));
    }
}
```

Choose the correct option.

**Options :**

A. ✔ This program generates output:
`[Ernest, Andrew]`

B. ✖ This program generates output:
`[Ernest, Andrew, Louis, Carl]`

C. ✖ This program generates output:
`[Louis, Carl]`

D. ✖ This program generates a compilation error because a `Stream` cannot be converted to a `Map`.

**Question Number : 300 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider the Java code given below, and answer the question that follows:

```
abstract class Op implements Runnable{
    static int product = 1;
}
class Op1 extends Op{
    public void run() {
        if (product != 3) {
            product = product * 2;
        }
    }
}
class Op2 extends Op{
    public void run() {
        if (product != 2) {
            product = product * 3;
        }
    }
}
public class RaceCondition {
    public static void main(String[] args) {
        Op o1 = new Op1();
        Op o2 = new Op2();

        Thread t1 = new Thread(o1);
        Thread t2 = new Thread(o2);

        t1.start();
        t2.start();

        System.out.println(Op.product);
    }
}
```

Choose the correct option.

**Options :**

A. ✖ The program will never generate the output: 1

B. ✖ The program will never generate the output: 2

C. ✖ The program will never generate the output: 3

D. ✖ The program will never generate the output: 6

E. ✔ The program may generate 1,2,3 or 6 as output

**Question Number : 301 Question Type : MSQ**

**Correct Marks : 5**

Question Label : Multiple Select Question

Consider the following code which has 4 user-defined threads: two threads would work as maker of breads and the other two work as eaters of breads from the same Baker object.

```
class Baker{
    int bread_count;
    public synchronized void make(int order_amt) {
        bread_count += order_amt;
        System.out.println("Inside make(), bread count = "+bread_count);
    }
    public synchronized void eat(int order_amt) {
        if(bread_count >= order_amt) {
            bread_count -= order_amt;
            System.out.println("Inside eat(), bread_count = "+bread_count);
        }
    }
}
class Threadutil extends Thread{
    Baker obj;
    public Threadutil(Baker o, String t_name){
        super(t_name);
        obj = o;
    }
    public void run() {
        if(Thread.currentThread().getName().contains("maker"))
            obj.make(5);
        else
            obj.eat(10);

    }
}
public class Test{
    public static void main(String args[]) {
        Baker my_acc =  new Baker();
        Threadutil t1 = new Threadutil(my_acc,"maker1");
        Threadutil t2 = new Threadutil(my_acc,"eater1");
        Threadutil t3 = new Threadutil(my_acc,"maker2");
        Threadutil t4 = new Threadutil(my_acc,"eater2");
        t1.start();
        t2.start();
        t3.start();
        t4.start();
    }
}
```

Choose all the option(s) that correspond to a possible result after execution of this code.

**Options :**

A. ✖
```
Inside make(), bread count = 5
Inside eat(), bread_count = 0
Inside make(), bread count = 10
```

B. ✔
```
Inside make(), bread count = 5
Inside make(), bread count = 10
Inside eat(), bread_count = 0
```

C. ✔
```
Inside make(), bread count = 5
Inside make(), bread count = 10
```

D. ✖
```
Inside make(), bread count = 5
Inside make(), bread_count = 10
Inside eat(), bread count = 0
Inside eat(), bread count = 0
```

**Question Number : 302 Question Type : MSQ**

**Correct Marks : 6**

Question Label : Multiple Select Question

Consider the Java code given below.

```
class PrlPrint implements Runnable{
    private int val;
    public PrlPrint(int i) {
        val = i;
    }
    public void run() {
        System.out.print(val + " ");
    }
}

public class FClass{
    public static void main(String[] args) throws InterruptedException{
        PrlPrint pp1 = new PrlPrint(1);
        PrlPrint pp2 = new PrlPrint(2);
        Thread th1 = new Thread(pp1);
        Thread th2 = new Thread(pp2);
        th1.start();
        System.out.print(3 + " ");
        th1.join();
        th2.start();
        System.out.print(4 + " ");
        th2.join();
        System.out.print(5 + " ");
    }
}
```

Among the following, which are the possible outputs of the program?

**Options :**

A. ✔ 3 1 4 2 5

B. ✔ 1 3 2 4 5

C. ✖ 1 2 3 4 5

D. ✖ 1 3 2 5 4

**Question Number : 303 Question Type : MSQ**

**Correct Marks : 6**

Question Label : Multiple Select Question

Consider the code given below.

```
import java.util.*;
interface Divisible{
    boolean isDivisible(int value);
}
public class FClass{
    static ArrayList<Integer> getDivList(
                            ArrayList<Integer> dataLst, Divisible di){
        ArrayList<Integer> resLst = new ArrayList<Integer>();
        for(Integer data : dataLst) {
            if(di.isDivisible(data))
                resLst.add(data);
        }
        return resLst;
    }
    public static void main(String[] args) {
        Integer[] values = {5, 2, 1, 7, 8, 3, 4, 6, 9};
        ArrayList<Integer> iLst = new ArrayList<Integer>(Arrays.asList(values));
        ArrayList<Integer> oLst = getDivList(iLst, __________);    //LINE 1
        for(int i : oLst)
            System.out.print(i + " ");
    }
}
```

Since the second parameter of `getDivList` requires to be of functional interface `Divisible` type, it may be substituted by a lambda expression. Identify the correct option(s) each of which may be filled in the blank at `LINE-1` such that the output is `3 6 9` (the integers from the list divisible by 3).

**Options :**

A. ✔ `(x) -> (x % 3 == 0)`

B. ✖ `x -> x % 3`

C. ✔
```
x -> {if(x % 3 == 0) return true;
        return false;
    }
```

D. ✖ `() -> x % 3 == 0`

**Question Number : 304 Question Type : MSQ**

**Correct Marks : 6**

Question Label : Multiple Select Question

Consider the following code that should segregate those mammals whose lifespan is more than 50, from a general collection of mammals.

```
import java.util.*;
interface Mammal{
    int getLifespan();
}
class Whale implements Mammal{
    private int lifespan;
    Whale(int l){
        lifespan = l;
    }
    public int getLifespan() {
        return lifespan;
    }
}
class Elephant implements Mammal{
    private int lifespan;
    Elephant(int l){
        lifespan = l;
    }
    public int getLifespan() {
        return lifespan;
    }
}
public class NationalPark{
    public static <S extends Mammal>
    void pickLongLspan(List<Object> tgt, List<S> src) {
        for(S animal : src)                              // LINE-1
            if(animal.getLifespan() > 50)
                tgt.add(animal);
    }
    public static void main(String args[]) {
        ArrayList<Elephant> el = new ArrayList<>();
        ArrayList<Whale> wh = new ArrayList<>();
        ArrayList<Mammal> long_lspan = new ArrayList<>();
        el.add(new Elephant(48));
        el.add(new Elephant(56));
        wh.add(new Whale(180));
        wh.add(new Whale(200));

        pickLongLspan(long_lspan,el);                    // LINE-2
        pickLongLspan(long_lspan,wh);                    // LINE-3
    }

 }
```

Choose all the correct option(s) regarding the given code.

**Options :**

A. ✖ LINE-1 leads to compilation error

B. ✔ LINE-2 leads to compilation error

C. ✔ LINE-3 leads to compilation error

D. ✖ There are no compilation errors in this program

**Question Number : 305 Question Type : MSQ**

**Correct Marks : 6**

Question Label : Multiple Select Question

Consider the Java code given below.

```
1  interface Shape{
2      int getArea();
3  }
4  interface Rectangle extends Shape{
5      boolean isAllSidesEqual();
6  }
7  interface Rhombus extends Shape{
8      boolean isAllAnglesEqual();
9  }
10 abstract class Square implements Rectangle, Rhombus{
11     int area = 16;
12     public int getArea() {
13         return area;
14     }
15 }
16 class UnitSquare extends Square{
17     public boolean isAllSidesEqual() {
18         return true;
19     }
20     public boolean isAllAnglesEqual() {
21         return true;
22     }
23 }
24 public class SubTypeInherit {
25     public static void main(String[] args) {
26         Shape s = new UnitSquare();
27         System.out.println(s.getArea());
28     }
29 }
```

What will the result(s) of compiling/executing this code be?

**Options :**

A. ✖ Compilation error at LINEs 4 and 7 because an interface cannot *extend* another interface.

B. ✖ Compilation error at LINE 10 to LINE 15 because the abstract class Square cannot implement two interfaces.

C. ✖ Compilation error at LINE 10 to LINE 15 because Square does not define methods isAllSidesEqual and isAllAnglesEqual.

D. ✖

Compilation error at LINE 16 to LINE 23 because UnitSquare does not implement method getArea.

E. ✖ Runtime error because a reference variable of interface Shape cannot refer to an object of class UnitSquare.

F. ✔ The program generates the output: 16

# MLF

**Number of Questions :** 20

**Section Marks :** 50

**Question Number : 306 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL: MACHINE LEARNING FOUNDATIONS"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 307 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

Discrete random variables:

| Distribution | PMF ($f_X(k)$) | CDF ($F_X(x)$) | $E[X]$ | $\mathrm{Var}(X)$ |
|---|---|---|---|---|
| Uniform($A$)<br>$A = \{a, a+1, \ldots, b\}$ | $\frac{1}{n}, \quad x = k$<br>$n = b - a + 1$<br>$k = a, a+1, \ldots, b$ | $\begin{cases} 0 & x < 0 \\ \frac{k-a+1}{n} & k \le x < k+1 \\ & k = a, a+1, \ldots, b-1, b \\ 1 & x \ge n \end{cases}$ | $\frac{a+b}{2}$ | $\frac{n^2-1}{12}$ |
| Bernoulli($p$) | $\begin{cases} p & x = 1 \\ 1-p & x = 0 \end{cases}$ | $\begin{cases} 0 & x < 0 \\ 1-p & 0 \le x < 1 \\ 1 & x \ge 1 \end{cases}$ | $p$ | $p(1-p)$ |
| Binomial($n, p$) | ${}^nC_k p^k (1-p)^{n-k}$,<br>$k = 0, 1, \ldots, n$ | $\begin{cases} 0 & x < 0 \\ \sum_{i=0}^{k} {}^nC_i p^i (1-p)^{n-i} & k \le x < k+1 \\ & k = 0, 1, \ldots, n \\ 1 & x \ge n \end{cases}$ | $np$ | $np(1-p)$ |
| Geometric($p$) | $(1-p)^{k-1} p$,<br>$k = 1, \ldots, \infty$ | $\begin{cases} 0 & x < 0 \\ 1-(1-p)^k & k \le x < k+1 \\ & k = 1, \ldots, \infty \end{cases}$ | $\frac{1}{p}$ | $\frac{1-p}{p^2}$ |
| Poisson($\lambda$) | $\frac{e^{-\lambda}\lambda^k}{k!}$,<br>$k = 0, 1, \ldots, \infty$ | $\begin{cases} 0 & x < 0 \\ e^{-\lambda} \sum_{i=0}^{k} \frac{\lambda^i}{i!} & k \le x < k+1 \\ & k = 0, 1, \ldots, \infty \end{cases}$ | $\lambda$ | $\lambda$ |

Continuous random variables:

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

1. **Markov's inequality:** Let $X$ be a discrete random variable taking non-negative values with a finite mean $\mu$. Then,
$$P(X \ge c) \le \frac{\mu}{c}$$

2. **Chebyshev's inequality:** Let $X$ be a discrete random variable with a finite mean $\mu$ and a finite variance $\sigma^2$. Then,
$$P(\mid X - \mu \mid \ge k\sigma) \le \frac{1}{k^2}$$

3. **Weak Law of Large numbers:** Let $X_1, X_2, \ldots, X_n \sim$ iid $X$ with $E[X] = \mu, \mathrm{Var}(X) = \sigma^2$.
Define sample mean $\overline{X} = \frac{X_1 + X_2 + \ldots + X_n}{n}$. Then,
$$P(|\overline{X} - \mu| > \delta) \le \frac{\sigma^2}{n\delta^2}$$

4. **Using CLT to approximate probability:** Let $X_1, X_2, \ldots, X_n \sim$ iid $X$ with $E[X] = \mu, \mathrm{Var}(X) = \sigma^2$.
Define $Y = X_1 + X_2 + \ldots + X_n$. Then,
$$\frac{Y - n\mu}{\sqrt{n}\sigma} \approx \mathrm{Normal}(0,1).$$

5. **Likelihood of i.i.d. samples:** Likelihood of a sampling $x_1, x_2, \ldots, x_n$, denoted
$$L(x_1, \ldots, x_n) = \prod_{i=1}^{n} f_X(x_i; \theta_1, \theta_2, \ldots)$$

6. **Maximum likelihood (ML) estimation:**
$$\theta_1^*, \theta_2^*, \ldots = \arg\max_{\theta_1^*, \theta_2^*, \ldots} \prod_{i=1}^{n} f_X(x_i; \theta_1, \theta_2, \ldots)$$

**Options :**

A. ✔ Useful Data has been mentioned above.

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

**Question Number : 308 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Stephen Fleming hired a ML team to predict whether CSK will be successful or not in winning IPL 2022 by using some classification models. Therefore the team collected presence/absence of various factors $x = [x_1, x_2, x_3]$ from both successful and unsuccessful year in past. The data and the corresponding label is shown in the table below.

| $x$ | $y$ |
|---|---|
| $[0, 1, 1]$ | 1 |
| $[1, 0, 1]$ | 1 |
| $[1, 0, 0]$ | 1 |
| $[1, 1, 1]$ | 1 |

Compute the zero-one error of the model if they have used

$$u(z) = \begin{cases} 1, & \text{for } z \geq 0 \\ 0, & \text{otherwise} \end{cases}$$

and $z = 0.5x_1 - 0.8x_2 + 0.4x_3$

**NOTE:** Enter your answer in two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0.25

**Question Number : 309 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

If the characteristic polynomial of a $3 \times 3$ matrix M is $\lambda^3 - \lambda^2 + a\lambda + 24, a \in R$ and one eigen value of M is 2, then the largest among the absolute values of eigen values of M is _____

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Question Number : 310 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

$X$ and $Y$ are independent uniform variables in the range of 1 to 5. What is the $87.5^{th}$ percentile of $X + Y$ ? i.e Calculate $a$ such that $P(X + Y \geq a) = 0.125$

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

8

**Question Number : 311 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Suppose $X$ be a random variable with mean $\mu = 80$ and standard deviation $\sigma = 6$. Find an interval [$a$,

$b$] about the mean $\mu = 80$ for which the probability that $X$ lies in the interval is at least 99 percent. Calculate the value $b - 2a$

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

100

**Question Type : COMPREHENSION**

**Question Numbers : (312 to 314)**

Question Label : Comprehension

For the function $f(x, y) = 3x^2 - 5y^2$ and point P(2,-3), answer the given subquestions:

**Sub questions**

**Question Number : 312 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

From the given point $P$, in which direction will the derivative of $f$ be maximal? (Provide the direction in the form of unit vector.) If the direction vector is $(u_1, u_2)$, then provide the value of $u_1$.

**NOTE:** Enter your answer in two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.30 to 0.45

**Question Number : 313 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

From the given point $P$, in which direction will the derivative of $f$ be maximal? (Provide the direction in the form of unit vector.) If the direction vector is $(u_1, u_2)$, then provide the value of $u_2$.

**NOTE:** Enter your answer in two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.85 to 0.97

**Question Number : 314 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

What is the derivative in the direction mentioned in question numbers 7 and 8?

**NOTE:** Enter your answer in one decimal place.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

31.5 to 33.0

**Question Type : COMPREHENSION**

**Question Numbers : (315 to 317)**

Question Label : Comprehension

Sita wants to fit a linear relationship between *x* and *y* as shown in the table. Using least squares method, find the closest (best) line to fit these points.

| $x$ | $y$ |
|---|---|
| 1 | 1 |
| 1 | 2 |
| 3 | 7 |
| 4 | 8 |
| 2 | 6 |

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 315 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

Enter the value of the slope of the best fit line.

**NOTE:** Enter your answer in three decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

2.180 to 2.300

**Question Number : 316 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

Enter the value of the intercept of the best fit line.

**NOTE:** Enter your answer in three decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

-0.124 to -0.110

**Question Number : 317 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

The sum of squared residuals obtained when the best fit line is used to fit the data points is _____.

**NOTE:** Enter your answer in two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

4.78 to 4.86

**Question Type : COMPREHENSION**

**Question Numbers : (318 to 319)**

Question Label : Comprehension

Consider the data points $x_1, x_2, x_3$ to answer the given subquestions.

$$x_1 = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}, x_2 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, x_3 = \begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}$$

**Sub questions**

**Question Number : 318 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The covariance matrix

$$C = \frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})(x_i - \bar{x})^T$$

for the data points $x_1, x_2, x_3$ is

**Options :**

A. ✖ $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

B. ✖ $\begin{bmatrix} 0.5 & 0.5 & 0.5 \\ 0.5 & 0.5 & 0.5 \\ 0.5 & 0.5 & 0.5 \end{bmatrix}$

C. ✔ $\begin{bmatrix} 2/3 & 0 & -2/3 \\ 0 & 0 & 0 \\ -2/3 & 0 & 2/3 \end{bmatrix}$

D. ✖ $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

**Question Number : 319 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The data points $x_1$, $x_2$, $x_3$ are projected onto the one dimensional space using PCA as points $z_1$, $z_2$, $z_3$ respectively.(Use eigenvector with maximum eigen values for this projection.)

**Options :**

A. ✖ $z_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, z_2 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, z_3 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$

B. ✖ $z_1 = \begin{bmatrix} 0.5 \\ 0.5 \\ 0.5 \end{bmatrix}, z_2 = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}, z_3 = \begin{bmatrix} -0.5 \\ -0.5 \\ -0.5 \end{bmatrix}$

C. ✖ $z_1 = \begin{bmatrix} 0 \\ 2 \\ 2 \end{bmatrix}, z_2 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, z_3 = \begin{bmatrix} 2 \\ 2 \\ 0 \end{bmatrix}$

D. ✔ $z_1 = \begin{bmatrix} -1 \\ 0 \\ 1 \end{bmatrix}, z_2 = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}, z_3 = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$

**Question Number : 320 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Let $A$ be a $n \times n$ real symmetric matrix with distinct eigen values $\lambda_i, 1 \leq i \leq n$ and corresponding eigen vectors are $u_i, 1 \leq i \leq n$, then which of the following statements is/are true?

**Options :**

A. ✔ $\lambda u_i u_i^T$ is a symmetric matrix.

B. ✖ $\lambda u_i u_i^T$ is not a symmetric matrix.

C. ✔ $\sum_{i=1}^{n} \lambda u_i u_i^T = A.$

D. ✖ $\sum_{i=1}^{n} \lambda u_i u_i^T \neq A.$

**Question Number : 321 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Let *U*, *V*, and *D* be three unitary matrices, then which of the following statements must be true always?

**Options :**

A. ✔ *UV D* is an unitary matrix

B. ✔ *UV* is an unitary matrix

C. ✖ *UV D* is not an unitary matrix

D. ✖ *UV D* is a hermitian matrix

**Question Number : 322 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

We need to find the optimal value of the objective function $f(x, y, z) = log(xyz) + xyz$. We start with $X_0 = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$. If $X_1 = \begin{bmatrix} i \\ j \\ k \end{bmatrix}$ using the gradient descent algorithm and using $\eta = 1$, then what is the absolute value of $|i + j + k|$? Enter the answer up to 2 decimals accuracy.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

7.5 to 8.5

**Question Number : 323 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

While solving for the optimal weight vector $(w)$ for a linear regression problem using gradient descent, we have $y = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ and $X = \begin{bmatrix} 0 & 1 \\ 2 & 3 \\ 3 & 4 \end{bmatrix}$. $w^t = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ after $t$ iterations. If the value of $w^{t+1} = \begin{bmatrix} i \\ j \end{bmatrix}$ in next iteration using gradient descent method, then what is the absolute value of $|i + j|$? Assume $\eta = 1$.

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

82 to 86

**Question Number : 324 Question Type : MCQ**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Given $A = \begin{bmatrix} -3 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

**Options :**

A. ✖ *det*[*A*] is positive

B. ✖ *A* is positive definite

C. ✖ *A* is positive semidefinite

D. ✔ *A* is negative definite

E. ✖ *A* is indefinite

**Question Number : 325 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the boundary value of $y$ so that the function $\sqrt{1-y^2}$ to remain concave?

**Options :**

A. ✖ $y \geq 1$ and $y \leq -1$

B. ✔ $y \leq 1$ and $y \geq -1$

C. ✖ for any value of y function will remain convex.

D. ✖ None of these

**Question Number : 326 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

What is the maximum value possible for the function $f(x, y) = e^{xy}$ subject to the conditions $x \geq 0$, $y \geq 0$, and $x^2 + y^2 = 2$

**NOTE:** Enter your answer in one decimal place.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

2.0 to 3.5

**Question Number : 327 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Each throw of an unfair die lands on the odd numbers with probability $p$ and lands on the even numbers with probability $2p$. Let

$$X = \begin{cases} 1, & \text{if the throw results in an even number} \\ 0, & \text{otherwise} \end{cases}$$

and

$$Y = \begin{cases} 1, & \text{if the throw results in an odd number} \\ 0, & \text{otherwise} \end{cases}$$

Find the value of $f_{XY}(1, 0)$. Enter the answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.64 to 0.70

**Question Number : 328 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

A pack of 5 items is known to contain 2 items that are defective. The items are checked one at a time (without replacement) until the defective ones are identified. Let $X$ denote the number of tests made until the first defective item is found and let $Y$ denote the additional number of tests until the second defective item is found. Find the value of $P(X = 2, Y = 3)$.

**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

**Possible Answers :**

0.1

**Question Number : 329 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

The probability density function of the time $X$ (in minutes) between calls at a customer care center is given by

$$f(x) = \begin{cases} \frac{1}{4}e^{\frac{-x}{4}} & \text{if } 0 \leq x < \infty \\ 0 & \text{otherwise} \end{cases}$$

Find the probability that time between calls not exceeds the mean time. Enter the answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.58 to 0.70

**Question Number : 330 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Suppose that the lifetime of light bulbs is modeled by an exponential distribution with unknown parameter λ. We test 5 bulbs and find that they have lifetimes of 3, 4, 2, 5 and 6 years respectively. What is the Maximum likelihood estimate for λ? Enter your answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.23 to 0.27

**Number of Questions :** 30

**Section Marks :** 100

**Question Number : 331 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL: MACHINE LEARNING TECHNIQUES"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 332 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

Instructions:

1. Always add dummy feature in the beginning of feature matrix where necessary.
2. Do NOT write your answers as percentages. E.g. if your answer is computed to be 12%, then type 0.12.
3. Answers are case sensitive.
4. Do NOT include single or double quotes in your typed answers.

Useful Data

Logistic Regression

Inference using logistic regression happens as follows. $T$ is called the threshold and is some real number in the interval $(0, 1)$. $\hat{y}$ stands for the predicted label.

$$\hat{y} = \begin{cases} 1, & P(y = 1 \mid \boldsymbol{x}) \geq T \\ 0, & \text{otherwise} \end{cases}$$

The threshold is usually set to 0.5 unless otherwise specified.

Multivariate Guassian Distribution

$\boldsymbol{x}$ is a vector of size $m$. $\boldsymbol{\mu}$ is the mean vector of size $m$, $\Sigma$ is the covariance matrix of size $m \times m$. The PDF is given by:

$$p(\boldsymbol{x}) = \frac{1}{\sqrt{(2\pi)^m |\Sigma|}} \exp\left(-\frac{1}{2}(\boldsymbol{x} - \boldsymbol{\mu})^T \Sigma^{-1} (\boldsymbol{x} - \boldsymbol{\mu})\right)$$

If $m = 2$, then this is called a bi-variate Gaussian distribution.

**Options :**

A. ✔ Useful Data has been mentioned above.

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

**Question Number : 333 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following statements are true regarding discriminative models?

1. They use probability distributions for modeling the underlying data generation process.
2. They learn separators between classes, instead of learning the underlying data generation

process

3. Logistic regression is an example of a discriminative model.

**Options :**

A. ✖ 1 and 2

B. ✖ 1,2 and 3

C. ✔ 2 and 3

D. ✖ 1 and 3

**Question Number : 334 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Abhinandan is a Lionel Messi fan. He wants to predict the number of goals Messi will score in **each of** the next 4 matches of coming champions league based on the goals scored by him in previous tournaments. This problem can be classified as a:

**Options :**

A. ✖ Single label Regression

B. ✖ Single label Classification

C. ✔ Multi label Regression

D. ✖ Multi label classification

**Question Number : 335 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The loss function used in the case of softmax classification is:

**Options :**

A. ✖ binary cross entropy

B. ✔ categorical cross entropy

C. ✖ negative log likelihood

D. ✖ gradient descent

**Question Number : 336 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following can act as possible termination conditions in K-Means?

1. Number of iterations.
2. Assignment of observations to clusters does not change between iterations.
3. Centroids do not change between successive iterations.

**Options :**

A. ✖ 1 and 2

B. ✖ 2 and 3

C. ✖ 1 and 3

D. ✔ 1, 2 and 3

**Question Number : 337 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

If a linear regression model without polynomial transformation, has 8 parameters, including one for dummy feature, then what should be the dimension of the original data?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

7

**Question Number : 338 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

Rajesh wants to train a polynomial regression model. But he is not sure which is the best value for degree. He has following table for training and validation error. Can you help him find the most appropriate value of degree?

| Degree | Training Error | Validation Error |
|---|---|---|
| 1 | 22.34 | 33.89 |
| 2 | 14.66 | 25.28 |
| 3 | 12.30 | 19.12 |
| 4 | 10.84 | 12.23 |
| 5 | 8.56 | 8.65 |
| 6 | 7.32 | 9.77 |
| 7 | 6.94 | 11.89 |
| 8 | 5.37 | 15.83 |
| 9 | 4.54 | 20.19 |

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

5

**Question Number : 339 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What is the output of the following snippet of code?

```python
from itertools import combinations_with_replacement
from functools import reduce
import numpy as np

def polynomial_transform(x, degree):
    if x.ndim == 1:
        x = x[:, None]
    x_t = x.transpose()
    features = [np.ones(len(x))]
    for degree in range(1, degree + 1):
        for items in combinations_with_replacement(x_t, degree):
            features.append(reduce(lambda x, y: x * y, items))
    return np.asarray(features).transpose()

polynomial_transform(np.array([[2, 3]]), 2)
```

**Options :**

A. ✔ array([[1., 2., 3., 4., 6., 9.]])

B. ✖ array([[2., 3., 4., 6., 9.]])

C. ✖ array([[1., 2., 3., 4., 9.]])

D. ✖ array([[1., 2., 3., 6.]])

**Question Number : 340 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider training examples with two features ($x_1$ and $x_2$), each belonging to one of the two classes (1 and −1), are perfectly linearly separable. A perceptron model is trained on this data. At the $i^{th}$ iteration of the weights update procedure, the decision boundary is given as $x_1 + x_2 - 5 = 0$. At this iteration, only one sample (1, 6) (true label is −1) is mis-classified as class 1. What will be the decision boundary at $(i + 1)^{th}$ iteration? (Consider the learning rate to be 1.)

**Options :**

A. ✖ $3x_1 + 11x_2 = 15$

B. ✖ $-11x_1 - x_2 = 7$

C. ✔ $-x_1 - 11x_2 = 7$

D. ✖ Can not be determined using the given information.

**Question Number : 341 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Given the following training set:

| Point | x | y |
|---|---|---|
| A. | (-8,20) | 0.4 |
| B. | (-12, 11) | 0.6 |
| C. | (0, 26) | 0.1 |
| D. | (-5, 5) | 1.0 |
| E. | (-1, 22) | 0.8 |
| F. | (-7, 1) | -0.3 |

Then the target value of the test point (-10,0) obtained by performing 1-nearest neighbor regression using the Euclidean metric will be:

**Options :**

A. ✖ 0.4

B. ✖ 0.6

C. ✖ 0.1

D. ✖ 1.0

E. ✔ -0.3

F. ✖ 0.8

**Question Number : 342 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

Consider the feature matrix $\mathbf{X}_{2\times4}$ (first/leftmost column represents dummy feature) and corresponding label vector $\mathbf{y}_{2\times1}$ in the below table. Let regularization rate, $\lambda = 0.1$.

| X | y |
|---|---|
| [1, 1, 2, 3] | 2 |
| [1, 3, 2, 4] | 4 |

Compute ridge regression loss using weight $\mathbf{w}_{ridge} = \begin{bmatrix} 1 \\ 0.1 \\ -0.2 \\ 0.3 \end{bmatrix}$. Enter the value of loss.

**NOTE:** Enter your answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

1.8 to 2.1

**Question Number : 343 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

We want to cluster 9 observations into 3 clusters using K-Means clustering algorithm. After the first iteration, clusters C1, C2 and C3 have the following samples:

C1: (1,1), (1,3), (4,2)

C2: (0,4), (4,0), (0.5,0.5)

C3: (5,5), (9,9), (1,4)

What will be the cluster centroids if you want to proceed for the second iteration?

**Options :**

A. ✖ C1:(2,2), C2:(1.5,1.5), C3:(5,5)

B. ✔ C1:(2,2), C2:(1.5,1.5), C3:(5,6)

C. ✖ C1:(2,2), C2:(1.25,1.25), C3:(5,6)

D. ✖ C1:(1,2), C2:(1.5,1.5), C3:(5,6)

**Question Number : 344 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

A classification model was trained on some training examples with two features and three classes (0, 1 and 2) using least square algorithm. The learnt weight matrix is

$$\mathbf{W} = \begin{bmatrix} 0.2 & -0.4 & 1 \\ 0.4 & 0.8 & -1.2 \\ 0.5 & 0.5 & 1 \end{bmatrix}$$

(Remember for $k$ class classification problem with $m$ features, shape of weight matrix is $(m+1)\times k$ that is in the given weight matrix, first row belongs to weights corresponding to dummy feature.)

Which class will the sample (2, 3) be classified to?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Question Number : 345 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following statement(s) related to multi-class classification are correct? Select all that apply.

**Options :**

A. ✔ One-vs-One strategy decomposes a multi-class classification problem into several binary classification problems.

B. ✔ One-vs-One strategy requires to train more binary classifiers than the One-vs- All strategy when the number of classes is 5.

C. ✖ One-vs-One strategy is same as One-vs-All strategy when the number of classes is 3.

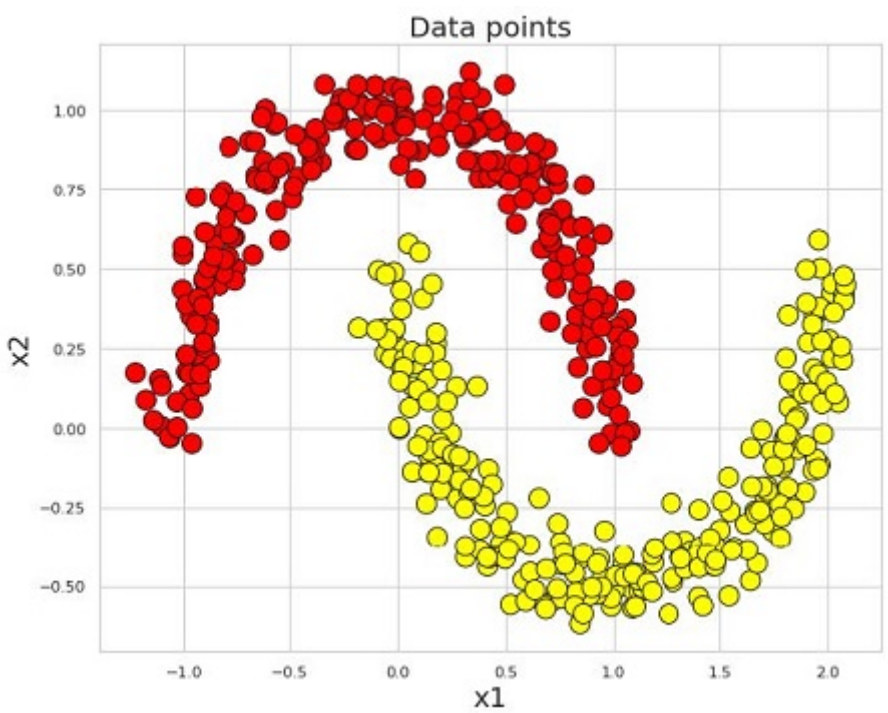
D. ✔ For the same multi-class classification problem, it is possible that some of the corresponding binary classification problems are not linearly separable when using the One-vs-All strategy, while the binary classification problems are all linearly separable when using the One-vs-One strategy.

**Question Number : 346 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Consider a dataset as shown in the plot given below with red and yellow colored points belonging to positive and negative classes respectively.



Select the suitable kernel(s) for the SVM model to classify the datapoints.

**Options :**

A. ✖ Linear kernel

B. ✖ Quadratic kernel

C. ✔ Cubic kernel

D. ✔ Radial basis function kernel

E. ✖ None of these

**Question Number : 347 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which among the following are some of the differences between bagging and boosting?

**Options :**

A. ✖ In bagging we use the same classification algorithm for training on each sample of the data, whereas in boosting, we use different classification algorithms on the different training data samples

B. ✔ Bagging is easy to parallelise whereas boosting is inherently a sequential process

C. ✔ In bagging we typically use sampling with replacement whereas in boosting, we typically use weighted sampling techniques

D. ✔ In comparison with the performance of a base classifier on a particular data set, bagging will generally not increase the error whereas boosting may lead to an increase in the error

**Question Number : 348 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

Which of the following statements are true?

**Options :**

A. ✔ Bagging reduces variance of the classifier

B. ✖ Bagging increases the variance of the classifier

C. ✔ Bagging can help make robust classifiers from unstable classifiers

D. ✔ In bagging, majority voting is one way of combining outputs from various classifiers which are being bagged

E. ✔ In Random forest, an individual tree is trained on subset of features and subset of all samples.

**Question Number : 349 Question Type : MSQ**

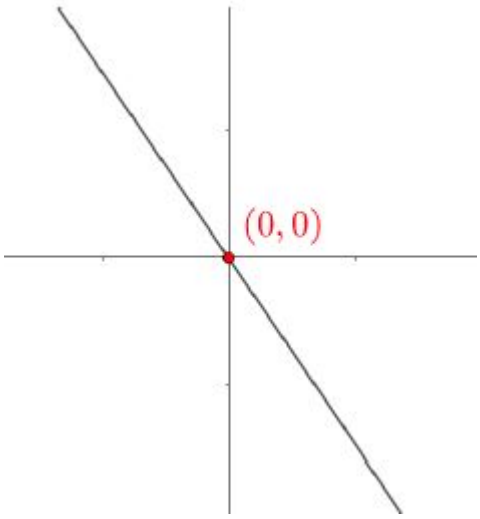
**Correct Marks : 3**

Question Label : Multiple Select Question

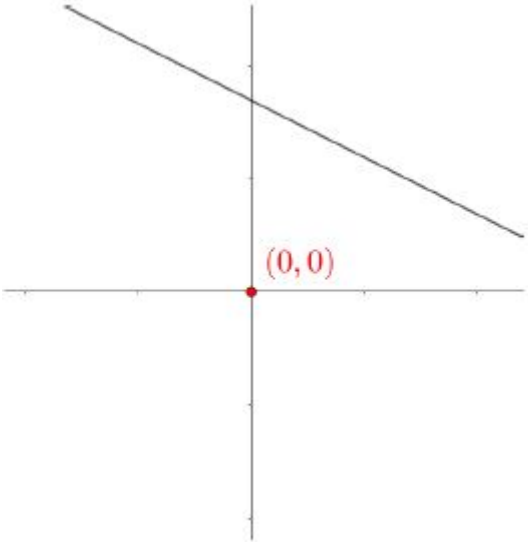
While training a logistic regression model for a toy-problem that has 2 features (excluding the dummy feature), a data scientist forgets to include the dummy feature and the weight corresponding to it. Which of the following could be the decision boundary obtained by him?

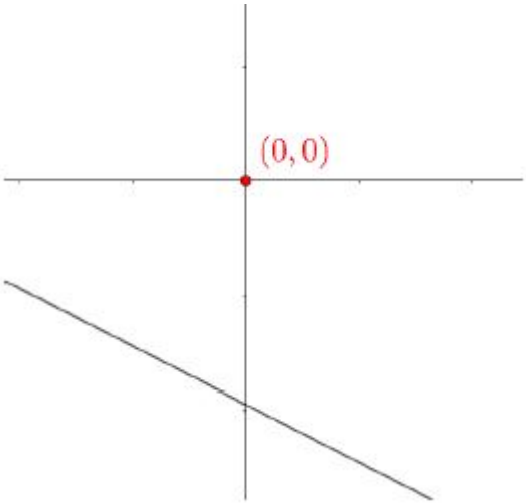
Focus only on the position of the decision boundary and forget about the distribution of the datapoints. This could be different for different options. Assume that the threshold for inference is 0.5 for the model. Multiple options could be correct.

**Options :**

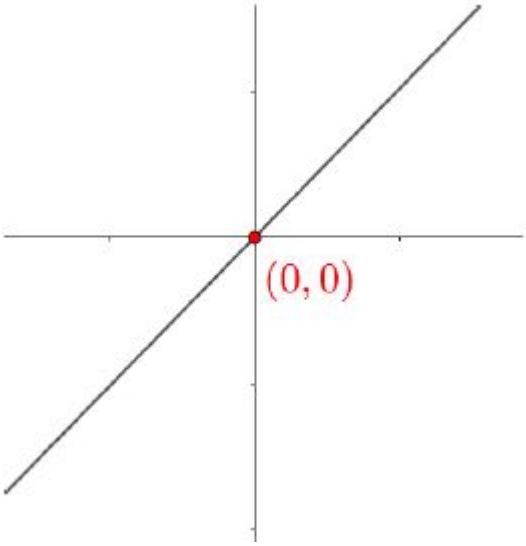
A. ✔ 


B. ✖




C. ✖




D. ✔

**Question Number : 350 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

We wish to classify a set of data-points in 2D space. Unfortunately, we don't have access to the labels. Though not very accurate, one approach is to first cluster the points using K-means algorithm and then build a Naive Bayes classifier using the cluster labels as the class labels.

Let us use $k$ = 2 for K-means. Upon execution, the algorithm gives us two clusters with labels 1 and 2, and centroids $\boldsymbol{\alpha_1}$ and $\boldsymbol{\alpha_2}$ respectively. Both are vectors of length 2. A Gaussian NB model is fit on this data. If $\boldsymbol{\mu_1}$ and $\boldsymbol{\mu_2}$ are the estimated means of the bi-variate Gaussian distribution for classes 1 and 2, which of the following statements are true?

**Options :**

A. ✔ $\mu_1 = \alpha_1$

B. ✔ $\mu_2 = \alpha_2$

C. ✖ $\mu_1 = \mu_2 = \alpha_1 + \alpha_2$

D. ✖ $\mu_1 = \mu_2 = \frac{\alpha_1 + \alpha_2}{2}$

E. ✖ $\mu_1 = \frac{\alpha_1}{2}$

F. ✖ $\mu_2 = \frac{\alpha_2}{2}$

**Question Number : 351 Question Type : MSQ**

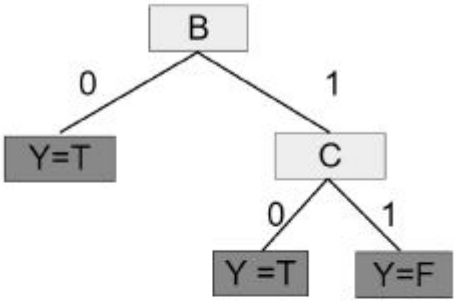
**Correct Marks : 3**

Question Label : Multiple Select Question

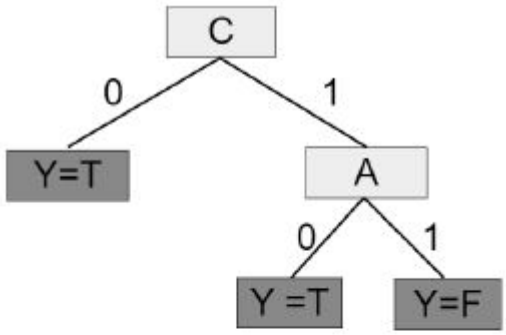
Consider a training dataset with three features A, B and C and label Y as shown in the table below.

| A | B | C | Y |
|---|---|---|---|
| 0 | 0 | 0 | T |
| 1 | 0 | 0 | T |
| 1 | 1 | 0 | T |
| 1 | 1 | 1 | F |
| 0 | 1 | 1 | T |
| 0 | 0 | 1 | T |

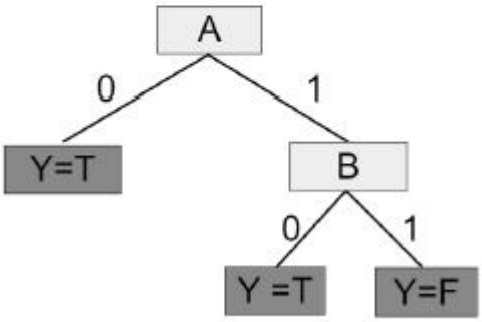
Which of the following trees will give the zero mis-classification error on the training dataset?



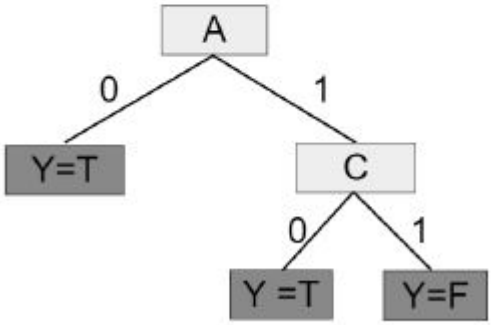

T1




T2




T3




T4

Note: In the trees, predictions are mentioned in the leaf nodes and in other nodes, the attribute along which the node is split is mentioned.

**Options :**

A. ✖ T1

B. ✔ T2

C. ✖ T3

D. ✔ T4

**Question Type : COMPREHENSION**

**Question Numbers : (352 to 354)**

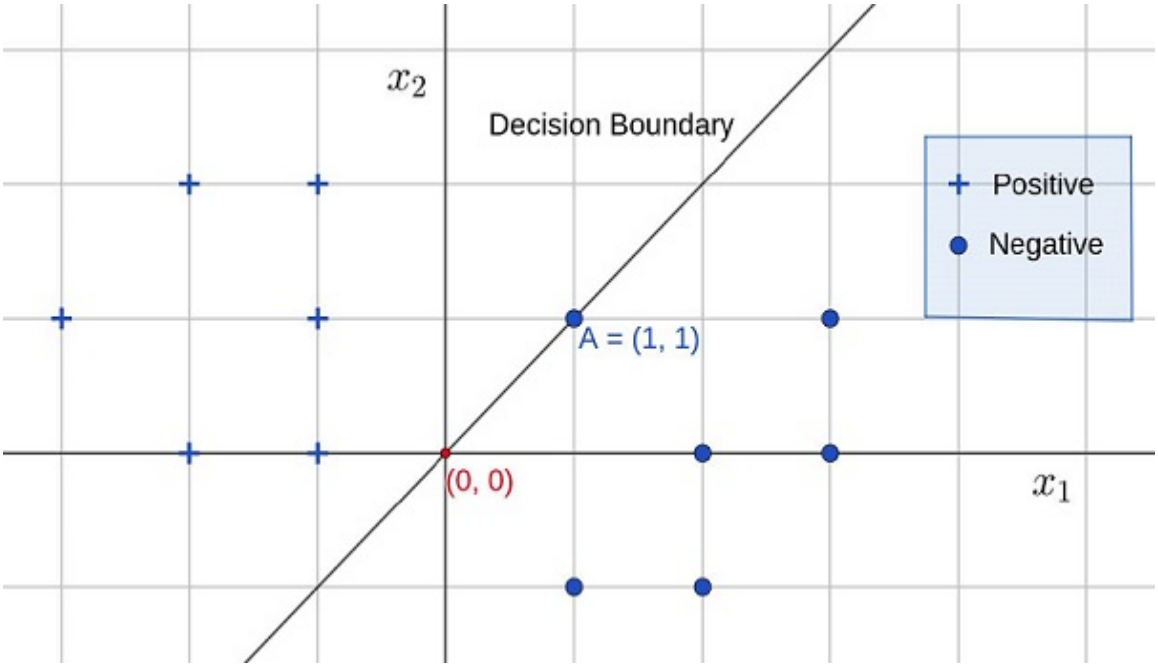
Question Label : Comprehension

**Specification**

• This is a binary classification problem with two features (excluding the dummy feature), with labels 1 and 0 for the positive and negative classes. There are 12 points in the dataset, six in each class.

• A logistic regression model is being trained using SGD with a learning rate of 2. $x_0 = 1$ is the dummy feature and $w_0$ is the weight corresponding to it. $w_1$ and $w_2$ are the weights corresponding to the two features $x_1$ and $x_2$ respectively.

This is a snapshot of all the training datapoints and the decision boundary at some intermediate stage of the training process, just before processing point *A*. Note that the image is drawn to scale. So, assume that the grid lines are equally spaced with unit distance between successive lines in both axes.




At this stage:

• $|w_1| = |w_2| = 1$

• Threshold for inference is 0.5 (refer to useful data).

• Except for point *A* that lies on the decision boundary, all points are classified correctly by the model.

Sub-question 22 is before the update using point *A*, sub-questions 23 and 24 are after the update using point *A*.

**Sub questions**

**Question Number : 352 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the value of the weight vector $\boldsymbol{w} = [w_0, w_1, w_2]^T$?

**Options :**

A. ✖ $[0, 1, 1]^T$

B. ✔ $[0, -1, 1]^T$

C. ✖ $[0, 1, -1]^T$

D. ✖ $[1, 1, 1]^T$

E. ✖ $[-1, 1, 1]^T$

**Question Number : 353 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

In the next iteration of SGD, the point *A* = (1, 1) that lies on the decision boundary is used by the algorithm to update the weights. Note that the point *A* belongs to the negative class. What is the value of the weight vector after the update? Use a learning of 2 for this update.

**Options :**

A. ✖ $[0, 1, -1]^T$

B. ✔ $[-1, -2, 0]^T$

C. ✖ $[-0.5, -1.5, 0.5]^T$

D. ✖ $[0,-1, 1]^T$

**Question Number : 354 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

If the training is halted at this stage and the model is evaluated on the entire dataset that you see in the given image, how many points will be misclassified? Use a threshold of 0.5 for inference. Note that the image is drawn to scale.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0

**Question Type : COMPREHENSION**

**Question Numbers : (355 to 356)**

Question Label : Comprehension

Consider a binary classification problem, where the feature vector $\boldsymbol{x} = (x_1, x_2)$ is a two-dimensional binary vector, i.e., each feature is binary. The class label $y$ is indexed using 1 and 2. A sample feature matrix and label vector is given below:

$$X = \begin{bmatrix} 1 & 0 \\ 0 & 0 \\ 0 & 1 \\ 1 & 0 \end{bmatrix}, y = \begin{bmatrix} 1 \\ 2 \\ 2 \\ 1 \end{bmatrix}$$

A Bernoulli Naive-Bayes classifier is trained for this data and the following parameter matrix is estimated:

$$P = \begin{bmatrix} p_{11} & p_{12} \\ p_{21} & p_{22} \end{bmatrix}$$

This matrix is to be understood as follows. For features $x_1$ and $x_2$:

$$p_{ij} = P(x_i = 1 \mid y = j)$$

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 355 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the value of the following probability?

$$P(x = (0, 0) \mid y = 1)$$

**Options :**

A. ✔ $(1 - p_{11}) \cdot (1 - p_{21})$

B. ✖ $p_{11} \cdot p_{21}$

C. ✖ $p_{12} \cdot p_{22}$

D. ✖ $(1 - p_{12}) \cdot (1 - p_{22})$

**Question Number : 356 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following expression:

$$\frac{p_{12} \cdot (1 - p_{22})}{p_{12} \cdot (1 - p_{22}) + p_{11} \cdot (1 - p_{21})}$$

What is this equal to? You can assume that the prior probability is equal to 0.5 for both the classes.

**Options :**

A. ✖ It is the probability that the label is 1, given that the data-point is (1, 0).

B. ✔ It is the probability that the label is 2, given that the data-point is (1, 0).

C. ✖ It is the probability of observing the data-point (1, 0), given the label 1.

D. ✖ It is the probability of observing the data-point (0, 1), given the label 2.

E. ✖ It is the probability that the label is 1, given that the data-point is (0, 1).

F. ✖ It is the probability that the label is 2, given that the data-point is (0, 1).

**Question Type : COMPREHENSION**

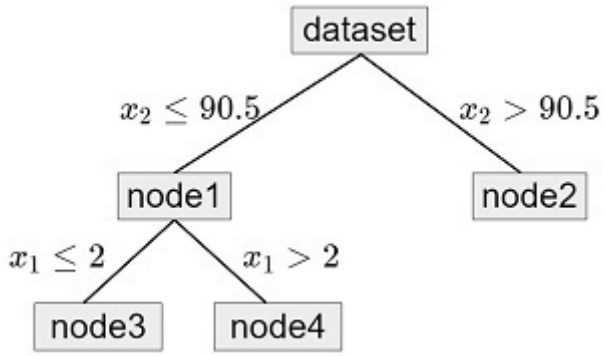
**Question Numbers : (357 to 358)**

Question Label : Comprehension

Consider the following training dataset with two features: no. of courses opted ($x_1$) and graded assignments' average score ($x_2$) and the target is final exam's score ($Y$).

| $x_1$ | $x_2$ | $Y$ |
|---|---|---|
| 1 | 90.5 | 55 |
| 2 | 95 | 81 |
| 2 | 70.5 | 45 |
| 1 | 92 | 72 |
| 3 | 83.5 | 66 |
| 3 | 88 | 58 |
| 2 | 91 | 96 |
| 2 | 78 | 42 |
| 3 | 60 | 57 |
| 3 | 91 | 86 |

Its regression tree is given as:




Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 357 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

If a student has opted 2 courses and his average score of graded assignments is 83, What will be the predicted final exam's score for him as per the given tree? Enter your answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

47.31 to 47.35

**Question Number : 358 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

If one student is predicted to be in node4, how many courses he has opted?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3

**Question Type : COMPREHENSION**

**Question Numbers : (359 to 360)**

Question Label : Comprehension

Consider a multi-class classification problem with $m$ classes. The feature vector is of size $m$. You don't need to add any dummy feature as we will be working with a neural network.

The network has $h$ hidden layers, each having m neurons. So, the network architecture would be a list of size $h + 2$, where all the elements are equal to $m$: $[m, \cdots, m]$

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 359 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

How many parameters (weights + biases) does the network have?

**Options :**

A. ✔ $(h + 1) \cdot m \cdot (m + 1)$

B. ✖ $h \cdot m \cdot (m + 1)$

C. ✖ $(h + 1) \cdot m^2$

D. ✖ $h \cdot m^2$

**Question Number : 360 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

If $m = 10$ and the network has 550 parameters (weights + biases), how many hidden layers does it have?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Question Number : 361 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

There is a dataset with 2000 samples. 21 samples belong to positive class and rest belong to

negative class. Charu trains a k-NN model on the entire dataset with k = 43. She computes classification metrics. Which of the following is likely to be output of her training:

**Options :**

A. ✖ Accuracy will be 0.

B. ✔ Accuracy will be 0.9895.

C. ✔ F1 score will be 0.

D. ✖ F1 score will be low but greater than 0.

E. ✖ Recall will be low but greater than 0.

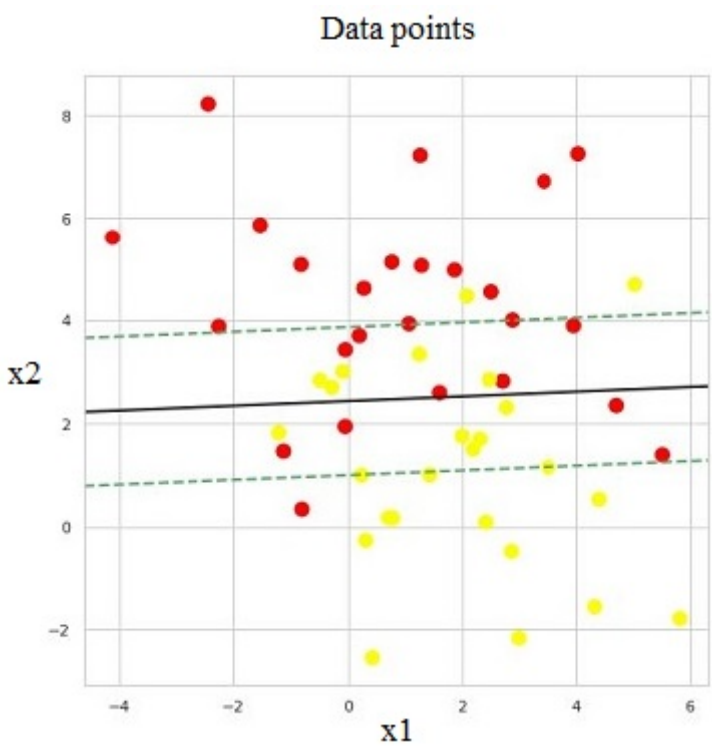
F. ✔ Recall score will be 0.

**Question Type : COMPREHENSION**

**Question Numbers : (362 to 363)**

Question Label : Comprehension

You have a non-linear dataset with two classes and want to use a support vector machine classifier to this dataset. Assume that you are using soft margin SVM. The dataset on which you are training is given below:



• Red colored points represent positive class.

• Yellow colored points represent negative class.

Consider the following four plots where the black line is the decision boundary and the dotted green lines are the bounding planes.

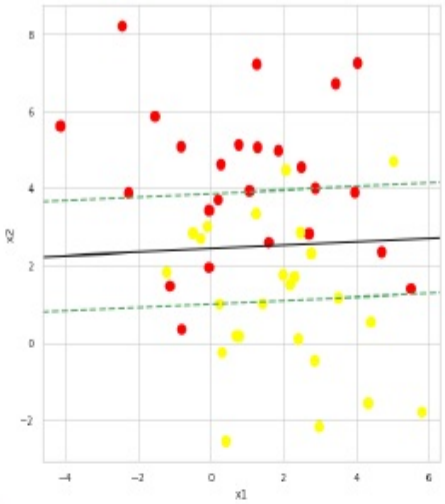



Fig.1.

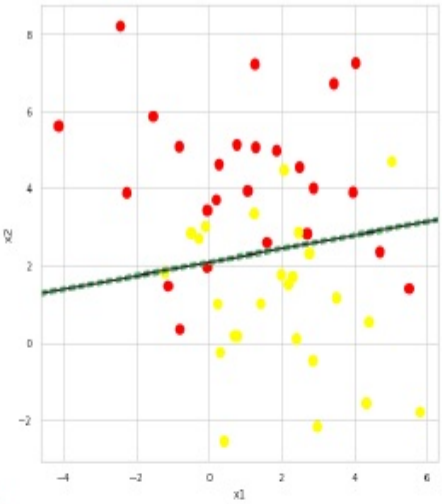



Fig.2.

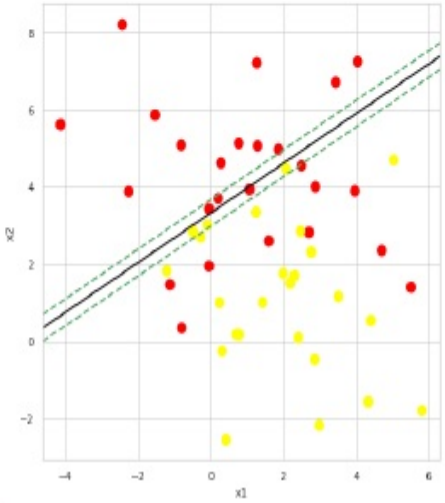



Fig.3.

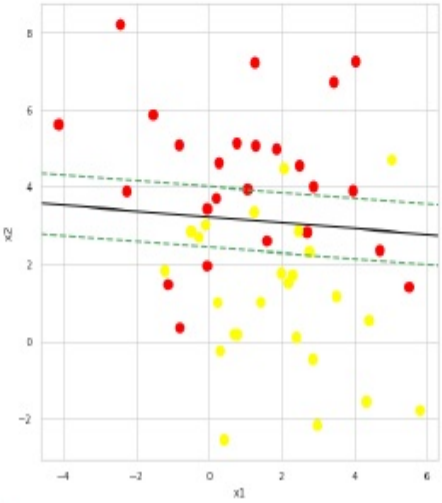



Fig.4.

A list of C values that are used for soft SVM classification to penalize slack variable are given as follows:

(i) C = 100

(ii) C = 10

(iii) C = 1000

(iv) C = 500

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 362 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Choose the correct match of decision boundaries shown in the figures with the C values based on qualitative assessment of the plots.

Match the data plots with its correct C value.

**Options :**

A. ✖ (Fig.1 - (ii)), (Fig.2 - (i)), (Fig.3 - (iii)), (Fig.4 - (iv))

B. ✖ (Fig.1 - (iii)), (Fig.2 - (i)), (Fig.3 - (iv)), (Fig.4 - (ii))

C. ✔ (Fig.1 - (ii)), (Fig.2 - (iii)), (Fig.3 - (iv)), (Fig.4 - (i))

D. ✖ (Fig.1 - (i)), (Fig.2 - (iv)), (Fig.3 - (iii)), (Fig.4 - (ii))

**Question Number : 363 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Now assume that you have split this dataset into training and test sets with 80:20 ratio. You have used kernel SVM with polynomial kernel of degree 2 instead of soft margin SVM and have obtained 100 percentage accuracy for both training and testing. What would you think will happen, if you increase model complexity by increasing the degree of the polynomial kernel to 9 and perform training and testing once again? Choose the correct statement from the following:

**Options :**

A. ✖ The new model will underfit the data.

B. ✔ The new model will overfit the data.

C. ✖ The new model will give same result as previous model.

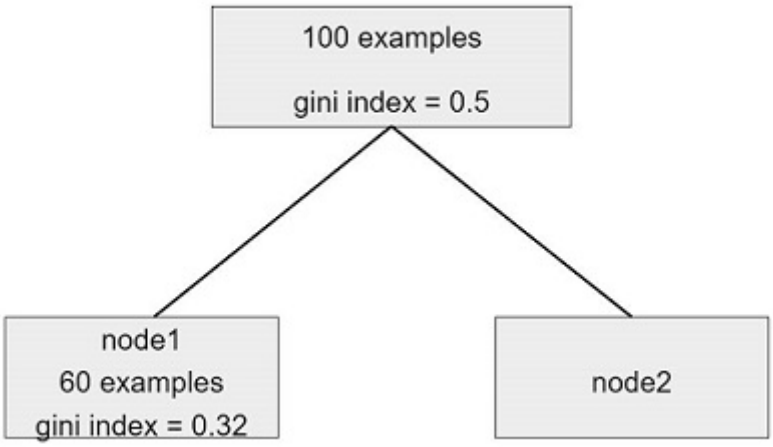
D. ✖ Can’t determine.

**Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group**

**Comprehension Questions : No**

**Question Numbers : (364 to 367)**

Question Label : Comprehension




Consider a classification tree with two classes (0 and 1) as shown in the above image. Gini index of the root node(entire dataset) is 0.5 and there are 100 examples in the root node. This root node is split into two child nodes node1 and node2 such that node1 has 60 examples and gini index of 0.32.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 364 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

How many examples in the root node belong to class 1?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

50

**Question Number : 365 Question Type : SA**

**Correct Marks : 1**

Question Label : Short Answer Question

If majority of examples in node1 belongs to class 1, how many examples in node1 belong to class 0?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

12

**Question Number : 366 Question Type : SA**

**Correct Marks : 2**

Question Label : Short Answer Question

What will be the gini index of node2? Write your answer correct to three decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.08 to 0.10

**Question Number : 367 Question Type : SA**

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

**Correct Marks : 2**

Question Label : Short Answer Question

Find the information gain (using gini index) of the split. Write your answer correct to two decimal places.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.25 to 0.29

**Question Number : 368 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the following data points

| |
|---|
| (1,2) |
| (2,3) |
| (2,4) |
| (3,1) |

We perform k-means clustering on the above data, with $k = 2$, using Manhattan distance as the distance measure. We choose (1,2) as centroid for cluster-1 and (3,1) as the centroid for cluster-2. After performing one iteration the point (2,4) will belong to

**Options :**

A. ✔ cluster-1

B. ✖ cluster-2

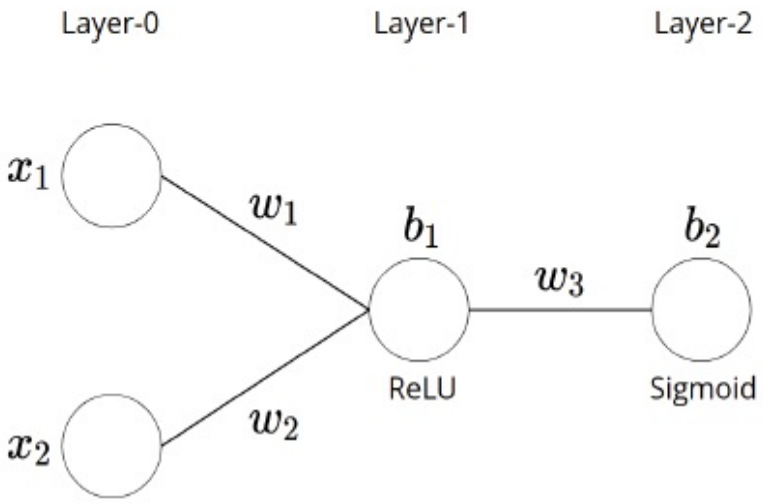
C. ✖ can not be determined

**Question Type : COMPREHENSION**

**Question Numbers : (369 to 372)**

Question Label : Comprehension

Consider a neural network with the following architecture: $[2, 1, 1]$. The hidden layer uses ReLU activation function and the output layer uses sigmoid, referred to as $\sigma$.




This network is used to solve a binary classification task with binary cross entropy loss. Recall that this setup is similar to logistic regression. Likewise, inference is also similar to logistic regression. The input vector to the network is $\boldsymbol{x} = [x_1, x_2]^T$ and the output is $\hat{y}$. The true label for this data-point is given by $y$ which lies in the set $\{0, 1\}$.

Note:

- This is a toy network and will do a poor job at classification. Don't worry about that.
- $\hat{y}$ is the output of the network and not the predicted label. Don't confuse this with the notation used in the useful data for logistic regression.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 369 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

$z_1$ is the pre-activation at layer-1. Which of the following is the correct expression for $z_1$?

**Options :**

A. ✔ $z_1 = w_1x_1 + w_2x_2 + b_1$

B. ✖ $z_1 = w_1x_1 + b_1$

C. ✖ $z_1 = w_2x_2 + b_1$

D. ✖ $z_1 = w_1x_1 + w_2x_2$

E. ✖ $z_1 = \text{ReLU}(w_1x_1 + w_2x_2)$

**Question Number : 370 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

$a_1$ is the activation at layer-1. Which of the following is the correct expression for the output $\hat{y}$ of the network? $\sigma$ is the sigmoid function.

**Options :**

A. ✔ $\hat{y} = \sigma(w_3a_1 + b_2)$

B. ✖ $\hat{y} = w_3a_1 + b_2$

C. ✖ $\hat{y} = \text{ReLU}(w_3a_1 + b_2)$

D. ✖ $\hat{y} = \sigma(w_3a_1 + b_1)$

**Question Number : 371 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

This network is tested on a dataset of 100 points, with 50 points in each class. Additionally, you are given the following information:

- All the points lie in the first quadrant: $x_1, x_2 > 0$ for all datapoints.
- All the parameters of the network are positive.
- $\hat{y} \neq 0.5$ for any point in this dataset.

The threshold for classification is set to 0.5. What will be the classification accuracy?

**NOTE:** The answer is between [0, 1]. Enter your answer correct to one decimal place.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0.5

**Question Number : 372 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Consider a variant of this network in which the hidden layer activation is changed from ReLU to

the identity function: $a_1 = g(z_1) = z_1$. The output activation function remains sigmoid. This new network is equivalent to a logistic regression model with weights **w** and a bias *b*:

$$\hat{y} = \sigma(\boldsymbol{w}^T \boldsymbol{x} + b)$$

What are the values of **w** and *b* in terms of the network's parameters? Choose exactly one option for **w** and one for *b*.

**Options :**

A. ✔ $\boldsymbol{w} = [w_3 w_1, w_3 w_2]^T$

B. ✔ $b = w_3 b_1 + b_2$

C. ✖ $\boldsymbol{w} = [w_1, w_2]^T$

D. ✖ $b = b_1 + b_2$

E. ✖ $\boldsymbol{w} = [w_1 w_2, w_2 w_3]^T$

F. ✖ $b = b_1 b_2$

# PDSA

**Number of Questions :** 30

**Section Marks :** 100

**Question Number : 373 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL: PROGRAMMING DATA STRUCTURES AND ALGORITHMS USING PYTHON"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 374 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Let $g(n) = 10n^3 + 20n^3$ and $f(n) = 102n^4 \log n + 26n^2$. Which of the following is **true**?

**Options :**

A. ✖ $f(n)$ is $O(g(n))$ and $g(n)$ is $O(f(n))$

B. ✖ $f(n)$ is $O(g(n))$, but $g(n)$ is not $O(f(n))$

C. ✖ $f(n)$ is not $O(g(n))$ and $g(n)$ is not $O(f(n))$

D. ✔ $g(n)$ is $O(f(n))$, but $f(n)$ is not $O(g(n))$

**Question Number : 375 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following statements is/are **true** about the Quicksort algorithm? Assume that the first element in the list selected as pivot for partitioning each time.

I. The best case is when the pivot element always divides the list into two equal halves.

II. The worst case is when the input list is arranged in either ascending or descending order.

**Options :**

A. ✖ Only I

B. ✖ Only II

C. ✔ Both I and II

D. ✖ None

**Question Number : 376 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

```
class Node:
    def __init__(self,data):
        self.data = data
        self.next = None
```

Consider an implementation of a singly linked list where each node is created using the given class `Node`. Suppose it has a `head` pointer that points to the first node of the linked list and a `tail` pointer that points to the last element of the linked list.

Which of the following operation **can not** be implemented in O(1) time with given representation of the linked list ?

**Options :**

A. ✖ Insertion of the new node at the front of the linked list.

B. ✖ Insertion of the new node at the end of the linked list.

C. ✖ Deletion of the first node of the linked list.

D. ✔ Deletion of the last node of the linked list.

**Question Number : 377 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider a undirected connected graph `G` with `8` vertices. Which of the following is a possible listing of the degrees of vertices in graph `G`?

**Options :**

A. ✖ 2, 3, 1, 4, 3, 4, 3, 3

B. ✖ 4, 2, 2, 3, 1, 3, 3, 5

C. ✔ 1, 2, 3, 1, 4, 2, 1, 2

D. ✖ 1, 2, 2, 2, 2, 1, 3, 4

**Question Number : 378 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider an undirected unweighted graph G. Let a breadth-first traversal of G be done starting from a node `s`. Let `d(s, u)` and `d(s, v)` be the lengths of the shortest paths from `s` to `u` and `v` respectively in terms of the number of edges in G. If `u` is visited before `v` during the breadth-first traversal, which of the following statements is correct?

**Options :**

A. ✖ `d(s, u) < d (s, v)`

B. ✖ `d(s, u) > d(s, v)`

C. ✔ `d(s, u) <= d (s, v)`

D. ✖ `d(s, u) >= d(s, v)`

**Question Number : 379 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Suppose we run Prim's algorithm and Kruskal's algorithm on a graph `G` which have edges with distinct weights and these two algorithms produce minimum-cost spanning trees $T_P$ and $T_K$, with total minimum cost $C_p$ and $C_k$ respectively. Which of the following is **true**?

**Options :**

A. ✖ $T_P$ and $T_K$ are always the same but $C_p$ may not be equal to $C_k$

B. ✖ $T_P$ may be different to $T_K$ but $C_p$ is always equal to $C_k$

C. ✔ $T_P$ and $T_K$ are always the same and $C_p$ is always equal to $C_k$

D. ✖ $T_P$ may be different to $T_K$ and $C_p$ may not be equal to $C_k$

**Question Number : 380 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

A Priority-Queue is implemented as a Max-Heap. Initially, the max-heap is `[20, 18, 15, 13, 12]`. Two new elements 10 and 17 are inserted in the given Max-Heap in that order. Max-Heap after the insertion of the elements is_____

**Options :**

A. ✖ `[20, 18, 17, 15, 13, 12, 10]`

B. ✖ `[20, 18, 17, 12, 13, 10, 15]`

C. ✖ `[20, 18, 17, 10, 12, 13, 15]`

D. ✔ `[20, 18, 17, 13, 12, 10, 15]`

**Question Number : 381 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

A data structure is required for storing a set of integers such that each of the following operations can be done in O(log n) time, where n is the number of elements in the set.

I. Deletion of the smallest element

II. Insertion of an element if it is not already present in the set

Which of the following options are **true**?

**Options :**

A. ✖ A heap can be used but not a balanced binary search tree

B. ✔ A balanced binary search tree can be used but not a heap

C. ✖ Both balanced binary search tree and heap can be used

D. ✖ Neither balanced search tree nor heap can be used

**Question Number : 382 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Suppose the letters {a, b, c, d, e} occur with the following frequencies.

| Character | a | b | c | d | e |
|---|---|---|---|---|---|
| Frequencies | 33 | 20 | 19 | 24 | 4 |

How many bits will be used to encode the letter **d** in the Huffman code for this alphabet?

**Options :**

A. ✖ 1

B. ✔ 2

C. ✖ 3

D. ✖ 4

**Question Number : 383 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

In a list `L`, two elements `L[i]` and `L[j]` form a **significant inversion** if `L[i] > 2 * L[j]` and `i < j`. The total number of significant inversions for `L = [4, 5, 2, 1, 3]` is_____

**Options :**

A. ✖ 2

B. ✔ 3

C. ✖ 4

D. ✖ 5

**Question Number : 384 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following recurrence relation for an algorithm - $T(n) = 3T(n/3) + n$.

The complexity of this algorithm is_____

**Options :**

A. ✖ $O(1)$

B. ✖ $O(logn)$

C. ✖ $O(n)$

D. ✔ $O(nlogn)$

**Question Number : 385 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider $n$ matrices $M_0, M_1, M_2 \cdots M_{n-1}$ which need to be multiplied. Let $C(i,j)$ be the cost required to multiply matrices $M_i$ to $M_j$ in the sequence. We compute $C(0, n-1)$ to get the overall cost.

Which of the following statement is **true**?

**Options :**

A. ✔ $C(i,j)$ depends on $C(i,k-1)$ and $C(k,j)$ for every $i < k \leq j$

B. ✖ $C(i,j)$ depends on $C(i,k-1)$ and $C(k,j)$ for every $i \leq k \leq j$

C. ✖ $C(i,j)$ depends on $C(i,k)$ and $C(k,j)$ for every $i < k \leq j$

D. ✖ $C(i,j)$ depends on $C(i,k)$ and $C(k+1,j)$ for every $i < k \leq j$

**Question Number : 386 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the function `mystery()` that takes strings `X` and `Y` as input. What will `mystery('ABRTCRT','ETAIBRC')` return? `LCS(X,Y)` returns the length of the longest common subsequence of X and Y.

```
def mystery(X, Y):
    m = len(X)
    n = len(Y)
    l = LCS(X, Y)
    return (m + n - l)
```

**Options :**

A. ✖ 7

B. ✖ 8

C. ✖ 9

D. ✔ 10

**Question Number : 387 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following option represents the fail function (or prefix function) for pattern **'bonbon'** in the Knuth-Morris-Pratt (KMP) algorithm?

**Options :**

A. ✖ [0, 0, 0, 1, 1, 2]

B. ✔ [0, 0, 0, 1, 2, 3]

C. ✖ [0, 0, 1, 2, 3, 3]

D. ✖ [0, 0, 0, 0, 1, 2]

**Question Number : 388 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

A problem in NP is NP-complete if_____

**Options :**

A. ✖ It can be reduced to the 3-SAT problem in polynomial time

B. ✖ It can be reduced to any other problem in NP in polynomial time

C. ✖ some problem in NP can be reduced to it in polynomial time

D. ✔ The 3-SAT problem can be reduced to it in polynomial time

**Question Number : 389 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

A company makes two kinds of leather belts, belt A and belt B. Belt A is a high quality belt and belt B is of lower quality. The respective profits are Rs 5 and Rs 6 per belt. The production of each of type A requires twice as much time as a belt of type B, and if all belts were of type B, the company could make 1,000 belts per day. The supply of leather is sufficient for only 800 belts per day (both A and B combined). Belt A requires a fancy buckle and only 300 of these are available per day. There are only 800 buckles a day available for belt B.

The above problem is to be formulated as a linear programming problem. Let $x_1$ and $x_2$ be the number of belts of type A and B, respectively, manufactured each day. Which of the following is **not a valid** constraint?

**Options :**

A. ✖ $x_1 \leq 300$

B. ✖ $x_2 \leq 800$

C. ✔ $x_1 + 2x_2 \leq 1000$

D. ✖ $2x_1 + x_2 \leq 1000$

**Question Number : 390 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the following implementation for Stack.

```
class Stack:
    def __init__(self):
        self.stack = []
    def Push(self,v):
        self.stack.append(v)
    def isempty(self):
        return(self.stack == [])
    def Pop(self):
        v = None
        if not self.isempty():
            v = self.stack.pop()
        return(v)
```

```
def fun(S):
    if (not S.isempty()):
        i = S.Pop()
        fun(S)
        S.Push(i)
```

What operation is performed by the above function `fun(S)`? S is a stack created using the given class `Stack`.

**Options :**

A. ✔ Leaves the stack S unchanged

B. ✖ Reverses the order of elements in the stack S

C. ✖ Swaps the elements of the top and bottom positions in stack S, keeping the other elements in between in the same order

D. ✖ Empties the stack S

**Question Number : 391 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the following implementation for Queue

```
class Queue:
    def __init__(self):
        self.queue = []
    def enqueue(self,v):
        self.queue.append(v)
    def isempty(self):
        return(self.queue == [])
    def dequeue(self):
        v = None
        if not self.isempty():
            v = self.queue[0]
            self.queue = self.queue[1:]
        return(v)
```

Which of the following function returns the correct list of the first `n` Fibonacci numbers starting from 0?

**Options :**

A. ✖

```
def fib(n):
    fiblist=[]
    Q = Queue()
    Q.enqueue(1)
    Q.enqueue(0)
    for i in range(1,n+1)
        a = Q.dequeue()
        b = Q.dequeue()
        Q.enqueue(a + b)
        Q.enqueue(b)
        fiblist.append(a)
    return fiblist
```

```
def fib(n):
    fiblist=[]
    Q = Queue()
    Q.enqueue(0)
    Q.enqueue(1)
    for i in range(1,n+1):
        a = Q.dequeue()
        b = Q.dequeue()
        Q.enqueue(a + b)
        Q.enqueue(b)
        fiblist.append(a)
    return fiblist
```

B. ✖

```
def fib(n):
    fiblist=[]
    Q = Queue()
    Q.enqueue(0)
    Q.enqueue(1)
    for i in range(1,n+1):
        a = Q.dequeue()
        b = Q.dequeue()
        Q.enqueue(b)
        Q.enqueue(a + b)
        fiblist.append(a)
    return fiblist
```

C. ✔

```
def fib(n):
    fiblist=[]
    Q = Queue()
    Q.enqueue(1)
    Q.enqueue(0)
    for i in range(1,n+1):
        a = Q.dequeue()
        b = Q.dequeue()
        Q.enqueue(a)
        Q.enqueue(a + b)
        fiblist.append(b)
    return fiblist
```

D. ✖

**Question Number : 392 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider a complete binary tree T with 15 nodes. Let distance of a node represent the number of edges from the root to that node. Let A be the distance of the 3rd visited node from the root by applying Breadth-First Search on T. Let B be the distance of the 7th visited node from the root by applying Depth-First Search on T. Both BFS and DFS start from the root node(1st visited node). The value of |A - B| is __

**Options :**

A. ✖ 0

B. ✖ 1

C. ✔ 2

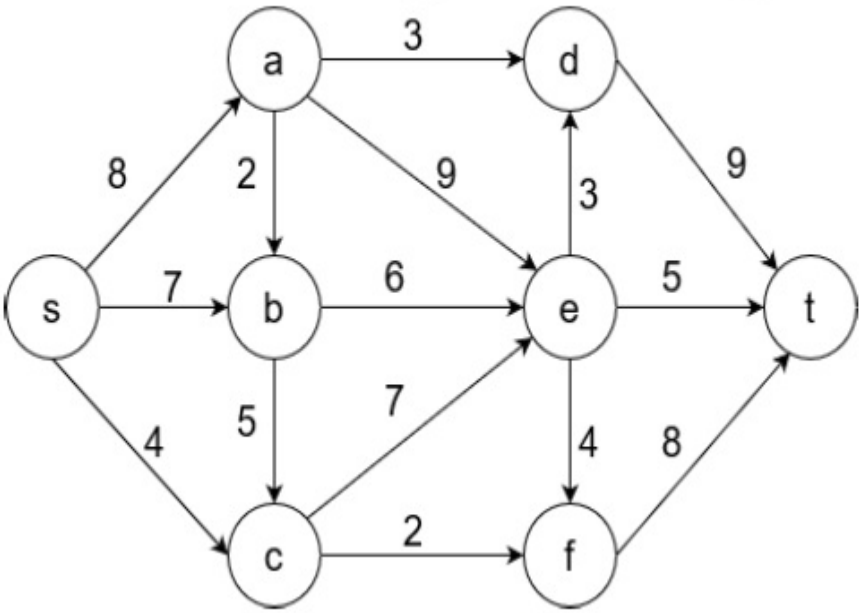
D. ✖ 3

**Question Number : 393 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the network given below with source $s$ and sink $t$, with the numbers on the edges denoting maximum capacity across a particular edge




Which of the following edges form a **valid min cut** in the given network?

**Options :**

A. ✔ Edges $\{ad, ed, et, ef, cf\}$

B. ✖ Edges $\{ad, ae, be, ce, cf\}$

C. ✖ Edges $\{ad, ed, et, ft, cf\}$

D. ✖ Edges $\{ad, ed, ef, cf\}$

**Question Number : 394 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

A hash table of size 10 uses open addressing with hash function `h(k) = k mod 10`, and linear probing. After inserting 6 values into an empty hash table, the table is as shown below.

| Index | Data |
|---|---|
| 0 | |
| 1 | |
| 2 | 72 |
| 3 | 23 |
| 4 | 12 |
| 5 | 54 |
| 6 | 36 |
| 7 | 83 |
| 8 | |
| 9 | |

Which one of the following option(s) gives a possible order in which the key values could have been inserted in the table?

**Options :**

A. ✔ 23, 36, 72, 12, 54, 83

B. ✔ 36, 72, 23, 12, 54, 83

C. ✖ 36, 23, 72, 12, 83, 54

D. ✔ 36, 23, 72, 12, 54, 83

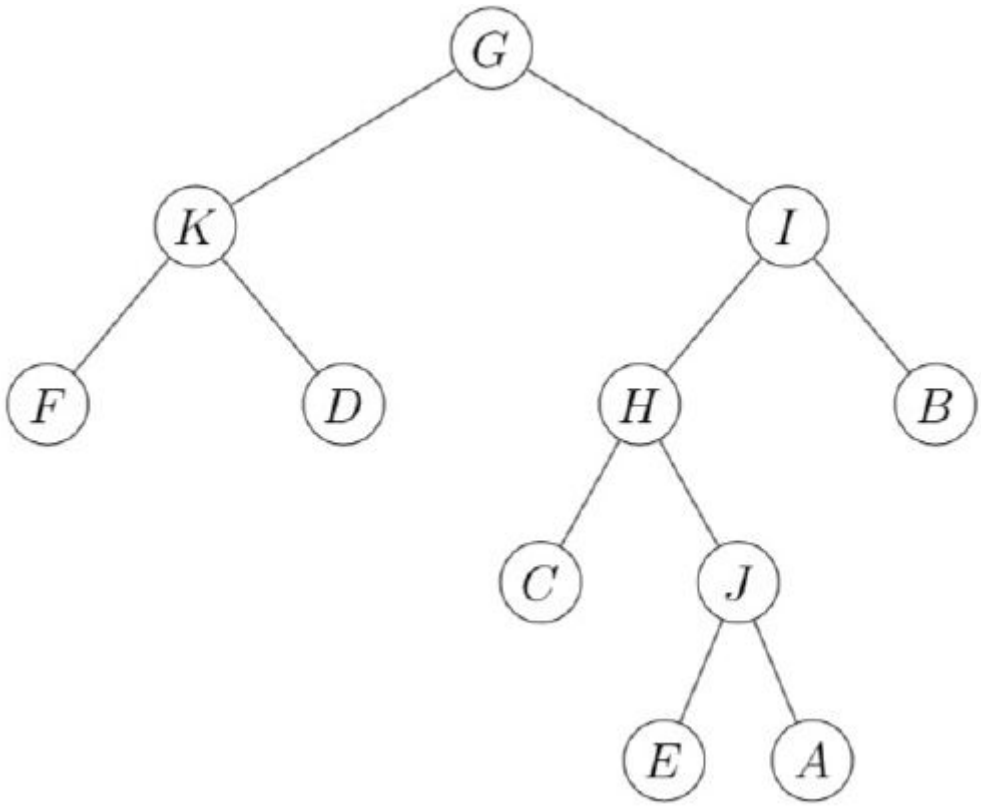
E. ✖ 72, 23, 36, 54, 12, 83

**Question Number : 395 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Suppose we obtain the following **BFS** tree rooted at node G for an undirected graph with vertices {A, B, C, D, E, F, G, H, I, J, K}.




Which of the following **can not** be an edge/edges in the original graph?

**Options :**

A. ✔ (D, G)

B. ✖ (F, D)

C. ✔ `(A, I)`

D. ✖ `(C, B)`

E. ✔ `(E, H)`

**Question Number : 396 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Which of the following statement is **true** about Dijkstra's algorithm to find shortest path?

**Options :**

A. ✔ Dijkstra’s algorithm doesn’t work for graphs with negative weights.

B. ✖ It returns the shortest path between all pair of nodes.

C. ✖ The shortest path returned by Dijkstra's algorithm always passes through the least number of vertices.

D. ✔ To decide which node to visit next, Dijkstra's algorithm selects the node with smallest known distance

E. ✖ It can find the shortest path for only acyclic graphs

**Question Number : 397 Question Type : MSQ**

**Correct Marks : 3**

Question Label : Multiple Select Question

Which of the following statements is **true** about binary trees? Assume that the height of the empty tree is 0.

**Options :**

A. ✔ If the number of nodes in the tree is *n*, then the maximum height of the tree can be *n*.

B. ✔ If the number of nodes in the tree is *n*, then the minimum height of the tree will be *int(log(n))* + 1.

C. ✖ The number of leaf nodes is always one more than the number of non-leaf nodes.

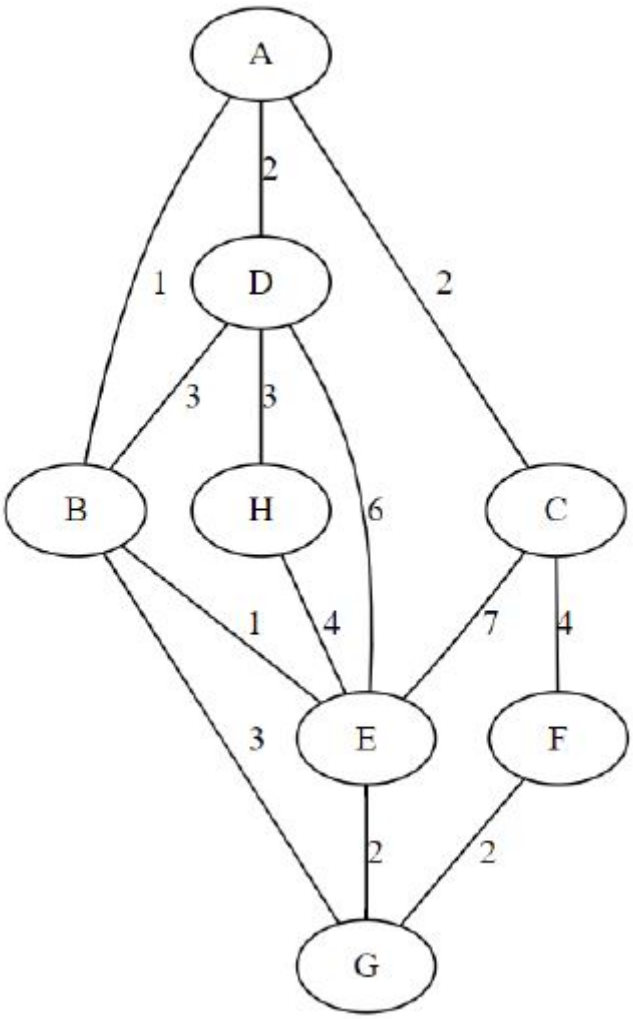
D. ✖ If number of nodes in the tree is $n$, then the number of edges in the tree will be $n + 1$.

E. ✔ Maximum number of nodes at level $L$ will be $2^L$ (if level number starts from 0(root node)).

**Question Number : 398 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question




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

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

13

**Question Number : 399 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

What will be the minimum number of nodes in an AVL tree of height 8 ? Consider that the height of the empty tree is 0.

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

54

**Question Number : 400 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

For an activity $X$, $X_s$ is the starting time and $X_e$ is the ending time. The following are the starting time and ending time of activities A, B, C, D, E, F, G and H given in chronological order.

$A_s, B_s, C_s, A_e, D_s, E_s, C_e, B_e, F_s, D_e, G_s, H_s, E_e, F_e, G_e, H_e$

What is the minimum number of rooms required to schedule the activities in a set of rooms such that there are no conflicts?

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Question Number : 401 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

Consider the following function `MoM`

```
def MoM(L): # Median of medians
  if len(L) <= 5:
    L.sort()
    return(L[len(L)//2])
  # Construct list of block medians
  M = []
  for i in range(0,len(L),5):
    X = L[i:i+5]
    X.sort()
    M.append(X[len(X)//2])
  return(MoM(M))
```

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

```
[4,3,5,6,2,1,8,9,12,10,19,15,18,17,11,7,21,18,25,23]
```

**NOTE:** Enter your answer to the nearest integer.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

17

**Question Type : COMPREHENSION**

**Question Numbers : (402 to 403)**

Question Label : Comprehension

Consider the following code, where L is a non-empty list of integers.

```
def mystery(L):
    n = len(L)
    S = [1] * n
    for i in range(1, n):
        for j in range(0, i):
            if L[i] < L[j] and S[i] < S[j] + 1:
                S[i] = S[j] + 1
    return max(S)
```

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 402 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

What function does `mystery(L)` return?

**Options :**

A. ✔ length of the longest strictly decreasing subsequence

B. ✖ length of the longest strictly increasing subsequence

C. ✖ length of the longest contiguous strictly decreasing sequence

D. ✖ length of the longest contiguous strictly increasing sequence

**Question Number : 403 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

What is the time complexity for function `mystery()`?

**Options :**

A. ✔ $O(n^2)$

B. ✖ $O(n\ log\ n)$

C. ✖ $O(log\ n)$

D. ✖ $O(n)$

# System Commands

| | |
|---|---|
| **Number of Questions :** | 25 |
| **Section Marks :** | 100 |

**Question Number : 404 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : SYSTEM COMMANDS"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 405 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

Suppose the file system on a machine is as given below. All the file names in this system start with the word `file` rest are directories.

E.g. directory `home` is the subdirectory of root( / ) directory, `folder_1` is a subdirectory of `home` directory, files `file011.txt` and `file012.txt` are located in directory `folder_1` and so on.

```
/
|
└──home
  |
  └──Desktop
  └──Documents
  └──Downloads
  |
  └──folder_1
  |   |   file011.txt
  |   |   file012.txt
  |   |
  |   └──subfolder_1
  |       |   file111.txt
  |       |   file112.txt
  |
  └──folder_2
      |   file021.txt
      |   file022.txt
      |
      └──subfolder_2
          |   file121.txt
          |   file122.txt
```

Ram wants to move file `file111.txt` from `subfolder_1` to `subfolder_2` and also rename it to `file123.txt`. Which of the following commands can be used to achieve this?

The output of running `pwd` command before running any of the below commands is `/home/folder_1/subfolder_1`.

## Options :

A. ✔

```
mv file111.txt ../../folder_2/subfolder_2/file123.txt
```

B. ✖

```
mv file111.txt ../../folder_2/subfolder_2/
mv file111.txt file123.txt
```

C. ✔

```
mv /home/folder_1/subfolder_1/file111.txt /home/folder_2/subfolder_2/file123.txt
```

D. ✖

```
mv file111.txt ../subfolder_2/file123.txt
```

**Question Number : 406 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

Select the keyboard inputs that will exit from the loop of the below code.

```
#!/bin/bash

echo "Enter a number between 1 and 10"
echo "A lucky number will exit from the loop"

select i in {1..10}; do
  case $i in
    1 | 4 | 6)
      echo "Wrong choice"
      ;;
    2 | 3 | 5 | 7)
      echo "It is not a prime number"
      ;;
    8 | 9 | 10)
      echo "You have chosen the right one"
      break
      ;;
  esac

done
```

**Options :**

A. ✖ 4

B. ✖ 3

C. ✔ 10

D. ✔ Ctrl+c

**Question Number : 407 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

Choose the commands that will show the CSV file named `file.csv`, without the first and last column.

**Options :**

A. ✖
```
sed -e 's/[(^.*,)|(,.*$)]//g' file.csv
```

B. ✖
```
sed -e 's/^.*,//g' -e 's/,.*$//g' file.csv
```

C. ✔
```
awk 'BEGIN {
  FS=",";
}
{
  for (i=2; i<NF-1; i++){
    printf $i",";
  }
  printf $i;
  printf "\n";
}' file.csv
```

D. ✔
```
sed -e 's/^[^,.]*,//g' -e 's/,[^,.]*$//g' file.csv
```

**Question Number : 408 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

Which of the following **cannot** be considered as the advantages of RAID 6?

**Options :**

A. ✖ Fault tolerance(i.e. in case a disk fails, you won't lose all the data)

B. ✖ Higher read speed.

C. ✔ Higher write speed.

D. ✔ Higher storage capacity.

**Question Number : 409 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

What does the output of the command `ls -lR ../ | grep -e "^[d]" | wc -l` represents?

**Options :**

A. ✖ Number of files in the current directory.

B. ✖ Number of directories in the current directory.

C. ✔ Number of directories and all sub-directories in the parent directory.

D. ✖ Number of directories and all sub-directories in the current directory.

E. ✖ Number of directories in the parent directory.

**Question Number : 410 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

What will be the output of the below command if the directory `myfolder` does not exist in the current directory?

```
cd myfolder 2>/dev/null && echo $?
```

**Options :**

A. ✖ bash: cd: myfolder: No such file or directory.

B. ✖ 0

C. ✖ 1

D. ✔ No output.

**Question Number : 411 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the two commands below.

```
$ cat numbers.txt
1
2
3
4
5
6
$ cat numbers.txt | awk 'BEGIN{value=0;}{value += $1*$1;}END{print value;}'
```

The output of the first command is shown. What will be the output of the second command?

**Options :**

A. ✖ 45

B. ✖ 30

C. ✖ 55

D. ✔ 91

**Question Number : 412 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the commands and their outputs below.

```
$ cat employee_details.txt
A1998001,Ram Kumar,10,Male
B2000002,Sanjay Narayan,7,Male
B2000003,Srishti Rai,10,Female
E1997001,Manoj Pillai,12,Male
G1998001,Preeti Suresh,9,Female
G1999001,Leela L G,16,Female

$ cat script.awk
#!/usr/bin/awk -f
BEGIN{
  OFS=":"
}
NR==3, NR==5 {
  print NR,$1
}

$ awk -f script.awk employee_details.txt
```

The output of the first two commands is shown. What will be the output of the last command?

**Hint:** OFS is the Output field separator used in AWK. OFS is inserted between the fields in the output

**Options :**

A. ✖

```
3:B2000003
4:E1997001
5:G1998001
```

B. ✖

```
3 B2000003
4 E1997001
5 G1998001
```

C. ✔

```
3:B2000003,Srishti
4:E1997001,Manoj
5:G1998001,Preeti
```

D. ✖

```
3:B2000003:Srishti
3:E1997001:Manoj
3:G1998001:Preeti
```

E. ✖

```
B2000003
E1997001
G1998001
```

**Question Number : 413 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

```
0 9 * * * sleep 300 && notify
```

Consider the command above. What will be the frequency of execution of the notify command?

**Hint:** sleep command sleeps the process for the given(as argument) seconds.

And below is the meaning of the sequence in the cron job command. It tells at what date/time periodically the job needs to be executed.

```
*   *   *   *   *   <Command(s) with argument>
|   |   |   |   |              |
|   |   |   |   |      Command or Script to Execute
|   |   |   |   |
|   |   |   |   |
|   |   |   |   |
|   |   |   | Day of the Week(0-6)
|   |   |   |
|   |   | Month of the Year(1-12)
|   |   |
|   | Day of the Month(1-31)
|   |
| Hour(0-23)
|
Min(0-59)
```

**Options :**

A. ✖ Every day at 9:00 am

B. ✔ Every day at 9:05 am

C. ✖ Every day at 9:10 am

D. ✖ 9th of every month 12:00 am

**Question Number : 414 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

Note: Mark the answer with respect to any of the two questions below. The answer is the same for both the questions.

Select the key combination that deletes the last line and get the cursor back to the first line.

With respect to the **Vi** editor, the commands are executed in command mode.

**Hint:** `G` command is to "go to the last line of the document".

(1) Gddgg

(2) gddGG

(3) gDDGG

(4) GDDgg

OR

Select the key/command combination that deletes the last line and get the cursor back to the first line.

With respect to the **Emacs** editor.

**Hint:** `<M->>` command is to "go to the last line of the document".

(1) `<M->><C-a><C-k><BACKSPACE>`

(2) `<C-a>`

(3) `<C-a><C-k>`

(4) `<C-k><BACKSPACE>`

**Options :**

A. ✔ 1

B. ✖ 2

C. ✖ 3

D. ✖ 4

**Question Number : 415 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

The current version of your project files/directories in your local branch is given below. You have made some changes to the files `recompute.py` and `setup.py`.

```
$ tree
.
|-- lib
|   |-- task.py
|-- log.py
|-- main.py
|-- recompute.py
|-- setup.py

1 directory, 5 files
```

Consider the below command output to know the current status of your local repository. It shows that you have not added the edited files to the staging area.

```
$ git status
On branch master
Untracked files:
  (use "git add <file>..." to include in what will be committed)
        log.py
        recompute.py
        setup.py

nothing added to commit but untracked files present (use "git add" to track)
```

You wish to push your changes to the remote branch. What sequence of the below commands can be executed to push your changes done in your local branch to the remote branch. (Given below are just the commands for simplicity without the arguments.)

I. git clone
II. git push
III. git pull
IV. git add
V. git commit

**Options :**

A. ✖ I --> V --> IV --> II

B. ✖ I --> III --> II --> IV --> V

C. ✖ V --> II

D. ✔ IV --> V --> II

E. ✖ III --> II --> V

**Question Number : 416 Question Type : MCQ**

**Correct Marks : 4**

Question Label : Multiple Choice Question

What does the output of the below AWK script represent?

Note: AWK variables NR and FNR are the number of lines processed in overall and individual files respectively.

```
awk '
    NR == FNR {
        arr[NR] = $0
    }
    NR != FNR {
        if ( arr[FNR] == $0 ) {
            print arr[FNR], $0
        }
    }
' file1 file2
```

**Options :**

A. ✖ Lines that are common to both the files `file1` and `file2`

B. ✖ Lines that are not common to both the files `file1` and `file2`

C. ✔ Lines that are common to both the files `file1` and `file2` also having the same line numbers

D. ✖ Lines that are not common to both the files `file1` and `file2` but have the same line numbers

**Question Number : 417 Question Type : SA**

**Correct Marks : 3**

Question Label : Short Answer Question

Use the below command outputs to answer the question below.

```
$ pwd
/home/student
$ cd tmp
$ cd 1241
$ cd 8912
$ cd ../4532/../
$
```

What will be the output of the command `pwd` after executing all the above commands? Give only a single line output answer in the space provided.

Note: Do not add any space before or after your answer. Use only one forward slash('/') between directory names in your answer.

Note: Do not add any space before or after your answer.

**Response Type :** Alphanumeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Answers Case Sensitive :** No

**Text Areas :** PlainText

**Possible Answers :**

/home/student/tmp/1241

**Question Number : 418 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Here is a snapshot of the top command at some instant. Select the process id which accounts for maximum memory usage at that instant.

```
top - 13:36:53 up  3:07,  2 users,  load average: 0.39, 0.33, 0.30
Tasks: 367 total,   1 running, 366 sleeping,   0 stopped,   0 zombie
%Cpu(s):  2.2 us,  2.2 sy,  0.0 ni, 95.6 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :   7613.3 total,    333.0 free,   4090.0 used,   3190.3 buff/cache
MiB Swap:   8192.0 total,   8132.7 free,     59.2 used.   2686.9 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
  10288 student   20   0   40.5g 201200 100300 S   4.3   2.6   4:13.29 Typora
   2124 student   20   0 5210804 349048 110740 S   1.3   4.5   6:58.65 gnome-shell
   3523 student   20   0   16.5g 382416 163336 S   1.3   4.9   5:31.53 chrome
  10251 student   20   0  488404 116472  73324 S   1.3   1.5   1:28.84 Typora
   8490 student   20   0   17.2g 342048 168412 S   1.0   4.4   3:00.44 msedge
   1966 student   20   0  521560  87804  48252 S   0.7   1.1   4:54.69 Xorg
   8630 student   20   0   36.5g 602928 114400 S   0.7   7.7   6:12.42 msedge
```

**Options :**

A. ✖ 10288

B. ✖ Typora

C. ✖ 110740

D. ✔ 3523

**Question Type : COMPREHENSION**

**Question Numbers : (419 to 420)**

Question Label : Comprehension

Given below are the commands executed on a bash terminal in the same sequence.

```
$ pwd
/home/user1/bigg
$
$ ls -l
total 24
-rw-rw-r-- 2 user1 group1   56 Mar 25 18:14 bigFile.csv
drwxrwxr-x 2 user1 group1 4096 Mar 25 18:21 movedir
drwxrwxr-x 2 user1 group1 4096 Mar 25 18:24 subdir1
drwxrwxr-x 2 user1 group1 4096 Mar 25 18:24 subdir2
drwxrwxr-x 2 user1 group1 4096 Mar 25 18:24 subdir3
$
$ ln -s bigFile.csv subdir1/slink1
$
$ ln -s $PWD/movedir/bigFile.csv subdir2/slink2
$
$ ln bigFile.csv subdir3/hlink3
$
$ cp bigFile.csv copyFile.csv
$
$ echo "new,line" >>bigFile.csv
$
$ mv bigFile.csv movedir/
$
$ ls -l subdir*
subdir1:
total 0
lrwxrwxrwx 1 user1 group1 11 Mar 25 18:50 slink1 -> bigFile.csv

subdir2:

total 0
lrwxrwxrwx 1 user1 group1 49 Mar 25 18:50 slink2 ->
/home/user1/bigg/movedir/bigFile.csv

subdir3:
total 4
-rw-rw-r-- 2 user1 group1 65 Mar 25 18:50 hlink3
```

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 419 Question Type : MSQ**

**Correct Marks : 5**

Question Label : Multiple Select Question

Just after executing all the given commands, we execute the commands given below in the options. Which of the following commands will execute without failing.

**Options :**

A. ✖ `cat bigFile.csv`

B. ✖ `cat subdir1/slink1`

C. ✔ `cat subdir2/slink2`

D. ✔ `cat subdir3/hlink3`

E. ✔ `cat copyFile.csv`

**Question Number : 420 Question Type : MSQ**

**Correct Marks : 4**

Question Label : Multiple Select Question

Which of the following commands after executing the commands given in the main question will give the same output as `cat movedir/bigFile.csv`?

**Options :**

A. ✖ `cat bigFile.csv`

B. ✖ `cat subdir1/slink1`

C. ✔ `cat subdir2/slink2`

D. ✔ `cat subdir3/hlink3`

E. ✖ `cat copyFile.csv`

**Question Number : 421 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

SWIFT codes are unique to each financial institution branch. We need to write a bash command to check if the SWIFT code provided in the shell variable `swift` is a valid SWIFT code.

A valid SWIFT code should be **at least** 10 characters long. The first 4 letters should be the upper case alphabets, the fifth one should be a zero, followed by 4 digits, followed by one or more upper case letters.

We want to write a bash script that displays the word `VALID` if the code in variable `swift` is a valid SWIFT code, else displays the word `INVALID` and returns with exit status code 80.

Which of the following bash scripts will successfully check the SWIFT code and print the output as described above.

**Options :**

A. ✖
```
echo $swift | egrep -q '[A-Z]{4}0[0-9]{4}[A-Z]+' || echo "VALID" && (echo "INVALID" ||
exit 80)
```

B. ✔
```
echo $swift | egrep -q '[A-Z]{4}0[0-9]{4}[A-Z]+' && echo "VALID" || (echo "INVALID" &&
exit 80)
```

C. ✖
```
echo $swift | egrep -q '[A-Z]{4}0[0-9]{4}[A-Z]*' && echo "VALID" || echo "INVALID" &&
exit 80
```

D. ✖
```
echo $swift | egrep -q '[A-Z]{4}0[0-9]{4}[A-Z]*' && echo "VALID" && echo "INVALID" ||
exit 80
```

**Question Number : 422 Question Type : MCQ**

**Correct Marks : 5**

Question Label : Multiple Choice Question

What will be the output of the below command?

```
echo "1A 2b ab abc3 s4d" | sed 's/\([0-9]\)\([a-z]\)/\1-\U\2/g'
```

Hint: Below is one example showing use of one back reference.

```
echo "as sample" | sed 's/\(a\)/\1\1/'
aas sample
$ echo "as sample" | sed 's/\(a\)/\1b/'
abs sample
```

**Options :**

A. ✔ `1A 2-B ab abc3 s4-D`

B. ✖ `1A 2-b ab abc3- s4-d`

C. ✖ `1-A 2-B ab abc3 s4-D`

D. ✖ `1A 2-b ab abc3 s4-d`

E. ✖ `1A 2-B ab abc3- s4-D`

**Question Number : 423 Question Type : MSQ**

**Correct Marks : 6**

Question Label : Multiple Select Question

Consider a file `twister.txt` with the below contents.

```
$ cat twister.txt
How much wood would a woodchuck chuck,
if a woodchuck could chuck wood?
He would chuck,
he would,
as much as he could,
and chuck as much wood
As a woodchuck would if a woodchuck could chuck wood
```

Which of the following sed scripts when run on file `twister.txt` will print the output as? For ease, the differences in the output from the original file are highlighted in bold. Along with these line number 4 is deleted in the output.

How much wood would a woodchuck chuck,
if a **WOOD**chuck could chuck wood?
he would,
as much as he could,
and chuck as much **WOOD**
As a **WOOD**chuck would if a woodchuck could chuck **WOOD**

####

**Options :**

A. ✔

```
2, $ s/wood/WOOD/3
2, /^As/ s/wood/WOOD/1
/He/ d
$ a ####
```

B. ✖

```
2, $ s/wood/WOOD/1
2, /^As/ s/wood/WOOD/3
/He/ d
$ a ####
```

C. ✔

```
2, /^As/ s/wood/WOOD/1
2, /^As/ s/wood/WOOD/2
/[H]e/ d
$ a ####
```

D. ✖

```
2, /^As/ s/wood/WOOD/1
2, /^As/ s/wood/WOOD/3
/He/ d
$ i ####
```

**Question Number : 424 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

You have been allotted a Linux machine running the latest Ubuntu, that sits inside the IIT Madras campus network. This machine is enabled for you to access it remotely from your local machine at home through a Linux terminal. You did **ssh** from your home machine onto the machine at the campus at 2:00 PM. Currently, you are in front of your machine at the campus, it is 3:00 PM and you do not remember if you closed the ssh session you opened from your home machine an hour back. Which command will you run on the machine at the campus to check if you closed the ssh session that you opened from your home machine?

Assume that you remember the Ip addresses of both your machines and also that your ssh session timeout is set for 3 hours.

**Options :**

A. ✖ ping

B. ✔ netstat

C. ✖ nslookup

D. ✖ ssh

E. ✖ dig

**Question Number : 425 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following commands is equivalent to `awk '{if(NR>=2 && NR<=4) {print $0}}' gnu.txt` ?

**Options :**

A. ✖ `cat gnu.txt | cut -f 2 | cut -f 4`

B. ✔ `head -4 gnu.txt | tail -3`

C. ✖ `sed -n '2p' gnu.txt && sed -n '4p' gnu.txt`

D. ✖ `sed '2,4 p' gnu.txt`

**Question Number : 426 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

```
$ netstat --help
usage: netstat [-vWeenNcCF] [<Af>] -r         netstat {-V|--version|-h|--help}
       netstat [-vWnNcaeol] [<Socket> ...]
       netstat { [-vWeenNac] -i | [-cnNe] -M | -s [-6tuw] }

        -r, --route              display routing table
        -i, --interfaces         display interface table
        -g, --groups             display multicast group memberships
        -s, --statistics         display networking statistics (like SNMP)
        -M, --masquerade         display masqueraded connections

        -v, --verbose            be verbose
        -W, --wide               don't truncate IP addresses
        -n, --numeric            don't resolve names
        --numeric-hosts          don't resolve host names
        --numeric-ports          don't resolve port names
        --numeric-users          don't resolve user names
        -N, --symbolic           resolve hardware names
        -e, --extend             display other/more information
        -p, --programs           display PID/Program name for sockets
        -o, --timers             display timers
        -c, --continuous         continuous listing

        -l, --listening          display listening server sockets
        -a, --all                display all sockets (default: connected)
        -F, --fib                display Forwarding Information Base (default)
        -C, --cache              display routing cache instead of FIB
        -Z, --context            display SELinux security context for sockets

  <Socket>={-t|--tcp} {-u|--udp} {-U|--udplite} {-S|--sctp} {-w|--raw}
           {-x|--unix} --ax25 --ipx --netrom
  <AF>=Use '-6|-4' or '-A <af>' or '--<af>'; default: inet
  List of possible address families (which support routing):
    inet (DARPA Internet) inet6 (IPv6) ax25 (AMPR AX.25)
    netrom (AMPR NET/ROM) ipx (Novell IPX) ddp (Appletalk DDP)
    x25 (CCITT X.25)
```

Using the above help text of the command, select the command that lists only the listening UDP ports.

**Options :**

A. ✖ netstat -tp

B. ✖ netstat -tulpn

C. ✖ netstat -tl

D. ✔ netstat -ul

**Question Number : 427 Question Type : MCQ**

**Correct Marks : 3**

Question Label : Multiple Choice Question

A Linux user does a task very frequently, the task is to create a new directory every day and change the working directory to a newly-created directory. Generally, it can be done by `mkdir` and `cd` commands. But this user wrote a script named `shortcut.sh` that performs both the actions and saved it in his home directory. The file `shortcut.sh` is given below.

```
mkdircd() {
  mkdir "$@" && cd "$1"
}
```

Choose the correct command that will create a new directory named `newdir` and change to the newly-created directory as well. The user executes the below command in his home directory.

**Options :**

A. ✖ `bash mkdircd newdir`

B. ✖ `echo "mkdircd newdir" > ./shortcuts.sh; bash ./shortcuts.sh`

C. ✔ `source ./shortcuts.sh; mkdircd newdir`

D. ✖ `bash ./shortcuts.sh newdir`

**Question Number : 428 Question Type : MCQ**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Consider a file named `employee_details.txt`, that contains information of all the employees in an organization. Given below are the top few lines of the file. All the remaining lines which are not shown are also in the same format as these lines. The first line of the file gives the format.

```
$ head -7 employee_details.txt
RollNumber,Name,Age,Gender
A1998001,Ram Kumar,30,Male
B2000002,Sanjay Narayan,27,Male
B2000003,Srishti Rai,40,Female
E1997001,Manoj Pillai,42,Male
G1998001,Preeti Suresh,19,Female
G1999001,Leela L G,26,Female
```

Consider an awk script named as `extract.awk` with the code as below.

```
#!/usr/bin/awk -f
{
        array[tolower($1)]++
}
END {
        for ( i in array ) {
                if (array[i]>1) {
                        print i, array[i]
                }
        }
}
```

What will be the output of the below command?

```
cat employee_details.txt | sed '1 d' | cut -d "," -f 2 | awk -f extract.awk
```

**Options :**

A. ✖ Total number of males and number of females in the organization.

B. ✖ Last names of all the employees that repeat more than once in the file along with the frequency.

C. ✔ First names of all the employees that repeat more than once in the file along with the frequency.

D. ✖ All the age values that are the same for more than one employee, along with the number of employees who have the same age.

**Question Number : 429 Question Type : SA**

**Correct Marks : 4**

Question Label : Short Answer Question

What will be the output of the below Bash script? Enter only the number.

Note: Operators `&&` and `||` have the same level of precedence in bash.

```
#!/usr/bin/bash

script() {
  [[ $# -lt 0 ]] && script ${@:1:$#-1} || echo $#
}

script 1 2 3 4 5
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

5

# TDS

| | |
|---|---|
| **Number of Questions :** | 26 |
| **Section Marks :** | 50 |

**Question Number : 430 Question Type : MCQ**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL: TOOLS IN DATA SCIENCE"

ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT?
CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN.

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

**Options :**

A. ✔ YES

B. ✖ NO

**Question Number : 431 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The final output from the BBC Weather Location Service API is in CSV format:

**Options :**

A. ✖ TRUE

B. ✔ FALSE

**Question Number : 432 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which among the following properties are returned by the sentiment function of the TextBlob library?

**Options :**

A. ✖ Score, Polarity

B. ✖ Polarity, Negativity

C. ✖ Median, Subjectivity

D. ✔ Polarity, Subjectivity

**Question Number : 433 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Subjectivity score ranges between -1 to +1.

**Options :**

A. ✖ TRUE

B. ✔ FALSE

**Question Number : 434 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

A subjectivity score of 0.4 means that the text statement:

**Options :**

A. ✖ has a positive sentiment

B. ✖ has a negative sentiment

C. ✖ is more of an opinion statement

D. ✔ is more of a factual statement

**Question Number : 435 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

A *polarity* score of 0.1 means that the text statement:

**Options :**

A. ✔ has a positive sentiment

B. ✖ has a negative sentiment

C. ✖ is more of an opinion statement

D. ✖ is more of a factual statement

**Question Number : 436 Question Type : MCQ**

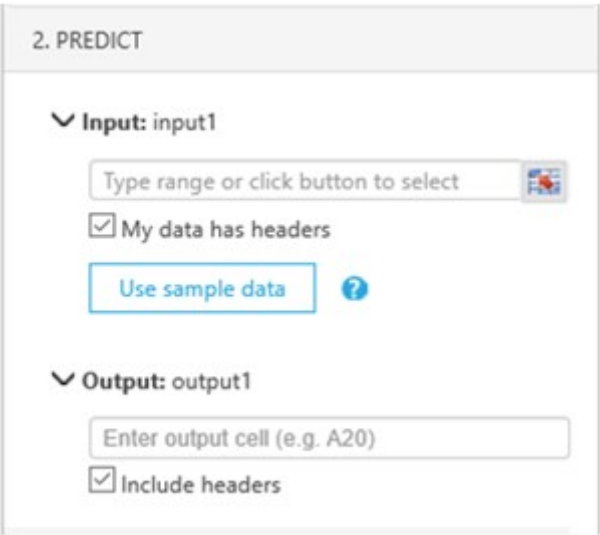
**Correct Marks : 2**

Question Label : Multiple Choice Question

Provided below is a snapshot of the dataset which consists of movie reviews and respective labels.

| | A | B |
|---|---|---|
| 1 | sentiment | review |
| 2 | positive | One of the other reviewers has mentione |
| 3 | positive | A wonderful little production. <br /><br /: |
| 4 | positive | I thought this was a wonderful way to spe |
| 5 | negative | Basically there's a family where a little bo |
| 6 | positive | Petter Mattei's "Love in the Time of Mone |
| 7 | positive | Probably my all-time favorite movie, a sto |
| 8 | negative | This show was an amazing, fresh & innova |
| 9 | negative | Encouraged by the positive comments abo |
| 10 | positive | If you like original gut wrenching laughter |
| 11 | negative | Phil the Alien is one of those quirky films |

To compute the sentiment scores the Azure Machine Learning add-in requires input and output values. In the figure provided below the input and output cells need to be populated with appropriate values to obtain sentiment scores.




Choose the most appropriate option that enables you to predict sentiment scores using the Excel

Azure Machine Learning add-in.

**Options :**

A. ✖ Input: Sheet1!A1:A11

Output: Sheet!C1

B. ✔ Input: Sheet1!B1:B11

Output: Sheet!C1

**Question Number : 437 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

We are interested in analyzing the effect of money spent on TV advertising on the sales volume of a product. Which Excel function would you use as a starting point in this analysis?

**Options :**

A. ✖ STDEV.P()

B. ✖ STDEV.S()

C. ✔ SLOPE()

D. ✖ EXACT()

**Question Number : 438 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

We have predictions (*y_hat*) on a train dataset of 100 records. Let *y* be the true value. We are interested in calculating **median(|y_1 - y_hat_1|, |y_2 - y_hat_2|, ..., |y_100 - y_hat_100|)**, . Which of the following functions will help you in achieving this easily?

**Options :**

A. ✖ from sklearn.metrics import mean_absolute_error

B. ✔ from sklearn.metrics import median_absolute_error

C. ✖ from sklearn.metrics import median_absolute_percentage_error

D. ✖ from sklearn.metrics import average_absolute_percentage_error

**Question Number : 439 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

You are working on a piece of code that classifies different vehicles into its respective class (car, LCV, truck, earth movers). Which of the following loss functions from *Keras* would you pick for the task?

**Options :**

A. ✖ binary_crossentropy

B. ✔ categorical_crossentropy

C. ✖ mean_squared_error

D. ✖ Mean_absolute_error

**Question Number : 440 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Tableau automatically divides the data fields into two categories. What are they..?

**Options :**

A. ✖ Measures and categories

B. ✔ Dimensions and Measures

C. ✖ Columns and rows

D. ✖ Matrices and columns

**Question Number : 441 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which Extension in Tableau transforms visualizations into narratives.?

**Options :**

A. ✖ Narrator

B. ✖ Navigator

C. ✔ Quill

D. ✖ Quora

**Question Number : 442 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

If you want to create comical characters while building business stories, which tool would be helpful.?

**Options :**

A. ✖ Cartoongen

B. ✖ Image size

C. ✔ Comicgen

D. ✖ Gentoon

**Question Number : 443 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is used to build and host web applications?

**Options :**

A. ✔ Streamlit for building web applications, Heroku for hosting web applications

B. ✖ Heroku for building web applications, Streamlit for hosting web applications

C. ✖ Streamlit for building web applications, Streamlit for hosting web applications

D. ✖ Heroku for building web applications, Heroku for hosting web applications

**Question Number : 444 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which among the following excel charts is the most suitable for detecting outliers in the data?

**Options :**

A. ✖ Bar chart

B. ✖ Line chart

C. ✔ Box and Whisker chart

D. ✖ Histogram

**Question Number : 445 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following libraries is used to construct API urls?

**Options :**

A. ✔ Urllib

B. ✖ BeautifulSoup

C. ✖ Requests

D. ✖ Pandas

**Question Number : 446 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following tabs is used to identify API calls in the Inspect element in any browser?

**Options :**

A. ✔ Network

B. ✖ Elements

C. ✖ Console

D. ✖ Sources

**Question Number : 447 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Google Studio is a tool that allows you to

**Options :**

A. ✖ merge Comicgen characters into a comic

B. ✖ visualize complex network data

C. ✔ create dashboards for small scale projects

D. ✖ Edit photographs and videos

**Question Number : 448 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Kumu is a tool that allows you to:

**Options :**

A. ✖ visualize dynamic line charts

B. ✖ create stunning dashboards for large projects

C. ✖ merge Comicgen characters into a comic

D. ✔ Visualize complex network data

**Question Number : 449 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

csr_matrix from the scipy library:

**Options :**

A. ✖ always helps reduce matrix space

B. ✔ helps reduce matrix space when there are a lot of zero entries in the matrix

C. ✖ helps reduce matrix space when there are a lot of negative entries in the matrix

D. ✖ makes matrix multiplication more meaningful and powerful

**Question Number : 450 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

classification_report function from the sklearn.metrics module

**Options :**

A. ✖ builds a decision tree classifier and prints the accuracy of the classifier

B. ✖ reports the root mean square error of the model

C. ✖ runs different classification models and compares the results

D. ✔ builds a text report displaying the main classification metrics

**Question Number : 451 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

pycaret is a

**Options :**

A. ✖ Visualization tool

B. ✖ Dashboard helper

C. ✔ low-code machine learning library

D. ✖ Data cleaning solution

**Question Number : 452 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

We are interested in fitting an ARIMA model to our time series data. Specifically, we are interested in a moving average model of 0, setting a lag value of 4 for autoregression, and a difference order of 1. Which of the following gives you such a model?

**Options :**

A. ✖ ARIMA(..., trend = (4,1,0))

B. ✔ ARIMA(..., order = (4,1,0))

C. ✖ ARIMA(..., order = (0,4,1))

D. ✖ ARIMA(..., trend = (0,4,1))

**Question Number : 453 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Scikit-learn has a DecisionTreeClassifier module that is useful in building decision tree classifiers. Suppose, our dataset is imbalanced in class. Which feature in the DecisionTreeClassifier() will help us tackle this problem?

**Options :**

A. ✖ random_state

B. ✖ min_sample_split

C. ✖ class_balance

D. ✔ class_weight

**Question Number : 454 Question Type : MCQ**

**Correct Marks : 2**

Question Label : Multiple Choice Question

k-means is typically influenced by the start values. What option in sklearn.cluster.KMeans helps reduce the impact?

**Options :**

A. ✖ verbose

B. ✖ algorithm

C. ✔ n_init

D. ✖ init

**Question Number : 455 Question Type : MSQ**

**Correct Marks : 2**

Question Label : Multiple Select Question

scikit-network package contains functions for (pick all correct sentences):

**Options :**

A. ✖ analysis of faults in a computer network

B. ✔ social network analysis

C. ✔ analysis of large graphs

D. ✖ enhancing one's social network