

# Indian Institute of Technology, Madras - Centre for Continuing Education

## Notations :

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

## Question Paper Name :

IIT M DAD DIPLOMA AN3 EXAM QPD3 20  
Nov 2022

## Subject Name :

2022 Nov: IIT M DAD DIPLOMA AN3 EXAM  
QPD3

## Creation Date :

2022-11-16 15:14:38

## Duration :

195

## Total Marks :

721

## Display Marks:

Yes

## Share Answer Key With Delivery Engine :

Yes

## Actual Answer Key :

Yes

## Calculator :

Scientific

## Magnifying Glass Required? :

No

## Ruler Required? :

No

## Eraser Required? :

No

## Scratch Pad Required? :

No

## Rough Sketch/Notepad Required? :

No

## Protractor Required? :

No

## Show Watermark on Console? :

Yes

## Highlighter :

No

## Auto Save on Console?

Yes

## Change Font Color :

No

<b>Change Background Color :</b>	No
<b>Change Theme :</b>	No
<b>Help Button :</b>	No
<b>Show Reports :</b>	No
<b>Show Progress Bar :</b>	No

## **Group I**

<b>Group Number :</b>	1
<b>Group Id :</b>	64065310799
<b>Group Maximum Duration :</b>	0
<b>Group Minimum Duration :</b>	90
<b>Show Attended Group? :</b>	No
<b>Edit Attended Group? :</b>	No
<b>Break time :</b>	0
<b>Group Marks :</b>	721
<b>Is this Group for Examiner? :</b>	No
<b>Examiner permission :</b>	Cant View
<b>Show Progress Bar? :</b>	No
<b>Revisit allowed for group Instructions? :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Minimum Instruction Time :</b>	0
<b>Group Time In :</b>	Minutes
<b>Navigate To Group Summary From Last Question? :</b>	No
<b>Disable Submit Button During Assessment? :</b>	No
<b>Section Selection Time? :</b>	0
<b>No of Optional sections to be attempted :</b>	0

<b>Section Id :</b>	64065328990
<b>Section Number :</b>	1
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	33
<b>Number of Questions to be attempted :</b>	33
<b>Section Marks :</b>	20
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065363384
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 1 Question Id : 640653445733 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

"Dear Students,

The B.S. Degree in Programming and Data Science is a unique initiative where we have attempted to provide access to quality learning content along with flexibility to a larger group of learners. This also means that there will be diverse approaches to learning and engagement within the programme. While we know some of the most common paths taken, the programme would greatly benefit if we are able to understand the spectrum of approaches that students are adopting while taking up courses. To gather this input, we are kindly requesting you to spend 10 minutes of your time to provide us with your learning and engagement feedback in the programme.

To compensate for the time that you spent in providing feedback, the following incentives will be provided from our side:

1. 15 minutes of extra time will be allotted to all students who are doing less than 4 courses.
2. Max of 5 marks will be provided as moderation to the student who filled this survey, if they are found short of minimum marks required for passing the course(s) in this term.

Kindly ensure that you provide an honest feedback to all the questions as your inputs will be pivotal in any policy change that we bring in the programme in the subsequent terms."

Are you doing this programme along with either a full-time or part-time job?

**Options :**

6406531485153. ✓ YES

6406531485154. ✗ NO

**Question Number : 2 Question Id : 640653445734 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Are you doing this programme along with either another full-time or part-time degree programme?

**Options :**

6406531485155. ✗ YES

6406531485156. ✓ NO

**Question Number : 3 Question Id : 640653445735 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

How much time are you able to spend in a week for studying in the programme?

**Options :**

6406531485157. ✘ <20 hours

6406531485158. ✓ 20 - 30 hrs

6406531485159. ✘ 30 - 40 hrs

6406531485160. ✘ 40 - 50 hrs

6406531485161. ✘ 50 - 60 hrs

6406531485162. ✘ >60 hrs

**Question Number : 4 Question Id : 640653445736 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

How many courses have you registered to in this term?

**Options :**

6406531485163. ✓ 1

6406531485164. ✘ 2

6406531485165. ✘ 3

6406531485166. ✘ 4

**Question Number : 5 Question Id : 640653445737 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Are you interested in interacting with your peers (other students) in this programme?

**Options :**

6406531485167. ✘ YES

6406531485168. ✓ NO

**Question Number : 6 Question Id : 640653445738 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

How much time will you be able to allocate in a week to interact with other students?

**Options :**

6406531485169. ✓ < 5 hours

6406531485170. ✗ 5 - 10 hrs

6406531485171. ✗ 10 - 15 hrs

6406531485172. ✗ >15 hrs

**Question Number : 7 Question Id : 640653445739 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you do the practice assignments?

**Options :**

6406531485173. ✓ Yes

6406531485174. ✗ No

**Question Number : 8 Question Id : 640653445740 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you do the activity questions?

**Options :**

6406531485175. ✓ Yes

6406531485176. ✗ No

**Question Number : 9 Question Id : 640653445741 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Are you part of a study group during the term (either student created or the mentorship pool)?

**Options :**

6406531485177. ✓ I study on my own

6406531485178. ✗ I have a group with who I study

**Question Number : 10 Question Id : 640653445742 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Are you aware of the gmeet for every course in the evening with a mentor available who you can ask questions?

**Options :**

6406531485179. ✓ YES

6406531485180. ✗ NO

**Question Number : 11 Question Id : 640653445743 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you try and solve the graded assignment on your own?

**Options :**

6406531485181. ✓ I solve it on my own.

6406531485182. ✗ We have a group and compare answers on it while submitting.

**Question Number : 12 Question Id : 640653445744 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

When do you attempt the graded assignment?

**Options :**

6406531485183. ❌ After watching the videos

6406531485184. ✓ After doing the practice assignment

6406531485185. ❌ Check the GA first, watch video, try to solve, again watch videos, etc

**Question Number : 13 Question Id : 640653445745 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you continue doing assignments till the last week?

**Options :**

6406531485186. ❌ Always

6406531485187. ✓ Sometimes

6406531485188. ❌ No, I dont.

**Question Number : 14 Question Id : 640653445746 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you have access to quiz Question papers and solutions from the previous terms?

**Options :**

6406531485189. ❌ YES

6406531485190. ✓ NO

**Question Number : 15 Question Id : 640653445747 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you try to solve previous term QPs before quizzes and final exams?

**Options :**

6406531485191. ✗ I dont have access.

6406531485192. ✓ I have the QPs but dont solve them.

6406531485193. ✗ I try and solve them.

**Question Number : 16 Question Id : 640653445748 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you attend the live sessions by instructors?

**Options :**

6406531485194. ✗ Sometimes

6406531485195. ✓ Never

**Question Number : 17 Question Id : 640653445750 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you watch the recordings of the live sessions later?

**Options :**

6406531485200. ✘ Sometimes

6406531485201. ✓ Always

6406531485202. ✘ Never

**Question Number : 18 Question Id : 640653445751 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Are you aware that past live sessions are now tagged with questions and annotated?

**Options :**

6406531485203. ✓ YES

6406531485204. ✘ NO

**Question Number : 19 Question Id : 640653445752 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you actively participate in the discussions in the forum (google group or discourse)?

**Options :**

6406531485205. ✓ YES

6406531485206. ✘ NO

**Question Number : 20 Question Id : 640653445753 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you search on the forum for answers to any doubts you may have?

**Options :**

6406531485207. ✓ YES

6406531485208. ✗ NO

**Question Number : 21 Question Id : 640653445754 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Are you connected with other students in the programme?

**Options :**

6406531485209. ✓ YES

6406531485210. ✗ NO

**Question Number : 22 Question Id : 640653445756 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Are you aware that each student in the programme is part of a Group and a House?

**Options :**

6406531485220. ✓ YES

6406531485221. ✗ NO

**Question Number : 23 Question Id : 640653445757 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you try to interact with your friends at the examination centre either before or after the exam?

**Options :**

6406531485222. ✓ YES

6406531485223. ✗ NO

**Question Number : 24 Question Id : 640653445758 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Are you aware of the various clubs and societies available within the programme?

**Options :**

6406531485224. ✓ YES

6406531485225. ✗ NO

**Question Number : 25 Question Id : 640653445759 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Are you aware of the Socio-technical flagship event of the programme - Paradox, which happened in person at IITM in May 2022 and online in Aug 2022?

**Options :**

6406531485226. ✓ YES

6406531485227. ✗ NO

**Question Number : 26 Question Id : 640653445760 Question Type : MCQ Is Question**

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

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Do you try to network with working professionals within the programme?

**Options :**

6406531485228. ✓ YES

6406531485229. ✘ NO

**Question Number : 27 Question Id : 640653445761 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Are you planning to do higher education after this or go for a job?

**Options :**

6406531485230. ✓ Pursue higher education

6406531485231. ✘ Go for a job

**Question Number : 28 Question Id : 640653445762 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Have you registered for more courses than you can handle and dropped off some courses?

**Options :**

6406531485232. ✓ YES

6406531485233. ✘ NO

**Question Number : 29 Question Id : 640653445763 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0.5**

Question Label : Multiple Choice Question

Rate the program in terms of the difficulty level.

**Options :**

6406531485234. ✓ 1

6406531485235. ✗ 2

6406531485236. ✗ 3

6406531485237. ✗ 4

6406531485238. ✗ 5

**Sub-Section Number :** 2

**Sub-Section Id :** 64065363385

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Number : 30 Question Id : 640653445749 Question Type : MSQ Is Question**

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

**Correct Marks : 0.5 Selectable Option : 0**

Question Label : Multiple Select Question

If you dont attend live sessions, please mention the reason for it.

**Options :**

6406531485196. ✓ Live sessions are too long.

6406531485197. ✓ Timing does not suit me.

6406531485198. ✗ I dont get to interact with the instructors.

6406531485199. ✗ I would prefer live sessions in local language.

**Question Number : 31 Question Id : 640653445755 Question Type : MSQ Is Question**

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

**Correct Marks : 0.5 Selectable Option : 0**

Question Label : Multiple Select Question

Are you part of any students' whatsapp/telegram/discourse groups?

**Options :**

6406531485211. ✓ Email

6406531485212. ✓ Google Chat

6406531485213. ✘ Discourse

6406531485214. ✘ WhatsApp

6406531485215. ✘ Telegram

6406531485216. ✘ Slack

6406531485217. ✘ Discord

6406531485218. ✘ MS Teams

6406531485219. ✘ Others

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363386

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Number : 32 Question Id : 640653445764 Question Type : SA Calculator : None**

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

**Correct Marks : 2.25**

Question Label : Short Answer Question

According to you, what is the biggest value addition to you from this programme?

**NOTE:** Your answer should not exceed 300 words.

**Response Type :** Alphanumeric

**Evaluation Required For SA :** No

**Max Word Count :** 300

**Show Word Count :** Yes

**Min Word Count :** 0

**Highlight min word :** Yes

**Single Line Response :** No

**Number of Rows :** 10

**Number Of Columns :** 70

**Text Areas :** PlainText

**Question Number :** 33 **Question Id :** 640653445765 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 2.25

**Question Label :** Short Answer Question

Mention some suggestions to improve the program.

**NOTE:** Your answer should not exceed 300 words.

**Response Type :** Alphanumeric

**Evaluation Required For SA :** No

**Max Word Count :** 300

**Show Word Count :** Yes

**Min Word Count :** 0

**Highlight min word :** Yes

**Single Line Response :** No

**Number of Rows :** 10

**Number Of Columns :** 70

**Text Areas :** PlainText

## Maths2

**Section Id :** 64065328991

**Section Number :** 2

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 8

**Number of Questions to be attempted :** 8

**Section Marks :** 25

<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065363387
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 34 Question Id : 640653445766 Question Type : MCQ Is Question**

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

**Correct Marks : 0**

**Question Label : Multiple Choice Question**

THIS IS QUESTION PAPER FOR THE SUBJECT " FOUNDATION LEVEL:SEMESTER 2/DIRECT ENTRY DIPLOMA : 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 :**

6406531485241. ✓ YES

6406531485242. ✗ NO

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	64065363388
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 35 Question Id : 640653445782 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following options is/are true?

**Options :**

6406531485267. ✓ Every matrix is similar to itself.

6406531485268. ✓ If  $A$  is similar to  $B$ , then  $A^{-1}$  is similar to  $B^{-1}$ .

6406531485269. ✗  $\begin{bmatrix} 2 & 1 \\ 0 & 2 \end{bmatrix}$  is similar to  $\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$ .

6406531485270. ✗ If  $A$  is similar to  $B + C$ , then  $\text{rank}(A) = \text{rank}(B) + \text{rank}(C)$ .

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363389

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 36 Question Id : 640653445767 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following options is/are true?

**Options :**

6406531485243. ✗ If  $A$  is a non-zero matrix of order  $4 \times 3$  and rank of  $A$  is 3, then the rows of  $A$  are linearly independent.

6406531485244. ✓ If  $A$  is a non-zero matrix of order  $4 \times 3$  and rank of  $A$  is 3, then the columns of  $A$  are linearly independent.

6406531485245. ✓ If  $A$  is a non-zero matrix of order  $m \times (m + 1)$ ,  $m > 1$ , then the maximum possible nullity of  $A$  is  $m$ .

6406531485246. ✓ If  $A$  is a non-zero matrix of order  $4 \times 5$  and rank of  $A$  is 3, then the dimension of

the solution space of the homogeneous system  $Ax = 0$  is 2.

**Sub-Section Number :**

4

**Sub-Section Id :**

64065363390

**Question Shuffling Allowed :**

No

**Is Section Default? :**

null

**Question Id : 640653445771 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (37 to 38)**

Question Label : Comprehension

Let  $W$  be a proper subspace of an inner product space  $V$ , where  $\dim(V) = 3$  and  $P_W$  be the projection of  $V$  on  $W$ . Answer the subquestion based on the given data.

**Sub questions**

**Question Number : 37 Question Id : 640653445772 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

If  $v \in V$  is vector of norm 5, then the maximum possible norm of the vector  $P_W(v)$  is

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

5

**Question Number : 38 Question Id : 640653445773 Question Type : MSQ Is Question**

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

**Correct Marks : 1 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following option is/are true?

**Options :**

6406531485254. ✓ Let  $v \in V$ , then  $v - P_W(v)$  is orthogonal to  $W$ .

If dimension of  $W$  is 2, then dimension of the null space of  $P_W$  may not be 1.

6406531485255. ✘

6406531485256. ✓ Zero vector is orthogonal to every vector of  $V$ .

6406531485257. ✓ If  $v \in W$ , then  $P_W(v) = v$ .

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363391

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653445768 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (39 to 40)**

Question Label : Comprehension

Consider  $V = \mathbb{R}^2$  with respect to the inner product defined as

$$\langle(x_1, x_2), (y_1, y_2)\rangle = x_1y_1 - (x_1y_2 + x_2y_1) + 2x_2y_2, \text{ for all } (x_1, x_2), (y_1, y_2) \in \mathbb{R}^2$$

Answer the Subquestions based on the given data.

**Sub questions**

**Question Number : 39 Question Id : 640653445769 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

Find  $\|(1, 3)\|^2$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

13

**Question Number : 40 Question Id : 640653445770 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following is/are unit vectors in  $V$ ?

**Options :**

6406531485248. ✓  $(1, 1)$

6406531485249. ✓  $\frac{1}{2}(2, 2)$

6406531485250. ✗  $\frac{1}{\sqrt{13}}(2, 3)$

6406531485251. ✗  $(0, 1)$

6406531485252. ✗ None of these

**Question Id : 640653445778 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (41 to 43)**

Question Label : Comprehension

Consider two linear transformations  $T : \mathbb{R}^3 \rightarrow \mathbb{R}^2$  such that

$T(x, y, z) = (x + y, y + z)$  and  $S : \mathbb{R}^2 \rightarrow \mathbb{R}^3$  such that  $S(x, y) = (x, y, x + y)$ .

Let  $\beta = \{(1, 0, 0), (0, 1, 0), (0, 0, 1)\}$  be an ordered basis for  $\mathbb{R}^3$  and  $\gamma = \{(1, 0), (0, 1)\}$  be an ordered basis for  $\mathbb{R}^2$ . Answer the subquestions based on the given data.

**Sub questions**

**Question Number : 41 Question Id : 640653445779 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Short Answer Question

If  $A$  is the matrix representation of  $S \circ T$  (the transformation defined by  $(S \circ T)(x, y, z) = S(T(x, y, z))$ ) with respect to the ordered basis  $\beta$  for both the domain and codomain and order of  $A$  is  $m \times n$ , then find the value of  $m + n$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

6

**Question Number : 42 Question Id : 640653445780 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

**Question Label :** Short Answer Question

If  $K = \{(x, y, z) \mid ax + by = 0, cy + dz = 0\}$

is the null space of  $S \circ T$ , then find the

value of  $(\frac{a}{b}) - 2(\frac{c}{d})$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

-1

**Question Number :** 43 **Question Id :** 640653445781 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 1

**Question Label :** Short Answer Question

Rank of  $S \circ T$  is

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Sub-Section Number :** 6

**Sub-Section Id :** 64065363392

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653445774 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Question Numbers : (44 to 46)**

Question Label : Comprehension

Consider a linear transformation  $T : \mathbb{R}^3 \rightarrow \mathbb{R}^2$  such that the

matrix representation of  $T$  is  $A = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 2 & 3 \end{bmatrix}$  with respect to the ordered

bases  $\beta = \{(1, 0, 0), (0, 1, 0), (1, 1, 1)\}$  and  $\gamma = \{(1, 0), (1, 1)\}$  for the domain and codomain, respectively. Answer the subquestions based on the given data.

### **Sub questions**

**Question Number : 44 Question Id : 640653445775 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

Nullity of the matrix  $A$  is

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

1

**Question Number : 45 Question Id : 640653445776 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following option is true?

**Options :**

6406531485259. ✘  $T$  is one-one.

6406531485260. ✓  $T$  is onto.

6406531485261. ✘  $T$  is an isomorphism.

6406531485262. ✘  $T$  is neither one-one nor onto.

**Question Number : 46 Question Id : 640653445777 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

If  $T(x, y, z) = (mx + ny + sz, px + qy + rz)$ ,

then find the value of

$(m + n + s) - 3(p + q + r)$

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

-6

**Question Id : 640653445783 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (47 to 49)**

Question Label : Comprehension

The teacher asked Soumya and Sohini to consider an affine space each.

Soumya considered the affine subspace  $L$  and Sohini considered the affine subspace  $L'$  of  $\mathbb{R}^3$ , where  $L = U$  and  $L' = (2, 0, 1) + U'$ , for some vector subspaces  $U = \text{Span}\{(2, 0, 1), (1, 1, 0), (0, 1, 0)\}$  and  $U' = \text{Span}\{(1, 0, 1), (0, 1, 1)\}$  of  $\mathbb{R}^3$ . Suppose there is a linear transformation

$T : U \rightarrow U'$  such that  $(0, 1, 0) \in \ker(T)$ ,  $T(2, 0, 1) = (0, 1, 1)$  and  $T(1, 1, 0) = (1, 0, 1)$ . An affine mapping  $f : L \rightarrow L'$  is obtained by defining  $f(u) = (2, 0, 1) + T(u)$ , for all  $u \in U$ . By using the above information answer the given subquestions:

### Sub questions

**Question Number : 47 Question Id : 640653445784 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following affine subspaces was considered by Soumya?

**Options :**

6406531485271. ✘  $L = \{(x, y, z) \mid x - y - 2z = 0\}$

6406531485272. ✘  $L = \{(x, y, z) \mid x + y - z = 1\}$

6406531485273. ✘  $L = \{(x, y, z) \mid x + y - z = 0\}$

6406531485274. ✓  $L = \mathbb{R}^3$

**Question Number : 48 Question Id : 640653445785 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following affine subspaces was considered by Sohini?

**Options :**

6406531485275. ❌  $L' = \{(x, y, z) \mid x - y - 2z = 0\}$

6406531485276. ✓  $L' = \{(x, y, z) \mid x + y - z = 1\}$

6406531485277. ❌  $L' = \{(x, y, z) \mid x + y - z = 0\}$

6406531485278. ❌  $L' = \mathbb{R}^3$

**Question Number : 49 Question Id : 640653445786 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following functions represents  $f$  correctly?

**Options :**

6406531485279. ✓  $f(x, y, z) = (x - 2z + 2, z, x - z + 1)$

6406531485280. ❌  $f(x, y, z) = (x - 2z + 2, \frac{x}{2}, x - z + 1)$

6406531485281. ❌  $f(x, y, z) = (x - 2z, z, x - z)$

6406531485282. ❌ It cannot be determined from the given information.

## Statistics2

<b>Section Id :</b>	64065328992
<b>Section Number :</b>	3
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	12
<b>Number of Questions to be attempted :</b>	12
<b>Section Marks :</b>	40
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065363393
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 50 Question Id : 640653445787 Question Type : MCQ Is Question**

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

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL:SEMESTER 2/DIRECT ENTRY DIPLOMA : STATISTICS 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 :**

6406531485283. ✓ Yes

6406531485284. ✗ No

**Question Number : 51 Question Id : 640653445788 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0**

**Question Label : Multiple Choice Question**

**Use the following values of  $F_Z$  if required:**

$$F_Z\left(\frac{-5}{6}\right) = 0.20, \quad F_Z\left(\frac{5}{6}\right) = 0.80, \quad F_Z(2) = 0.977, \quad F_Z(-2) = 0.023, \quad F_Z(1) = 0.84,$$

$$F_Z\left(\frac{2}{3}\right) = 0.75, \quad F_Z\left(\frac{-2}{3}\right) = 0.25$$

**Discrete random variables:**

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

**Continuous random variables:**

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

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

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

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

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

**Options :**

6406531485285. ✓ Useful Data has been mentioned above.

6406531485286. ✗ This data attachment is just for a reference & not for an evaluation.

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	64065363394
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Id : 640653445789 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (52 to 53)**

Question Label : Comprehension

Suppose a fair die is thrown twice. Let the random variable  $X$  denote the number obtained on the first die. Let the random variable  $Y$  denote the number obtained on the second die. Define  $Z = |X - Y|$ .

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 52 Question Id : 640653445790 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Find the range of  $Z$ .

**Options :**

6406531485287. ✓  $T_Z = \{0, 1, 2, 3, 4, 5\}$

6406531485288. ✗  $T_Z = \{1, 2, 3, 4, 5\}$

6406531485289. ✖  $T_Z = \{1, 2, 3, 4, 5, 6\}$

6406531485290. ✖  $T_Z = \{0, 1, 2, 3, 4, 5, 6\}$

**Question Number : 53 Question Id : 640653445791 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Find the probability mass function (PMF) of Z.

**Options :**

$z$	1	2	3	4	5
$f_Z(z)$	6/36	16/36	24/36	30/36	34/36

6406531485291. ✖

$z$	0	1	2	3	4	5
$f_Z(z)$	6/36	10/36	8/36	6/36	4/36	2/36

6406531485292. ✓

$z$	1	2	3	4	5	6
$f_Z(z)$	6/36	10/36	8/36	6/36	4/36	2/36

6406531485293. ✖

$z$	0	1	2	3	4	5
$f_Z(z)$	0	6/36	16/36	24/36	30/36	34/36

6406531485294. ✖

$z$	0	1	2	3	4	5	6
$f_Z(z)$	6/36	6/36	6/36	6/36	4/36	2/36	6/36

6406531485295. ✖

**Question Id : 640653445792 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (54 to 55)**

Question Label : Comprehension

Let the random variables  $X$  and  $Y$  have the following joint PDF:

$$f_{XY}(x, y) = \begin{cases} 2x & \text{for } 0 \leq x < 1, 0 \leq y < 1 \\ 0 & \text{otherwise} \end{cases}$$

Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 54 Question Id : 640653445793 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statements are true?

**Options :**

6406531485296. ✓ Marginal density of  $X$  is  $2x$ , for  $0 \leq x < 1$ .

6406531485297. ✗ Marginal density of  $X$  is  $\frac{x^2}{2}$ , for  $0 \leq x < 1$ .

6406531485298. ✗ Marginal density of  $Y$  is  $2y$ , for  $0 \leq y < 1$ .

6406531485299. ✓ Marginal density of  $Y$  is  $1$ , for  $0 \leq y < 1$ .

**Question Number : 55 Question Id : 640653445794 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Are  $X$  and  $Y$  independent?

**Options :**

6406531485300. ✓ YES

6406531485301. ✘ NO

**Sub-Section Number :** 3**Sub-Section Id :** 64065363395**Question Shuffling Allowed :** Yes**Is Section Default? :** null**Question Number : 56 Question Id : 640653445795 Question Type : SA Calculator : None****Response Time : N.A Think Time : N.A Minimum Instruction Time : 0****Correct Marks : 3**

Question Label : Short Answer Question

The probability density function of a continuous random variable  $X$  is given by

$$f(x) = \begin{cases} 2x & \text{for } 0 \leq x < 1 \\ 0 & \text{otherwise} \end{cases}$$

Find the value of  $E[X]$ . Enter the answer correct to two decimal places.**Response Type :** Numeric**Evaluation Required For SA :** Yes**Show Word Count :** Yes**Answers Type :** Range**Text Areas :** PlainText**Possible Answers :**

0.65 to 0.68

**Question Number : 57 Question Id : 640653445797 Question Type : SA Calculator : None****Response Time : N.A Think Time : N.A Minimum Instruction Time : 0****Correct Marks : 3**

Question Label : Short Answer Question

Let  $X_1, X_2, \dots, X_n$  be i.i.d. Poisson(9). Using Chebyshev's inequality, what should be the minimum value of  $n$  such that the probability that the sample mean ( $\bar{X}$ ) lies in between 8.6 and 9.4 is at least 0.95?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1125

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363396

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number :** 58 **Question Id :** 640653445796 **Question Type :** MCQ **Is Question**

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

**Correct Marks :** 3

Question Label : Multiple Choice Question

Suppose iron rods are manufactured with a mean weight of 10 kg and a standard deviation of 0.4 kg. How does the variance of the sample mean change when the sample size is increased from 25 to 64?

**Options :**

6406531485303. ✗ Variance is increased from 0.00625 to 0.016.

6406531485304. ✗ Variance is increased from 0.0025 to 0.0064.

6406531485305. ✓ Variance is reduced from 0.0064 to 0.0025.

6406531485306. ✗ Variance is reduced from 0.016 to 0.00625.

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363397

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653445798 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (59 to 60)**

Question Label : Comprehension

Let X be a random variable denoting the survival time (in years) of patients after the treatment of a certain disease. It is known that X is exponentially distributed with a mean of 2 years.

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 59 Question Id : 640653445799 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

What is the probability that a patient selected at random (who went through the treatment) will survive for more than 2 years?

**Options :**

6406531485308.  $\frac{1}{2}e^{-1}$

6406531485309.  $e^{-1}$

6406531485310.  $2e^{-1}$

6406531485311.  $e^{-4}$

**Question Number : 60 Question Id : 640653445800 Question Type : SA Calculator : None**

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

**Correct Marks : 3**

**Question Label :** Short Answer Question

Find  $P(X > 6 | X > 4)$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.35 to 0.38

**Question Id : 640653445802 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

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

Question Label : Comprehension

In a telecom system, each data file consists of 400 bits. Due to noise, each data bit received may have an error with probability 0.1. It is assumed that bit errors occur independently.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 61 Question Id : 640653445803 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Suppose  $Y$  represents the total number of bits without an error in a certain data file. Which of the following is true?

**Options :**

6406531485314. ✘  $Y \sim \text{Bernoulli}(0.9)$

6406531485315. ✘  $Y \sim \text{Bernoulli}(0.1)$

6406531485316. ✓  $Y \sim \text{Binomial}(400, 0.9)$

6406531485317. ✘  $Y \sim \text{Binomial}(400, 0.1)$

**Question Number : 62 Question Id : 640653445804 Question Type : SA Calculator : None**

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

**Correct Marks : 3**

Question Label : Short Answer Question

Using Central limit theorem, find the approximate probability that there are more than 45 errors in a certain data file. 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 :**

0.18 to 0.22

**Question Id : 640653445805 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (63 to 64)**

Question Label : Comprehension

Suppose  $X_1, X_2, X_3, X_4 \sim \text{iid Bernoulli}\left(\frac{1}{3}\right)$ . Let  $Y$  be a random variable defined as

$$Y = \begin{cases} 5 & , \text{ if } X_1 = X_2 = X_3 = X_4 = 0 \\ \min\{i : X_i = 1\} & , \text{ otherwise} \end{cases}$$

Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 63 Question Id : 640653445806 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Find the moment generating function of the random variable  $Y$ .

**Options :**

6406531485319. ✘ 
$$M_Y(\lambda) = \frac{2}{3}e^\lambda + \frac{2}{9}e^{2\lambda} + \frac{2}{27}e^{3\lambda} + \frac{2}{81}e^{4\lambda} + \frac{1}{81}e^{5\lambda}$$

6406531485320. ✘ 
$$M_Y(\lambda) = \frac{1}{3}e^\lambda + \frac{2}{9}e^{2\lambda} + \frac{5}{27}e^{3\lambda} + \frac{7}{81}e^{4\lambda} + \frac{16}{81}e^{5\lambda}$$

6406531485321. ✘ 
$$M_Y(\lambda) = \frac{1}{3}e^\lambda + \frac{2}{9}e^{2\lambda} + \frac{4}{27}e^{3\lambda} + \frac{16}{81}e^{4\lambda} + \frac{8}{81}e^{5\lambda}$$

6406531485322. ✓ 
$$M_Y(\lambda) = \frac{1}{3}e^\lambda + \frac{2}{9}e^{2\lambda} + \frac{4}{27}e^{3\lambda} + \frac{8}{81}e^{4\lambda} + \frac{16}{81}e^{5\lambda}$$

**Question Number : 64 Question Id : 640653445807 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

Find the expected value of  $Y$ . 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 :**

2.55 to 2.65

**Question Id : 640653445808 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (65 to 66)**

Question Label : Comprehension

Let  $X$  denote the stock price (in units of hundred rupees) of a company  $A$  and let  $Y$  denote the stock price (in units of hundred rupees) of company  $B$ . The joint density function of  $X$  and  $Y$  is given below:

$$f_{XY}(x, y) = \begin{cases} cy & \text{for } 0 < x, y < 2 \\ 0 & \text{otherwise} \end{cases}$$

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 65 Question Id : 640653445809 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

Find the value of  $8c$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

**Question Number : 66 Question Id : 640653445810 Question Type : SA Calculator : None**

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

**Correct Marks : 3**

Question Label : Short Answer Question

Find the probability that the stock price of *A* will be higher than that of *B*. 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 :**

0.31 to 0.35

**Sub-Section Number :** 6

**Sub-Section Id :** 64065363398

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 67 Question Id : 640653445801 Question Type : SA Calculator : None**

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

**Correct Marks : 5**

Question Label : Short Answer Question

A company manufactures square shaped chess boards. The length of the chess board is normally distributed with mean equal to 40 cm with standard deviation of 5 cm. Find the probability that the area of the chess board is less than 2500 cm<sup>2</sup>. Enter the answer correct to three decimal places.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.970 to 0.984

## CT

<b>Section Id :</b>	64065328993
<b>Section Number :</b>	4
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	15
<b>Number of Questions to be attempted :</b>	15
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065363399
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 68 Question Id : 640653445811 Question Type : MCQ Is Question**

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

**Correct Marks : 0**

Question Label : Multiple Choice Question

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 :**

6406531485326. ✓ Yes

6406531485327. ✗ No

**Question Number : 69 Question Id : 640653445812 Question Type : MCQ Is Question**

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

**Correct Marks : 0**

Question Label : Multiple Choice Question

Scores								
SeqNo	Name	Gender	DateOfBirth	TownCity	Mathematics	Physics	Chemistry	Total
0	Bhuvanesh	M	7 Nov	Erode	68	64	78	210
					■ ■ ■			

Words			
SeqNo	Word	PartOfSpeech	LetterCount
0	It	Pronoun	2
			■ ■ ■

Library							
SeqNo	Name	Author	Genre	Language	Pages	Publisher	Year
0	Igniting Minds	Kalam	Nonfiction	English	178	Penguin	2002
					■ ■ ■		

# Olympics

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

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

Item List

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

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

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

Options :

6406531485328. ✓ Useful Data has been mentioned above.

6406531485329. ✗ This data attachment is just for a reference & not for an evaluation.

Sub-Section Number : 2

Sub-Section Id : 64065363400

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 70 Question Id : 640653445813 Question Type : MCQ Is Question

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

Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

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

```
1 | D = { 'a' : {'a': 5, 'b' : 4}, 'b': 1}
2 | D['b'] = D['b'] + D['b']
```

**Options :**

6406531485330. ✘ D = { 'a' : {'a': 5, 'b' : 4}, 'b' : 1}

6406531485331. ✓ D = { 'a' : {'a': 5, 'b' : 4}, 'b' : 2}

6406531485332. ✘ D = { 'a' : {'a': 10, 'b' : 8}, 'b' : 2}

6406531485333. ✘ D = { 'a' : {'a' : 5, 'b' : 8}, 'b' : 1}

**Question Number : 71 Question Id : 640653445814 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Let **dict** be a dictionary, then which of the following is not a valid value of **dict**?

**Options :**

6406531485334. ✘ dict = { 'a' : {'a' : 5, 'b' : 4}, 'b' : {'a' : 2}}

6406531485335. ✘ dict = { 'a' : {'a' : 'a', 'b' : 'b'}, 'b' : {'a' : 2}}

6406531485336. ✓ dict = { 'a' : {'a' : 5, 'a' : 4}, 'b' : {'a' : 2}}

6406531485337. ✘ dict = { 'a' : {'a' : 5, 'b' : 4}, 'b' : {'b' : 2}}

**Sub-Section Id :** 64065363401

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 72 Question Id : 640653445815 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

**Question Label : Multiple Choice Question**

Let 'x', 'y', and 'z' be the only keys of dictionary **D** and **L = keys(D)**. At the end of the execution of the following pseudocode, **flag** stores True.

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

Choose the possible value of **L** from the given choices.

**Options :**

6406531485338. ✓ ['z', 'y', 'x']

6406531485339. ✗ ['y', 'x', 'z']

6406531485340. ✗ ['x', 'z', 'y']

6406531485341. ✗ ['z', 'x', 'y']

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363402

**Question Shuffling Allowed :** Yes

**Is Section Default? :**

null

**Question Number : 73 Question Id : 640653445816 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Let **timeList** be a list of pairs containing information about trains associated with a station **stn**.

Specifically, each element in this list is a pair: **[Arrival, Departure]** (pair of arrival and departure time). If the arrival or departure time is empty, it is represented as "None". What does **count** represent at the end of the execution of the following pseudocode?

```
1 count = 0
2 foreach x in timeList{
3     if(first(x) != "None" and last(x) != "None"){
4         count = count + 1
5     }
6 }
```

**Options :**

6406531485342. ✘ Number of trains for which **stn** is a starting station

6406531485343. ✘ Number of trains for which **stn** is an ending station

6406531485344. ✘ Number of trains for which **stn** is either a starting or an ending station

6406531485345. ✓ Number of trains for which **stn** is neither a starting nor an ending station

**Question Number : 74 Question Id : 640653445817 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider the following pseudocode, where **D** is a dictionary.

```
1 sum = 0
2 foreach key in keys(D){
3     sum = sum + first(D[key])
4 }
```

Choose a statement regarding **D** from the given choices such that **sum** will always store a value greater than 0 at the end of the execution of the above code.

**Options :**

6406531485346. ✘ Each key of the dictionary **D** should be mapped to a positive integer.
6406531485347. ✘ Each key of the dictionary **D** should be mapped to a dictionary with each key mapped to a positive integer.
6406531485348. ✘ Each key of the dictionary **D** should be mapped to a non-empty list of integers.
6406531485349. ✓ Each key of the dictionary **D** should be mapped to a non-empty list of positive integers.

**Question Number : 75 Question Id : 640653445818 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Let X be a row from the "Words" table. Consider the following procedure.

```
1 Procedure isRich(X)
2     vDict = {}
3     i = 1, A = ''
4     while(i <= X.LetterCount){
5         A = ith letter in X.Word
6         if(A is a vowel){
7             vDict[A] = True
8         }
9         i = i + 1
10    }
11    if(length(keys(vDict)) >= 3){
12        return(True)
13    }
14    return(False)
15 End isRich
```

The return value of `isRich(Y)` will be False if

**Options :**

6406531485350. ✓ `Y.Word = "perseverance"`

6406531485351. ✗ `Y.Word = "computational"`

6406531485352. ✗ `Y.Word = "router"`

6406531485353. ✗ `Y.Word = "online"`

**Sub-Section Number :**

5

**Sub-Section Id :**

64065363403

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 76 Question Id : 640653445819 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4**

### Question Label : Multiple Choice Question

Let `explode(W)` returns the list of letters in the word `W`. For example `explode("common")` will return `['c', 'o', 'm', 'm', 'o', 'n']`. What will `count` store at the end of the execution of the following pseudocode?

```
1 count = 0, letterList = []
2 wordList = ["keep", "exploring", "and", "keep", "learning"]
3 foreach word in wordList{
4     letterList = explode(word)
5     lastLetter = '', flag = False
6     foreach letter in letterList{
7         if(letter is a vowel and letter == lastLetter){
8             flag = True
9         }
10        lastLetter = letter
11    }
12    if(flag){
13        count = count + 1
14    }
15 }
```

### Options :

6406531485354. ✘ 1

6406531485355. ✓ 2

6406531485356. ✘ 3

6406531485357. ✘ 4

**Question Number : 77 Question Id : 640653445820 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

The following pseudocode is executed using the "Words" dataset. Assume that the rows in Table 1 are arranged in the increasing order of sequence numbers from top to bottom. At the end of the execution of the following pseudocode, L stores the list of nouns that appear immediately after an adjective. Choose the correct code fragment to complete the pseudocode.

```
1 | L = []
2 | A = "None"
3 | Read the first row X in Table 1
4 | A = X.Partofspeech
5 | Move X to Table 2
6 | while(Table 1 has more rows){
7 |     Read the first row Y in Table 1
8 |     *****
9 |     ** Fill the code **
10 |    *****
11 |    A = Y.Partofspeech
12 |    Move Y to Table 2
13 | }
```

### Options :

```
1 | if(Y.Partofspeech == "Noun"){
2 |     if(A == "Adjective"){
3 |         L = L ++ [Y.word]
4 |     }
5 | }
```

6406531485358. ✓

```
1 | if((A == "Adjective") or (Y.Partofspeech == "Noun")){
2 |     L = L ++ [Y.word]
3 | }
4 | }
```

6406531485359. ✗

```
1 | if((A == "Noun") and (Y.Partofspeech == "Adjective")){
2 |     L = L ++ [Y.word]
3 | }
4 | }
```

6406531485360. ✗

6406531485361. ✗

```

1 if(Y.PartofSpeech == "Adjective"){
2     if(A == "Noun"){
3         L = L ++ [Y.word]
4     }
5 }
```

<b>Sub-Section Number :</b>	6
<b>Sub-Section Id :</b>	64065363404
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 78 Question Id : 640653445821 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider the procedure given below, where **aList** is a list of integers.

```

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

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

**Options :**

6406531485362. ✓ The first element of both the lists, **cumuList** and **aList**, will be same.

6406531485363. ✗ Number of elements in **cumuList** will be one lesser than that of **aList**

6406531485364. ✗ **cumuList** is a list of numbers in increasing order.

6406531485365. ✓ Number of elements in both lists, **cumuList** and **aList**, will be same

<b>Sub-Section Number :</b>	7
<b>Sub-Section Id :</b>	64065363405

<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 79 Question Id : 640653445822 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

Let **medalDict** be a dictionary with player's name as a key mapped to the list of medals associated with the player from the "Olympics" dataset. For example **medalDict = {"xyz" : ["Silver", "Gold", "Gold"], .... }**. In this example, the player xyz has won one Silver and two Gold medals.

At the end of the execution, **repeatMedals(medalDict)** returns the list of players who have won at least one type of medal more than one time. But the code may have mistakes. Identify all such mistakes (if any). Assume that all statements not listed in the options below are free of errors. It is a Multiple Select Question (MSQ).

```

1 procedure repeatMedals(medalDict)
2     repeatPlayers = []
3     foreach player in keys(medalDict){
4         tempDict = {}
5         foreach medal in medalDict[player]{
6             tempDict[medal] = True
7         }
8         if(length(keys(tempDict)) == length(medalDict[player])){
9             repeatPlayers = repeatPlayers ++ [player]
10        }
11    }
12    return(repeatPlayers)
13 End repeatMedals

```

**Options :**

6406531485366. ❌ Line 2: Incorrect initialization of **repeatPlayers**

6406531485367. ❌ Line 4: Incorrect initialization of **tempDict**

6406531485368. ✓ Line 8: Incorrect conditional statement to update **repeatPlayers**

6406531485369. ❌ No mistakes

<b>Sub-Section Number :</b>	8
-----------------------------	---

<b>Sub-Section Id :</b>	64065363406
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**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 80 Question Id : 640653445823 Question Type : MSQ Is Question**

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

**Correct Marks : 5 Selectable Option : 0**

**Question Label : Multiple Select Question**

The following pseudocode is executed using the "Olympics" dataset. At the end of the execution, **medalDict** stores a dictionary with player's name as key mapped to another dictionary. The nested dictionary stores the medal type as key mapped to a list of years in which the player won that medal. For example if player Xyz has won a silver medal in 2006, a gold medal in 2008, and another silver medal in 2011, then

```
medalDict = {"Xyz": {"Silver": [2006, 2011], "Gold": [2008]}, ...}
```

Assume that every player has a distinct name. But the pseudocode may have mistakes. Identify all such mistakes (if any). Assume that all statements not listed in the options below are free of errors. It is a Multiple Select Question (MSQ).

```
1 medalDict = {}
2 while(Table 1 has more rows){
3     Read the first row X in Table 1
4     if(isKey(medalDict, X.Name)){
5         if(iskey(medalDict[X.Name], X.Medal)){
6             medalDict[X.Name][X.Medal] = [X.Year]
7         }
8         else{
9             medalDict[X.Name][X.Medal] = [X.Year]
10        }
11    }
12    else{
13        medalDict[X.Name][X.Medal] = [X.Year]
14    }
15    Move X to Table 2
16 }
```

**Options :**

6406531485370. ✖ Line 1: Incorrect initialization of **medalDict**

6406531485371. ✓

Line 6: The current statement should be replaced by

```
1 | medalDict[X.Name][X.Medal] = medalDict[X.Name][X.Medal] ++ [X.Year]
```

Line 9: The current statement should be replaced by

```
1 | medalDict[X.Name][X.Medal] = medalDict[X.Name][X.Medal] ++ [X.Year]
```

6406531485372. ✖

Line 13: The current statement should be replaced by

```
1 | medalDict[X.Name] = {X.Medal : [X.Year]}
```

6406531485373. ✓

No Mistakes

6406531485374. ✖

**Sub-Section Number :** 9

**Sub-Section Id :** 64065363407

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id :** 640653445828 **Question Type :** COMPREHENSION **Sub Question Shuffling**

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

**Calculator :** None **Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Question Numbers :** (81 to 82)

Question Label : Comprehension

The following pseudocode is executed using the "Scores" dataset. At the end of the execution, **medallist** should store the list of sequence numbers of the students who have scored at least 200 total marks and have scored more than 80 marks at least in two subjects. Answer the given subquestions based on the pseudocode.

```
1  medallist = [], A = 0, scount = False
2  while(Table 1 has more rows){
3      Read the first row X in Table 1
4      A = X.Total
5      scount = nsub(X.SeqNo)
6      if((A >= 200) and scount){
7          medallist = medallist ++ [X.SeqNo]
8      }
9      Move X to Table 2
10 }
```

## Sub questions

**Question Number : 81 Question Id : 640653445829 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statement(s) is(are) true about **nSub** based on the pseudocode mentioned in the main question ? It is a Multiple Select Question (MSQ).

### Options :

6406531485378. ✓ **nSub** is a procedure which accepts the sequence number of a student and returns True if the student has scored more than 80 marks at least in two subjects otherwise returns False.

6406531485379. ✗ **nSub** is a procedure which accepts the sequence number of a student and returns the number of subjects in which the student has scored more than 80 marks.

6406531485380. ✗ **nSub** is a dictionary with sequence numbers of students mapped to the number of subjects in which the student has scored more than 80 marks.

6406531485381. ✗ **nSub** is a dictionary with sequence numbers of students mapped to True if the student has scored more than 80 marks at least in two subjects otherwise mapped to False.

**Question Number : 82 Question Id : 640653445830 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4**

**Question Label : Multiple Choice Question**

Let **M**, **P**, and **C** be the lists of sequence numbers of the students who have scored more than 80 marks in Mathematics, Physics, and Chemistry respectively. If **n** is the sequence number of a student then choose the correct implementation of **nSub**?

**Options :**

```
1 Procedure nSub(n)
2     count = 0
3     if(member(M, n)){
4         count = count + 1
5     }
6     if(member(P, n)){
7         count = count + 1
8     }
9     if(member(C, n)){
10        count = count + 1
11    }
12    return(count)
13 End nsub
```

6406531485382. \*

```
1 Procedure nsub(n)
2     count = 0
3     if(member(M, n)){
4         count = count + 1
5     }
6     if(member(P, n)){
7         count = count + 1
8     }
9     if(member(C, n)){
10        count = count + 1
11    }
12    if(count >= 2){
13        return(True)
14    }
15    return(False)
16 End nsub
```

6406531485383. ✓

```

1 nSub = {}
2 while(Table 1 has more rows){
3     Read the first row x from Table 1
4     count = 0
5     if(member(M, X.SeqNo)){
6         count = count + 1
7     }
8     if(member(P, X.SeqNo)){
9         count = count + 1
10    }
11    if(member(C, X.SeqNo)){
12        count = count + 1
13    }
14    if(count >= 2){
15        nSub[X.SeqNo] = True
16    }
17    Move X to Table 2
18 }
```

6406531485384. \*

```

1 nSub = {}
2 while(Table 1 has more rows){
3     Read the first row x from Table 1
4     count = 0
5     if(member(M, X.SeqNo)){
6         count = count + 1
7     }
8     if(member(P, X.SeqNo)){
9         count = count + 1
10    }
11    if(member(C, X.SeqNo)){
12        count = count + 1
13    }
14    nSub[X.SeqNo] = count
15    Move X to Table 2
16 }
```

6406531485385. \*

**Sub-Section Number :** 10

**Sub-Section Id :** 64065363408

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653445824 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

### **Question Numbers : (83 to 85)**

Question Label : Comprehension

Let **Z** be a row in the "Words" table and **D** be a dictionary. Use the procedure given below for answering the given subquestions.

```
1 Procedure updateDict(Z, Dict)
2     i = 1, x = ''
3     while(i <= Z.LetterCount){
4         x = ith letter of Z.Word
5         if(not isKey(Dict, x)){
6             Dict[x] = 1
7         }
8         else{
9             Dict[x] = Dict[x] + 1
10        }
11        i = i + 1
12    }
13    return(Dict)
14 End updateDict
```

### **Sub questions**

**Question Number : 83 Question Id : 640653445825 Question Type : SA Calculator : None**

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

**Correct Marks : 3**

Question Label : Short Answer Question

Let **X.Word** be "thinking". At the end of the execution of the following pseudocode, what will be the value of **length(keys(alphaDict))**?

```
1 alphadict = {'t':2, 'c':1, 'e':1}
2 alphadict = updateDict(x, alphadict)
```

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas :** PlainText

**Possible Answers :**

8

**Question Number : 84 Question Id : 640653445826 Question Type : SA Calculator : None**

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

**Correct Marks : 3**

Question Label : Short Answer Question

Let *X.Word* and *Y.Word* be "computational" and "thinking" respectively. The following pseudocode is executed using the "Words" dataset and the procedure **updateDict** mentioned in the main question.

```
1 firstDict = {}, secondDict = {}, commonDict = {}
2 firstDict = updateDict(X, commonDict)
3 secondDict = updateDict(Y, commonDict)
4 foreach key in keys(firstDict){
5     if(isKey(secondDict, key)){
6         if(firstDict[key] > secondDict[key]){
7             commonDict[key] = firstDict[key]
8         }
9     else{
10         commonDict[key] = secondDict[key]
11     }
12 }
13 }
```

At the end of the execution of above pseudocode, what would be the value of `length(keys(commonDict))`?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3

**Question Number : 85 Question Id : 640653445827 Question Type : SA Calculator : None**

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

**Correct Marks : 4**

**Question Label : Short Answer Question**

Consider the dictionary **commonDict** created in the previous question. What would be the value of **commonDict['i']**?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

2

## DBMS

<b>Section Id :</b>	64065328994
<b>Section Number :</b>	5
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	16
<b>Number of Questions to be attempted :</b>	16
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065363409

<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 86 Question Id : 640653445831 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "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 :**

6406531485386. ✓ Yes

6406531485387. ✗ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065363410

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 87 Question Id : 640653445835 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Find the correct match with respect to the normal forms shown below.

	Normal Forms
1	First Normal Form
2	Second Normal Form
3	Third Normal Form
4	Fourth Normal Form

	Properties of Normal Forms
A	To eliminate the functional dependencies in which non-prime attributes determine other non-prime attributes.
B	Does not allow multivalued attributes.
C	To eliminate multivalued dependencies.
D	To eliminate functional dependencies in which proper subsets of candidate keys determine non-prime attributes.

**Options :**

6406531485397. ✘ 1 - B, 2 - A, 3 - D, 4 - C

6406531485398. ✘ 1 - C, 2 - D, 3 - A, 4 - B

6406531485399. ✘ 1 - C, 2 - A, 3 - D , 4 - B

6406531485400. ✓ 1 - B, 2 - D, 3 - A , 4 - C

**Question Number : 88 Question Id : 640653445839 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the URL given below:

<https://student.iitm.ac.in/index.html>

- A: Protocol
- B: Domain name
- C: Resource-name

1:index.html  
2:student.iitm.ac.in  
3:https

Choose the correct option.

**Options :**

6406531485410. ✓ 1-C, 2-B, 3-A

6406531485411. ✗ 1-B, 2-C, 3-A

6406531485412. ✗ 1-C, 2-A, 3-B

6406531485413. ✗ 1-A, 2-B, 3-C

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363411

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 89 Question Id : 640653445834 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider the relational schema  $R(A, B, C, X, U)$  with the following functional dependencies (assume that all the attributes have atomic values).

$$\begin{aligned}\mathcal{F} = \{ &U \rightarrow B, \\ &XA \rightarrow C, \\ &XA \rightarrow U, \\ &B \rightarrow A, \\ &XA \rightarrow A \\ &\}\end{aligned}$$

Check if the relation schema  $R$  is in third normal form or not. If not, which of the following functional dependency can be removed to make the relation in third normal form?

**Options :**

6406531485393. ✗  $U \rightarrow B$

6406531485394. ✗  $B \rightarrow A$

6406531485395. ✗  $XA \rightarrow U$

6406531485396. ✓  $R$  is in third normal form.

**Question Number : 90 Question Id : 640653445840 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

A company manufactures magnetic disks and sells them to the local markets. These magnetic disks are tested before they are sold to determine their average lifespan. While testing a set of 150 magnetic disks for 1700 hours, you observed that 35 magnetic disks lasted for 1500 hours, 70 magnetic disks lasted for 1650 hours and the remaining lasted for 1300 hours.

What will be the MTTF of 100 magnetic disks randomly selected from the set?

**Options :**

6406531485414. ✘ 1.5 hours

6406531485415. ✓ 15.1 hours

6406531485416. ✘ 31 hours

6406531485417. ✘ None of these

**Question Number : 91 Question Id : 640653445841 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the Binary Search Tree shown in Figure 1.

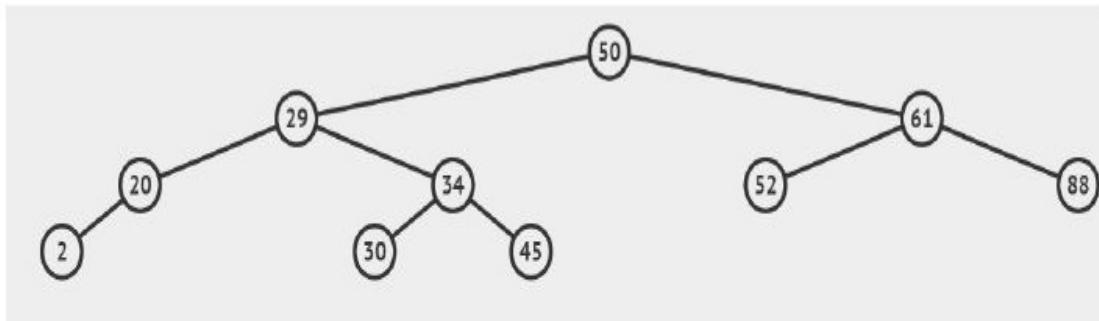


Figure 1: Binary Search Tree (BST)

Assume that the elements 2 and 45 are removed from the given binary search tree. If the elements are removed, what is the height of the binary search tree and how many leaf nodes are there?

**Options :**

6406531485418. ✖ height = 3, number of leaf nodes= 3

6406531485419. ✖ height = 2, number of leaf nodes= 5

6406531485420. ✓ height = 3, number of leaf nodes= 4

6406531485421. ✖ height = 2, number of leaf nodes= 3

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363412

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 92 Question Id : 640653445836 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4**

**Question Label : Multiple Choice Question**

Consider a relation CustomerLogs(*Name, Items, Restaurant, Date*) with the following data values.

Name	Items	Restaurant	Date
Zury	Coffee	Your's cafe	19-10-21
Zury	Tea	Our's cafe	21-10-21
Zury	Tea	C	E
Zury	A	B	D

If multivalued dependency ( $Name \rightarrow\!\!> \{Items, Date\}$ ) exists in the above CustomerLogs relation, then what are the values of A, B, C, D, E?

**Options :**

6406531485401. ✖ A = Tea, B = Your's cafe, C = Our's cafe, D = 21-10-21, E = 19-10-21

6406531485402. ✖ A = Coffee, B = Your's cafe, C = Our's cafe, D = 21-10-21, E = 19-10-21

6406531485403. ✓ A = Coffee, B = Our's cafe, C = Your's cafe, D = 19-10-21 , E = 21-10-21

6406531485404. ✘ A = Tea, B = Our's cafe, C = Your's cafe, D = 19-10-21, E = 21-10-21

**Question Number : 93 Question Id : 640653445846 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the relation  $R(A, B, C, D, E, G)$  with the following sets of functional dependencies

$$\mathcal{F} = \{AB \rightarrow C, AC \rightarrow B, AD \rightarrow E, B \rightarrow D, BC \rightarrow A, E \rightarrow G\}$$

Let the  $R$  is decomposed in two ways:

$$D1 = R1(AB), R2(BC), R3(ABDE), R4(EG)$$

$$D2 = R1(ABC), R2(ACDE), R3(ADG)$$

Which among the following statement is correct?

**Options :**

6406531485429. ✘  $D1$  is a lossless decomposition and  $D2$  is a lossy decomposition.

6406531485430. ✓  $D1$  is a lossy decomposition and  $D2$  is a lossless decomposition.

6406531485431. ✘  $D1$  and  $D2$  both are lossless decompositions.

6406531485432. ✘  $D1$  and  $D2$  both are lossy decompositions.

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363413

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 94 Question Id : 640653445838 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider the relational schema given below.

**instructor(*id, name, dept\_name, salary*)**

Choose the SQL statement(s) that can result in an SQL Injection which retrieves all information from the **instructor** table.

**Options :**

SELECT \*  
FROM instructor  
WHERE dept\_name='Biology' and 1=1

6406531485406. ❌

SELECT \*  
FROM instructor  
WHERE dept\_name='Biology' and dept\_name=dept\_name

6406531485407. ❌

SELECT \*  
FROM instructor  
WHERE dept\_name='Biology' or 100=100

6406531485408. ✓

SELECT \*  
FROM instructor  
WHERE dept\_name='Biology' or dept\_name=dept\_name

6406531485409. ✓

**Sub-Section Number :**

6

**Sub-Section Id :**

64065363414

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 95 Question Id : 640653445848 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

## Question Label : Multiple Select Question

Consider the following SQL statement to create table Customer.

```
CREATE TABLE Customer (
    custid int NOT NULL,
    name varchar(30) NOT NULL,
    city varchar(30) NOT NULL,
    country varchar(30) NOT NULL,
    postcode varchar(20) NOT NULL,
    PRIMARY KEY (custid) )
```

Which among the following functional dependencies set will not be applicable to the table Customer?

### Options :

$$\mathcal{F} = \{name \rightarrow custid,$$
  
$$name \rightarrow city,$$

6406531485437. ✓  $city \rightarrow postcode\}$

$$\mathcal{F} = \{custid \rightarrow name,$$
  
$$name \rightarrow city, country,$$

6406531485438. ✘  $city \rightarrow postcode\}$

$$\mathcal{F} = \{name \rightarrow custid,$$
  
$$custid, name \rightarrow city, country,$$

6406531485439. ✓  $city \rightarrow postcode\}$

$$\mathcal{F} = \{custid \rightarrow name,$$
  
$$name \rightarrow custid,$$

$$name \rightarrow city,$$

$$name \rightarrow country,$$

$$city \rightarrow postcode\}$$

6406531485440. ✘

**Sub-Section Number :**

7

**Sub-Section Id :**

64065363415

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

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

**Time : 0**

**Correct Marks : 4 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider a relational schema  $\text{Contacts}(aadhaarNo, name, mobileNo, address)$ . Assume that all the attributes have atomic values. Which of the following functional dependencies is/are example(s) of the third normal form?

**Options :**

$$\mathcal{F} = \{aadhaarNo \rightarrow (name, address), \\ mobileNo \rightarrow aadhaarNo, \\ (name, address) \rightarrow mobileNo\}$$

6406531485388. ✓

$$\mathcal{F} = \{aadhaarNo \rightarrow name, \\ mobileNo \rightarrow aadhaarNo, \\ (name, address) \rightarrow aadhaarNo\}$$

6406531485389. ✘

$$\mathcal{F} = \{(aadhaarNo, name) \rightarrow address, \\ mobileNo \rightarrow name, \\ (name, aadhaarNo) \rightarrow mobileNo\}$$

6406531485390. ✓

$$\mathcal{F} = \{(aadhaarNo, name) \rightarrow (address, mobileNo), \\ mobileNo \rightarrow aadhaarNo, \\ name \rightarrow address\}$$

6406531485391. ✘

**Question Number : 97 Question Id : 640653445842 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 4 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider the relational schemas shown below.

movie(m\_id, title, year, p\_id)  
producer(p\_id, name, contact)

Assume that both the relations consists of large number of tuples. Let the following queries be executed on the two relations.

1. SELECT p.name, m.title FROM producer AS p NATURAL JOIN movie AS m WHERE m.year > '2002-12-31'
2. SELECT title, year FROM movie WHERE m\_id = 'M025'
3. SELECT p.name, m.title FROM producer AS p, movie AS m WHERE m.p\_id = p.p\_id AND p.name = 'Yash'

Identify which of the statement(s) is/are true?

**Options :**

6406531485422. ❌ Query 1 and 2 will execute more efficiently when sequential file organization scheme is used.

6406531485423. ✓ Query 1 and 3 will execute more efficiently when multitable clustering file organization scheme is used.

6406531485424. ❌ Query 2 and 3 will execute more efficiently when sequential clustering file organization scheme is used.

6406531485425. ❌ Query 2 will execute more efficiently when multitable clustering file organization scheme is used.

6406531485426. ✓ Query 2 will execute more efficiently when sequential clustering file organization scheme is used.

**Question Number : 98 Question Id : 640653445847 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

In the relational schema given below, the domains of all its attributes are atomic only.

$R(employee\_num, employee\_name, department\_num, department\_name)$

Suppose R satisfies the following functional dependencies:

$$\{employee\_num \rightarrow employee\_name, \\ department\_num \rightarrow department\_name, \\ employee\_num \rightarrow department\_name\}$$

If R is decomposed into:

$R1(employee\_num, employee\_name)$  and

$R2(department\_num, department\_name)$ ,

then, which among the following statement(s) is/are correct?

**Options :**

**R1** and **R2** are in BCNF, but decomposition is not a dependency preserving

6406531485433. ✓ one.

6406531485434. ✓ **R1** and **R2** are in BCNF, but decomposition is a lossy.

**R1** and **R2** are in BCNF, but decomposition is a lossless decomposition as

6406531485435. ✗ well as dependency preserving.

**R1** and **R2** are not in BCNF, and decomposition is neither a lossless nor

6406531485436. ✗ dependency preserving.

**Sub-Section Number :** 8

**Sub-Section Id :** 64065363416

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 99 Question Id : 640653445833 Question Type : SA Calculator : None**

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

**Correct Marks : 4**

**Question Label : Short Answer Question**

Consider the relational schema **car**(*carEngineNo*, *model*, *fuelType*, *company*, *headQuarters*, *aadhaar*, *customer*, *state*, *mobile*, *purchaseDate*) with the following set of functional dependencies (assume that all the attributes have atomic values).

$$\begin{aligned}\mathcal{F} = \{ & \\ & \text{carEngineNo} \rightarrow (\text{model}, \text{fuelType}, \text{company}), \\ & (\text{carEngineNo}, \text{aadhaar}) \rightarrow \text{purchaseDate}, \\ & \text{company} \rightarrow \text{headQuarters}, \\ & \text{aadhaar} \rightarrow (\text{customer}, \text{state}), \\ & \text{customer} \rightarrow \text{mobile}, \\ & \text{mobile} \rightarrow \text{aadhaar} \end{aligned}\}$$

Check if the relational schema **car** is in BCNF or not. If **car** is not in BCNF, decompose into minimum X number of smaller relations, so that all the smaller relations are in BCNF as well as dependency preserving. The value of X is \_\_\_\_\_

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

**Sub-Section Number :** 9

**Sub-Section Id :** 64065363417

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number :** 100 **Question Id :** 640653445837 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 3

**Question Label :** Short Answer Question

Consider table **instructor** inside the **university** database.  
The **instructor** table consists of the data as shown in Table 1

id	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000.00
12121	Wu	Finance	90000.00
15151	Mozart	Music	40000.00
32343	El Said	History	60000.00
33456	Gold	Physics	87000.00
76766	Crick	Biology	72000.00
98345	Kim	Elec. Eng.	80000.00

Table 1: **instructor**

Based on the table, what will be the output of the below Python code?

```
import psycopg2
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 count(*) from instructor where dept_name like '%o%';"
        cursor.execute(query)
        result = cursor.fetchall()[0][0]
        print(result)
        cursor.close()

    except (Exception, psycopg2.DatabaseError) as error:
        print(error)
    finally:
        connection.close()
connectDb("university", "postgres", "root", "127.0.0.1", "5432")
```

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

<b>Sub-Section Number :</b>	10
<b>Sub-Section Id :</b>	64065363418
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Id : 640653445843 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Question Numbers : (101 to 102)**

Question Label : Comprehension

Consider the relation  $R(A, B, C, D, E)$  with the following sets of functional dependencies.

$$\mathcal{F}_1 = \{A \rightarrow B, BC \rightarrow D, E \rightarrow A\}$$

$$\mathcal{F}_2 = \{B \rightarrow C, AB \rightarrow D, E \rightarrow AB, C \rightarrow E\}$$

$$\mathcal{F}_3 = \{A \rightarrow B, B \rightarrow C, C \rightarrow D, D \rightarrow E, E \rightarrow A\}$$

Based on the above data and answer the given subquestions.

**Sub questions**

**Question Number : 101 Question Id : 640653445844 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

Let  $m$  be the number of candidate keys for  $R$  based on  $\mathcal{F}_1$ ,  $n$  be the number of candidate keys for  $R$  based on  $\mathcal{F}_2$  and  $p$  be the number of candidate keys for  $R$  based on  $\mathcal{F}_3$ . Find out the value of  $m + n + p$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas :** PlainText

**Possible Answers :**

9

**Question Number :** 102 **Question Id :** 640653445845 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 3

**Question Label :** Short Answer Question

Let  $m$  be the maximum number of super keys for  $R$  based on  $\mathcal{F}_1$ ,  $n$  be the maximum number of super keys for  $R$  based on  $\mathcal{F}_2$  and  $p$  be the maximum number of super keys for  $R$  based on  $\mathcal{F}_3$ .

Find out the value of  $m + n + p$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

67

## PDSA

**Section Id :** 64065328995

**Section Number :** 6

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 16

**Number of Questions to be attempted :** 16

<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065363419
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 103 Question Id : 640653445849 Question Type : MCQ Is Question**

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

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "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 :**

6406531485441. ✓ Yes

6406531485442. ✗ No

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	64065363420
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

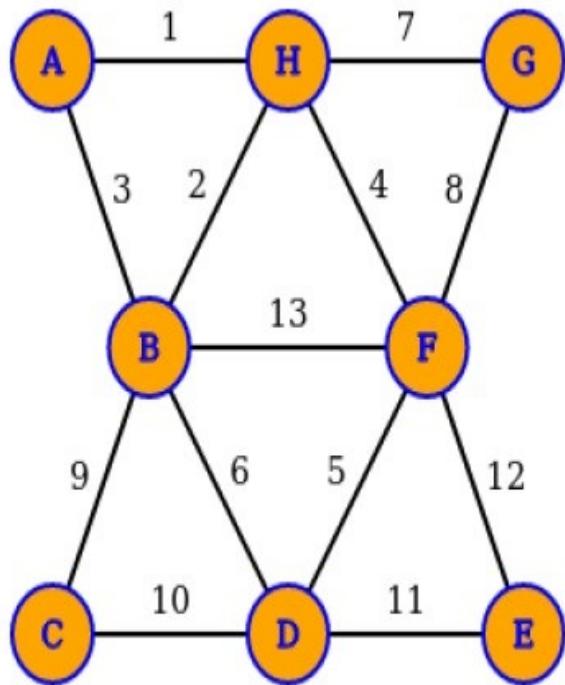
**Question Number : 104 Question Id : 640653445850 Question Type : SA Calculator : None**

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

**Correct Marks : 4**

Question Label : Short Answer Question

Consider the graph  $G$  given below.



Let  $\alpha$  denote the number of minimum spanning trees of  $G$  and  $\beta$  denote the weight of such a minimum spanning tree.

The value of  $\alpha + \beta$  is \_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

40

**Question Number :** 105 **Question Id :** 640653445855 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 4

Question Label : Short Answer Question

Consider a binary tree  $T$  that has 50 leaf nodes. Then the number of nodes in  $T$  that has exactly two children are \_\_\_\_\_

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

49

**Question Number :** 106 **Question Id :** 640653445861 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 4

**Question Label :** Short Answer Question

Meetings M1, M2, ...., M10 are to be conducted in a single available meeting room. The table below gives the start and end times of these meetings. If any activity finishes at time T, then other activities can be started at time T or afterward.

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
start	8	2	11	4	10	6	6	3	1	2
end	15	3	12	7	11	9	10	5	4	7

How many meetings can be scheduled at most by following the timing constraints given above?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

5

**Question Number :** 107 **Question Id :** 640653445864 **Question Type :** SA **Calculator :** None

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

**Correct Marks : 4**

**Question Label :** Short Answer Question

In an array  $A$ , two elements  $A[i]$  and  $A[j]$  form an inversion pair, if  $A[i] > A[j]$  for  $i < j$ .

The maximum number of inversion pairs possible in an integer array  $A$  of size 12 is \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

66

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363421

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number :** 108 **Question Id :** 640653445851 **Question Type :** MCQ **Is Question**

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

**Time :** 0

**Correct Marks :** 3

**Question Label :** Multiple Choice Question

Let  $G$  be a connected graph with at least 5 vertices and all edges in  $G$  having distinct weights. Let  $T$  be a minimum spanning tree of  $G$ . Consider the following statements:

1. If  $e$  is the heaviest edge in a cycle in  $G$ , then  $T$  must exclude  $e$ .
2. If  $e$  is the lightest edge in a cycle in  $G$ , then  $T$  must include  $e$ .
3. If  $e_3$  and  $e_4$  are the third and fourth smallest edges in  $G$ , then  $T$  must include at least one of them.

Which of the above statement(s) is/are **correct** regarding  $G$  and  $T$ ?

**Options :**

6406531485444. ✘ Statement 1 only

6406531485445. ✘ Statement 3 only

6406531485446. ✘ Statements 1 and 2

6406531485447. ✓ Statements 1 and 3

**Question Number : 109 Question Id : 640653445852 Question Type : MCQ Is Question**

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

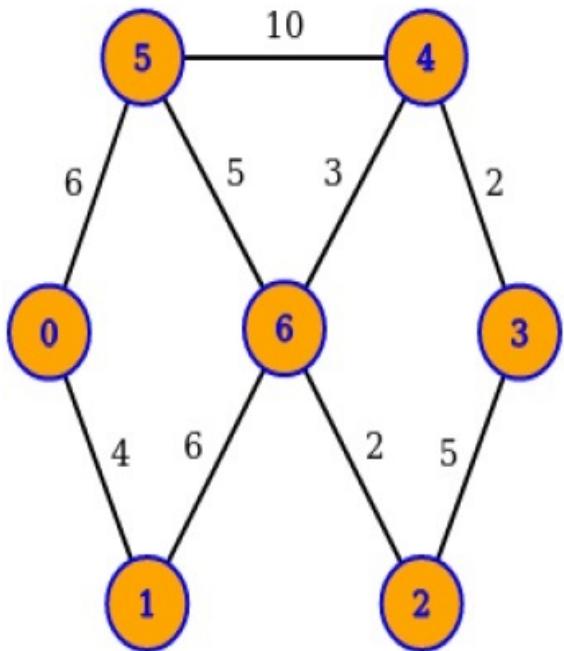
**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

In the given graph, if we try to find the shortest path from node 0 to all other nodes using the Dijkstra's algorithm given below, in what order will the nodes be marked as `True` in the `visited` dictionary?

```
1 def dijkstralist(wList,s):
2     infinity = 1 + len(wList.keys())*max([d for u in wList.keys() for (v,d)
3         in wList[u]])
4     (visited,distance) = ({},{})
5     for v in wList.keys():
6         (visited[v],distance[v]) = (False,infinity)
7     distance[s] = 0
8     for u in wList.keys():
9         nextd = min([distance[v] for v in wList.keys() if not visited[v]])
10        nextvlist = [v for v in wList.keys() if (not visited[v]) and
11            distance[v] == nextd]
12        if nextvlist == []:
13            break
14        nextv = min(nextvlist)
15        visited[nextv] = True
16        for (v,d) in wList[nextv]:
17            if not visited[v]:
                distance[v] = min(distance[v],distance[nextv]+d)
return(distance)
```



**Options :**

6406531485448. ✘ 0 1 2 6 5 4 3

6406531485449. ✘ 0 1 5 6 2 3 4

6406531485450. ✓ 0 1 5 6 2 4 3

6406531485451. ✘ 0 1 5 6 4 2 3

**Question Number : 110 Question Id : 640653445854 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider a max-heap  $H = [20, 10, 12, 8, 9]$ . If we perform the following operations in the given order on the max-heap  $H$  then the resulting max-heap would be \_\_\_\_\_

- 1 insert(15) #The resulting heap after inserting 15 would be max-heap
- 2 delete\_max() #The resulting heap after deleting the max element would be max-heap

**Options :**

6406531485457. ✘ [15, 9, 8, 10, 12]

6406531485458. ✓ [15, 10, 12, 8, 9]

6406531485459. ✘ [15, 12, 10, 9, 8]

6406531485460. ✘ [15, 12, 10, 8, 9]

**Question Number : 111 Question Id : 640653445856 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following statements:

1. Time required for searching an item in a min-heap of size  $n$  is bounded by  $O(\log n)$ .
2. Time required for searching an item in a balanced binary search tree of size  $n$  is bounded by

$O(\log n)$ .

3. A binary tree can be reconstructed back if either its preorder or postorder traversal is known.

4. A binary search tree can be reconstructed back if its inorder traversal is known.

Which of the above given statement(s) is/are **true**?

**Options :**

6406531485462. ✘ Statements 1 and 3

6406531485463. ✘ Statements 3 and 4

6406531485464. ✘ Statements 1 and 2

6406531485465. ✘ Statement 4 only

6406531485466. ✓ Statement 2 only

**Question Number : 112 Question Id : 640653445857 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

While inserting the elements 20, 60, 10, 45, 65, 30, and 90 in an empty binary search tree (BST) in the sequence shown, the elements at maximum depth are\_\_\_\_

**Options :**

6406531485467. ✓ 30, 90

6406531485468. ✘ 45, 90

6406531485469. ✘ 65, 90

6406531485470. ✘ 45, 65

**Question Number : 113 Question Id : 640653445859 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider a string: I I T M B S I I T T M B B I I T

What is the average length of bits required for encoding each letter using Huffman encoding ?

**Options :**

6406531485476. ✘ 1.87

6406531485477. ✘ 3.15

6406531485478. ✘ 2.46

6406531485479. ✓ 2.18

**Question Number : 114 Question Id : 640653445860 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider a random sequence of positive integers  $x_1, x_2, x_3, \dots, x_n$ , we have to partition them in two sets  $P(p_1, p_2, \dots, p_k)$  and  $Q(q_1, q_2, \dots, q_{n-k})$  such that the difference between the sum of these two sets is minimum i.e.  $|\sum p_i - \sum q_i|$  is minimum.

Which of the following greedy strategy would work for this problem ?

**Options :**

Sort  $x_1, x_2, x_3, \dots, x_n$  and put all even positioned elements in P and odd positioned  
6406531485480. ✘ element in Q from the sorted sequence.

Find the median element of  $x_1, x_2, x_3, \dots, x_n$  put all elements lesser or equal to the median  
6406531485481. ✘ in P and greater than the median in Q.

Sort  $x_1, x_2, x_3, \dots, x_n$ , from the sorted sequence at  $i^{th}$  step,  $x_i$  is placed in that set (P or Q)  
6406531485482. ✘ whose sum of all current elements is smaller in the  $i^{th}$  step.

6406531485483. ✓ None of these.

**Question Number : 115 Question Id : 640653445863 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Which of the following statement is **true** for searching the  $k^{th}$  smallest element in an unsorted array of size  $n$  ?

**Options :**

6406531485489. ❌ Using Quick select strategy the worst case running time will be  $O(n \log n)$ .

6406531485490. ❌ Using max-heap of size  $k$  the worst case running time will be  $O(k)$ .

6406531485491. ✓ Using Quick select strategy the worst case running time will be  $O(n^2)$ .

6406531485492. ❌ Using Quick select strategy the worst case running time will be  $O(n)$ .

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363422

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 116 Question Id : 640653445853 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

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

**Options :**

6406531485452. ✓ Bellman Ford algorithm can detect negative weight cycles in a graph.

Time complexity of Dijkstra's algorithm when implemented using an adjacency list is

6406531485453. ❌  $O(E + V)$ .

The formula to update the length of the shortest path from vertex  $i$  to  $j$  in Floyd-Warshall algorithm is

$$SP^k[i, j] = \min[SP^k[i, k] + SP^k[k, j], SP^{k-1}[i, j]]$$

6406531485454. ❌

The shortest path returned by Dijkstra's algorithm always passes through the least number of vertices.

Given a graph where all edges have positive weights, the shortest path produced by Dijkstra's and Bellman-Ford algorithm may be different, but the path weight would be the same.

**Question Number : 117 Question Id : 640653445858 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Consider that the following elements are inserted in the given order to create an AVL tree  $T$ :

36, 40, 32, 18, 72, 5, 35, 34

Which of the following node(s) would be leaf nodes of  $T$ ?

**Options :**

6406531485471. ✓ 5

6406531485472. ✓ 32

6406531485473. ✗ 40

6406531485474. ✓ 35

6406531485475. ✗ 34

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363423

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 118 Question Id : 640653445862 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the following recurrences and choose the **correct** option.

1.  $T_1(n) = 9T_1(n/3) + O(n)$

Base Case :  $T_1(1) = O(1)$

2.  $T_2(n) = 3T_2(n/4) + O(n^2)$

Base Case :  $T_2(1) = O(1)$

**Options :**

6406531485485. ❌  $T_1 = O(n^{\log_2 3})$  and  $T_2 = O(n^2)$

6406531485486. ✓  $T_1 = O(n^2)$  and  $T_2 = O(n^2)$

6406531485487. ❌  $T_1 = O(n)$  and  $T_2 = O(n^2)$

6406531485488. ❌  $T_1 = O(n^2)$  and  $T_2 = O(n^{\log_3 4})$

## AppDev1

**Section Id :** 64065328996

**Section Number :** 7

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 19

**Number of Questions to be attempted :** 19

**Section Marks :** 50

**Display Number Panel :** Yes

**Group All Questions :** No

**Enable Mark as Answered Mark for Review and** Yes

**Clear Response :**

**Maximum Instruction Time :** 0

**Sub-Section Number :** 1

**Sub-Section Id :** 64065363424

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Number : 119 Question Id : 640653445865 Question Type : MCQ Is Question**

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

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL: MODERN APPLICATION DEVELOPMENT 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 :**

6406531485494. ✓ Yes

6406531485495. ✗ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065363425

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 120 Question Id : 640653445866 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Suppose a request “<https://xyz.com?name=Abhi&age=22>” generates the below response on the terminal.

Name : Abhi

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

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

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

**Options :**

Code1: “/”, methods = ['GET', 'POST']  
6406531485496. ✓ Code2: request.args['name']

Code1: “/”, methods = ['GET']  
6406531485497. ✗ Code2: request.form['name']

Code1: “/”
Code2: request.args.get('name')  
6406531485498. ✓

Code1: “/”
Code2: request.form['name']  
6406531485499. ✗

**Question Number : 121 Question Id : 640653445867 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

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

**Options :**

6406531485500. ✓ The flask framework uses server side rendering (SSR) to deliver web pages.
6406531485501. ✓ In general, the HTTP GET request does not have a request body.
6406531485502. ✗ The HTML forms can be used to make “GET” and “DELETE” HTTP requests.
6406531485503. ✗ All of these

**Question Number : 122 Question Id : 640653445876 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider the following model classes “Section” and “Book” corresponding to tables “section” and “book” respectively in the SQLite database.

```
class Section(db.Model):
    section_id = db.Column(db.Integer(), primary_key = True)
    section_name = db.Column(db.String(50), nullable = False)
    books = db.relationship("Book", backref = "sectionof")

class Book(db.Model):
    book_id = db.Column(db.Integer(), primary_key = True)
    book_name = db.Column(db.String(50), nullable = False)
    section = db.Column(db.Integer(), db.ForeignKey("section.section_id"))
```

If an object “s1” that represents an existing record in the table “section” is defined as `s1 = Section.query.get(1)`, The correct way(s) to add a book with the name “Wings of fire” that belongs to s1 using the Python console is/are.

**Options :**

- ```
>>> b1 = Book(book_name = "Wings of fire", section = 1)
>>> db.session.add(b1)
6406531485536. ✓ >>> db.session.commit()
```

```
>>> b1 = Book(book_name = "Wings of fire", sectionof = 1)
>>> db.session.add(b1)
>>> db.session.commit()
```

6406531485537. ✗

6406531485538. ✗

```
>>> b1 = Book(book_name = "Wings of fire", section = s1)
>>> db.session.add(b1)
>>> db.session.commit()
```

```
>>> b1 = Book(book_name = "Wings of fire", sectionof = s1)
>>> db.session.add(b1)
>>> db.session.commit()
```

6406531485539. ✓

**Question Number : 123 Question Id : 640653445883 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statements is/are true about indexing?

**Options :**

6406531485564. ✓ Indexes are special lookup tables that the database search engine can use to speed up data retrieval.

6406531485565. ✓ Indexes can be created or dropped without any effect on the data.

6406531485566. ✓ Indexes should be avoided for tables that have frequent insert operations.

6406531485567. ❌ Indexes enhance the performance even if the table is updated frequently.

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363426

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 124 Question Id : 640653445868 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following SQLAlchemy class models.

```
class College(Base):
    __tablename__ = "college"
    college_id = Column(Integer, primary_key=True)
    college_name = Column(String(50))
    students = relationship("Student", back_populates="college",
                           uselist=False)

class Student(Base):
    __tablename__ = "student"
    student_id = Column(Integer, primary_key=True)
    student_name = Column(String(30))
    parent_id = Column(Integer, ForeignKey("college.id"), unique=True)
    college = relationship("College", back_populates="students")
```

Which of the following relationships is depicted between the “College” and “Student” models?

**Options :**

6406531485504. ❌ Many-to-Many

6406531485505. ❌ Many-to-One

6406531485506. ❌ One-to-Many

6406531485507. ✓ One-to-One

**Question Number : 125 Question Id : 640653445869 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following python functions.

```
def module1(a, b, c):
    mod1 = a%b+c
    print(mod1)
def module3(original_func):
    def module2(*args):
        module1(*args)
        x,y,z = args
        print((z)**2)
    return module2(4,5,7)
module3(module1)
```

Supposing the statement “module3(module1)” works in the way a decorator works, then what will be the output of the above python snippet.

**Options :**

6406531485508. ✘ 12

49

6406531485509. ✓ 11

49

6406531485510. ✘ 11

25

6406531485511. ✘ Error

**Question Number : 126 Question Id : 640653445870 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following restful API implementation using Flask.

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

app = Flask(__name__)
api = Api(app)
food_items = {"rice": "50", "pulses": "60", "wheat": "70"}

class Home(Resource):
    def get(self):
        return food_items

    def post(self):
        data=request.json
        food_items.update(data)
        return "Data is Inserted"

api.add_resource(Home, '/')

if __name__ == '__main__':
    app.run(debug = True)
```

If the above flask application is running on URL "<http://127.0.0.1:5000>", choose its output when we send POST and GET requests in the sequence given below.

1. POST "<http://127.0.0.1:5000/>" with request body {"grape": "30"}
2. GET "<http://127.0.0.1:5000/>"

### Options :

1. "Data is Inserted"

2. {  
 "rice": "50",  
 "pulses": "60",  
 "wheat": "70"  
 "grape": "30"

6406531485512. ✓

6406531485513. ✗

1. {  
    "rice": "50",  
    "pulses": "60",  
    "wheat": "70"  
}

2. "Data is Inserted"

1. Error

2. {  
    "rice": "50",  
    "pulses": "60",  
    "wheat": "70"

6406531485514. \*

}

1. "Data is Inserted"

2. Error

6406531485515. \*

**Question Number : 127 Question Id : 640653445873 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider the below flask application.

```
from flask_sqlalchemy import SQLAlchemy
from flask import Flask

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

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

    def __init__(self, roll_no, name):
        self.roll_no = roll_no
        self.name = name

db.create_all()
student1 = student(roll_no = 1, name= 'Sam')
db.session.add(student1)
db.session.commit()
student2 = student(roll_no = 2, name = 'Lee')
student3 = student(roll_no = 3, name = 'Sandy')
db.session.add(student2)
db.session.commit()
db.session.add(student3)

result = student.query.all()
print([x.name for x in result])
```

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

**Options :**

6406531485524. ❌ ['Sam', 'Lee'] will be displayed in the terminal and two tuples will be added in the student relation in the “testdb” database.

6406531485525. ✓ ['Sam', 'Lee', 'Sandy'] will be displayed in the terminal and two tuples will be added in the student relation in the “testdb” database.

6406531485526. ❌ ['Sam', 'Lee', 'Sandy'] will be displayed in the terminal and three tuples will be added in the student relation in the “testdb” database.

6406531485527. ❌ [] will be displayed in the terminal and no tuple will be added in the student relation in the “testdb” database.

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

A search function S with number of inputs 'N' varies with time 't' according to relation

$N = \log_{10} t$ . What is the nature of algorithmic complexity of the search function S?

**Options :**

6406531485544. ❌ Logarithmic

6406531485545. ❌ Cubic

6406531485546. ✓ Exponential

6406531485547. ❌ Bi-Quadratic

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363427

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 129 Question Id : 640653445871 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the files given below.

File 1: macros.py

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

@app.route('/')
@app.route('/home')
def home():
    return render_template('index.html', my_list = [1, 5, 10, 69, 25, 30, 34, 45,])

app.run(debug=True)
```

File 2: index.html

```
{% from "macro.html" import calc %}
<!DOCTYPE html>
<html>
  <body>
    {{ calc(my_list) }}
  </body>
</html>
```

File 3: macro.html

```
{% macro calc(my_list) %}
  <p> The original list :{{ my_list }} </p>
  The modified list is:
  {% for x in my_list %}
    {% if (x % 2) == 0 and (x % 3) == 0 %}
      <p>{{x}}</p>
    {% elif (x % 5) == 0 %}
      {{x}}
    {% endif %}
  {% endfor %}
{% endmacro %}
```

What will be rendered by the browser if we hit the URL "<http://127.0.0.1:5000/>" or "<http://127.0.0.1:5000/home>"?

**Options :**

The original list :[1, 5, 10, 69, 25, 30, 34, 45]  
6406531485516. ✘ The modified list is: 5 10 25 30 45

The original list :[1, 5, 10, 69, 25, 30, 34, 45]  
The modified list is: 5 10 25  
30  
6406531485517. ✓ 45

The original list :[1, 5, 10, 69, 25, 30, 34, 45]

The modified list is:

5

10

25

30

6406531485518. ✘ 45

The original list :[1, 5, 10, 69, 25, 30, 34, 45]

6406531485519. ✘ The modified list is: 5 10 69 25 30 34 45

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363428

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number :** 130 **Question Id :** 640653445872 **Question Type :** MCQ **Is Question**

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

**Time :** 0

**Correct Marks :** 2

**Question Label :** Multiple Choice Question

Consider the below flask application.

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

@app.route('/hello/<int:a>/<int:b>', methods = ['GET', 'POST'])
def doOp1(a,b):
    return a+b
if __name__ == '__main__':
    app.run(debug = True)
```

If the application is running on “<http://127.0.0.1:5000>” and a request is sent to the URL “<http://127.0.0.1:5000/hello/2/1>”. What will be rendered by the browser?

**Options :**

6406531485520. ✘ 2

6406531485521. ✘ 12

6406531485522. ✓ 3

6406531485523. ✘ 21

**Question Number : 131 Question Id : 640653445877 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the following code block.

```
from flask import Flask, request

app = Flask(__name__)

#===== START =====

    Code Here

#===== END =====

app.run(debug = True)
```

Which of the following controllers will come in place of “Code Here” that can handle the given request URL below:

<http://127.0.0.1:5000/params?course=MAD1&stream=programming>

#### Options :

```
@app.route('/')
def info():
    params = request.args
    return f"<h2>The course {params['course']} belongs to
6406531485540. ✘ {params['stream']} stream </h2>"

@app.route('/params')
def info():
    arg = request.args
    return f"<h2>The course {arg['course']} belongs to {arg['stream']}
6406531485541. ✓ stream </h2>"

@app.route('/params/<course>/<stream>')
def info(course, stream):
    return f"<h2>The course {course} belongs to {stream} stream </h2>"

6406531485542. ✘

@app.route('/<course>/<stream>')
def info(course, stream):
    return f"<h2>The course {course} belongs to {stream} stream </h2>"

6406531485543. ✘
```

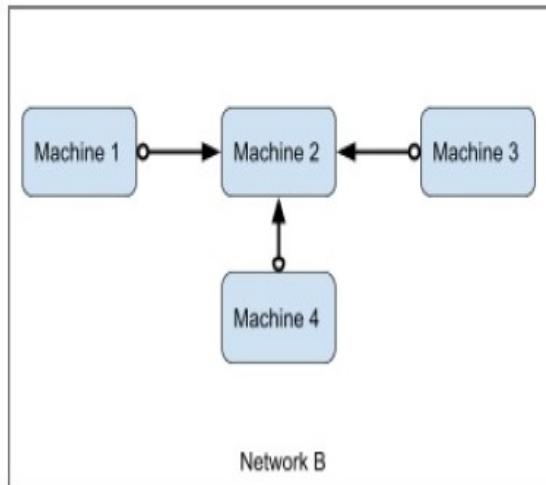
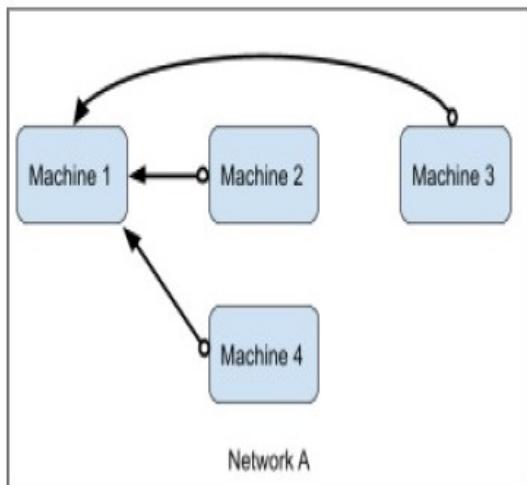
**Question Number : 132 Question Id : 640653445879 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

**Question Label : Multiple Choice Question**

Consider two network structures given below. If a request can transmit only from Dot (o) to arrow (→) and responses from arrow (→) to Dot (o), Which of the following statements is correct?



**Options :**

6406531485548. ❌ Network A is a client-server model, whereas Network B is a peer-to-peer model.

6406531485549. ❌ Network B is a client-server model, whereas Network A is a peer-to-peer model.

6406531485550. ✓ Both the networks A and B represent client-server.

6406531485551. ❌ Both the networks A and B represent peer-to-peer.

**Question Number : 133 Question Id : 640653445880 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

**Question Label : Multiple Choice Question**

Which of the following operations is not idempotent, in the context of REST?

**Options :**

6406531485552. ❌ GET

640653148553. ✓ POST

640653148554. ✗ PUT

640653148555. ✗ DELETE

**Question Number : 134 Question Id : 640653445881 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is/are the advantage(s) of RESTful web service, being stateless?

A: Web services can treat each method request independently.

B: Web services need not maintain the client's previous interactions. It simplifies application design.

C: As HTTP is itself a stateless protocol, RESTful Web services work seamlessly with HTTP protocol.

**Options :**

640653148556. ✗ Only A and B

640653148557. ✗ Only A and C

640653148558. ✗ Only B and C

640653148559. ✓ All A, B and C

**Question Number : 135 Question Id : 640653445882 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the following column names for the table "Person":

**Person**

roll_no	name	father_name	DOB
---------	------	-------------	-----

Which of the following is the correct query syntax in SQLite to create UNIQUE index with name student\_multiindex on multiple column (name, father\_name and DOB) for table student\_info?

**Options :**

`CREATE UNIQUE INDEX student_multiindex ON Person  
COLUMN(name,father_name,DOB);`

6406531485560. ✘

`CREATE INDEX student_multiindex ON UNIQUE Person  
COLUMN(name,father_name,DOB);`

6406531485561. ✘

`CREATE INDEX student_multiindex ON Person  
COLUMN(name,father_name,DOB);`

6406531485562. ✘

`CREATE UNIQUE INDEX student_multiindex ON  
Person(name,father_name,DOB);`

6406531485563. ✓

**Sub-Section Number :**

6

**Sub-Section Id :**

64065363429

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 136 Question Id : 640653445874 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following is/are true regarding DOM?

**Options :**

6406531485528. ✘ DOM stands for Document Object Module.

6406531485529. ✘ DOM is an API that is used to send the requests to and receive the responses from the server.

6406531485530. ✓ DOM is like a tree structure model of the web document.

6406531485531. ✓ Objects of the DOM can be manipulated with the help of javascript.

**Sub-Section Number :** 7

**Sub-Section Id :** 64065363430

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 137 Question Id : 640653445875 Question Type : MSQ Is Question**

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

**Correct Marks : 4.5 Selectable Option : 0**

**Question Label : Multiple Select Question**

Suppose, Mr. Arun wants UTF-8 encoding of a document with 1000 characters with the given below image. Assuming, the document contains only one character being repeated one thousand times. The code point for the only character used 1000 times is U+00D8. What will be the size of the document?

1st Byte	2nd Byte	3rd Byte	4th Byte	Free Bits	Maximum Expressible Unicode Value
0xxxxxxx				7	007F hex (127)
110xxxxx	10xxxxxx			(5+6)=11	07FF hex (2047)
1110xxxx	10xxxxxx	10xxxxxx		(4+6+6)=16	FFFF hex (65535)
11110xxx	10xxxxxx	10xxxxxx	10xxxxxx	(3+6+6+6)=21	10FFFF hex (1,114,111)

**Options :**

6406531485532. ✓ 2000 bytes

6406531485533. ✘ 8000 bytes

6406531485534. ✓ 16000 bits

6406531485535. ✘ 24000 bits

## **MLF**

<b>Section Id :</b>	64065328997
<b>Section Number :</b>	8
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	14
<b>Number of Questions to be attempted :</b>	14
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065363431
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 138 Question Id : 640653445884 Question Type : MCQ Is Question**

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

**Correct Marks : 0**

Question Label : Multiple Choice Question

**THIS IS QUESTION PAPER FOR THE SUBJECT "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 :**

6406531485568. ✓ Yes

6406531485569. ✗ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065363432

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 139 Question Id : 640653445885 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

Choose the correct option(s) with respect to a square Hermitian matrix  $A$  of order  $n$

**Options :**

If  $A$  is a Hermitian matrix, and  $k$  is any real scalar, then  $kA$  is also a Hermitian matrix.

6406531485571. ✓ For every  $a_{ij} \in A$ ,  $\overline{a_{ij}} = a_{ji}$  for all  $(1 \leq i, j \leq n)$ .

6406531485572. ✓ Every diagonal element of the matrix  $A$  is a real number.

6406531485573. ✗ The determinant of  $A$  can either be real or complex.

**Question Number : 140 Question Id : 640653445886 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

Consider a hermitian matrix  $A$  given as

$$A = \begin{bmatrix} 2 & i \\ -i & 2 \end{bmatrix}$$

and choose the correct option(s):

**Options :**

6406531485574. ✓ The eigenvalues of  $A$  are 1 and 3.

6406531485575. ✗ The eigenvalues of  $A$  are 1 repeated twice.

6406531485576. ✓ The matrix  $A$  is unitarily diagonalizable.

6406531485577. ✗ The matrix  $A$  is not unitarily diagonalizable.

**Question Number : 141 Question Id : 640653445890 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

Consider the matrix  $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$  and choose the correct option(s).

**Options :**

6406531485587. ✓ The eigenvalues of  $A$  are non-negative.

6406531485588. ✓ The matrix  $A$  is a positive semidefinite matrix.

6406531485589. ✗ The eigenvectors of  $A$  are  $v_1 = (-1, 1)$ ,  $v_2 = (1, 2)$

6406531485590. ✗ The matrix  $A$  is positive definite.

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363433

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 142 Question Id : 640653445887 Question Type : SA Calculator : None**

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

**Correct Marks : 4**

**Question Label : Short Answer Question**

Let  $v_1$  and  $v_2$  be two non zero real vectors of size  $3 \times 1$ . Suppose that  $v_1$  and  $v_2$  satisfy  $v_1^T v_2 = 0$ ,  $v_1^T v_1 = 1$  and  $v_2^T v_2 = 1$ . Let  $A$  be  $3 \times 3$  matrix given as  $A = 2v_1v_1^T + 3v_2v_2^T$ , then eigen values of  $A$  are  $\lambda_1$ ,  $\lambda_2$  and  $\lambda_3$ , then find the value of  $\lambda_1 + \lambda_2 + \lambda_3$ ?

**Note:** Enter the 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 :**

5

**Question Number : 143 Question Id : 640653445895 Question Type : SA Calculator : None**

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

**Correct Marks : 4**

**Question Label : Short Answer Question**

Find the height of a cylinder of maximum volume that can be inscribed in a sphere of radius  $a = \sqrt{3}$

**Note:** Enter the 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 : 144 Question Id : 640653445896 Question Type : SA Calculator : None**

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

**Correct Marks : 4**

Question Label : Short Answer Question

You are told to make an open box with a squared base from a wooden piece of  $27\ m^2$  area such that the volume of the resulting box is maximum. If the dimensions (length, breadth, and height) of the resulting box are  $l$ ,  $b$ , and  $h$  respectively, then the length of the required box is?

**Note:** Enter the 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

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363434

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 145 Question Id : 640653445888 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

The matrix  $A = \frac{1}{2} \begin{bmatrix} 1+i & \sqrt{k} \\ 1-i & \sqrt{ki} \end{bmatrix}$  is unitary if  $k$  is

**Options :**

6406531485579. ✘  $\frac{1}{2}$

6406531485580. ✘ 1

6406531485581. ✓ 2

6406531485582. ✘  $\frac{1}{4}$

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363435

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 146 Question Id : 640653445891 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Given  $f(x, y) = 10x^2 + 10xy + 5y^2$ , then point  $(0, 0)$  is a \_\_\_\_\_.

**Options :**

6406531485591. ✘ maxima

6406531485592. ✓ minima

6406531485593. ✘ saddle point

6406531485594. ✘ None of these

**Sub-Section Number :** 6

**Sub-Section Id :** 64065363436

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 147 Question Id : 640653445889 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

The SVD of matrix  $A = \begin{bmatrix} -4 & -7 \\ 1 & 4 \end{bmatrix}$  is

**Options :**

6406531485583. ✓  $\begin{bmatrix} -0.894 & 0.447 \\ 0.447 & 0.894 \end{bmatrix} \begin{bmatrix} \sqrt{81} & 0 \\ 0 & \sqrt{1} \end{bmatrix} \begin{bmatrix} 0.447 & 0.894 \\ -0.894 & 0.447 \end{bmatrix}$

6406531485584. ✗  $\begin{bmatrix} -0.447 & 0.894 \\ -0.894 & -0.447 \end{bmatrix} \begin{bmatrix} \sqrt{40} & 0 \\ 0 & \sqrt{10} \end{bmatrix} \begin{bmatrix} -0.707 & 0.707 \\ 0.707 & 0.707 \end{bmatrix}$

6406531485585. ✗  $\begin{bmatrix} -0.707 & 0.707 \\ 0.707 & 0.707 \end{bmatrix} \begin{bmatrix} 4 & 0 \\ 0 & -5 \end{bmatrix} \begin{bmatrix} -0.447 & 0.894 \\ -0.894 & -0.447 \end{bmatrix}$

6406531485586. ✗  $\begin{bmatrix} -0.512 & 0.707 \\ 0.707 & -0.512 \end{bmatrix} \begin{bmatrix} \sqrt{40} & 0 \\ 0 & \sqrt{10} \end{bmatrix} \begin{bmatrix} 0.707 & -0.707 \\ 0.707 & 0.707 \end{bmatrix}$

**Question Number : 148 Question Id : 640653445892 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

Let  $A = \begin{bmatrix} 2 & -2 & 0 \\ -2 & 1 & -2 \\ 0 & -2 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 2 & -2 \\ 2 & 5 & -4 \\ -2 & -4 & 5 \end{bmatrix}$  Then choose the right option.

**Options :**

6406531485595. ✗ Only  $A$  is positive definite

6406531485596. ✓ Only  $B$  is positive definite

6406531485597. ✗ Both  $A$  and  $B$  are positive definite

6406531485598. ✘ None of them is positive definite.

**Question Number : 149 Question Id : 640653445893 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the data points

$$x_1 = \begin{bmatrix} 0 \\ 2 \end{bmatrix}, x_2 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}, x_3 = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$$

If we are projecting this dataset onto the first principal component, then what is the projected variance?

**Options :**

6406531485599. ✘ 0.34

6406531485600. ✘ 1

6406531485601. ✓ 1.34

6406531485602. ✘ None of these

**Question Number : 150 Question Id : 640653445894 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider these data points to answer the following question:

$$x_1 = \begin{bmatrix} -4 \\ 4 \end{bmatrix}, x_2 = \begin{bmatrix} -2 \\ 2 \end{bmatrix}, x_3 = \begin{bmatrix} 2 \\ -2 \end{bmatrix}, x_4 = \begin{bmatrix} 4 \\ -4 \end{bmatrix}$$

The projected (new) data points  $x'_1, x'_2, x'_3, x'_4$  corresponding to the original points  $x_1, x_2, x_3, x_4$  in one dimensional PCA is

**Options :**

$$6406531485603. ✘ x'_1 = \begin{bmatrix} 0 \\ 2 \end{bmatrix}, x'_2 = \begin{bmatrix} 2 \\ 4 \end{bmatrix}, x'_3 = \begin{bmatrix} 4 \\ 2 \end{bmatrix}, x'_4 = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$$

6406531485604. ✘  $x'_1 = \begin{bmatrix} 2 \\ 2 \end{bmatrix}, x'_2 = \begin{bmatrix} 4 \\ 4 \end{bmatrix}, x'_3 = \begin{bmatrix} 4 \\ 4 \end{bmatrix} x'_4 = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$

6406531485605. ✓  $x'_1 = \begin{bmatrix} -4 \\ 4 \end{bmatrix}, x'_2 = \begin{bmatrix} -2 \\ 2 \end{bmatrix}, x'_3 = \begin{bmatrix} 2 \\ -2 \end{bmatrix} x'_4 = \begin{bmatrix} 4 \\ -4 \end{bmatrix}$

6406531485606. ✘  $x'_1 = \begin{bmatrix} -2 \\ 2 \end{bmatrix}, x'_2 = \begin{bmatrix} -4 \\ 4 \end{bmatrix}, x'_3 = \begin{bmatrix} 2 \\ -2 \end{bmatrix} x'_4 = \begin{bmatrix} 4 \\ -4 \end{bmatrix}$

**Sub-Section Number :** 7

**Sub-Section Id :** 64065363437

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653445897 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (151 to 152)**

Question Label : Comprehension

A furniture dealer deals in only two items, i.e tables and chairs. He has a maximum of \$10000 to invest and a space to store at most 60 pieces. A table costs him \$500 and chair \$200. He can sell a table at a profit of \$50 and a chair at a profit of \$15. Assume that he can sell all the items that he buys. Formulate this problem so that he can maximize the profit

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 151 Question Id : 640653445898 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

The objective function for the problem is

**Options :**

6406531485609. ❌ min  $50x + 15y$

6406531485610. ✓ max  $50x + 15y$

6406531485611. ❌ min  $50x - 15y$

6406531485612. ❌ max  $50x - 15y$

**Question Number : 152 Question Id : 640653445899 Question Type : MSQ Is Question**

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

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

The constraint function for the problem is

**Options :**

6406531485613. ✓  $x \geq 0, y \geq 0$

6406531485614. ✓  $5x + 2y \leq 100$

6406531485615. ❌  $5x + 2y \geq 100$

6406531485616. ✓  $x + y \leq 60$

## Java

<b>Section Id :</b>	64065328998
<b>Section Number :</b>	9
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	16

<b>Number of Questions to be attempted :</b>	16
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065363438
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 153 Question Id : 640653445900 Question Type : MCQ Is Question**

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

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : PROGRAMMING CONCEPTS USING 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 :**

6406531485617. ✓ YES

6406531485618. ✗ NO

<b>Sub-Section Number :</b>	2
<b>Sub-Section Id :</b>	64065363439
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 154 Question Id : 640653445901 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
abstract class SmartSpeaker{
    public abstract void output();
}

class Echo extends SmartSpeaker{
    public void output() {
        System.out.println("Echo speaks");
    }
}

class EchoDot extends SmartSpeaker{
    public void output() {
        System.out.println("EchoDot speaks");
    }
}

class DeviceList{
    private Object[] dArr = {new Echo(), new EchoDot()};
    public void getOutput(){
        for(int i = 0; i < dArr.length; i++){
            //LINE 1
        }
    }
}

public class Test{
    public static void main(String[] args) {
        DeviceList l = new DeviceList();
        l.getOutput();
    }
}
```

Identify the appropriate option to fill in place of LINE 1 such that the output is

Echo speaks  
EchoDot speaks

**Options :**

6406531485619. ❌ dArr[i].output();

6406531485620. ❌ ((EchoDot)dArr[i]).output();

6406531485621. ❌ ((Echo)dArr[i]).output();

6406531485622. ✓ ((SmartSpeaker)dArr[i]).output();

**Question Number : 155 Question Id : 640653445902 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
public class ArrayExample{
    public <T extends Comparable> void sortArray(T[] obj){
        // Sorts obj
    }
    public <T> void elementDisplay(T[] arr){
        System.out.println(arr[0]);
    }
}
```

How does class `ArrayExample` look after type erasure?

**Options :**

```
public class ArrayExample{
    public void sortArray(Object[] obj){
        //Sorts obj
    }
    public void elementDisplay(Object[] arr){
        System.out.println(arr[0]);
    }
}
```

6406531485623. ❌ }

```
public class ArrayExample{
    public void sortArray(Comparable[] obj){
        //Sorts obj
    }
    public void elementDisplay(T[] arr){
        System.out.println(arr[0]);
    }
}
```

6406531485624. ❌ }

```
public class ArrayExample{  
    public void sortArray(Comparable[] obj){  
        //Sorts obj  
    }  
    public void elementDisplay(Object[] arr){  
        System.out.println(arr[0]);  
    }  
}
```

6406531485625. ✓ }

```
public class ArrayExample{  
    public void sortArray(T[] obj){  
        //Sorts obj  
    }  
    public void elementDisplay(T[] arr){  
        System.out.println(arr[0]);  
    }  
}
```

6406531485626. ✘ }

**Question Number : 156 Question Id : 640653445903 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider the Java code given below that returns `true` if the runs scored by at least one non-captain player is more than that of the runs scored by the captain. From among the options, identify the appropriate function header for function `findPlayer` that takes as input an array of `Player` objects and a `Captain` object, and finds if such a player exists.

```
import java.util.*;
interface Playable{
    public abstract int getScore();
}
class Player implements Playable{
    private String name;
    private int runs;
    /---- Constructor
    /---- Accessor methods
    public int getScore() {
        return runs;
    }
}
class Captain extends Player{
    /---- Constructor
}
public class Test{
    // FUNCTION HEADER for function findPlayer
    {
        /----- returns true if at least one player has scored
              more than the captain, else false
    }
    public static void main(String[] args) {
        Player[] p = {new Player("ABC",23), new Player("XYZ",40)};
        Captain c = new Captain("CAP",34);
        System.out.println(findPlayer(p,c));
    }
}
```

Choose the correct option.

#### Options :

6406531485627. ❌ `public static <T, S extends T> boolean findPlayer(T[] arr, S c)`

6406531485628. ✓ `public static <T extends Playable, S extends T> boolean findPlayer(T[]
arr, S c)`

6406531485629. ❌ `public static <T extends S, S> boolean findPlayer(T[] arr, S c)`

public static <T extends S, S extends Playable> boolean findPlayer(T[] arr, S c)  
6406531485630. ✘

**Question Number : 157 Question Id : 640653445905 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class AgeLimitException extends Exception{
    public AgeLimitException() {
        System.out.println("Age should be atleast 18");
    }
}

public class FClass{
    public static void castVote(int age) throws AgeLimitException {
        if(age < 18)
            throw new AgeLimitException();
        System.out.println("Voted successfully");
    }

    public static void main(String[] args) {
        try {
            castVote(10);
            castVote(20);           // LINE 1
        }
        catch(AgeLimitException ae) {
            System.out.println("Cannot vote");
        }
        catch(Exception e) {      // LINE 2
        }
    }
}
```

Choose the correct option.

**Options :**

6406531485635. ✘ LINE 1 generates compilation error because of unreachable code

6406531485636. ✘

This program generates output:

Age should be atleast 18

Cannot vote

Voted successfully

This program generates output:

Age should be atleast 18

Cannot vote

6406531485637. ✓

6406531485638. ✗ LINE 2 generates compilation error because of unreachable code

**Question Number : 158 Question Id : 640653445906 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.util.*;
class Example{
    List<Integer> lst;
    public Example(List<Integer> l){
        lst = l;
    }
    public void copyList(int[] arr){
        try {
            for(int i = 0; i < lst.size(); i++){
                arr[i] = lst.get(i);
                System.out.println(arr[i]);
            }
        }
        catch(ArrayIndexOutOfBoundsException ae) {
            System.out.println("cannot copy");
        }
    }
}
public class Test {
    public static void main(String[] args){
        List<Integer> l = new ArrayList<>();
        l.add(10);
        l.add(20);
        l.add(30);
        int[] a = new int[2];
        Example e1 = new Example(l);
        try {
            e1.copyList(a);
        }
        catch(Exception e) {
            System.out.println("caught in main");
        }
    }
}
```

**Options :**

This program generates the output:

10

20

cannot copy

6406531485639. ✘ caught in main

6406531485640. ✓

This program generates the output:

10

20

cannot copy

This program generates the output:

10

20

30

6406531485641. \*

This program generates the output:

cannot copy

caught in main

6406531485642. \*

**Question Number : 159 Question Id : 640653445907 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
class Example{  
    public static boolean validate(int a, int b){  
        assert a == 0: "a should be zero"; //LINE 1  
        assert b >= 10: "b should not be less than 10"; //LINE 2  
        return true;  
    }  
}  
  
public class Test {  
    public static void main(String[] args) {  
        int a = 2; //LINE 3  
        int b = 10; //LINE 4  
        int result = 0;  
        if (Example.validate(a, b))  
            result = a - b;  
        System.out.println(result);  
    }  
}
```

Identify lines that throw `AssertionError` when the program is executed as:

`java -ea Test`

**Options :**

6406531485643. ✓ LINE 1

6406531485644. ✗ LINE 2

6406531485645. ✗ LINE 3

6406531485646. ✗ LINE 4

**Question Number : 160 Question Id : 640653445909 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Match the following:

A. Maintains insertion order of elements	I. ArrayList
B. Does not maintain any specific order of elements	II. LinkedList
C. Elements will be placed in their natural ascending order	III. HashSet
D. We can get an element using its index	IV. LinkedHashSet V. TreeSet VI. HashMap VII. LinkedHashMap VIII. TreeMap

**Options :**

A---> IV, VII

B--> III, VI

C--> V, VIII

6406531485651. ❌ D--> I, II

A---> I, III, V, VIII

B--> III, VI

C--> IV, VII

6406531485652. ❌ D--> I, II

A---> I, II, IV, VII

B--> III, VI

C--> V, VIII

6406531485653. ✓ D--> I, II

A---> V, VIII

B--> III, VI

C--> I, II, IV, VII

6406531485654. ❌ D--> I, II

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

**Time : 0**

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider the Java code given below that checks whether the input string is a palindrome or not.

```
import java.util.*;
public class QTest {
    public static boolean check(Deque<Character> q) {
        //CODE BLOCK
        return q.isEmpty();
    }
    public static void main(String[] args) {
        String str1 = "HANNAH";
        String str2 = "BANANA";
        Deque<Character> queue1 = new ArrayDeque<Character>();
        Deque<Character> queue2 = new ArrayDeque<Character>();
        for(int i = 0 ;i < 6; i++) {
            queue1.add(str1.charAt(i));
            queue2.add(str2.charAt(i));
        }
        System.out.println(check(queue1));
        System.out.println(check(queue2));
    }
}
```

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

true  
false

You may make use of the descriptions of the methods given below. These are methods inside type Deque.

**pollLast()**: Retrieves and removes the last element of this deque, or returns null if this deque is empty.

**poll()**: Retrieves and removes the head of the queue represented by this deque (in other words, the first element of this deque), or returns null if this deque is empty.

**isEmpty()**: Returns true if this deque contains no elements.

**Options :**

```
while(q.size() < 0) {
    while(q.poll() != q.pollLast())
        break;
}
```

6406531485655. \*

```
        while(q.size() < 0) {  
            if(q.poll() != q.pollLast())  
                break;  
    }
```

6406531485656. ✘

```
        while(q.size() > 0) {  
            if(q.poll() != q.pollLast())  
                break;  
    }
```

6406531485657. ✓

```
        while(q.size() > 0) {  
            while(q.poll() != q.pollLast())  
                break;  
    }
```

6406531485658. ✘

**Question Number : 162 Question Id : 640653445911 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the Java code given below that takes as input the points obtained by teams in the matches they have played, and computes the total points obtained by each team. You may make use of the method description given below.

`getOrDefault(Object key, V defaultValue)`: Returns the value to which the specified key is mapped, or `defaultValue` if this map contains no mapping for the key.

```
import java.util.*;
class Team{
    String name, year;
    int points;
    /--- Constructor
}
public class MapTest{
    public static void printTeams(ArrayList<Team> tL) {
        var map = new LinkedHashMap<String, Integer>();
        Team tm = null;
        for(Team t:tL) {
            map.put(t.name, map.getOrDefault(t.name, 0)+t.points);
        }
        for (Map.Entry<String, Integer> e:map.entrySet()) {
            System.out.println(e.getKey()+" = "+e.getValue());
        }
    }
    public static void main(String[] args) {
        ArrayList<Team> tList = new ArrayList<Team>();
        tList.add(new Team("CSK", "2008", 14));
        tList.add(new Team("RCB", "2008", 8));
        tList.add(new Team("RCB", "2009", 14));
        tList.add(new Team("CSK", "2009", 12));
        printTeams(tList);
    }
}
```

What will the output be?

#### Options :

CSK = 26  
6406531485659. ✓ RCB = 22

RCB = 22  
6406531485660. ✗ CSK = 26

RCB = 14  
6406531485661. ✗ CSK = 12

CSK = 12

6406531485662. ✶ RCB = 14

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363440

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 163 Question Id : 640653445904 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4**

**Question Label : Multiple Choice Question**

Consider the three Java files given below.

**Calculator.java:**

```
package pack1;
public class Calculator {
    public int sum(int a, int b) {
        return a + b;
    }
    protected int div(int a, int b) {
        return a / b;
    }
    private int diff(int a, int b) {
        return a - b;
    }
}
```

**SmartCalculator.java:**

```
package pack1;
public class SmartCalculator extends Calculator{
    public void time() {
        System.out.println("prints current time");
    }
}
```

**Test.java:**

```
package pack1;
public class Test {
    public static void main(String[] args) {
        Calculator c1 = new SmartCalculator();
        System.out.println(c1.div(10, 2));      //LINE 1
        System.out.println(c1.time());          //LINE 2
        System.out.println(c1.sum(10, 20));     //LINE 3
        System.out.println(c1.diff(10, 20));    //LINE 4
    }
}
```

Choose the correct option.

**Options :**

This program generates the output:

5  
prints current time  
30

6406531485631. ✘ -10

6406531485632. ✘ LINE 1 and LINE 2 generate compilation errors.

6406531485633. ❌ LINE 1 and LINE 4 generate compilation errors.

6406531485634. ✓ LINE 2 and LINE 4 generate compilation errors.

**Question Number : 164 Question Id : 640653445908 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

Question Label : Multiple Choice Question

Consider the Java code given below.

```
import java.util.*;
class Player implements Cloneable{
    String name;
    ArrayList<String> achievements = new ArrayList<String>();
    public Player(String n, ArrayList<String> a){
        name = n;
        achievements = a;
    }
    public Object clone() throws CloneNotSupportedException{
        Player p = (Player) super.clone();
        ArrayList<String> achobj = new ArrayList<String>();
        for (String str: this.achievements)
            achobj.add(str);
        p.achievements = achobj;
        return p;
    }
    public String toString(){
        return name+": "+achievements;
    }
}
public class CloTest{
    public static void main(String[] args){
        ArrayList<String> pa = new ArrayList<String>();
        pa.add("MoM(10 times)");           //MoM: Man of the Match
        pa.add("PoS(5 times)");           //PoS: Player of the Series
        Player p1 = new Player("Rohit", pa);
        try{
            Player p2 = (Player)p1.clone();
            p1.achievements.add("WR");      //WR: World Record
            p2.name = "Kohli";
            System.out.println(p1+"\n"+p2);
        }
        catch(CloneNotSupportedException e){
            System.out.println(e);
        }
    }
}
```

What will the output be?

#### Options :

Kohli: [MoM(10 times), PoS(5 times), WR]  
6406531485647. ❌ Kohli: [MoM(10 times), PoS(5 times), WR]

Rohit: [MoM(10 times), PoS(5 times), WR]  
6406531485648. ❌ Kohli: [MoM(10 times), PoS(5 times), WR]

Rohit: [MoM(10 times), PoS(5 times), WR]

6406531485649. ✓ Kohli: [MoM(10 times), PoS(5 times)]

Rohit: [MoM(10 times), PoS(5 times)]

Kohli: [MoM(10 times), PoS(5 times), WR]

6406531485650. ✶

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363441

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 165 Question Id : 640653445912 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 4 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider the following program.

```
class Point<T extends Number>{
    private T x;
    private T y;
    public Point(T x_val, T y_val){
        x = x_val;
        y = y_val;
    }
    public T get_x() {
        return x;
    }
    public T get_y() {
        return y;
    }
    public Point<Double> addition(LINE 1) {
        Point<Double> p1 = new Point<>(0.0, 0.0);
        p1.x = this.x.doubleValue() + p.get_x().doubleValue();
        p1.y = this.y.doubleValue() + p.get_y().doubleValue();
        return p1;
    }
}
public class Test{
    public static void main(String args[]) {
        Point<Integer> p1 = new Point<Integer>(3, 4);
        Point<Integer> p2 = new Point<Integer>(3, 2);
        Point<Double> p3 = p1.addition(p2);
        System.out.println(p3.get_x() + "," + p3.get_y());
    }
}
```

Choose all the options which can be used in place of LINE 1 for a successful compilation of the given code.

#### Options :

6406531485663. ✘ Point<Number> p

6406531485664. ✓ Point<T> p

6406531485665. ✘ Point<Object> p

6406531485666. ✓ Point<?> p

**Question Number : 166 Question Id : 640653445914 Question Type : MSQ Is Question**

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

**Correct Marks : 4 Selectable Option : 0**

Question Label : Multiple Select Question

Consider the Java code given below that prints the names of consumers whose CIBIL score (which gives a summary of one's credit history) is between 500 and 700 (both including).

```
import java.util.*;
class Consumer{
    String name;
    double cibilscore;
    public Consumer(String name, double cibilscore) {
        this.name = name;
        this.cibilscore = cibilscore;
    }
}
public class StreamEx {
    public static void main(String[] args) {
        List<Consumer> list = new ArrayList<Consumer>();
        list.add(new Consumer("ABC", 560));
        list.add(new Consumer("PQR", 750));
        list.add(new Consumer("MNO", 400));
        list.add(new Consumer("XYZ", 350));
        list.add(new Consumer("EFG", 578));
        //CODE BLOCK
    }
}
```

Choose the correct option(s) to fill in place of CODE BLOCK to obtain the right answer.

**Options :**

6406531485671. ❀ 

```
list.stream()
    .map(p -> p.cibilscore >= 500 && p.cibilscore <= 700)
    .forEach(s->System.out.println(s.name));
```

6406531485672. ✓ 

```
list.stream()
    .filter(p -> p.cibilscore >= 500 && p.cibilscore <= 700)
    .forEach(s->System.out.println(s.name));
```

```
list.stream()
    .filter(p -> p.cibilscore>=500)
    .filter(p -> p.cibilscore<=700)
    .forEach(s->System.out.println(s.name));
```

6406531485673. ✓

```
list.stream()
    .filter(p -> p.cibilscore>=500)
    .map(p -> p.cibilscore<=700)
    .forEach(s->System.out.println(s.name));
```

6406531485674. ✗

**Question Number : 167 Question Id : 640653445915 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 4 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider the Java code given below.

```
import java.util.*;
class Player{
    String name;
    int runs;
    public Player(String n, int r) {
        name = n;
        runs = r;
    }
    public String toString() {
        return "name=" + name + ", runs=" + runs;
    }
}
public class Main {
    public static void printTopBatsman(List<Player> p){
        // CODE BLOCK
    }
    public static void main(String[] args) {
        var pList=new ArrayList<Player>();
        pList.add(new Player("Shami", 579));
        pList.add(new Player("Bumrah", 450));
        pList.add(new Player("Rohit", 1700));
        pList.add(new Player("Kohli", 1850));
        printTopBatsman(pList);
    }
}
```

Choose the correct option(s) to fill in place of CODE BLOCK so that the program outputs the details about the batsman who has scored maximum runs:

name=Kohli, runs=1850

#### Options :

6406531485675. ❌ `Collections.sort(p);  
p.stream().limit(1).forEach(System.out::println);`

6406531485676. ❌ `Collections.sort(p);  
p.stream().forEach(System.out::println);`

6406531485677. ✓ `Collections.sort(p, (r2, r1)-> r1.runs-r2.runs);  
p.stream().limit(1).forEach(System.out::println);`

6406531485678. ✓

```
Collections.sort(p, (r1, r2)-> r2.runs-r1.runs);
p.stream().limit(1).forEach(s->System.out.println(s));
```

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363442

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 168 Question Id : 640653445913 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 3 Selectable Option : 0**

Question Label : Multiple Select Question

Consider the Java code given below.

```
interface Queue1<E>{
    public void add();
    public E poll();
}

interface Queue2<E> extends Queue1<E>{
    public void addFirst();
    public E pollLast();
}

class QueueImpl1<E> implements Queue1<E>{
    //implemented abstract methods
}

class QueueImpl2<E> implements Queue2<E>{
    //implemented abstract methods
}

public class IndirectionTest {
    public static void main(String[] args) {
        //CODE BLOCK
    }
}
```

Identify the correct option to be filled in place of CODE BLOCK to create objects for QueueImpl1 and QueueImpl2.

**Options :**

6406531485667. \*

```
Queue2<String> q1, q2;  
q1 = new QueueImpl1<String>();  
q2 = new QueueImpl2<String>();
```

6406531485668. ✓

```
Queue1<String> q1, q2;  
q1 = new QueueImpl1<String>();  
q2 = new QueueImpl2<String>();
```

6406531485669. ✘

```
QueueImpl1<String> q1, q2;  
q1 = new QueueImpl1<String>();  
q2 = new QueueImpl2<String>();
```

6406531485670. ✘

```
QueueImpl2<String> q1, q2;  
q1 = new QueueImpl1<String>();  
q2 = new QueueImpl2<String>();
```

## AppDev2

<b>Section Id :</b>	64065328999
<b>Section Number :</b>	10
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	17
<b>Number of Questions to be attempted :</b>	17
<b>Section Marks :</b>	50
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065363443

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Number : 169 Question Id : 640653445916 Question Type : MCQ Is Question**

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

**Correct Marks : 0**

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL: MODERN APPLICATION DEVELOPMENT 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 :**

6406531485679. ✓ Yes

6406531485680. ✗ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065363444

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 170 Question Id : 640653445917 Question Type : MCQ Is Question**

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

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the below javascript program.

```
async function result (x) {
  const y = 3;
  return new Promise ((reject, resolve) => {
    if (((x * 15) / (5 * x) - 2) == 1)
      reject(y ** 2)
    console.log("Inside Promise")
    resolve(y ** 3)
  })
}

result(x).then(
  rej => console.log("Promise rejected with the value", rej),
  res => console.log("Promise resolved with the value", res)
).then(data => {
  console.log("Data received is", data);
  return "5"
}).finally(data => {
  console.log("Data received is", data);
  return "15"
}).then(data => console.log("Data received is", data))
```

Assuming the variable “x” passed to the “result” function is a whole number between 1 and 99 (including 1 and 99), what will be shown on the console, if the above program is executed?

#### Options :

- Promise rejected with the value 9
- Data received is undefined
- Data received is 5
- 6406531485681. ❌ Data received is 15

- Inside Promise
- Promise rejected with the value 8
- Data received is undefined
- Data received is undefined
- 6406531485682. ❌ Data received is 15

- Inside Promise
- Promise rejected with the value 9
- Data received is undefined
- Data received is undefined
- 6406531485683. ✓ Data received is 5

- 6406531485684. ❌

Promise rejected with the value 8  
Data received is undefined  
Data received is undefined  
Data received is 5

**Question Number : 171 Question Id : 640653445921 Question Type : MCQ Is Question**

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

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider the below javascript program.

```
var num = 15;

const obj = {
    num : 8,

    func : function () {
        console.log("Number 1:", this.num, "Number 2:", num)
    }
}
obj.func.call()
```

What will be the output of the above program, if it is executed as a script and in a REPL (interactive mode), respectively?

**Options :**

6406531485697. ✓ For Script: Number 1: undefined Number 2: 15

For REPL: Number 1: 15 Number 2: 15

6406531485698. ✗ For Script: Number 1: 8 Number 2: 15

For REPL: Number 1: 15 Number 2: 15

6406531485699. ✗ For Script: Number 1: undefined Number 2: 15

For REPL: Number 1: 8 Number 2: 15

6406531485700. ✗ For Script: Number 1: 8 Number 2: 15

For REPL: Number 1: 8 Number 2: 15

**Question Number : 172 Question Id : 640653445930 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4.5**

**Question Label : Multiple Choice Question**

Consider the following application with markup index.html and script app.js.

index.html:

```
<body>
  <div id="app"><router-view></router-view></div>
  <script
src="https://cdn.jsdelivr.net/npm/vue@2/dist/vue.js"></script>
  <script
src="https://unpkg.com/vue-router@2.0.0/dist/vue-router.js"></script>
  <script src="app.js"></script>
</body>
```

app.js:

```
const Header = {
  template: `<div>This is header <router-view /> </div>`,
}
const Error = {
  template: '<div> 404 Page not found</div>',
}
const Profile = {
  template: `<div> Welcome to profile page</div>`,
}
const routes = [
{
  path: '/',
  component: Header,
  children: [
    { path: 'profile', component: Profile },
    { path: '*', component: Error },
  ],
},
]
const router = new VueRouter({
  routes,
})
new Vue({
  el: '#app',
  router,
})
```

Suppose the application is running on <http://127.0.0.1:8080>. What will be rendered for the router-view component in Header component if the user visit the URL <http://127.0.0.1:8080/#/profile>?

**Options :**

6406531485733. ❗ This is header

6406531485734. ✖ 404 Page not found

6406531485735. ✓ Welcome to profile page

6406531485736. ✖ None of these

**Question Number : 173 Question Id : 640653445932 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 4.5**

Question Label : Multiple Choice Question

Consider an application with markup index.html and script app.js.

index.html:

```
<body>
  <div id="app">
    <router-view></router-view>
  </div>
  <script
src="https://cdn.jsdelivr.net/npm/vue@2/dist/vue.js"></script>
  <script
src="https://unpkg.com/vue-router@2.0.0/dist/vue-router.js"></script>
  <script src="app.js"></script>
</body>
```

app.js:

```
const Player = {
  props: {
    run: { type: Number, default: 50 },
  },
  computed: {
    playerName() {
      return this.$route.params.name
    },
  },
  template: `<div>Name: {{playerName}}, Run: {{run}}</div>`,
}

const router = new VueRouter({
  routes: [{ path: '/player/:name', component: Player }],
})

new Vue({
  el: '#app',
  router,
})
```

Suppose the application is running on <http://127.0.0.1:8080>. What will be rendered inside the router-view for <http://127.0.0.1:8080/#/player/rohit>?

### Options :

6406531485741. ✘ Name: rohit, Run: 0

6406531485742. ✘ Name: rohit, Run:

6406531485743. ✘ Name: , Run: 0

6406531485744. ✓ Name: rohit, Run: 50

Sub-Section Number :

3

**Sub-Section Id :** 64065363445

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 174 Question Id : 640653445918 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the below Vue application with markup file “index.html” and javascript file “app.js”.

index.html:

```
<div id = "app">
  <input v-model = "data" />
  <p> Random Number : {{random_number}} </p>
  <button @click = "do_something1"> Click Me</button>
</div>
<script src = "app.js"> </script>
```

app.js:

```
const a = new Vue({
  el : '#app',
  data : {
    random_number : 15,
    hits : 0,
    data : "",
  },
  methods: {
    do_something1 : function () {
      this.hits+= 1
      if (this.hits % 2) {
        sessionStorage.data = this.data + this.data
      }
      localStorage.data = sessionStorage.data
    }
  },
  mounted : function () {
    try {
      this.random_number = localStorage.data.split("iitm").length+1;
    }
    catch {
    }

    this.data = "suffix" + localStorage.data + "prefix"
  }
})
```

Suppose a user of the application opens the “index.html” file in a browser, and enters the text “iitm” in the input box (after removing the old text, if any). After entering the text, the user clicks the button with the text “Click Me” thrice, and closes the browser, and reopens the app in a new browser window. What will be shown in the input text box, and the placeholder “random\_number”, respectively?

### Options :

6406531485685. ✘ suffixiitmiitmprefix, 3

6406531485686. ✓ suffixiitmiitmprefix, 4

6406531485687. ✘ suffixiitmiitmiitmprefix, 3

6406531485688. ✘ suffixiitmiitmiitmprefix, 4

**Question Number : 175 Question Id : 640653445919 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider the below Vuex store definition.

```
const store = new Vuex.Store({
  state : {
    students : [],
    // other state properties
  },
  mutations : {
    filter_rows : function (state, data) {
      // filtering logic
    }
  },
  code1 : {
    fetch_data : function (context) {
      let data_to_be_sent = "nothing";
      fetch(some_url).then(response => response.json()
        ).then(data => {
          data_to_be_sent = data;
        })
      code2
    }
  }
})
```

Suppose the function named “fetch\_data” makes an API call to get the data from the backend, and invokes another function named “filter\_rows” after receiving the data to filter the results based on some criteria. Which of the following is the best option to fill the placeholders “code1” and “code2”?

**Options :**

6406531485689. ✘ Code 1: mutations

Code 2: context.dispatch("filter\_rows", data)

6406531485690. ✘ Code 1: actions

Code 2: context.dispatch("filter\_rows", data\_to\_be\_sent)

6406531485691. ✘ Code 1: mutations

Code 2: context.commit("filter\_rows", data)

6406531485692. ✓ Code 1: actions

Code 2: context.commit("filter\_rows", data\_to\_be\_sent)

**Question Number : 176 Question Id : 640653445923 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the below javascript program, and predict the output, if executed.

```
async function quiz () {
    let x = await new Promise((res, rej) => res(6 || 9));
    console.log("Statement 1")
    let y = await new Promise((res, rej) => res(6 && 9));
    console.log("Statement 2", "gives result as", x + y)
}
quiz()
console.log("Statement 3")
```

**Options :**

6406531485705. ✓ Statement 3

Statement 1

Statement 2 gives result as 15

6406531485706. ✗ Statement 3

Statement 1

Statement 2 gives result as 18

6406531485707. ✗ Statement 1

Statement 3

Statement 2 gives result as 15

6406531485708. ✗ Statement 1

Statement 3

Statement 2 gives result as 12

**Question Number : 177 Question Id : 640653445926 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Suppose you want to store some data in browser which is relevant only till the browser restarts.

Which of the following is most suited for this purpose?

**Options :**

6406531485717. ✓ Session Storage

6406531485718. ✗ Local Storage

6406531485719. ✗ Both localstorage and sessionStorage

6406531485720. ✗ None of these

**Question Number : 178 Question Id : 640653445927 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

What will be the output of the below given JavaScript program, if executed?

```
const createPromise = (condition) => {
  return new Promise((reject, resolve) => {
    if (condition) {
      setTimeout(() => {
        resolve('Promise Resolved')
      }, 2000)
    } else {
      setTimeout(() => {
        reject('Promise Rejected')
      }, 1000)
    }
  })
}

createPromise(true)
  .then((val) => {
    console.log(val)
  })
  .catch(() => {
    console.log('Promise was not resolved')
  })
```

**Options :**

6406531485721. ✘ Promise Resolved

6406531485722. ✘ Promise Rejected

6406531485723. ✓ Promise was not resolved

6406531485724. ✘ None of these

**Question Number : 179 Question Id : 640653445928 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

What will be the output of the below written JavaScript program, if executed?

```
async function Demo(str) {  
    let r = await new Promise((res, rej) => {  
        res(str)  
    })  
    return r  
}  
  
Demo('Hello').then(val) => {  
    console.log(val)  
}  
  
console.log('World')
```

**Options :**

6406531485725. ✘ Hello

World

6406531485726. ✓ World

Hello

6406531485727. ✘ Hello

6406531485728. ✘ World

**Question Number : 180 Question Id : 640653445929 Question Type : MCQ Is Question**

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

**Correct Marks : 3**

Question Label : Multiple Choice Question

Consider the following application with markup index.html and script app.js.

index.html:

```
<body>
  <div id="app"><router-view></router-view></div>
  <script
src="https://cdn.jsdelivr.net/npm/vue@2/dist/vue.js"></script>
  <script
src="https://unpkg.com/vue-router@2.0.0/dist/vue-router.js"></script>
  <script src="app.js"></script>
</body>
```

app.js:

```
const Header = {
  template: `<div>This is header <router-view /> </div>`,
}
const Error = {
  template: '<div> 404 Page not found</div>',
}
const Profile = {
  template: `<div> Welcome to profile page</div>`,
}
const routes = [
  {
    path: '/',
    component: Header,
    children: [
      { path: 'profile', component: Profile },
      { path: '*', component: Error },
    ],
  },
]
const router = new VueRouter({
  routes,
})
new Vue({
  el: '#app',
  router,
})
```

Suppose the application is running on <http://127.0.0.1:8080>. What will be rendered for the router-view component used inside Header component, "if the user visits the URL '<http://127.0.0.1:8080/#/home>'?

## Options :

6406531485729. ✘ This is header

6406531485730. ✓ 404 Page not found

6406531485731. ✘ Welcome to profile page

6406531485732. ✘ None of these

**Question Number : 181 Question Id : 640653445931 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 3**

**Question Label : Multiple Choice Question**

Consider the application with markup index.html and script app.js.

index.html:

```
<body>
  <div id="app">
    <h1>Welcome to the application</h1>
    <button @click="getMovies">Get Movies</button>
    <router-view></router-view>
  </div>
  <script
src="https://cdn.jsdelivr.net/npm/vue@2/dist/vue.js"></script>
  <script
src="https://unpkg.com/vue-router@2.0.0/dist/vue-router.js"></script>
  <script src="app.js"></script>
</body>
```

app.js:

```
const Movies = {
  template: `<div>
    Movie from {{this.$route.query.startIndex}} to
{{this.$route.query.endIndex}}
  </div>`,
}

const router = new VueRouter({
  routes: [{ path: '/movies', name: 'movies', component: Movies }],
})

new Vue({
  el: '#app',
  router,
  methods: {
    getMovies() {
      this.$router.push({
        name: 'movies',
        query: { startIndex: 1, endIndex: 10 },
      })
    },
  },
})
```

Suppose the application is running on <http://127.0.0.1:8080> and let user clicks on the button "Get Movies". What will be rendered inside the "router-view" component?

**Options :**

6406531485737. ✓ Movie from 1 to 10

6406531485738. ✗ Movie from

6406531485739. ✗ Movie from 0 to 10

6406531485740. ✗ None of these

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363446

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 182 Question Id : 640653445922 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Consider the below javascript program, and predict the output of the statements mentioned in the program, if executed in a non-strict environment?

```
function quiz () {  
    var a = 10;  
    let b = c = 20;  
    console.log(b); // Statement 1  
}  
quiz();  
console.log(c); // Statement 2  
console.log(a); // Statement 3
```

**Options :**

6406531485701. ✗ Statement 1: 20

Statement 2: 20

Statement 3: 10

6406531485702. ✓ Statement 1: 20

Statement 2: 20

Statement 3: Reference Error

6406531485703. ✗ Statement 1: 20

Statement 2: Error

**Statement 3: Control will not reach till statement 3**

6406531485704. ✘ Statement 1: Error

**Statement 2: Control will not reach till statement 2**

**Statement 3: Control will not reach till statement 3**

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363447

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 183 Question Id : 640653445920 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statement(s) is/are true regarding REST and GraphQL?

**Options :**

6406531485693. ✘ GraphQL is always preferred over REST, when it comes to fetching the data.

6406531485694. ✓ GraphQL is helpful in solving 2 general problems - "overfetching" and "underfetching".

6406531485695. ✓ REST defines GET, PUT and DELETE methods to be idempotent, if implemented correctly.

6406531485696. ✘ All of these

**Question Number : 184 Question Id : 640653445924 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statements describes the best practices with respect to Vuex?

**Options :**

6406531485709. ✓ The "getters" property in a Vuex store should be used for read only operations.

6406531485710. ❌ The “actions” in a Vuex store should not be used for any asynchronous operations.

6406531485711. ❌ The “mutations” in a Vuex store should be used to perform asynchronous operations, if required.

6406531485712. ✓ All the components should use “this.\$store” to access the properties of a Vuex store, instead of directly using the Vuex store object name.

**Question Number : 185 Question Id : 640653445925 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following statements is/are true regarding Vuex?

**Options :**

6406531485713. ❌ A component which uses store state cannot have local state.

6406531485714. ✓ A component can have local state, even if it uses store state.

6406531485715. ✓ Getters in vuex is used to create derived state.

6406531485716. ❌ All of these

## MLT

**Section Id :** 64065329000

**Section Number :** 11

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 17

**Number of Questions to be attempted :** 17

**Section Marks :** 100

**Display Number Panel :** Yes

**Group All Questions :** No

**Enable Mark as Answered Mark for Review and**

Yes

**Clear Response :**

**Maximum Instruction Time :**

0

**Sub-Section Number :**

1

**Sub-Section Id :**

64065363448

**Question Shuffling Allowed :**

No

**Is Section Default? :**

null

**Question Number : 186 Question Id : 640653445933 Question Type : MCQ Is Question**

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

**Correct Marks : 0**

Question Label : Multiple Choice Question

**THIS IS QUESTION PAPER FOR THE SUBJECT "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 :**

6406531485745. ✓ YES

6406531485746. ✗ NO

**Sub-Section Number :**

2

**Sub-Section Id :**

64065363449

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 187 Question Id : 640653445934 Question Type : MCQ Is Question**

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

**Correct Marks : 7**

Question Label : Multiple Choice Question

Let  $X$  be the data matrix of shape  $(d, n)$  and  $y$  be the corresponding label vector. A linear regression model of the form  $\hat{y}_i = w^T x_i$  is fit using the squared error on the same dataset. If the solution  $w^*$  to the optimization problem is orthogonal to the subspace spanned by the data points (columns of matrix  $X$ ), what will be the squared error?

**Options :**

6406531485747. ✘ 0

6406531485748. ✘ 1

6406531485749. ✓  $\|y\|^2$

6406531485750. ✘ Insufficient information to answer

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363450

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 188 Question Id : 640653445935 Question Type : MCQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Choice Question

Which of the following regression model will certainly achieve zero training error on a given training dataset where the error is defined as the sum of squared error? Assume that  $x_i \in \mathbb{R}^d$  is the  $i^{th}$  data point and  $y_i \in \mathbb{R}$  is the corresponding label.

**Options :**

6406531485751. ✘  $h(x_i) = \bar{y} \quad \forall i$ , where  $\bar{y}$  is the average of all the labels.

6406531485752. ✘  $h(x_i) = w^T x_i \quad \forall i$ , where  $w \in \mathbb{R}^d$

6406531485753. ✘  $h(x_i) = c$  where  $c$  is a constant.

6406531485754. ✓  $h(x_i) = y_i \quad \forall i$

**Question Number : 189 Question Id : 640653445936 Question Type : MCQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Choice Question

Let  $w^*$ ,  $w^g$ , and  $w^{sg}$  be the weight vectors obtained using analytical, gradient descent, and stochastic gradient descent approaches, respectively, on the same linear regression model. The following expression holds true for these weight vectors:

$$\|w^g - w^*\| < \|w^{sg} - w^*\|$$

The model obtained by the analytical solution gives a training error of 0.5. Which of the following approaches is more likely to give less training error? Assume that the loss function is a convex function.

**Options :**

6406531485755. ✓ Gradient descent

6406531485756. ✗ Stochastic gradient descent

**Question Number : 190 Question Id : 640653445937 Question Type : MCQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Choice Question

Consider the following data set:

$$X = [-3, 5, 4]$$

$$y = [-10, 20, 20]$$

Assuming a ridge penalty  $\lambda = 50$ , what will be the value of  $\frac{\hat{w}_{ridge}}{\hat{w}_{MLE}}$ ?

Here  $\hat{w}_{ridge}$  and  $\hat{w}_{MLE}$  are the Ridge and MLE estimates of the weight vectors, respectively.

**Options :**

6406531485757. ✘ 2

6406531485758. ✘ 1

6406531485759. ✘ 0.666

6406531485760. ✓ 0.5

6406531485761. ✘ 0.25

**Question Number : 191 Question Id : 640653445938 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Consider the following data  $\{(x_1, y_1), (x_2, y_2), (x_3, y_3)\}$ :

x	y
0	2
2	2
3	1

Assume that Leave one out cross validation is applied on this data.

Note: The model to be used is  $y = w_0 + w_1 x$ .

What will be the weights obtained when  $(x_2, y_2)$  is used in the validation set?

**Options :**

6406531485762. ✘  $\{w_0 : 4, w_1 : -1\}$

6406531485763. ✘  $\{w_0 : 2/5, w_1 : 0\}$

6406531485764. ✘  $\{w_0 : 4, w_1 : -2/5\}$

6406531485765. ✓  $\{w_0 : 2, w_1 : -1/3\}$

**Question Number : 192 Question Id : 640653445940 Question Type : MCQ Is Question**

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

**Correct Marks : 6**

**Question Label : Multiple Choice Question**

A Gaussian naive Bayes model is trained on a given dataset. For an unseen data point  $x$ , the following two values are calculated as

$$P(x|y=0) = 0.4$$
$$P(x|y=1) = 0.6$$

What will be the predicted label for  $x$ ?

**Options :**

6406531485770. ✘ 0

6406531485771. ✘ 1

6406531485772. ✓ Insufficient information to make a prediction

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363451

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 193 Question Id : 640653445939 Question Type : MCQ Is Question**

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

**Correct Marks : 4**

**Question Label : Multiple Choice Question**

The training dataset for a binary classification problem has 100 points, 50 of which belong to class +1. Consider a  $k$ -NN algorithm with  $k = 1$  that is used to predict the labels of the training data-points. A point is considered as its own neighbor. Based on this setup, study the following statements:

S1: The number of points that are **misclassified** by the classifier is zero.

S2: Since the training error is zero, we have found a very good classifier for this problem.

**Options :**

6406531485766. ✓ S1 is true but S2 is false

6406531485767. ✘ S1 is false but S2 is true

6406531485768. ✘ Both S1 and S2 are true

6406531485769. ✘ Both S1 and S2 are false

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363452

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 194 Question Id : 640653445941 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Choice Question

You know the distribution  $P(X, y)$  for a given dataset  $\{X, y\}$ . Can you always find the distribution  $P(y|X)$  for the same dataset  $\{X, y\}$ ?

**Options :**

6406531485773. ✓ Yes

6406531485774. ✘ No

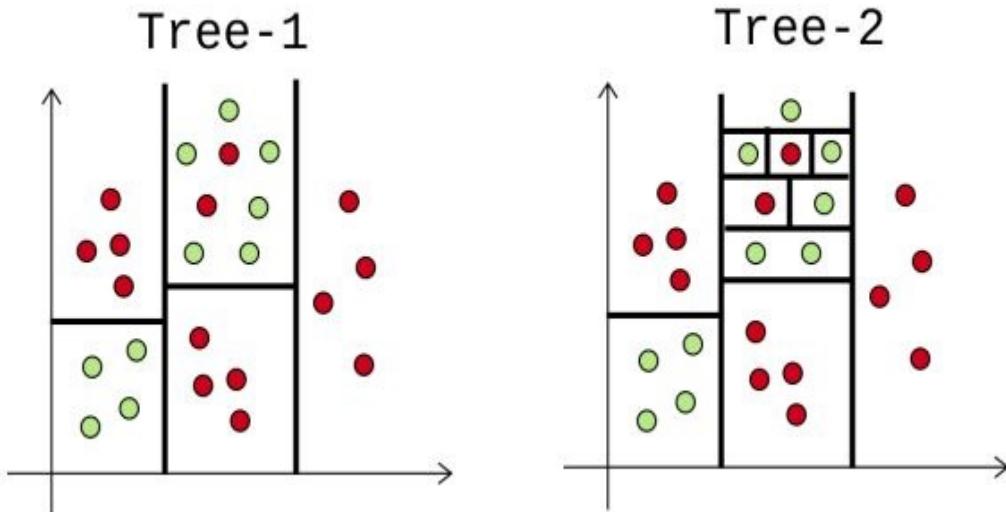
**Question Number : 195 Question Id : 640653445947 Question Type : MCQ Is Question**

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

**Correct Marks : 5**

Question Label : Multiple Choice Question

Consider a training dataset for a binary classification problem in  $\mathbb{R}^2$ . Two decision trees are trained on the same dataset. The decision regions obtained are plotted for both the trees:



Which of these two trees is likely to perform better on test data?

**Options :**

6406531485784. ✓ Tree-1

6406531485785. ✗ Tree-2

**Sub-Section Number :**

6

**Sub-Section Id :**

64065363453

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 196 Question Id : 640653445942 Question Type : MSQ Is Question**

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

**Correct Marks : 5 Selectable Option : 0**

**Question Label : Multiple Select Question**

Consider the following dataset for a binary classification problem in  $\mathbb{R}^2$ .

$$\mathbf{x}_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}, y_1 = +1 \quad \mathbf{x}_2 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}, y_2 = +1$$

$$\mathbf{x}_3 = \begin{bmatrix} -1 \\ 0 \end{bmatrix}, y_3 = -1 \quad \mathbf{x}_4 = \begin{bmatrix} 0 \\ -1 \end{bmatrix}, y_4 = -1$$

Choose all linear classifiers that result in zero misclassifications on this dataset. Here,  $\mathbf{w}$  is the weight vector for the linear classifier.

**Options :**

6406531485775. ✓  $\mathbf{w} = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$

6406531485776. ✓  $\mathbf{w} = \begin{bmatrix} 10 \\ 19 \end{bmatrix}$

6406531485777. ✗  $\mathbf{w} = \begin{bmatrix} -1 \\ -4 \end{bmatrix}$

6406531485778. ✗  $\mathbf{w} = \begin{bmatrix} -5 \\ 3 \end{bmatrix}$

6406531485779. ✗  $\mathbf{w} = \begin{bmatrix} 5 \\ -3 \end{bmatrix}$

**Sub-Section Number :** 7

**Sub-Section Id :** 64065363454

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 197 Question Id : 640653445943 Question Type : SA Calculator : None**

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

**Correct Marks : 7**

**Question Label :** Short Answer Question

Kernel regression with a polynomial kernel of degree three is applied on a data set  $\{X, y\}$ . Let the weight vector be given by

$$w = \phi(X)[1.3, 0.6, -0.2, -0.7]^T$$

Here  $\phi(X)$  is the transformed data matrix whose  $i^{th}$  column is  $\phi(x_i)$ . What will be the prediction for the data point  $[0, 0, 0, 0]^T$ ?

**Response Type :** Numeric

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

1

**Sub-Section Number :** 8

**Sub-Section Id :** 64065363455

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

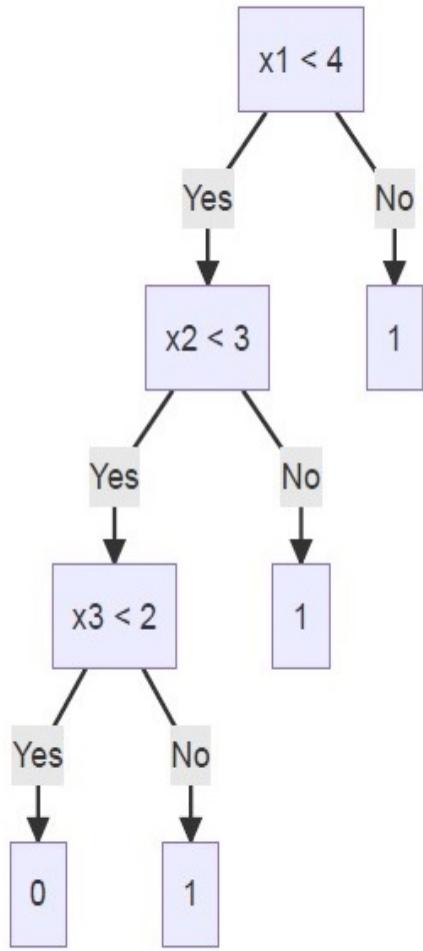
**Question Number : 198 Question Id : 640653445944 Question Type : SA Calculator : None**

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

**Correct Marks : 5**

Question Label : Short Answer Question

Consider a dataset in  $\mathbb{R}^3$ . Each data-point is represented by  $\mathbf{x} = [x_1 \ x_2 \ x_3]^T$ . The features in this problem are all positive. That is,  $x_1, x_2, x_3 > 0$  for all data-points. Consider the following decision tree trained on this dataset. The features are represented without the subscript in the nodes: for example,  $x_1$  is represented as  $x1$ .



Consider only those points for which  $x_1, x_2$ , and  $x_3$  are all positive.

Let  $S$  be the set of all points in  $\mathbb{R}^3$  that are predicted as 0 by this decision tree. What is the volume of the region  $S$ ?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

24

**Sub-Section Number :** 9

**Sub-Section Id :** 64065363456

**Question Shuffling Allowed :** Yes

**Is Section Default? :**

null

**Question Number : 199 Question Id : 640653445945 Question Type : SA Calculator : None**

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

**Correct Marks : 6**

**Question Label : Short Answer Question**

Suppose you have a three-class classification problem where class label  $y \in \{0, 1, 2\}$  and each training example  $x_i$  has 3 binary features  $f_1, f_2, f_3 \in \{0, 1\}$ . How many parameters do you need to know to classify an example using the Naive Bayes classifier?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

11

**Sub-Section Number : 10**

**Sub-Section Id : 64065363457**

**Question Shuffling Allowed : Yes**

**Is Section Default? : null**

**Question Number : 200 Question Id : 640653445946 Question Type : SA Calculator : None**

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

**Correct Marks : 4**

**Question Label : Short Answer Question**

Consider fitting a linear regression model (as stated below) for the following data:

x	y
-1	1
0	-1
2	1

Fit  $y_i = \beta_0$ . Find  $\beta_0$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.3 to 0.4

**Sub-Section Number :** 11

**Sub-Section Id :** 64065363458

**Question Shuffling Allowed :** No

**Is Section Default? :** null

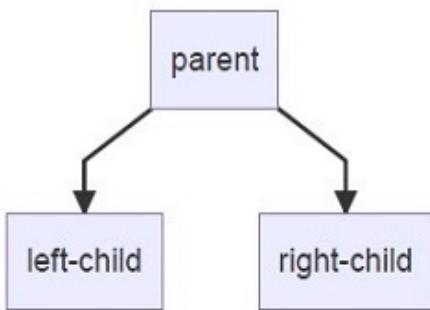
**Question Id :** 640653445948 **Question Type :** COMPREHENSION **Sub Question Shuffling Allowed :** No **Group Comprehension Questions :** No **Question Pattern Type :** NonMatrix

**Calculator :** None **Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Question Numbers :** (201 to 205)

**Question Label :** Comprehension

A decision stump is a decision tree that has exactly one question at the parent node (root) which then splits into two prediction nodes (leaves):



Consider a decision stump for a binary classification problem that has 500 data points at the parent node, out of which 200 data points go into the left child. The number of data points that belong to class 1 in the parent node is 300. The number of data points that belong to class 1 in the left child is 50. The labels are in  $\{1, 0\}$ .

Note for calculations: Use  $\log_2$  for all calculations that involve logarithms. For all questions, enter your answer correct to three decimal places. Use three decimal places even while calculating intermediate quantities.

Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 201 Question Id : 640653445949 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

What is the label assigned to the left child? Enter 1 or 0 .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

0

**Question Number : 202 Question Id : 640653445950 Question Type : SA Calculator : None**

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

**Correct Marks : 3**

**Question Label :** Short Answer Question

What is the entropy of the parent?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.92 to 1

**Question Number :** 203 **Question Id :** 640653445951 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 3

Question Label : Short Answer Question

What is the entropy of the left child?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.80 to 0.83

**Question Number :** 204 **Question Id :** 640653445952 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 3

Question Label : Short Answer Question

What is the entropy of the right child?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.62 to 0.68

**Question Number :** 205 **Question Id :** 640653445953 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 3

Question Label : Short Answer Question

What is the information gain corresponding to the question at the parent node?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.21 to 0.29

**Sub-Section Number :** 12

**Sub-Section Id :** 64065363459

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id :** 640653445954 **Question Type :** COMPREHENSION **Sub Question Shuffling**

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

**Calculator :** None **Response Time :** N.A **Think Time :** N.A **Minimum Instruction Time :** 0

**Question Numbers :** (206 to 207)

Question Label : Comprehension

Consider a naive Bayes model is trained on the following data matrix  $X$  of shape  $(d, n)$  and corresponding label vector  $y$ :

$$X = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 \end{bmatrix} \quad y = [1 \ 0 \ 1 \ 0]^T$$

Assume that  $\hat{p}$  and  $\hat{p}_j^{y_i}$  are estimates for  $P(y = 1)$  and  $P(f_j = 1|y = y_i)$ , respectively. Here,  $f_i; i = 1, 2, 3$  is the  $i^{th}$  feature. These parameters are estimated using MLE.

Based on the above data, answer the given subquestions.

### Sub questions

**Question Number : 206 Question Id : 640653445955 Question Type : SA Calculator : None**

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

**Correct Marks : 3**

Question Label : Short Answer Question

What is the value of  $\hat{p}_3^0$ ? Assume that no smoothing is done.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

0.5

**Question Number : 207 Question Id : 640653445956 Question Type : SA Calculator : None**

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

**Correct Marks : 5**

Question Label : Short Answer Question

What will be the predicted label for the point  $[1 \ 0 \ 0]^T$ ? Assume that no smoothing is done.

**Response Type : Numeric**

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

## MLP

**Section Id :** 64065329001

**Section Number :** 12

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 22

**Number of Questions to be attempted :** 22

**Section Marks :** 50

**Display Number Panel :** Yes

**Group All Questions :** No

**Enable Mark as Answered Mark for Review and Clear Response :** Yes

**Maximum Instruction Time :** 0

**Sub-Section Number :** 1

**Sub-Section Id :** 64065363460

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Number :** 208 **Question Id :** 640653445957 **Question Type :** MCQ **Is Question**

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

**Correct Marks :** 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : MACHINE LEARNING PRACTICE"

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 :**

6406531485793. ✓ Yes

6406531485794. ✗ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065363461

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 209 Question Id : 640653445958 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following options is the output of the following block of code?

```
from sklearn.linear_model import Perceptron
X=[(0,1),(0,2),(2,0),(3.5,3.5)]
y=[1,2,3,4]
clf = Perceptron()
clf.fit(X, y)
clf.score(X, y)
```

**Options :**

6406531485795. ✓ 1.0

6406531485796. ✗ 0.0

6406531485797. ✗ 0.5

6406531485798. ✗ 0.75

**Question Number : 210 Question Id : 640653445963 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

If the data is expected to be already centered, is intercept estimation (fit\_intercept) necessary for RidgeClassifier?

**Options :**

6406531485811. ❌ Yes, as intercepts are required to be modeled and fit, especially at this scenario, keep fit\_intercept =True

6406531485812. ✓ No, as no intercept will be used in calculations: fit\_intercept =False

**Question Number : 211 Question Id : 640653445981 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

In GradientBoostingRegressor, which of the following parameters is used to specify the fraction of samples to be used for fitting the individual base learners?

**Options :**

6406531485874. ❌ sample fraction

6406531485875. ❌ shrinkage

6406531485876. ❌ subspace

6406531485877. ✓ subsample

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363462

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 212 Question Id : 640653445959 Question Type : MCQ Is Question**

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

**Correct Marks : 2.5**

Question Label : Multiple Choice Question

Which of the following options is the output of the following block of code?

```
import numpy as np
from sklearn.dummy import DummyClassifier
X = np.array([1,-512, 3.14j, 1])
y = np.array([0, 0, 0, 1])
dummy_clf = DummyClassifier(strategy="most_frequent")
dummy_clf.fit(X, y)
dummy_clf.predict(X)
```

**Options :**

6406531485799. ❌ array([0.5, 0.5, 0.5, 0.5])

6406531485800. ❌ SyntaxError:'j' is a complex number, hence DummmyClassifier failed

6406531485801. ✓ array([0, 0, 0, 0])

6406531485802. ❌ array([1, 1, 1, 1])

**Question Number : 213 Question Id : 640653445968 Question Type : MCQ Is Question****Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction****Time : 0****Correct Marks : 2.5**

Question Label : Multiple Choice Question

Which of the following options represent the output of the following block of code?

```
import numpy as np
from sklearn.naive_bayes import CategoricalNB
rng = np.random.RandomState(1)
X = rng.randint(6, size=(3, 3))
y = np.array([1, 4, 6])
clf = CategoricalNB()
clf.fit(X, y)
print(clf.predict(X[2:3]))
#Output of the previous line, i.e., clf.predict(X[2:3]) is [6]
print(clf.score(X,y))
```

**Options :**

6406531485825. ❌ 0.5

6406531485826. ❌ 0.9

6406531485827. ✓ 1.0

6406531485828. ✗ 0.75

**Question Number : 214 Question Id : 640653445969 Question Type : MCQ Is Question**

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

**Correct Marks : 2.5**

Question Label : Multiple Choice Question

Which of the following options is the correct output of the following block of code?

```
from sklearn.model_selection import LeaveOneOut
X = [0, 1, 1, 0]
loo = LeaveOneOut()
for train, test in loo.split(X):
    print("%s %s" % (train, test))
```

**Options :**

- [1 2 3] [0]
- [0 2 3] [1]
- [0 1 3] [2]

6406531485829. ✓ [0 1 2] [3]

- [1 2 3] [4]
- [4 2 3] [1]
- [4 1 3] [2]

6406531485830. ✗ [4 1 2] [3]

- [1 1 0] [0]
- [0 0 1] [1]
- [0 1 0] [1]

6406531485831. ✗ [0 1 1] [0]

6406531485832. ✗ None of these

**Question Number : 215 Question Id : 640653445970 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2.5**

Question Label : Multiple Choice Question

Which of the following options is the output of the possible block of code?

```
X = [[0], [1], [2], [3], [4]]  
y = [0, 0, 1, 1, 1]
```

```
from sklearn.neighbors import KNeighborsClassifier  
neigh = KNeighborsClassifier(n_neighbors=1)  
neigh.fit(X, y)  
print(neigh.predict([[3.1]]))
```

**Options :**

6406531485833. ✘ Output is [0]

6406531485834. ✓ Output is [1]

6406531485835. ✘ Output is [3]

6406531485836. ✘ Output is [3.1]

**Question Number : 216 Question Id : 640653445971 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2.5**

Question Label : Multiple Choice Question

Which of the following options is the correct output of the following block of code?

```
from sklearn.metrics import mean_squared_error  
y_true = [3, -0.5, 2, 7]  
y_pred = [2.5, 0.0, 2, 8]  
mean_squared_error(y_true, y_pred, squared=False)
```

**Options :**

6406531485837. ✘ 0.75

6406531485838. ✘ 0.375

6406531485839. ✓ 0.612

6406531485840. ✘ 2.839

**Question Number : 217 Question Id : 640653445972 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2.5**

Question Label : Multiple Choice Question

Consider the block of code given below:

```
from sklearn.metrics import confusion_matrix
y_true = ["cat", "ant", "cat", "cat", "ant", "bird"]
y_pred = ["ant", "ant", "cat", "cat", "ant", "cat"]
confusion_matrix(y_true, y_pred, labels=["ant", "bird", "cat"])
```

The resulting confusion matrix from this code is following:

```
array([[2, 0, 0],
       [0, 0, 1],
       [1, 0, 2]])
```

What will be the precision value for the class “ant”?

**Options :**

6406531485841. ✘ 0.75

6406531485842. ✘ 0.0

6406531485843. ✘ 1.00

6406531485844. ✓ 0.67

**Question Number : 218 Question Id : 640653445974 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 2.5**

Question Label : Multiple Choice Question

Which of the following options is the output of the following block of code?

```
import numpy as np
X = np.array([[0, 0], [1, 1], [2, 1]])
y = np.array([1, 3, 3])
from sklearn.svm import SVC
clf = SVC()
clf.fit(X, y)
print(clf.predict([[2, 3]]))
```

**Options :**

6406531485849. ✓ [3]

6406531485850. ✗ [1]

6406531485851. ✗ [2]

6406531485852. ✗ [0]

**Question Number : 219 Question Id : 640653445976 Question Type : MCQ Is Question**

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

**Correct Marks : 2.5**

Question Label : Multiple Choice Question

In the Figure 1, different classification boundaries are shown with various regularization parameters. If regularization parameters for Figures 1(A), 1(B) and 1(C) are  $C_A, C_B, C_C$  correspondingly, then find out which of the following option represent the relation between  $C_A, C_B, C_C$ ?

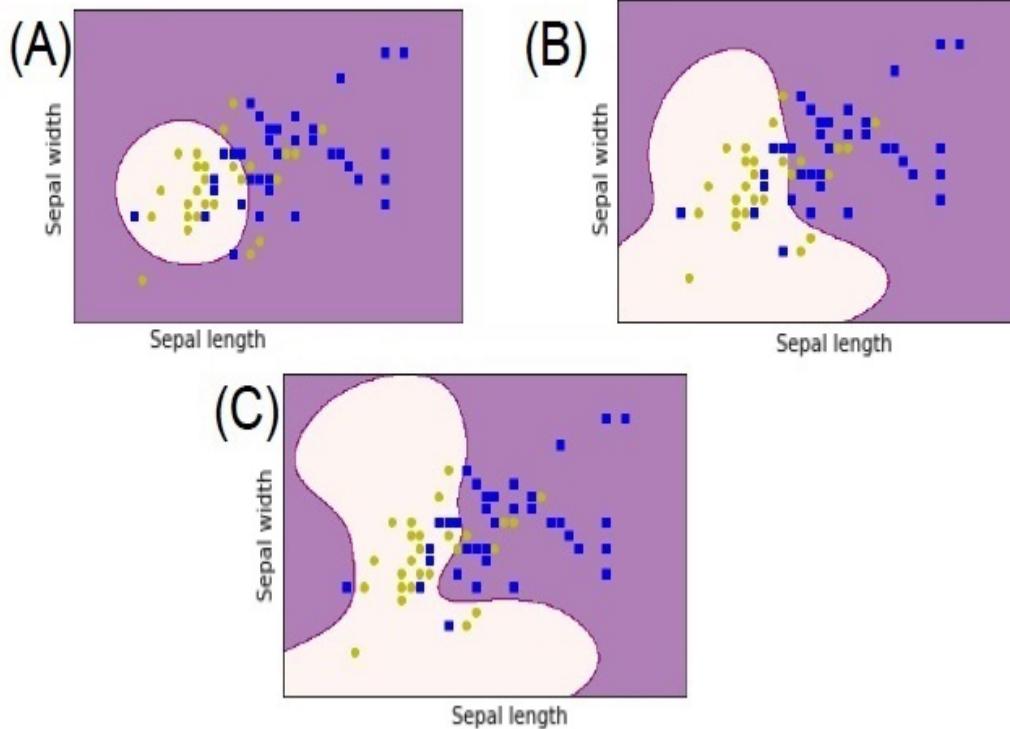


Figure 1

**Options :**

6406531485857. ✓  $C_A < C_B < C_C$

6406531485858. ✗  $C_A > C_B < C_C$

6406531485859. ✗  $C_A < C_B > C_C$

6406531485860. ✗  $C_A > C_B > C_C$

**Sub-Section Number :**

4

**Sub-Section Id :**

64065363463

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

In *HashingVectorizer* class, *build\_analyzer()* method is used to

**Options :**

6406531485845. ❌ Transform a sequence of documents to a document-term matrix.

6406531485846. ✓ Return a callable to process input data.

6406531485847. ❌ Return a function to preprocess the text before tokenization.

6406531485848. ❌ Return a function that splits a string into a sequence of tokens.

**Question Number : 221 Question Id : 640653445982 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Choose the correct statements:

1. Bagging decreases bias.
2. Bagging increases variance.
3. Bagging increases bias.
4. Bagging decreases variance

**Options :**

6406531485878. ❌ Only 1 and 2 are correct.

6406531485879. ✓ Only 3 and 4 are correct.

6406531485880. ❌ Only 1 and 3 are correct.

6406531485881. ❌ Only 2 and 4 are correct.

**Question Number : 222 Question Id : 640653445983 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following statements is correct?

**Options :**

6406531485882. ✓ In both boosting and bagging techniques, a set of weak learners whose predictive power is slightly more than guessing is used for training.

6406531485883. ✗ Boosting and Bagging techniques cannot be deployed on any other machine learning model except Decision Trees.

6406531485884. ✗ Boosting and Bagging perform better than Artificial Neural Network in all circumstances.

6406531485885. ✗ Boosting and Bagging are as interpretative as Decision Trees are.

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363464

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 223 Question Id : 640653445978 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Consider following code snippet:

```
import pandas as pd
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split

df = pd.read_csv('balance-scale.data')

# take last column as label, and rest columns as features
y = df[df.columns[-1]]
X = df[df.columns[1:]]

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.2)

clf = DecisionTreeClassifier(random_state = 0)
clf.fit(X_train,y_train)
```

Which of the following statements can be used to compute the height of the trained decision tree model?

**Options :**

6406531485865. ✓ clf.get\_depth()

6406531485866. ✓ clf.tree\_.max\_depth

6406531485867. ✗ clf.tree\_.get\_depth()

6406531485868. ✗ clf.tree.get\_depth

**Question Number : 224 Question Id : 640653445979 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following are correct statements regarding cost complexity pruning?

**Options :**

6406531485869. ✓ It is useful in reducing overfitting in a decision tree.

6406531485870. ✗ It is useful in reducing underfitting in a decision tree.

6406531485871. ✓ This technique allows the decision tree to grow as much as possible, then it clips parts of the tree.

6406531485872. ✗ This technique doesn't allow the decision tree to grow beyond a certain depth.

**Sub-Section Number :** 6

**Sub-Section Id :** 64065363465

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 225 Question Id : 640653445975 Question Type : MSQ Is Question**

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

**Correct Marks : 2.5 Selectable Option : 0**

Question Label : Multiple Select Question

Which of the following options are correct?

**Options :**

6406531485853. ✓ NuSVC implements the “one-versus-one” approach for multi-class classification.

6406531485854. ✓ LinearSVC implements “one-vs-the-rest” approach for multi-class classification.

6406531485855. ✓ SVC implements the “one-versus-one” approach for multi-class classification.

6406531485856. ✗ NuSVC implements the “one-versus-the-rest” approach for multi-class classification.

**Question Number : 226 Question Id : 640653445977 Question Type : MSQ Is Question**

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

**Correct Marks : 2.5 Selectable Option : 0**

Question Label : Multiple Select Question

Mention which of the following statements are correct:

**Options :**

6406531485861. ✓ If we have a small number of hyperparameters and sufficient training time, we should apply GridSearchCV.

6406531485862. ✓ For a very large number of hyperparameters and less training time scenarios, RandomizedSearchCV will be more appropriate.

6406531485863. ✖ GridSearchCV takes smaller training time than RandomizedSearchCV if the number of hyperparameters is very large.

6406531485864. ✖ Number of hyperparameters and training time of the dataset, do not influence the selection of RandomizedSearchCV and GridSearchCV.

**Sub-Section Number :** 7

**Sub-Section Id :** 64065363466

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653445960 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (227 to 228)**

Question Label : Comprehension

Based on the following block of code, prepare the confusion matrix and answer the given subquestions

```
from sklearn.metrics import confusion_matrix
x = [2, 0, 2, 2, 0, 2]
y = [0, 0, 2, 2, 0, 2]
confusion_matrix(x, y)
```

**Sub questions**

**Question Number : 227 Question Id : 640653445961 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options represent the precision score?

**Options :**

6406531485803. ✓ 1.00

6406531485804. ✘ 0.75

6406531485805. ✘ 0.90

6406531485806. ✘ 0.00

**Question Number : 228 Question Id : 640653445962 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options represent the recall value?

**Options :**

6406531485807. ✘ 1.00

6406531485808. ✓ 0.75

6406531485809. ✘ 0.90

6406531485810. ✘ 0.00

**Sub-Section Number :** 8

**Sub-Section Id :** 64065363467

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653445964 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (229 to 231)**

Question Label : Comprehension

Sunita wrote a code for logistic regression as shown below:

```
import numpy as np
from sklearn.linear_model import LogisticRegression
x = np.arange(10).reshape(-1, 1)
y = np.array([0, 0, 0, 0, 1, 1, 1, 1, 1, 1])
model = LogisticRegression(solver='liblinear', random_state=0).fit(x,y)
model.predict_proba(x)
```

The output of the code was following:

```
array([[0.74002157, 0.25997843],
       [0.62975524, 0.37024476],
       [0.5040632 , 0.4959368 ],
       [0.37785549, 0.62214451],
       [0.26628093, 0.73371907],
       [0.17821501, 0.82178499],
       [0.11472079, 0.88527921],
       [0.07186982, 0.92813018],
       [0.04422513, 0.95577487],
       [0.02690569, 0.97309431]])
```

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 229 Question Id : 640653445965 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options represents the output if Sunita writes the following line of code after the given code block?

```
model.predict(x)
```

**Options :**

6406531485813. ✓ array([0, 0, 0, 1, 1, 1, 1, 1, 1])

6406531485814. ✗ array([0, 0, 1, 0, 1, 1, 1, 1, 1])

6406531485815. ✗ array([1, 1, 1, 0, 0, 0, 0, 0, 0])

6406531485816. ✗ array([0, 0, 1, 1, 1, 1, 1, 1, 1])

**Question Number : 230 Question Id : 640653445966 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following options is the output of the following line of code?

`model.classes_`

**Options :**

6406531485817. ❌ Sparse matrix: [[0],[1]]

6406531485818. ✓ array([0, 1])

6406531485819. ❌ array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9])

6406531485820. ❌ None of these

**Question Number : 231 Question Id : 640653445967 Question Type : MCQ Is Question**

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

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following options is the output of the following block of code?

`print(model.score(x,y))`

**Options :**

6406531485821. ❌ 1.0

6406531485822. ✓ 0.9

6406531485823. ❌ 0.5

6406531485824. ❌ 0.0

**Sub-Section Number :** 9

**Sub-Section Id :** 64065363468

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 232 Question Id : 640653445980 Question Type : SA Calculator : None**

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

**Correct Marks : 3**

**Question Label : Short Answer Question**

Consider following code snippet:

```
import pandas as pd
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split

df = pd.read_csv('some-dataset.data')

# take last column as label, and rest columns as features
y = df[df.columns[-1]]
X = df[df.columns[1:]]

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.2)

train_scores = []
test_scores = []

for i_depth in range(1,16):
    i_clf = DecisionTreeClassifier(max_depth = i_depth).fit(X_train, y_train)
    train_scores.append(i_clf.score(X_train, y_train))
    test_scores.append(i_clf.score(X_test, y_test))

plt.figure(figsize=(10,6))
plt.plot(range(1, 16), train_scores,c='b', label='Training')
plt.scatter(range(1, 16), train_scores,c='b')
plt.plot(range(1, 16), test_scores,c='r',label='Test')
plt.scatter(range(1, 16), test_scores,c='r')
plt.xlabel('Max Depth');plt.ylabel('Score')
plt.legend()
plt.xticks(list(range(1,16)),list(range(1,16)))
plt.grid(True);plt.show()
```

Above code block produces the following chart displayed below, Figure 2, what is the optimal value of tree depth based on this chart?

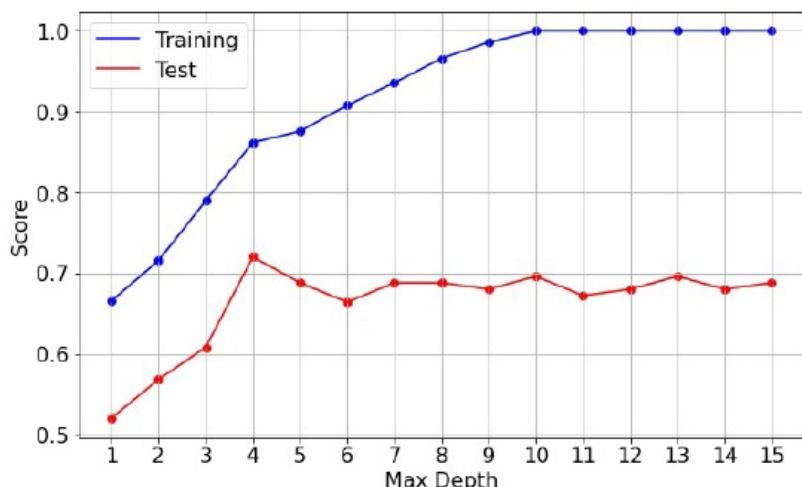


Figure 2

**Response Type : Numeric**

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

4

## BDM

<b>Section Id :</b>	64065329002
<b>Section Number :</b>	13
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	13
<b>Number of Questions to be attempted :</b>	13
<b>Section Marks :</b>	16
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065363469
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number :** 233 **Question Id :** 640653445984 **Question Type :** MCQ **Is Question**

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

**Correct Marks :** 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "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 :**

6406531485886. ✓ Yes

6406531485887. ✗ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065363470

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number :** 234 **Question Id :** 640653445985 **Question Type :** MCQ **Is Question**

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

**Correct Marks :** 1

Question Label : Multiple Choice Question

Added satisfaction from having one more unit of the good is called

**Options :**

6406531485888. ✗ Total utility

6406531485889. ✗ Average utility

6406531485890. ✓ Marginal utility

6406531485891. ✗ None of these

**Question Number :** 235 **Question Id :** 640653445986 **Question Type :** MCQ **Is Question**

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

**Correct Marks :** 1

Question Label : Multiple Choice Question

The axes (x and y) of the supply curve represent:

**Options :**

6406531485892. ❌ X: Price; Y: Price

6406531485893. ✓ X: Price; Y: Quantity

6406531485894. ❌ X: Supply; Y: Demand

6406531485895. ❌ X: Quantity; Y: Quantity

**Question Number : 236 Question Id : 640653445987 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

An increase in income leads to (a/an) \_\_\_\_\_ in demand for luxury goods.

**Options :**

6406531485896. ❌ Decrease

6406531485897. ❌ No change

6406531485898. ✓ Increase

6406531485899. ❌ A moderate decrease

**Question Number : 237 Question Id : 640653445989 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Ravi's demand for ice creams fell by 10% when his income decreased by 5%. Ice creams are \_\_\_\_\_ for Ravi.

**Options :**

6406531485906. ❌ an inferior good

6406531485907. ❌ a normal good

6406531485908. ✓ a luxury

6406531485909. ✘ a substitute good

**Question Number : 238 Question Id : 640653445996 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Debtor days is a measure of:

**Options :**

6406531485918. ✘ Number of days for the business to pay back its debts

6406531485919. ✓ Number of days for the business to recover its debts

6406531485920. ✘ Number of days a lender must wait before taking another loan

6406531485921. ✘ Number of days a lender must wait before making another purchase

**Question Number : 239 Question Id : 640653445997 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Total utility is maximum when:

**Options :**

6406531485922. ✘ Marginal utility is negative

6406531485923. ✘ Marginal utility is increasing

6406531485924. ✘ Marginal utility is decreasing

6406531485925. ✓ Marginal utility is zero

**Question Number : 240 Question Id : 640653445999 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

The elasticity of demand for a commodity is estimated to be 1.5, then a decrease in price from INR 10 to INR 8 would be expected to:

**Options :**

6406531485930. ✘ Increase demand by 25%

6406531485931. ✘ Decrease demand by 15%

6406531485932. ✘ Decrease demand by 20%

6406531485933. ✓ Increase demand by 30%

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363471

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 241 Question Id : 640653445988 Question Type : MSQ Is Question**

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

**Correct Marks : 1 Selectable Option : 0**

Question Label : Multiple Select Question

Which among the following variable(s), when changed, results in a movement **along** the demand curve? Select multiple options if applicable.

**Options :**

6406531485900. ✘ Income

6406531485901. ✘ Prices of related goods

6406531485902. ✘ Expectations

6406531485903. ✘ Number of buyers

6406531485904. ✓ Price of the item

6406531485905. ✘ Tastes

**Question Number : 242 Question Id : 640653445998 Question Type : MSQ Is Question**

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

**Correct Marks : 1 Selectable Option : 0**

Question Label : Multiple Select Question

Goods with less substitutes are: (select all possible statements)

**Options :**

6406531485926. ✓ Less elastic in demand

6406531485927. ✗ More elastic in demand

6406531485928. ✗ Sensitive to price fluctuations

6406531485929. ✓ Insensitive to price fluctuations

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363472

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

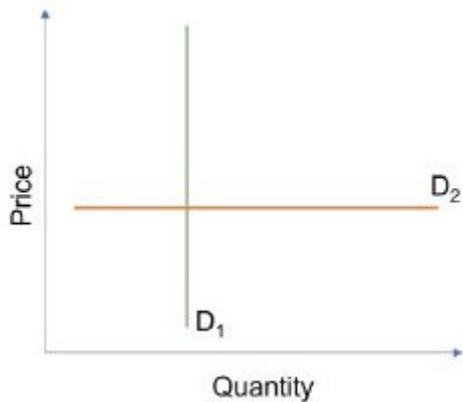
**Question Number : 243 Question Id : 640653445990 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

See the 2 demand curves in the figure; D<sub>1</sub> and D<sub>2</sub>. Choose all the correct statements:



**Options :**

6406531485910. ✗ D<sub>1</sub> represents a perfectly elastic demand curve

6406531485911. ✓ D<sub>2</sub> represents a perfectly elastic demand curve

6406531485912. ✓ D<sub>1</sub> represents a perfectly inelastic demand curve

6406531485913. ✖ D<sub>2</sub> represents a perfectly inelastic demand curve

<b>Sub-Section Number :</b>	5
<b>Sub-Section Id :</b>	64065363473
<b>Question Shuffling Allowed :</b>	Yes
<b>Is Section Default? :</b>	null

**Question Number : 244 Question Id : 640653446000 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

**Question Label : Short Answer Question**

A firm has annual sales turnover of INR 75,00,000/-. Its total current liabilities sum up to INR 2,00,00,000/-. It has INR 5,00,000/- as accounts receivable. Calculate the firm's debtor days (round the answer to 2 decimal places).

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

24.00 to 24.40

<b>Sub-Section Number :</b>	6
<b>Sub-Section Id :</b>	64065363474
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Id : 640653445991 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (245 to 248)**

**Question Label : Comprehension**

A firm has a total revenue of INR 7,50,00,000/- . The firm's variable cost is INR 65,00,000/- and fixed cost is INR 1,00,00,000/- . Calculate the firms given in the subquestions.

### **Sub questions**

**Question Number : 245 Question Id : 640653445992 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

Gross profit

**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 :**

58500000

**Question Number : 246 Question Id : 640653445993 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

Net profit

**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 :**

37500000

**Question Number : 247 Question Id : 640653445994 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

Gross profit margin in %

**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 :**

91.00 to 91.50

**Question Number : 248 Question Id : 640653445995 Question Type : SA Calculator : None**

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

**Correct Marks : 1**

Question Label : Short Answer Question

Net profit margin in %

**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 :**

## Business Analytics

<b>Section Id :</b>	64065329003
<b>Section Number :</b>	14
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	10
<b>Number of Questions to be attempted :</b>	10
<b>Section Marks :</b>	20
<b>Display Number Panel :</b>	Yes
<b>Group All Questions :</b>	No
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes
<b>Maximum Instruction Time :</b>	0
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	64065363475
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Number : 249 Question Id : 640653446001 Question Type : MCQ Is Question**

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

**Correct Marks : 0**

Question Label : Multiple Choice Question

**THIS IS QUESTION PAPER FOR THE SUBJECT "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 :**

6406531485935. ✓ YES

6406531485936. ✗ NO

**Sub-Section Number :** 2**Sub-Section Id :** 64065363476**Question Shuffling Allowed :** No**Is Section Default? :** null

**Question Id : 640653446002 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (250 to 252)**

Question Label : Comprehension

You are given the following contingency table based on sample data with people belonging to two cities (City A and City B) and their brand preferences. You perform a chi-squared test of independence to make inferences about the population from this sample.

	Brand A	Brand B	Brand C	Brand D
City A	155	145	234	126
City B	85	98	97	89

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 250 Question Id : 640653446003 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1.5**

Question Label : Short Answer Question

From the given contingency table, find the expected frequency of people belonging to City B preferring brand C?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

115 to 121

**Question Number :** 251 **Question Id :** 640653446004 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 1.5

Question Label : Short Answer Question

What is the calculated value of chi-squared?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

8 to 14

**Question Number :** 252 **Question Id :** 640653446005 **Question Type :** MCQ Is Question

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

**Correct Marks :** 1.5

Question Label : Multiple Choice Question

At the significance level of 0.05, the chi-squared tabular value is 7.814. What do you conclude?

**Options :**

6406531485939. ✓ Reject the null hypothesis and conclude that the categorical variables are not independent

6406531485940. ✗ Fail to reject the null hypothesis and conclude that the categorical variables are not independent

6406531485941. ❌ Fail to reject the null hypothesis and conclude that the categorical variables are independent

6406531485942. ❌ Reject the null hypothesis and conclude that the categorical variables are independent

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363477

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653446011 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (253 to 255)**

Question Label : Comprehension

You are solving a regression problem with 4 explanatory variables. The data has 40 observations and the R-square value was found to be 0.74.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 253 Question Id : 640653446012 Question Type : SA Calculator : None**

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

**Correct Marks : 2**

Question Label : Short Answer Question

What is the value of adjusted R-square (round off to two decimal values)?

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

0.71

**Question Number : 254 Question Id : 640653446013 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

You are adding a new explanatory variable to the dataset and the new adjusted R squared value is 0.745. Is the new variable significant?

**Options :**

6406531485961. ✘ Yes

6406531485962. ✘ No

6406531485963. ✓ Calculation error in Adjusted R Squared value

**Question Number : 255 Question Id : 640653446014 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

You are removing a few explanatory variables from the dataset and the new adjusted R square value is -0.21. Is it possible?

**Options :**

6406531485964. ✓ Yes. Adjusted R squared value can be negative

6406531485965. ✘ No. Calculation error

6406531485966. ✘ None of these

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363478

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653446015 Question Type : COMPREHENSION Sub Question Shuffling**

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

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (256 to 257)**

Question Label : Comprehension

Using the confusion matrix, answer the given subquestions

n = 165	Predicted: No	Predicted: Yes
Actual: No	50	10
Actual: Yes	5	100

### **Sub questions**

**Question Number : 256 Question Id : 640653446016 Question Type : SA Calculator : None**

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

**Correct Marks : 1.5**

Question Label : Short Answer Question

Calculate the precision.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

0.90 to 0.92

**Question Number : 257 Question Id : 640653446017 Question Type : SA Calculator : None**

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

**Correct Marks : 1.5**

Question Label : Short Answer Question

Calculate the recall.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.94 to 0.96

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363479

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number :** 258 **Question Id :** 640653446006 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 1.5

**Question Label :** Short Answer Question

Suppose a factory manufactures products on three machines A, B and C. Suppose 25% of total output comes from machine A, 20% of total output comes from machine B and 55% of total output comes from machine C. From the past data, it is known that 8% of products by machine A are defectives, 15% of products by machine B are defectives and 5% of products by machine C are defectives. What is the probability that the product has come from machine C given that it is a defective?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

0.32 to 0.38

**Sub-Section Number :** 6

**Sub-Section Id :** 64065363480

**Question Shuffling Allowed :** Yes

**Is Section Default? :**

null

**Question Number : 259 Question Id : 640653446007 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

What is the meaning of an Elasticity of 2?

**Options :**

6406531485944. ✓ 10% reduction in price will yield a 20% increase in sales

6406531485945. ✗ 10% reduction in price will yield a 20% decrease in sales

6406531485946. ✗ 25% increase in price will yield 50% increase in sales

6406531485947. ✓ 25% increase in price will yield 50% decrease in sales

**Question Number : 260 Question Id : 640653446009 Question Type : MSQ Is Question**

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

**Correct Marks : 2 Selectable Option : 0**

Question Label : Multiple Select Question

Select the correct option from below:

**Options :**

6406531485952. ✗ For inelastic product demand ( $\epsilon < 1$ ) the revenue can be increased by setting price close to zero.

6406531485953. ✓ For elastic product demand ( $\epsilon > 1$ ) the revenue can only be increased by setting price close to zero

6406531485954. ✓ For inelastic product demand ( $\epsilon < 1$ ) the revenue can be increased by simply increasing the prices

6406531485955. ✗ For elastic product demand ( $\epsilon > 1$ ) the revenue can only be increased by simply increasing the prices

**Sub-Section Number :**

7

**Sub-Section Id :**

64065363481

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 261 Question Id : 640653446008 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following data will you use to calculate price elasticity?

**Options :**

6406531485948. ❌ Protein-powder sales increases by 10% when the national income grows by 15%.

6406531485949. ❌ Tea sales increases by 10% when daily average working hours of employees goes up by 2 hrs .

6406531485950. ✓ Paneer (Indian Cottage Cheese) sales go down by 10% when price goes up from Rs.100 to Rs.120 per 200 gram.

6406531485951. ❌ All of these

**Question Number : 262 Question Id : 640653446010 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

In Multiple Linear Regression, if the explanatory variables are highly correlated, then that phenomenon is called

**Options :**

6406531485956. ❌ Normality

6406531485957. ❌ Singularity

6406531485958. ✓ Collinearity

6406531485959. ❌ Variation Inflation

**Question Number : 263 Question Id : 640653446018 Question Type : MCQ Is Question**

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

**Correct Marks : 1**

Question Label : Multiple Choice Question

What is called as efficiency?

**Options :**

6406531485969. ❌ Output/(1-input)

6406531485970. ❌ 1 - (output/input)

6406531485971. ✓ Output/Input

6406531485972. ❌ None of these

## System commands

**Section Id :** 64065329004

**Section Number :** 15

**Section type :** Online

**Mandatory or Optional :** Mandatory

**Number of Questions :** 12

**Number of Questions to be attempted :** 12

**Section Marks :** 100

**Display Number Panel :** Yes

**Group All Questions :** No

**Enable Mark as Answered Mark for Review and Clear Response :** Yes

**Maximum Instruction Time :** 0

**Sub-Section Number :** 1

**Sub-Section Id :** 64065363482

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Number : 264 Question Id : 640653446019 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 0**

Question Label : Multiple Choice Question

**THIS IS QUESTION PAPER FOR THE SUBJECT "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 TOP FOR THE SUBJECTS REGISTERED BY YOU)**

**Options :**

6406531485973. ✓ Yes

6406531485974. ✘ No

**Sub-Section Number :** 2

**Sub-Section Id :** 64065363483

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 265 Question Id : 640653446020 Question Type : SA Calculator : None**

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

**Correct Marks : 6**

Question Label : Short Answer Question

What will be output of the given command?

```
awk '/^[a-zA-Z]/ { c++ } END{ print c }' myfile.txt
```

The contents of **myfile.txt** are

  Lorem ipsum dolor sit amet,  
  consectetur adipisci elit,  
  sed eiusmod tempor incididunt  
  ut labore et dolore magna aliqua.

  Ut enim ad minim veniam,  
  quis nostrum exercitationem ullam  
  corporis suscipit laboriosam,  
  nisi ut aliquid ex ea commodi consequatur.

  Quis aute iure reprehenderit  
  in voluptate velit esse cillum  
  dolore eu fugiat nulla pariatur.

  Excepteur sint obcaecat cupiditat non proident,  
  sunt in culpa qui officia deserunt  
  mollit anim id est laborum.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

14

**Sub-Section Number :** 3

**Sub-Section Id :** 64065363484

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number :** 266 **Question Id :** 640653446021 **Question Type :** MCQ **Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Choice Question

What will be the output of the below script?

Note that a single negative argument to seq will not give any output.

```
for i in $(seq 9); do
    for j in $(seq $((5-i))); do
        echo -n '* '
    done
    for j in $(seq $((i-5))); do
        echo -n '* '
    done
    echo
done
```

**Options :**

\* \* \* \*  
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6406531485976. ✓

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6406531485977. ❌

6406531485978. ❌

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6406531485979. ❌ \*

**Question Number : 267 Question Id : 640653446024 Question Type : MCQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Choice Question

How many lines will be printed if the following command is executed? Assume that **myfile.txt** contains more than 3 lines.

```
sed '  
1 i ---START---  
3 c ---THREE---  
$ a ---END---  
' myfile.txt
```

**Options :**

6406531485988. ❌ Same as the number of lines in *myfile.txt*

6406531485989. ❌ Number of lines in *myfile.txt* + 1

6406531485990. ✓ Number of lines in *myfile.txt* + 2

6406531485991. ✗ Number of lines in *myfile.txt* + 3

**Question Number : 268 Question Id : 640653446025 Question Type : MCQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Choice Question

Choose the command that converts comma separated file named *data.csv* to a tab separated file named *data.tsv*. Assume there is no comma in the field values.

**Options :**

6406531485992. ✗ mv *data.csv* *data.tsv*

6406531485993. ✗ sed 's/\t/,/' *data.tsv* > *data.csv*

6406531485994. ✓ sed 's/,/\t/g' *data.csv* > *data.tsv*

6406531485995. ✗ sed '/,/ c \t' *data.csv* > *data.tsv*

**Sub-Section Number :** 4

**Sub-Section Id :** 64065363485

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 269 Question Id : 640653446022 Question Type : MSQ Is Question**

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

**Correct Marks : 6 Selectable Option : 0**

Question Label : Multiple Select Question

Select the command(s) that prints only the lines containing the string TODO in any part of the line in the file todo.txt

**Options :**

6406531485980. ❌ awk '{print TODO}' todo.txt

6406531485981. ✓ awk '/TODO/ {print}' todo.txt

6406531485982. ❌ awk '{ if (\$1 ~ /TODO/) {print;}}' todo.txt

6406531485983. ✓ awk '{ if (\$0 ~ /TODO/) {print;}}' todo.txt

**Sub-Section Number :** 5

**Sub-Section Id :** 64065363486

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 270 Question Id : 640653446023 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 8**

Question Label : Multiple Choice Question

Which command will print only the multi-line strings from the python file named ***myscript.py***?

Example:

```
my_multiline = """  
a  
b  
c  
d  
"""
```

Note:

1. The multi-line string will start with `"""` and ends with `"""`
2. There will be a single equal sign (=) before starting `"""` and there can be spaces in-between them.
3. There is no text after starting `"""`
4. There is no text before and after at ending `"""` in the same line.
5. `-v` option in grep will print only the non-matched lines.

Options :

6406531485984. ✓ `sed -n '/= */,/ */ p' myscript.py | grep -v '***'`

6406531485985. ✗ `sed '/= */,/ */ d' myscript.py`

6406531485986. ✗ `sed -n '/= */,/ */ p' myscript.py | grep '***'`

6406531485987. ✗ `sed -n '/= */,/ */ p' myscript.py | grep ***`

**Sub-Section Number :** 6

**Sub-Section Id :** 64065363487

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

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

**Correct Marks : 8 Selectable Option : 0**

Question Label : Multiple Select Question

Select the command(s) that list all regular users in the system. UID of regular users is greater than 999 and their default shell is bash (*/usr/bin/bash*).

Note: The option -E enables the Extended Regular Expression (ERE) in sed.

The file */etc/passwd* contains the user information. The format of the file is specified below

username:x:UID:GID:Description:Home Directory:Full Path to Shell

**Options :**

6406531485996. ✓ `sed -nE '/.+:::[[:digit:]]{4,}.*bash/ p'` /etc/passwd

6406531485997. ✗ `sed -nE '/.+:::[[:digit:]]{3}.*bash/ p'` /etc/passwd

6406531485998. ✓ `awk '$3 > 999 && $7 ~ /.*bash/ {print $1}'` /etc/passwd

6406531485999. ✗ `awk 'BEGIN{FS=":"} $3 > 999 && $7 ~ /.*bash/ {print $1}'` /etc/passwd

**Question Number : 272 Question Id : 640653446027 Question Type : MSQ Is Question**

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

**Correct Marks : 8 Selectable Option : 0**

Question Label : Multiple Select Question

The contents of the current working directory are given below.

```
$ ls -R
.:
a  b

./a:
file0  file1  file2  file3  file4

./b:
file10  file3  file4  file5  file6
```

Select all the file(s) that will be present in the current working directory after executing the below script.

```
cd a
for i in *; do
    ls .. /b | grep $i || mv $i .. /b
done
```

**Options :**

6406531486000. ✘ file0

6406531486001. ✓ file1

6406531486002. ✘ file2

6406531486003. ✓ file3

6406531486004. ✓ file4

**Question Number : 273 Question Id : 640653446032 Question Type : MSQ Is Question**

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

**Correct Marks : 8 Selectable Option : 0**

Question Label : Multiple Select Question

Consider the below information to answer the question.

```
$ whatis kill
kill (1)           - send a signal to a process
kill (2)           - send signal to a process

$ kill --help
kill: kill [-s sigspec | -n signum | -sigspec] pid | jobspec ... or kill
-l [sigspec]
    Send a signal to a job.

Send the processes identified by PID or JOBSPEC the signal named by
SIGSPEC or SIGNUM. If neither SIGSPEC nor SIGNUM is present, then
SIGTERM is assumed.

Options:
  -s sig      SIG is a signal name
  -n sig      SIG is a signal number
  -l          list the signal names; if arguments follow `"-l` they are
            assumed to be signal numbers for which names should be
listed
  -L          synonym for -l

Kill is a shell builtin for two reasons: it allows job IDs to be
used
instead of process IDs, and allows processes to be killed if the
limit
on processes that you can create is reached.

Exit Status:
Returns success unless an invalid option is given or an error
occurs.

$ whatis killall
killall (1)          - kill processes by name

$ killall --help
Usage: killall [OPTION]... [--] NAME...
      killall -l, --list
      killall -V, --version

-e,--exact           require exact match for very long names
-I,--ignore-case     case insensitive process name match
-g,--process-group   kill process group instead of process
-y,--younger-than    kill processes younger than TIME
-o,--older-than      kill processes older than TIME

-i,--interactive     ask for confirmation before killing
-l,--list             list all known signal names
-q,--quiet            dont print complaints
-r,--regexp           interpret NAME as an extended regular expression
-s,--signal SIGNAL   send this signal instead of SIGTERM
-u,--user USER        kill only process(es) running as USER
-v,--verbose          report if the signal was successfully sent
-V,--version          display version information
-w,--wait             wait for processes to die
-n,--ns PID           match processes that belong to the same namespaces
                      as PID
-Z,--context REGEXP   kill only process(es) having context
                      (must precede other arguments)
```

Select the bash script(s) that kills all the processes of sleep.

**Options :**

6406531486019. ✓ killall sleep

```
while (ps | grep sleep); do
    kill sleep
```

6406531486020. ✗ done

```
while (ps | grep sleep); do
    kill $(ps | grep sleep | head -1 | awk '{print $1}')
done
```

6406531486021. ✓

```
while (ps | grep sleep); do
    kill $(ps | head -1 | awk '{print $1}')
done
```

6406531486022. ✘

**Sub-Section Number :** 7

**Sub-Section Id :** 64065363488

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653446028 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (274 to 276)**

Question Label : Comprehension

The file */etc/group* stores the group information of the system in the format given below

```
GroupName:x:GID:Members(separated by comma)
```

An example line from */etc/group* file is given below

```
student:x:214:ram,ahmed,robert,seema
```

The file */etc/passwd* contains the user information. The format of the file is given below

```
username:x:UID:GID:Description:Home Directory:Full Path to Shell
```

From man awk,

```
split(s, a [, r [, seps] ])
Split the string s into the array a and the separators array
seps on the regular expression r, and return the number of
fields. If r is omitted, FS is used instead. The arrays a
and seps are cleared first. seps[i] is the field separator
matched by r between a[i] and a[i+1]. If r is a single
space, then leading whitespace in s goes into the extra array
element seps[0] and trailing whitespace goes into the extra
array element seps[n], where n is the return value of
split(s, a, r, seps). Splitting behaves identically to field
splitting, described above. In particular, if r is a single-
character string, that string acts as the separator, even if
it happens to be a regular expression metacharacter.
```

### **script\_1**

```
awk '
BEGIN {
    FS=":"
    A=0
    B=""
    C=""
}
{
    n = split($4, arr, ",")
    if (n > A) {
        A = n
        B = $1
        C = $4
    }
}
END {
    print A,B,C # Line 17
}
' /etc/group
```

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 274 Question Id : 640653446029 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 6**

Question Label : Multiple Choice Question

What will be the value of A when the print statement in line 17 of the given script is executed?

**Options :**

6406531486005. ✘ The number of lines in the input file

6406531486006. ✘ The number of groups having more than one users

6406531486007. ✓ The maximum number of users in any group

6406531486008. ✘ The minimum number of users in any group

**Question Number : 275 Question Id : 640653446030 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 6**

Question Label : Multiple Choice Question

What will be the value of B when the print statement in line 17 of the given script is executed?

**Options :**

6406531486009. ✘ The first field of last line

6406531486010. ✓ The last occurrence of group with the maximum number of users

6406531486011. ✘ The last occurrence of group with the minimum number of users

6406531486012. ✘ The last occurrence of group with no users

**Question Number : 276 Question Id : 640653446031 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 8**

Question Label : Multiple Choice Question

What will be the output if the output from the script **script\_1** is piped to the script below?

```
awk '
{
    split($3, arr, ",")
    for (i in arr) {

        # Execute the string and get the first line of
        # the output in the variable u
        "grep ^"arr[i]": /etc/passwd" | getline u

        split(u, arr2, ":")
        print arr2[3]
    }
}
'
```

**Options :**

- 6406531486013. ❌ The other group names in which the users from the largest group are present.
- 6406531486014. ❌ The other group names in which the users from the smallest non-zero member group are present.
- 6406531486015. ❌ The GIDs of the users belonging to the largest group.
- 6406531486016. ❌ The GIDs of the users belonging to the smallest group.
- 6406531486017. ✓ The UIDs of the users belonging to the largest group.
- 6406531486018. ❌ The UIDs of the users belonging to the smallest group.

**Sub-Section Number :** 8

**Sub-Section Id :** 64065363489

**Question Shuffling Allowed :** No

**Is Section Default? :** null

**Question Id : 640653446033 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (277 to 279)**

Question Label : Comprehension

In a computer science project, the students are asked to provide their remote git repository URLs. The URLs are then stored in the file named `data.csv`. There is a bash script written to validate the programs(which they submitted as git repository) written by the students. The project was structured such that `main.sh` in the project's root directory takes standard input and provides the standard output that is used for validation.

Note:

1. The fields of `data.csv` are roll number and repository URL respectively.
2. The test cases are located in the directory `testcases` which is located in home directory.
3. The structure of `testcases` directory is given below

```
~/testcases/
├── 1/
│   ├── input.txt
│   └── output.txt
├── 2/
│   ├── input.txt
│   └── output.txt
├── 3/
│   ├── input.txt
│   └── output.txt
..
```

4. All the required packages (git, diff, ...) are already installed in the system.

```

#!/bin/bash

# PART-1 Getting the project files using git
# Input Field Separator (IFS)
IFS="," # Line 1-a
while read rollno url; do # Line 1-b
    # Clone files to a new directory named with rollno
    git clone $url $rollno # Line 1-c
done # Line 1-d

# ****

# PART-2 Evaluating the project using test cases
# and generate a log file with evaluation results
TESTCASE_DIR=~/testcases # Line 2-a
LOG_FILE=~/log.csv; echo "" > $LOG_FILE
while read rollno url; do # Line 2-c
    cd $rollno # Line 2-d
    for tc in $TESTCASE_DIR/*; do
        bash main.sh < $tc/input.txt > /tmp/tmp_output # Line 2-f
        diff $tc/output.txt /tmp/tmp_output > /dev/null 2>&1 # Line 2-g
        if [ $? = 0 ]; then # Line 2-h
            echo "$rollno,$tc,PASS" >> $LOG_FILE # Line 2-i
        else
            echo "$rollno,$tc,FAIL" > $LOG_FILE # Line 2-k
        fi
    done
    cd ..
done < data.csv

# ****

# PART-3 Generating results to terminal
TOTAL_TESTCASES=$(ls $TESTCASE_DIR | wc -l) # Line 3-a
echo "SUMMARY"
while read rollno url; do # Line 3-c
    passed_tc=$(grep PASS $LOG_FILE | wc -l) # Line 3-d
    echo "$rollno $passed_tc/$TOTAL_TESTCASES" # Line 3-e
done < data.csv

```

Based on the above data, answer the given subquestions.

### **Sub questions**

**Question Number : 277 Question Id : 640653446034 Question Type : MSQ Is Question**

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

**Time : 0**

**Correct Marks : 6 Selectable Option : 0**

**Question Label : Multiple Select Question**

Identify all the mistakes in the PART-1 of the script.

**Options :**

6406531486023. ✘ Line 1-a: The value of the IFS variable is wrong

Line 1-b: No standard input is provided, thus replacing Line 1-a with `cat data.txt`  
6406531486024. ✓ | while read rollno url; do will resolve the issue.

Line 1-c: `git clone $url $rollno` is an invalid statement because no command  
6406531486025. ✘ named git is installed in the system.

Line 1-d: No standard input is provided, thus replacing this with `done < data.txt`  
6406531486026. ✓ will resolve the issue.

**Question Number : 278 Question Id : 640653446035 Question Type : MCQ Is Question**

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

**Correct Marks : 6**

Question Label : Multiple Choice Question

Read the description given in the comments and identify all the mistakes in the PART- 2 of the script.

**Options :**

6406531486027. ✘ Line 2-c: Standard input not provided

6406531486028. ✘ Line 2-f: Incorrect IO redirection

6406531486029. ✘ Line 2-g: Incorrect IO redirection

6406531486030. ✘ Line 2-h: Incorrect condition

6406531486031. ✘ Line 2-i: Incorrect IO redirection

6406531486032. ✓ Line 2-k: Incorrect IO redirection

**Question Number : 279 Question Id : 640653446036 Question Type : MCQ Is Question**

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

**Time : 0**

**Correct Marks : 6**

Question Label : Multiple Choice Question

Read the description given in the comments and identify all the mistakes in the PART- 3 of the script.

**Options :**

6406531486033. ✖ Line 3-a: Incorrect calculation of the total test cases

6406531486034. ✖ Line 3-c: Standard input not provided

Line 3-d: Incorrect calculation of the passed test cases, it should be

6406531486035. ✓    `passed_tc=$(grep "^\$rollno," $LOG_FILE | grep PASS | wc -l)`

6406531486036. ✖ Line 3-e: Some of the referred variables are not defined