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TCS NQT PREPINSTA CHEAT SHEET

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Test Pattern

Part A: Foundation Section

- Traits (1 Question in 1 min)
 - Numerical Ability (20 Questions)
 - Reasoning Ability (20 Questions)
 - Verbal Ability (25 Questions)
- Allotted Time for Foundation Section: 76 minutes

Part B: Advanced Section

- Advanced Quantitative Aptitude (10 Questions)
 - Advanced Reasoning Ability (10 Questions)
 - Advanced Coding (2 Questions)
- Allotted Time for Advanced Section:
35 mins for Quants and Reasoning
55 mins for Coding

Reasoning Ability -

- Word Pattern
- Letter Series
- Number Series
- Seating Arrangements
- Blood Relations
- Directional Sense
- Statement and Conclusion
- Syllogism
- Data Sufficiency
- Logical Venn Diagram Based DI
- Selection Decision Table

Advanced Section

Advanced Quantitative Ability

- Number System
- Percentages
- Profit and Loss
- Simple and Compound Interest
- Ratio and Proportion
- Averages
- Time and Work
- Time, Speed and Distance
- Mensuration
- Permutations and Combinations
- Probability
- Data Sufficiency

Advanced Reasoning Ability

- Letter Analogy
- Ages
- Blood Relations
- Complex Seating Arrangements
- Distance and Directions
- Odd Man Out
- Symbols and Notations
- Data Sufficiency
- Decision Making

Advanced Coding

- Greedy Programming
- DSA
- Dynamic Programming

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Analysis and Instruction

- The test flowed in a particular order. Foundation Section had to be completed before moving to Advanced Section.
- There were both Fill in the blank as well as MCQ Questions.
- Foundation Section is Mandatory for Ninja Profile and Advanced Section is mandatory for Digital Profile
- No Negative Marking
- Section Switching is not allowed
- Candidates are not allowed to revisit already answered questions.
- Sub- Section switching not allowed
- Browser tab shifting not allowed (Exam will end immediately)
- Video and Audio will be monitored by an AI (for people giving test from home)
- One teacher will proctor the exam of over 20 students.
- Traits was not part of On-campus drive but can be asked in Off-campus drive

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VERBAL ABILITY (FOUNDATION)

Question 1: Sentences of a paragraph are given here in jumbled order. Arrange the sentences in the right order to form a meaningful and coherent paragraph.

- A. The skills to make India a global handloom hub exist but they are dying for lack of proper infrastructure and planning.
- B. India has over nine million textile craftspeople, with skills unmatched by any other country.
- C. Today 'handmade' and 'handloom' are becoming sought after international brands, and new markets and buyers are emerging.
- D. These people also have an enormous repertoire of designs going back generations and creating textiles in hundreds of different techniques.

Options:

- C, D, B, A
- A, D, B, C
- B, D, C, A
- D, C, B, A

Answer: Option C

D, C, B, A

Question 2: Select the option that is the meaning of the underlined words/segment in the given context.

Please allow me to pick your brain on this topic.

- A. to find fault in you
- B. to talk to an intelligent person such as you
- C. to irritate you
- D. To obtain more information from you

Answer: Option D

To obtain more information from you

Question 3: She kept looking at the men behind the counter in utter disbelief -she had thought the Thanjavur painting would _____, _____ as the gems were not precious

- A. Cost an arm and a hand, but it was dirt cheap
- B. Cost an arm and a leg, but it was dead cheap
- C. Cost an arm and a leg, but it was dirt cheap
- D. Cost two arms and both legs, but it was dirt cheap

Answer: Option B

Cost an arm and a leg, but it was dead cheap

Direction for Question 4-6:

Read the following passage and answer the questions that follow:
Under the harsh light of a naked blue bulb, the handloom weaver sits in a pit, craning his neck over a loom, manipulating a mass of threads. Slowly frame by frame, a paisley motif emerges on fuchsia pink silk, sourced from South India. Banaras silk is mentioned in the Rig Veda and Buddhist history texts, which, together with images from the Mughal court, provide clues to its evolution. Silk-embroidered sarees have been an art form during the Mughal period in the 16th century.

To gain an insight into the intricate weaving process, a visit to the Mehta International Silk Centre helps. Here you can understand the intricacies of the process: difference between phenkua and kadhuwa: the technique of throwing the shuttle from end-to-end between the threads of the warp, and weaving in the threads, one by one.

Three generations can wear an intricately woven Banarasi saree, and it is more a family heirloom than a mother passes on to her daughter or daughter-in-law. The complexity of design in a Banarasi saree is of the highest order —the highest pixels.

The workers, mostly men, may take 10 days to weave a saree working eight hour shifts on wages as low as Rs 600 per day. If the design is complicated, then the saree may proceed at 2

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VERBAL ABILITY (FOUNDATION)

inches a day and the weaver may even take three months to weave just one saree. Sarees may tell pictorial stories; the motifs on sarees are like a history book of influences — Persian and Mughal and Hindu culture. One can find motifs like asharfi (coin-shape), gainda (marigold flower), chand-tara (moon and star), lateefa (floral bouquet), etc.

Question 4: What is the broad theme of the given passage?

- A. The various types of Banarasi sarees.
- B. The flourishing weaving industry of Varanasi.
- C. The poor condition of the weavers of Varanasi.
- D. The intricate weaving process of Banarasi sarees

Answer: Option D

The intricate weaving process of Banarasi sarees.

Question 5: Which of the following is the odd one out in the history of influences on Banarasi sarees?

- A. Buddhist
- B. Hindu
- C. Persian
- D. Mughal

Answer: Option A

Buddhist

Question 6: Three generations can wear an intricately woven Banarasi saree because

- A. It goes through an intricate weaving process.
- B. It becomes a family heirloom.
- C. It is very strong and lasts for years together.
- D. It has a complexity of design of the highest order

Answer: Option A

It goes through an intricate weaving process.

Direction for Question 7- 8:

Four words have been deleted in the paragraph given below. The four sentences, from which the words have been deleted, are given below —individually. Select the word that best completes the sentence in each of the four items below. Good art must connect with ordinary lives. It must be relatable. It must connect with themes that other people's lives are influenced by. The artist cannot merely _____ an ideal. The best _____ works depict an ideal which is achievable. The best _____ works depict a terrifying future that's ever possible. Orwell's Nineteen Eighty-Four is terrifying because it so accurately portrays the _____ and human suffering that occurs when fascism takes over. Great literature holds a hand-mirror up to the flaws on society's face. it forces people to face the consequences of their actions and helps us try to _____ a better, more equal society.

Question 7: The artist cannot merely _____ an ideal.

- A. Create
- B. Correct
- C. Abjure
- D. Adore

Answer: Option A

Create

Question 8: Orwell's Nineteen Eighty-Four is terrifying because it so accurately portrays the _____ and the human suffering that occurs when fascism takes over.

- A. Insanity
- B. Inimitability
- C. Immunity
- D. Invulnerability

Answer: Option A

Insanity

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VERBAL ABILITY (FOUNDATION)

Direction for Question 9 to Question 13:

Fill in the blanks in the passage given below using the options provided.

India has the potential to become a cybersecurity powerhouse. We must take advantage of the fact that India is entering the demographic dividend phase and provide an adequate training opportunity for the youth. The 1 the future cybersecurity workforce and it is important to 2 cybersecurity courses from the ground up in the curriculum of middle school, high school, and college students. Other countries notably Israel, have already taken steps to educate the youth on cyber threats and attacks and effective 3 against such threats. The National Skills Development Council (NSDC) has several qualification packs in Cyber Security that will create a skilled workforce. As a 4, a course on Cyber Security covering areas like cryptography, network security, and secure application development 5 in TCS for 500 fresh Science graduates.

Question 9. Fill in the 1st blank.

- A. Youths constitute
- B. Youth constitutes
- C. Youth constitute
- D. Youths constitutes

Answer: Option B

Explanation: This can be answered with thorough knowledge of the following things.

- The plural form of youth is youths.
 - The subject introduced in the sentence prior to the first blank is youth (singular, i.e. "...adequate training opportunity for the youth")
 - As per Subject Verb Agreement, the appropriate verb for the singular subject youth is constitutes. Similar examples include bird flies, boy runs, the movie plays, etc.
- Thus, the answer is option b.

Question 10: Fill in the 2nd blank.

- A. Embed
- B. Instill
- C. Attach
- D. Extend

Answer: Option A

Explanation: If keywords to help answer this blank are ground up. If one were to proactively solve this blank, we'd go for a word that's similar to incorporate.

Amongst the answer options, Embed means incorporate something, while Instill means inculcate ideas of qualities (not something that's physically tangible, but more used with qualities, i.e. intangible stuff). The other answer options won't fit in anyway, and thus the fight is between options A and B. Since we're discussing the incorporation of something physically tangible here (i.e. cybersecurity courses), the answer is option A.

Question 11: Fill in the 3rd blank.

- A. Warfare
- B. Countermeasures
- C. Softwares
- D. Viruses

Answer: Option B

Explanation: The key phrase is against such threats.

Countermeasures are what you take against threats. Thus, the answer is option b.

Question 12: Fill in the 4th blank.

- A. Stopgap arrangement
- B. Piece of the puzzle
- C. Fight in this stair
- D. Step in this direction

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VERBAL ABILITY (FOUNDATION)

Answer: Option d

Explanation: The sentence prior to the blank talks about the NSDC having several qualification packs on Cyber Security. It is in continuation to it that TCS has a course on Cyber Security. Thus, the right answer is option d.

Stopgap arrangement: Temporary arrangement pieces of the puzzle: An element that helps you solve a mystery

Question 13: Fill in the 5th blank.

- A. Is in the cockpit
- B. Is piloting
- C. Is being piloted
- D. Are being piloted

Answer: Option C

Explanation: Cockpit refers to an aircraft term, unlike piloting (which can also mean testing/ trying for the first time). Thus, option A is eliminated. The sentence here is in the passive voice. Thus, one cannot use option B (in which case, we need to know who is piloting this course). The sentence is not structured to work in the active voice form.

Between options C and D, option C is the right answer since the subject (a course on Cyber Security) is singular. We need a singular verb (is being piloted).

Direction for Question 14-18:

Fill in the blanks in the passage given below using the options provided.
TCS business leader, Ashok Pal, recently blogged: "Too much focus on technology and too little on the operating model will, after initial success, 1 the enterprise in the middle of a digital dip. Such a digital dip is typically caused by 2 approach, confusion over KPIs, conflicting 3 views, and poor user adoption. Operating model changes without adequate technology upgrade will 4 the efficiency of the enterprise."

Remember that digital success across the breadth and depth of the enterprise is the real objective. It is much easier to succeed with smaller projects. For lasting results, technology transformation must be driven by a comprehensive IT and operation 5 that leverage agility, analytics automation, and cloud."

Question 14: Fill in the 1st blank.

- A. Landed
- B. Land
- C. Lands
- D. Left

Answer: Option B

Explanation: Here, the subject is enterprise. The appropriate verb to go with the future tense auxiliary verb (will) is land. While forming future tense, the syntax is always will + singular present tense form of the verb.

Question 15: Fill in the 2nd blank.

- A. Siloed
- B. Singleton
- C. Bottom-top
- D. Heroic

Answer: Option A

Explanation: The keywords that help you answer this question are "...too much focus on technology and too little focus on the operating model". This means there's focus only on one area, while the other is neglected. We need a word that symbolizes this meaning. That is done by siloed. Its meaning is isolated from others. In this case, it refers to an approach where other options are neglected.

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VERBAL ABILITY (FOUNDATION)

Question 16: Fill in the 8th blank.

- A. Client
- B. Stakeholder
- C. Consumer
- D. Rival

Answer: Option B

Explanation: This part of the paragraph talks about a dip in an organization. It cannot be caused by the client or consumer or rival views, all of whom are external agents to an organization. However, stakeholder refers to internal decision-makers and parties concerned, who can cause this digital dip. Thus, the answer is option B.

Question 17: Fill in the 9th blank.

- A. Maximize
- B. Sophisticate
- C. Constrain
- D. Increase

Answer: Option C

Explanation: We need an answer option that refers to something that will be done to the efficiency of the enterprise when operating model changes are without adequate technology upgrades. The technology upgrade is positive. Thus, without adequate technology upgrades, only something negative can happen to an enterprise's efficiency. The only negative answer option is option c. Constrain, by the way, refers to control or stunt.

Question 18: Fill in the 10th blank.

- A. Protocol
- B. Pact
- C. Law

- D. Framework

Answer: Option D

Explanation: Protocol: A set of rules and regulations
Pact: An agreement
Framework: A structure or system
In this sentence, the option that best fits is option d, since we're looking for a word that goes with operations. Operations protocol (or) operations pact (or) operations law does not fit well when talking about something that leverages agility, analytics automation, etc.

Question 19: One part of the sentence below may contain an error. Identify the part. If there is no error, choose 'No error'.

Suma told / she would answer / all the calls later.

- A. Suma told
- B. She would answer
- C. All the calls later
- D. No error

Answer: Option A

Explanation: Whenever told is used, it must always be followed by a person (told X, told Y, told Z, etc.). In this case, that person (told whom?) is missing. Thus, option A is error-strewn.

Direction for Question 20 to 22: Please go through the following passage to answer the questions that follow.

In the game of cricket, any side with a pair of bowlers of complementing superior qualities proves invincible. The current generation would know the Bhuvi-Bumrah or Starc-Cummins pairs better than their own parents. So, let me dissect a pair that ruled the cricketing world during the fifties and early sixties. Brian Statham and Fred Trueman of England proved to be a

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VERBAL ABILITY (FOUNDATION)

lethal combination that every batsman wanted to avoid playing. Statham was a bowler of immaculate accuracy, nagging length, and lyrical run-up. Oxymorically, his virtues were the basis for his misfortunes. Knowing that he would bowl in a manner that's unplayable, batsmen were smugger in defending his balls than when playing an erratic bowler.

Trueman, nicknamed as Fiery, had a long delivery stride and made no bones about his intentions to test batsman's physical and mental strength. The ball would flash past the bat in moments of incredibility with the batsman thanking his Maker if the ball missed his limbs and occasionally the stumps.

Question 20: Which one of the following sentences has an appropriate bold part that can be replaced with lethal?

- A. The series of never-ending bubbles rejoiced the children to an end
- B. The never-say-die team won the tournament for the tenth time.
- C. Mount Vesuvius' eruption proved to be completely ruinous to Pompeii.
- D. The life-saving drug administered to the patient brought him back to his elements.

Answer: Option C

Explanation: The meaning of lethal is dangerous. This can be contextually deciphered by going through the sentence "...a lethal combination that every batsman wanted to avoid playing" if you didn't know the meaning of the word. The answer option that best uses this meaning is option C. Ruinous means disastrous, which is similar to what we need.

Question 21: Any team with two bowlers sharing the required traits is:

- A. Arrogant to its opponents
- B. Vulnerable to choke

- C. Hard to defeat
- D. Insignificant in its contribution

Answer: Option C

Explanation: This can be answered by going through the very first line of the passage ("In the game of cricket, any side with a pair of bowlers of complementing superior qualities prove invincible.")

Invincible: Hard to defeat

Question 22: Oxymoron is a special language device, where

- A. A tough idea is simplified by bringing a simple parallel to it
- B. Two contrasting elements are placed side by side reinforcing an idea
- C. A brilliant object issued in place of a dull entrance
- D. An abstract entity is compared to an enactment emphasizing similarity/difference

Answer: Option B

Explanation: You could try answering this question through your knowledge of the word's meaning, which would point to option B. You could also try deciphering it by going through the line where this word is used in the passage ("Oxymorically, his virtues were the basis for his misfortunes.") The line in the passage goes on to mention that a positive quality (virtue) was also negative (misfortune), thus rhyming with option B.

Here are more examples of oxymorons in the English language.

- Bittersweet
- Act naturally
- Deafening silence
- Definitely maybe

Question 23: For the four-sentence (S1-S4) paragraph given below, sentences S1 and S4 are given. From the options P, Q and R, choose appropriate sentences for S2 and S3 respectively.

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VERBAL ABILITY (FOUNDATION)

S1: Can we imagine carrying objects that are ten times heavier than our own body weight?

S2: _____

S3: _____

S4: This is because of their small body size; it enables them to use fewer muscles to carry their own body and more to carry bigger loads.

P: Ants, however, are able to carry or pull objects much heavier than their own body weight.

Q: One would assume that they have stronger muscles that enable them to have more strength than humans.

R: Superman probably could, but it does not seem possible for an ordinary man to do so.

C. Which

D. Who

Answer - whom

Question 25: Four words have been deleted in the paragraph given below.

The four sentences from which the words have been deleted are given below individually. Select the word that best completes the sentence in each of the space below

A key power that language gave us is negotiations in the source of speaking together towards mutual understanding. We take turns at talking and this provides every participant in a conversation with a systematic _____ for consent and descent. We can see our turn at talk for the normal of _____ conversation. we could be answering a question telling a story_____ or assistance and collaboration. We can also use our turns to do metacommunicative work, for instance to signal that we are on the same page or to ask for clarification. Often these metacommunicative signals such as- m-hm? Or 'huh'? for the rather manual and _____ they seem to be optimally adapted to the task of streaming conservations.

We can use our terms at talk for the normal of _____ conversation

A. Baning

B. Commence

C. Campaign

D. Business

Answer: Option b

Explanation: S4 begins with "This is because of their small body size". Thus, we need a sentence before S4 that introduces a subject that will have a small body size. That is done by P (Ants is the subject). This means that P has to immediately precede S4.

The only answer option with P at the end is option B.

Question 24: Select the option which is most appropriate for the blank

Answer - Business

The Person with _____ you should be coordinating will call you soon

Option

A. Whoever

B. Whom

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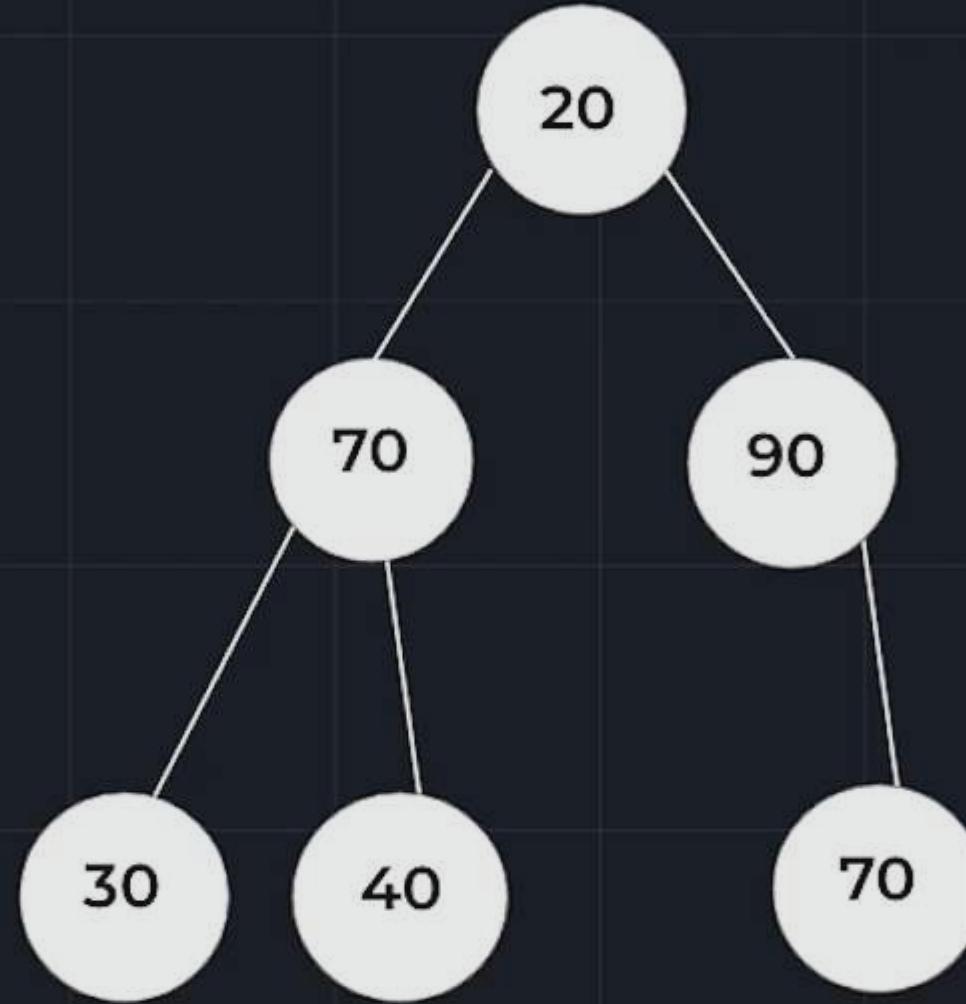
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Max Element in Binary Tree

Solve Recursively by asking each subtree : What's max element in your subtree and

Compare that to root node of the subtree



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NUMERICAL ABILITY (FOUNDATION)

Question 1: The average age of five persons in a group is 18 years. The group has an additional member, such that the new average is 25 years less than the age of the new member. What is the age(in years) of the new member?

- A. 48
- B. 38
- C. 50
- D. 42

Answer: Option A

48

Explanation:

Let the age of five persons be X_1, X_2, X_3, X_4, X_5 , and the average age of 5 persons is given as 18.

Then

$$\frac{X_1 + X_2 + X_3 + X_4 + X_5}{5} = 18$$

$$X_1 + X_2 + X_3 + X_4 + X_5 = 90 \text{ -----(1)}$$

Let the age of the additional member be X_6

Then according to question,

$$\frac{X_1 + X_2 + X_3 + X_4 + X_5 + X_6}{6} = X_6 - 25 \quad X_6 = 25$$

$$(X_1 + X_2 + X_3 + X_4 + X_5 + X_6) = (X_6 - 25) * 6 \text{ -----(2)}$$

From equation 1 and 2,

$$90 + X_6 = X_6 - 25 * 6$$

$$6X_6 - 150 = X_6 + 90$$

$$5X_6 = 240$$

$$X_6 = \frac{240}{5}$$

$$X_6 = 48$$

Hence the age of the new member is 48 years.

Question 2: What is the average of all the natural numbers from 31 to 50, both inclusive?

- A. 39.5
- B. 40.5
- C. 40
- D. 38

Answer: Option B

40.5

Explanation:

$$\text{Sum of Natural Numbers} = \frac{n(n+1)}{2} + 1$$

Therefore, sum of natural numbers between 31 to 50 =

$$\begin{aligned} &= \frac{50(50+1)}{2} - \frac{30(30+1)}{2} \\ &= \frac{50(51)}{2} - \frac{30(31)}{2} \\ &= \frac{(2550 - 930)}{2} \\ &= \frac{1620}{2} \end{aligned}$$

Now count of all the natural numbers between 31 to 50 = 20

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NUMERICAL ABILITY (FOUNDATION)

Therefore

$$\text{Average} = \frac{810}{20} = 40.5$$

$$= 40.5$$

Question 3: A restaurant serves small pizzas of 6-inch diameter and regular pizzas of 9-inch diameter. If a small pizza is priced at ₹200, then what is a fair price for a larger pizza of the same type?

₹450

₹300

₹350

₹400

Answer: Option A

₹450

Explanation:

Diameter of large Pizza = 9 inch
And diameter of small Pizza = 6 inch

Let the price of the large Pizza be C_1 and the price of the small Pizza be C_2 .

Then

$$C_1:C_2=81:36$$

$$C_1 = \frac{81 \times 200}{36} = 450$$

$$C_1=450$$

Hence price for the large pizza is INR 450/-

Question 4: While presenting data in the form of a positive number, I committed a mistake by mentioning the cube of the number. If the error due to this mistake was 800%, what was the number?

- A. 2
- B. 4
- C. 5
- D. 3

Answer: Option D

3

Explanation:

Let the Number be x .

Number Mentioned by mistake = x^3

$$\begin{aligned}\text{Error} &= x^3 - x \\ &= x(x^2 - 1)\end{aligned}$$

$$\text{Error}/\% = 100 \times \frac{x(x^2 - 1)}{x}$$

According to question

$$\begin{aligned}100(x^2 - 1) &= 800 \\ (x^2 - 1) &= 8 \\ x^2 &= 9 \\ x &= \pm 3\end{aligned}$$

As we are presenting data in form of positive number hence $x=3$.

Question 5: A retailer gives a discount of 20% on an item, and yet makes a profit of 10%. What is the ratio of the cost price to the list price?

- A. 7:12
- B. 8:11
- C. 4:5
- D. 1:2

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NUMERICAL ABILITY (FOUNDATION)

Answer: Option B

8 : 11

Question 6: There were 36 students in a class and their average height was 4 feet 6 inches. At the end of the year, 4 students, with an average height of 3 feet 3.5 inches left the class. Moreover, 6 new students got admitted to this class, their average height being 4 feet 9 inches. The average height, in feet, of the students currently in the class is:

- A. $4\left(\frac{1}{6}\right)$
- B. $4\left(\frac{2}{3}\right)$
- C. $4\left(\frac{3}{4}\right)$
- D. $4\left(\frac{1}{3}\right)$

Answer: Option B

$4\left(\frac{2}{3}\right)$

Question 7: X goes to the office by driving at $\frac{5}{7}$ times his usual speed. If he normally takes half an hour to reach his office by how many minutes will he be late?

- A. 12
- B. 8
- C. 10.5
- D. 13.5

Answer: Option A

12

Question 8: A set of mugs consists of 5 plastic mugs each of a different design and 2 glass mugs each of a different design. In how many ways can these 7

mugs be arranged in a row if the glass mugs are separated from each other?

- A. 4320
- B. 1440
- C. 3600
- D. 5040

Answer: Option C
3600

Question 9: The product of a real number and its square is 1728. What is the number?

Enter your answer ONLY as NUMERAL in the box.

This is a FUB Question you have enter values in this box

Answer: 12

Question 10: Anil buys cashews and raisins from a farmer, the per kg price of cashews being four times that of raisins. He sells 8 kg cashews at 20% profit, and 12 kg raisins at 30% profit to Sunil. Now, Sunil sells 5 kg of cashews at ₹120 per kg, and then mixes the remaining cashews and raisins and sells this mixture at ₹95 per kg. If Sunil makes a total profit of 25% the price, in ₹ per kg, paid by Anil for cashews is:

Enter your answer ONLY as NUMERAL in the box

This is a FUB Question you have enter values in this box

Answer: 120

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NUMERICAL ABILITY (FOUNDATION)

Question 11: What is the least multiple of 13 which divided by 3, 4, 5, 8 and 10 leaves remainder 2 in each case?

Enter your answer ONLY as NUMERAL in the box.

This is a FUB Question you have enter values in this box

Answer: 962

Question 11: In a birthday party, there are 20 identical slices of cake that have to be distributed among 4 children. If every child is to get at least two slices, then in how many ways can this distribution be done?

Enter your answer ONLY as NUMERAL in the box.

This is a FUB Question you have enter values in this box

Answer: 455

Question 12: P is five times as efficient as Q in respect of doing work. Together, they complete it in 20 days. In how many days can P alone do it?

- A. 28
- B. 24
- C. 25
- D. 30

Answer: B

24

Question 13: In case of a transaction, there was a loss of 18.75%. What was the

ratio of the cost price to the selling price?

- A. 4 : 3
- B. 8 : 5
- C. 32 : 25
- D. 16 : 13

Answer: D

16:13

Question 14: A valuable sword belonging to the Grand King was stolen, and the three suspects were Ibn, Hasan and Abu. Ibn claimed that Hasan stole it, and Hasan claimed that Abu stole it. It was not clear that one of them stole it, but it was later learnt that no innocent person had lied. It was also learnt that the sword was stolen by only one person. Who stole the sword?

- A. Hasan
- B. Abu
- C. Ibn
- D. None of them

Answer: A

Hasan

Question 15: A sum of ₹10,00,000 was invested in a scheme where it got compounded annually and the sum increased to ₹11,06,704 in 2 years. What is the rate of interest?

- A. 5.2%
- B. 5.4%
- C. 4.8%
- D. 4.4%

Answer: Option A

5.2%

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NUMERICAL ABILITY (FOUNDATION)

Question 16: Mita and Geeta jointly start a small business. Mita invests ₹15,000, whereas Geeta invests ₹10,000. After 2 months, Mita withdrew ₹2,500 from her investment in the business. After 8 more months, Mita again withdrew ₹2,500. Geeta does not withdraw any money in 1 year. After 1 year, they make a profit of ₹8,100 from their business. If they want to share this profit in the ratio of their money in the business, then how much money, in ₹, should Mita get as her share of the profit?

- A. 4400
- B. 4200
- C. 4500
- D. 4300

Answer: C
4500

Question 17: Given a set of letters {a, b, c, d, e, f, g, h, i, j, k, l, m}, we can list out all permutations of these letters in lexicographic (dictionary) order. The first three permutations in this list are abcdefghijklm, abcdefghijkml and abcdefghijklm and the last one is mlkjihgfedcba. What permutation would appear immediately after the following one in this lexicographically ordered list of permutations?

Bcjameflkihgfd

- A. Bcjameglkihfd
- B. Bcjamegdfhikl
- C. Bcjalefmkihgfd
- D. Bcjameflkihdg

Answer: B

Bcjamegdfhikl

Question 18: A music talent show has 100 contestants and 10,000 viewers. Each viewer picks their top 5 performers. Any performer who is nominated by at least 20% of the viewers gets a prize. What is the maximum number of prizes that could be awarded?

- A. 50
- B. 25
- C. 10
- D. 5

Answer: B
25

Question 19: A sum invested at simple interest to ₹18375 and ₹20125 in 5 and 7 years, respectively. What was the interest (in ₹) earned in 1 year?

- A. 950
- B. 925
- C. 875
- D. 975

Answer: C
875

Question 20: The average age of five persons in a group is 18 years. The group has an additional member, such that the new average is 25 years less than the age of the new member. What is the age (in years) of the new member?

- A. 42
- B. 50
- C. 48
- D. 34

Answer: C
48

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Darth an Attacker.

For Bob Darth is Alice.

For Alice Darth is Bob.

The diagram shows three computer users: Bob, Darth, and Alice. Bob is on the left, Darth is in the center, and Alice is on the right. A cloud labeled 'Internet or other comms facility' connects them. An arrow points from Darth's computer to Alice's, labeled 'Message from Darth that appears to be from Bob'. Below the diagram is the caption '(a) Masquerade'.



What is the average speed of this person from point A to point B?

uid:#5021003452

Total distance = 100 Km

Time = $\frac{50}{A} + \frac{50}{B}$

Time = $\frac{50B + 50A}{AB}$

Average speed = $\frac{100}{50(A + B)}$

Case: Distance is equally distributed

The diagram shows a car driving on a road. Point A is at the start, B is in the middle, and C is at the end. The distance between A and B is 50 Km, and the distance between B and C is also 50 Km. The speed from A to B is labeled 'Speed = A Km/h' and the speed from B to C is 'Speed = B Km/h'.



Speed time and distance

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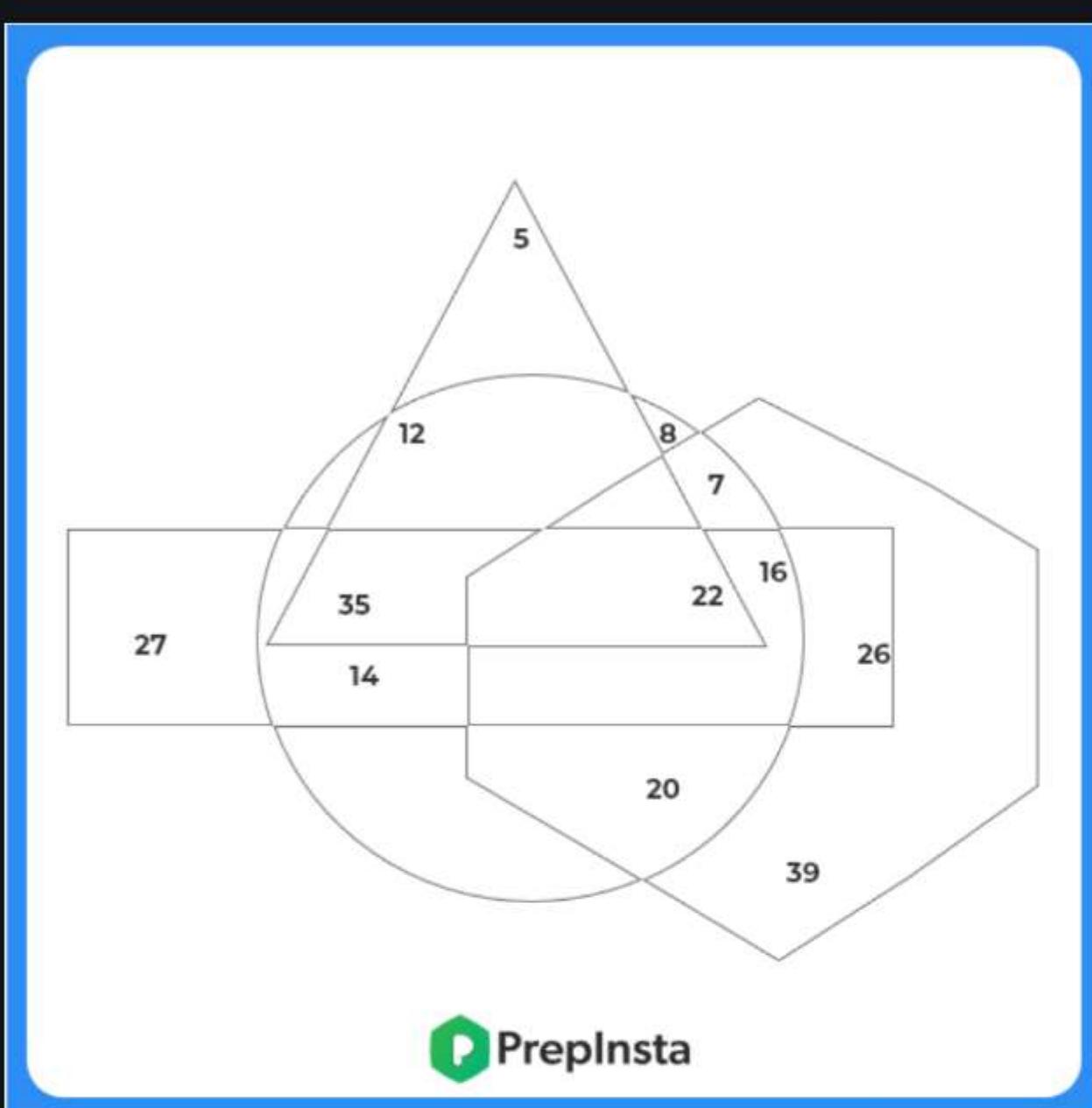
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REASONING ABILITY (FOUNDATION)

Question 1: In the following diagram, the triangle stands for “males”, the circle stands for “doctors”, the rectangle stands for “government employed”, the hexagon stands for “corona warriors”. The numbers in different segments show the number of persons for that segment.

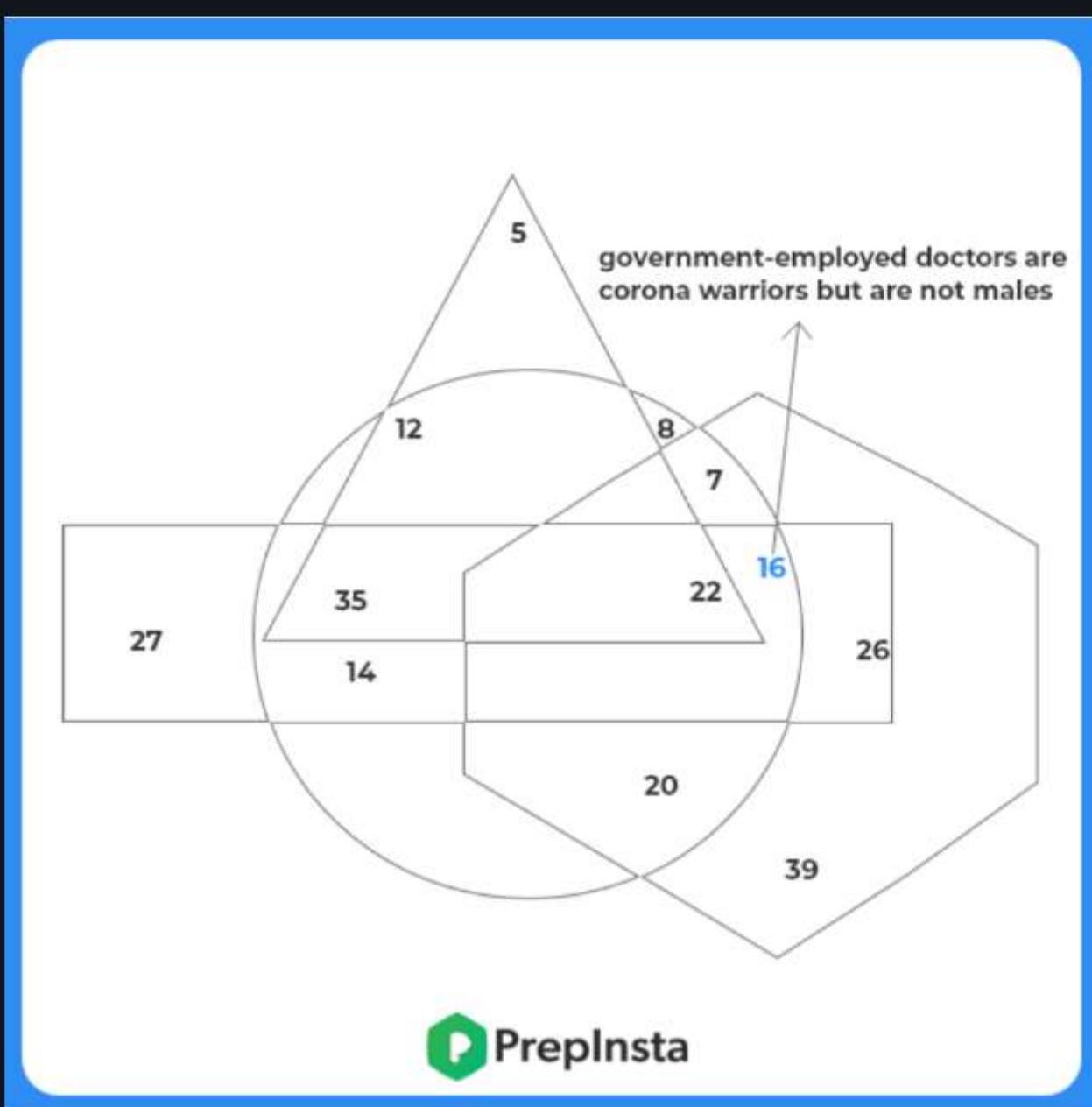


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How many government-employed doctors are corona warriors but are not males?

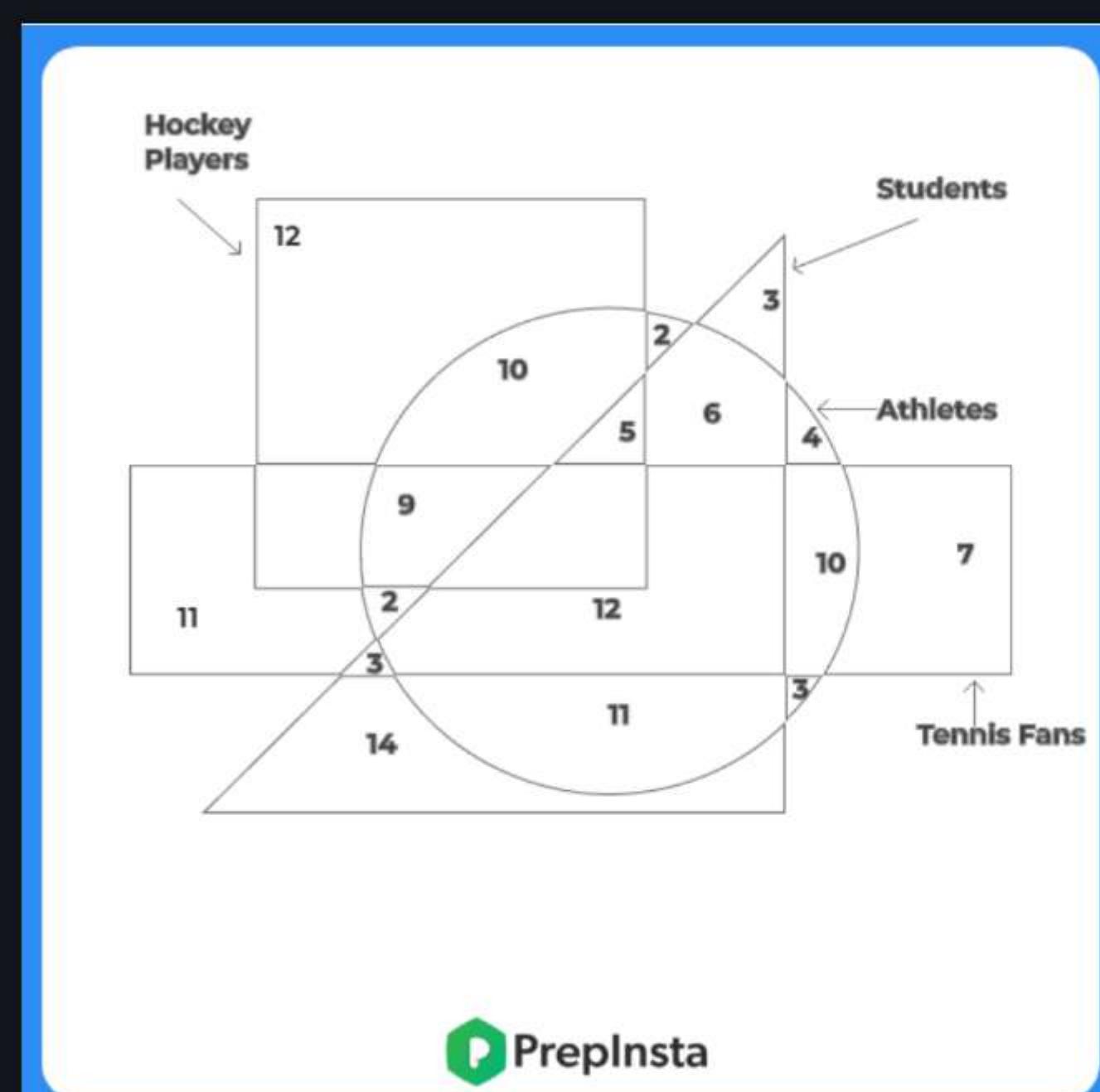
- A. 14
- B. 23
- C. 16
- D. 17

Solution:



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Question 2: In the following diagram, the rectangle stands for tennis fans, the circle stands for athletes, and the triangle stands for students, and the square stands for hockey players. The number in different segments show the number of persons for that segment.

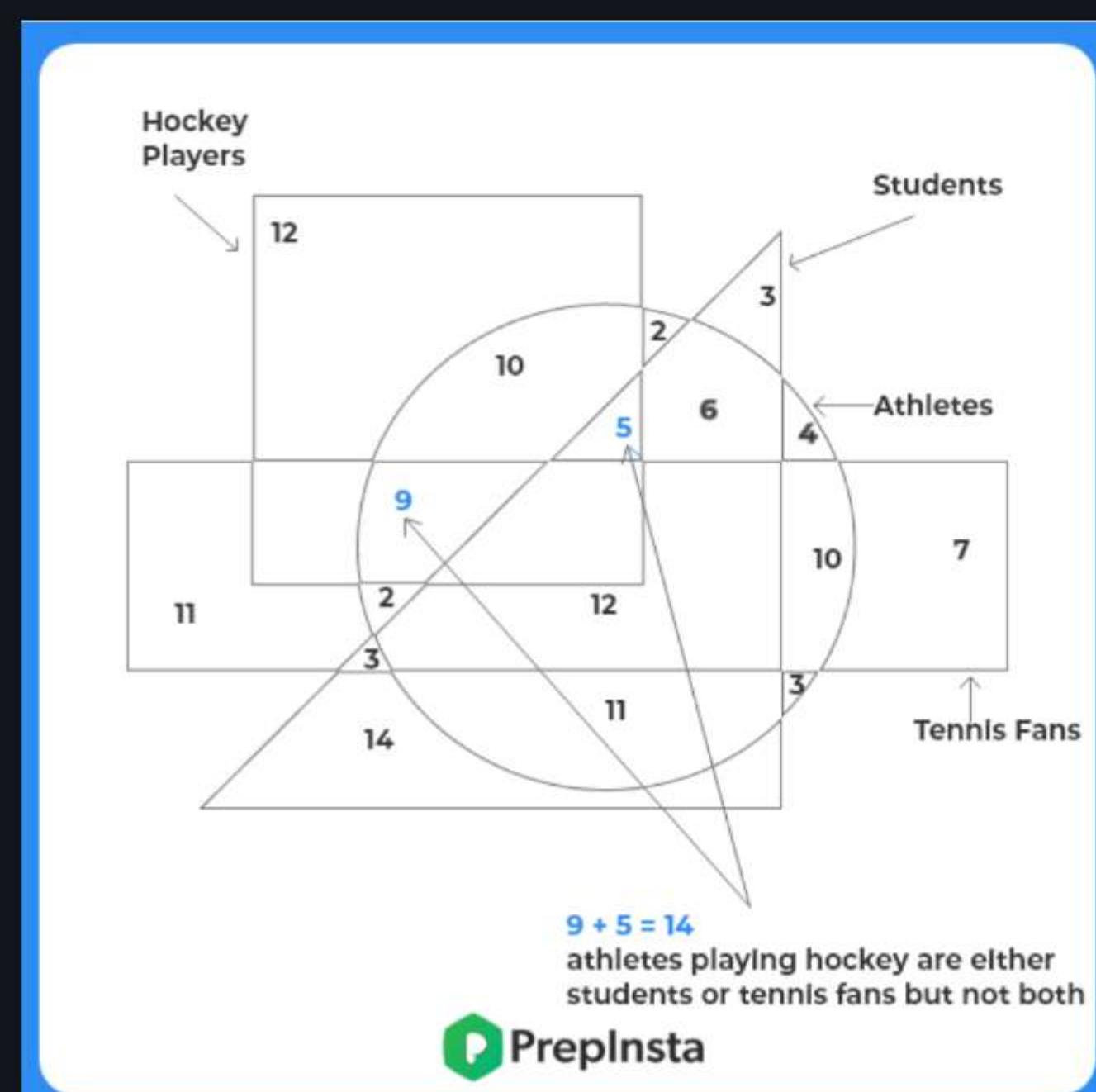


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How many athletes playing hockey are either students or tennis fans but not both

- A. 18
- B. 15
- C. 14
- D. 3

Solution:



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REASONING ABILITY (FOUNDATION)

Questions 3: In a certain code A%B means A is the brother of B, A&B means A is the mother of B, A@B means A is the daughter of B, A\$B means A is the father of B, A#B means A is the sister of B.

If K \$ Z % U & H # N @ T, how T is related to U?

- A. Sister
- B. Brother
- C. Husband
- D. Wife

Answer 3: K \$ Z = K is the father of Z (1)

Z % U = Z is the brother of U (2)

U & H = U is the mother of H (3)

H # N = H is the sister of N (4)

N @ T = N is the daughter of T (5)

From statement 3, 4, and 5

As U is the mother of H, H is the sister of N and N is the daughter of T complies that U and T are sisters

Question 4: Four friends A, B, C, and D have one of the four professions i.e., Doctor, architect, engineer, and lawyer. Each friend belongs to one of the four different cities, Chandigarh, Indore, Lucknow, and Pune. A is not a lawyer or engineer. The doctor is from Lucknow, D is an architect. The lawyer is from Pune. The engineer is neither from Chandigarh nor Pune. D is not from Pune. C is from Indore. Which of the following statements is correct about B?

- A. B is the lawyer and belongs to Chandigarh
- B. B is Doctor and belongs to Pune
- C. B is a doctor and belongs to Chandigarh
- D. B is a lawyer and belongs to Pune

Answer 4:

A is not a lawyer or engineer

The doctor is from Lucknow

D is an architect

The lawyer is from Pune

The engineer is neither from Chandigarh nor Pune

D is not from Pune

C is from Indore

From the above statements, we can draw a table

People	Profession	Cities
A	Doctor	Lucknow
B	Lawyer	Pune
C	Engineer	Indore
D	Architect	Chandigarh

Questions 5: Nehal, Iqbal, Ronit, Malini, and Harbajan, in any one of the 5 activities, i.e., quiz, singing, dance, debate, and mimicry. Ronit participates in singing, Harbajan does not participate in debate or mimicry, Malini does not participate in Mimicry. Iqbal participates in Quiz. Who participates in the debate?

- A. Nehal or Malini
- B. Can not be determined
- C. Malini
- D. Nehal

Answer 5:

1. Ronit participates in singing
2. Harbajan does not participate in debate or mimicry
3. Malini does not participate in Mimicry
4. Iqbal participates in Quiz

From the above statements, we can draw a table

Person	Activities
Nehal	Mimicry
Iqbal	Quiz
Ronit	Singing
Malini	Debate
Harbajan	Dance

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REASONING ABILITY (FOUNDATION)

Question 6: Five teachers P, Q, R, S, and T teach a group of students in a sequence between 9 a.m. and 2 p.m. Each teacher teaches for one hour. Q takes the first class, S teaches just after T. R teaches before P and T. Who takes the second class from 10 am to 11 am?

- A. P
- B. T
- C. R
- D. S

Answer 6:

1. Q takes the first class
 2. S teaches just after T
 3. R teaches before P and T
- As Q is taking the first class (10 - 11 am) and R teaches before P and T, also S is teaching after T.
Hence R is taking the second class.

Question 7: Each of the five pairs of letter clusters, the letter in the second term is a rearranged, transformed form of the letters to the first term in a particular pattern. In which two pairs has the transformation been done the same?

1. MASON: AMNOS
2. PARTY: APRYT
3. FAULT: AFTLU
4. LODGE: DOLEG
5. CARGO: ACOGS

- A. D and E
- B. A and C
- C. B and C
- D. A and E

Answer 7:

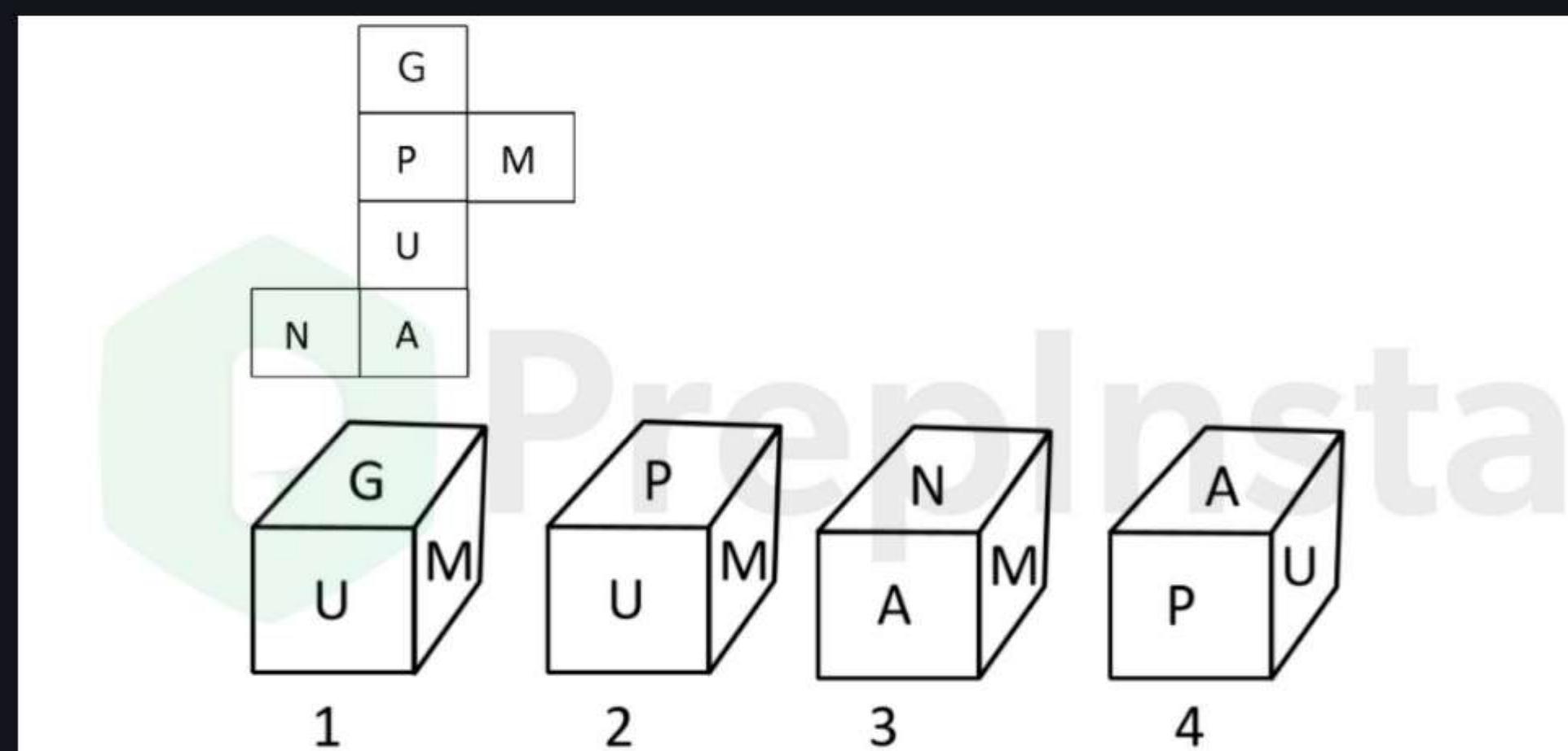
A : MASON: AMNOS

M and A are interchanged and S and N are interchanged keeping O at its original position

Similarly

C: FAULT: AFTLU
F and A are interchanged and U and T are interchanged keeping L at its original position.

Question 8: Which of the following patterns of the boxes can be formed when the sheet given below is folded? (the letters are shown to indicate the sides only)



- A. Only 1, 2, and 4
- B. Only 2
- C. Only 2 and 3
- D. Only 1 and 2

Answer 8: Only 2

Question 9: Given below is a question followed by two statements. I and II, each containing some information. Decode which of the statements are sufficient to answer?

How many Rs would Shalini need to spend to buy 11 pencils and 14 pens?

1. Shalini spent an amount of Rs 201 to buy 15 pencils and 12 pens
2. Shalini spent an amount of Rs 121 to buy 7 pencils and 9 pens

- A. Statement II alone is sufficient
- B. The combination of both statements I and II are necessary
- C. The combination of both the statements are not sufficient
- D. Statement I alone is sufficient

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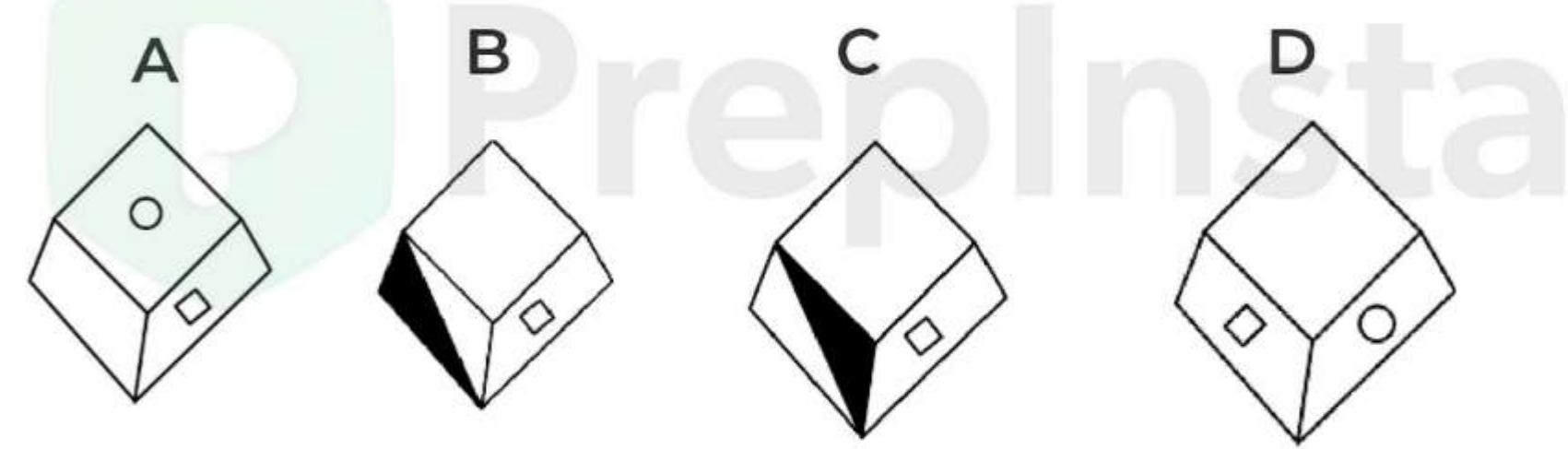
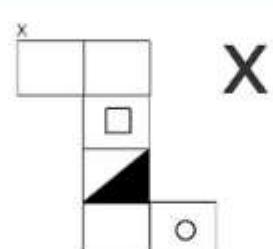
REASONING ABILITY (FOUNDATION)

Answer 9:

The combination of both statements I and II are necessary

Question 10:

The fig marked X is folded to form a box. Four possible boxes A, B, C, and D are given below, some of which can be formed and some cannot be formed. Choose from the alternatives, the boxes that can be formed



- A.** A and B only
- B.** B and C only
- C.** B and D only

Answer 10: B and C only

Question 11: The number of employees working in six different departments in two companies A and B are given below. Study the given data and answer the questions that follow.

Company A

Departement	No of Employees
Marketing	256
HR	72
Production	504
Accounts	68
Operations	256
Planning	46
Total	1202

Company B

Departement	No of Employees
Marketing	524
HR	108
Production	736
Accounts	122
Operations	146
Planning	58
Total	1694

What is the percentage difference between the employees working in the production department of company A and B.

- A.** 3.21%
- B.** 2.27%
- C.** 1.52%
- D.** 1.15%

Question 12 - If both company A and B merge together to form company C, then what is the percentage of marketing and accounting employees in total employees of company C?

- A.** 33.49%
- B.** 37.59
- C.** 29.52%
- D.** 41.24%

Answer 12: Total no of employees in marketing in both the companies = $256 + 524 = 780$

Total no of employees in accounting in both the companies = $68 + 122 = 190$

Total number of employees in marketing and accounting in both A and B = $(780 + 190) = 970$.

And the total no of employees in both the companies = $1202 + 1694 = 2896$.

Hence, percentage of employees in marketing and accounting in

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REASONING ABILITY (FOUNDATION)

total employees in company

$$C = (970/2896) * 100$$

=33.49%

Question 13: A statement is followed by two assumptions numbered I and II. Consider the statement and decide which of the given assumption(s) is/are implicit in the statement.

Statement-

1 Various governments across the world have issued strict guidelines for the public to wear masks and wash hands regularly to safeguard their health during covid-19 pandemic.

Assumptions-

1. Covid-19 Pandemic is a serious health issue.
2. There are ways by which people can save themselves from Covid-19 pandemic.

Options-

- A. Neither I nor II is implicit
- B. Both I and II are implicit
- C. Only II is implicit
- D. Only I is implicit

Answer 13 - Both I and II are implicit.

Question 14: Five Friends A,B,C,D,E are sitting in a line facing North. Who is sitting exactly in the middle?

1. C is sitting between A and B. E is at the fourth place to the left of B.
2. E is sitting to the immediate left of D. C is to the immediate left of B.

Options:

- A. Statement II alone is sufficient.

- B. The combination of both the statements I and II are not sufficient.
- C. The combination of both the statements I and II are necessary.
- D. Statement I alone is sufficient.

Answer 14: Statement I alone is sufficient

Question 15: What is the wrong number in the following series?

CMQ , FPT , JTX ,OYC , UFI

- A. OYC
- B. JTX
- C. FPT
- D. UFI

Answer 15 - UFI is the wrong number in the series.

Lets take CMQ

Difference between letter C and Letter M is 10 and difference between M and Q is 3 ..same with OYC , JTX,FPT

But not with UFI

Question 16:- In a certain code , K*N means K is the brother of N , K+N means K is the husband of N, K x N means K is the mother of N and K ÷ N means K is the sister of N , then which of the following expressions means C is the daughter of Y.?

- A. Y + R x C * H ÷ V
- B. Y + R x H ÷ C *V
- C. Y + R x H * C ÷ V
- D. Y x R + H * C ÷ V

Answer 16 - option c

Y +R = Y is husband of R

R x H = R is mother of H

H * C= H is brother of C

C ÷ V = C is the sister of V

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REASONING ABILITY (FOUNDATION)

Question 17:- Given below is a question followed by two statements , I and II, each containing some information. Decide which of the statement(s) is/ are sufficient to answer the question.

How is A related to C?

Statements:-

1. A is the wife of B and B is the brother of C.
2. C is the son of D

A. Statement I alone is sufficient.

B. Statement II is sufficient.

C. Both I and II together are sufficient

D. Both I and II together are not sufficient.

Answer 17:- Statement I alone is sufficient

A is sister in law of C.

Question 18:- Four Statements are followed by four conclusion numbered conclusions(s) logically follows/follow from the statements.

Statements.

1. All vegetables are fruit.
2. No Carrot is fruit.
3. Some roots are carrot
4. All roots are eatables

Conclusion

1. Some fruits are eatables.
2. No root is vegetable
3. Some eatables are carrot
4. Some roots are vegetables

A. Only III and IV follow.

B. Only I and either II or IV follow

C. Only III and either II or IV follow

D. Only II , III and IV follow

Answer 19- option c

Question 20:- The following are the criteria of Selecting a Software Engineer for an IT company.

The Candidate must

- a.** Have completed B.C.A with more than 70 % marks.
- b.** Be more than 25 years and less than 30 years of age as June 1 , 2020.
- c.** Have secured more than 75 % in the interview and more than 60% marks in the written test.

However , if the candidate fulfills all the above criteria except

- d.** At (b) , but has completed M.C.A with at least 75% of marks, his/her case is to be referred to the managing director.
- e.** At (c) , but has secured more than 85% marks in B.C.A, his/her case is to be referred to the chief Executive officer.

Keith completed B.C.A and M.C.A with 76% and 72% marks respectively. He has completed 27 years of age in the year 2019. He has secured 65% marks in the written test and 78% in the interview . What decision would be taken in his case?

A. His case is to be referred in the managing director

B. He would be selected

C. He would not be selected

D. His case is to be referred to the chief executive officer.

Answer 20: b) He would be selected because all the conditions are full-filled.

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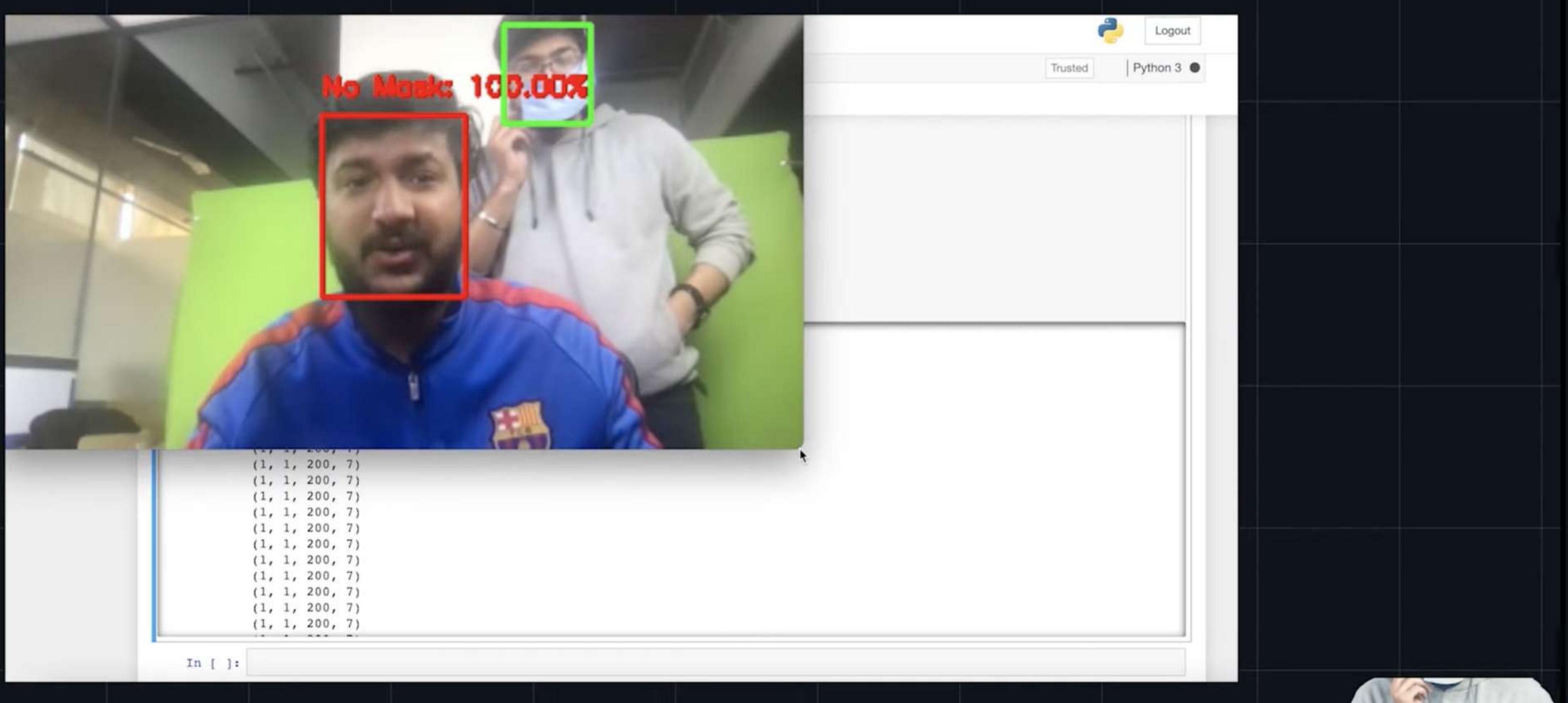
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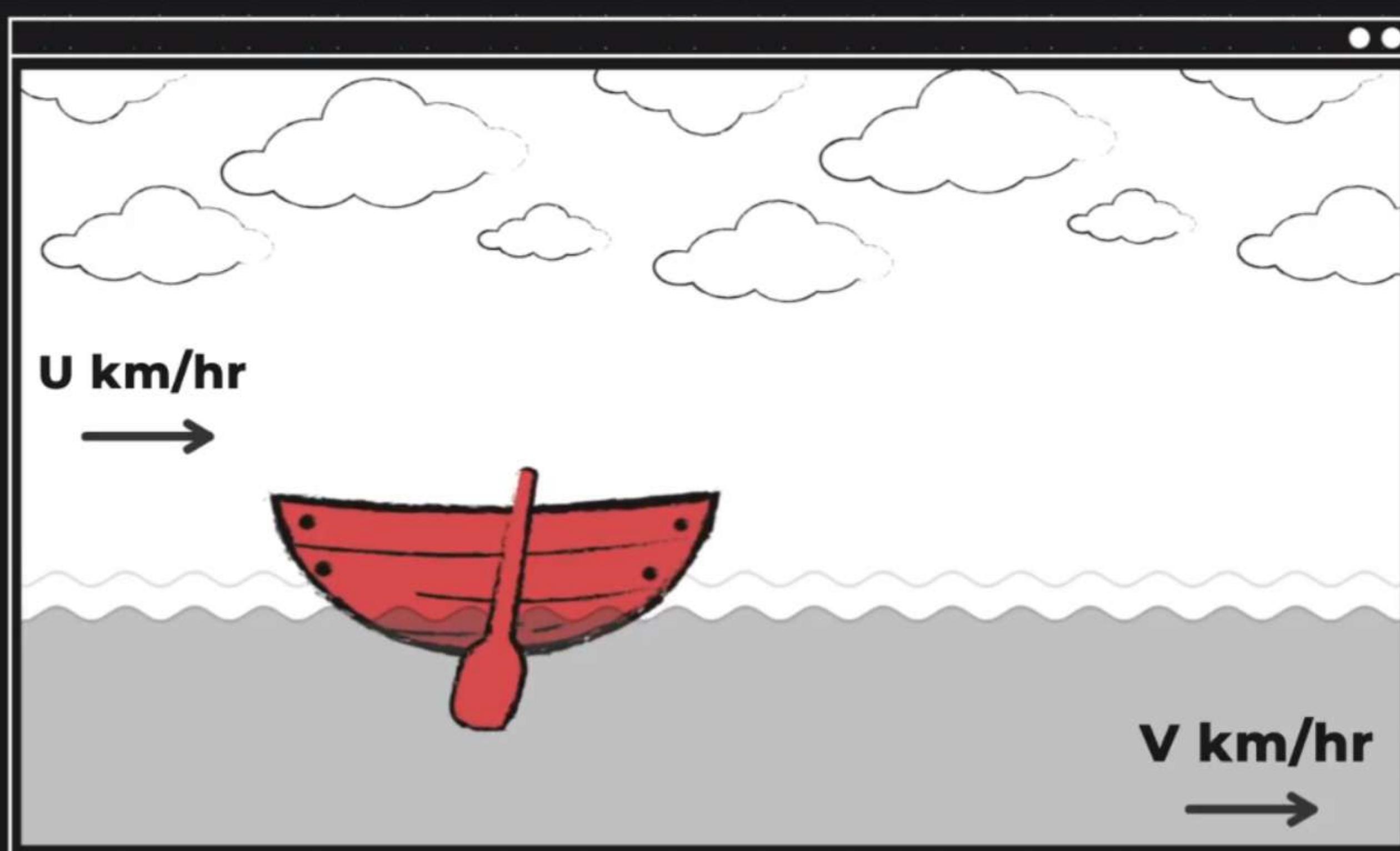
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QUANTITATIVE APTITUDE (ADVANCED)

Question 1: An express train is 150 metres long and it is running at a speed of 90 km per hour. It crosses a mail train, which is running on a parallel track in the opposite direction, in 6.3 seconds. When these two trains are travelling on parallel tracks in the same direction, with the same speeds as before, they take 50.4 seconds to cross each other. The length, in meters, of the mail train is:
Enter your answer ONLY as NUMERAL in the box

This is a FUB Question you have enter values in this box

Answer: 130

Question 2: I asked my daughter how many students there are in her class. She said it is equal to the sum of 3 consecutive natural numbers. Moreover, it is also equal to the sum of the two natural numbers following those 3 consecutive natural numbers. What is the answer to my question?

Enter your answer ONLY as NUMERAL in the box.

This is a FUB Question you have enter values in this box

Answer: 15

Question 3: You want to pick two distinct numbers from the set {1, 2, 3, 4}.

In how many ways can you do this so that the product is even?
Enter your answer ONLY as NUMERAL in the box.

This is a FUB Question you have enter values in this box

Answer: 5

Question 4: I was supposed to complete a task in 12 h, but I took more time and the error was 6.25%. How much time did I take to complete the task?

- A. 12 h 15 min
- B. 12 h 30 min
- C. 12 h 20 min
- D. 12 h 45 min

Answer: D
12 h 45 min

Question 28: The values of

$$\frac{(6.43)^2 + 33.3074 + (5.18)^2}{6.43 \times 41.3449 - 10.36 \times 2.59 \times 5.18}$$

lies between

- A. 0.1 and 0.5
- B. 0.5 and 1
- C. 1 and 1.2
- D. 1.2 and 1.5

Answer: Option B

Question 5: A's capital exceeds B's capital by 20.5%. B invests his capital at 20% p.a for 3 years, interest compounded annually. At what rate percentage p.a

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QUANTITATIVE APTITUDE (ADVANCED)

must A invest his capital at simple interest so that at the end of 3 years, both get the same amount(in INR)? (Correct to one decimal place)

- A. 13.8
- B. 14.2
- C. 14.5
- D. 15.2

Answer: Option C

Question 4: A shop sells chocolates. It used to sell chocolates for Rs.2 each, but there were no sales at that price. When he reduced the price, all chocolates sold out enabling the shopkeeper to realize Rs. 164.90 from the chocolates alone. If the new price was not less than half the original price quoted. How many chocolates were sold (at the reduced price)?

- A. 39
- B. 97
- C. 37
- D. 71

Answer: Option B

Explanation:

Let the number of chocolates be x and price per chocolate be y
New price of the chocolates is not less than half of the quoted price, which means our answer should be between 1 and 2
Quoted price = Rs. 2.

New price will be not less than Rs. 1.

$x \cdot y = \text{Between } 1 \text{ and } 2$. The options given are the values of X . Let's substitute and find which option gives y value between 1 and 2,

Options A: $y = 164.9/39 = \text{Rs. } 4.22$

Options B: $y = 164.9/97 = \text{Rs. } 1.7$

Option C: $y = 164.9/37 = \text{Rs. } 4.45$

Option D: $y = 164.9/71 = \text{Rs. } 2.32$

In all the options except 2, the selling price is more than Rs. 2. It should be less than Rs. 2.

So, answer is option B.

Question 5: 96 men were engaged for a project of constructing a railway track of the length of 18 km in four weeks. After one week it was observed that the work of 4 km was completed. How many additional men should be engaged for timely completion of the project?

- A. 16
- B. 14
- C. 15
- D. 12

Answer:

4 km was completed by 96 men
Remaining work is 14km in three weeks so per week $14/3$

For 4km _____ 96men

For $14/3$ km _____ ?

$= 14/3 \times 96 \times 1/4 = 112$ so additionally 16 men needed

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QUANTITATIVE APTITUDE (ADVANCED)

Question 6: What is the mean proportional (MP) between the MPs of

$$\left(\frac{2}{7} \text{ & } \frac{32}{343}\right) \text{ and } \left(2 \text{ & } \frac{1}{5000}\right)$$

- A. $\frac{2}{175}$
- B. $\frac{3}{35}$
- C. $\frac{2}{35}$
- D. $\frac{4}{35}$

Answer:

$$\begin{aligned} &\sqrt{\sqrt{\frac{2}{7} \times \frac{32}{343}} \times \sqrt{2 \times \frac{1}{5000}}} \\ &4\sqrt{\frac{2}{7} \times \frac{22}{343} \times \frac{2}{5000}} \\ &4\sqrt{\frac{2^4}{7^4} \times \frac{8}{5000}} \\ &4\sqrt{\frac{2^4}{7^4} \times \frac{1}{5^4}} \\ &\frac{2}{35} \end{aligned}$$

Question 7: Which one among the following has the least value?

- A. $\sqrt{77} - \sqrt{76}$
- B. $\sqrt{75} - \sqrt{74}$
- C. $\sqrt{76} - \sqrt{75}$
- D. $\sqrt{74} - \sqrt{73}$

Answer: Squaring all we get the equation in the form of

$$(a^2 - b^2) = (a + b)(a - b)$$

Applying formula we get
 $(77+76)(77-76)=(153)(1)=153$

$$(75+74)(75-74)=(149)(1)=149$$

$$(76+75)(76-75)=(151)(1)=151$$

$$(74+73)(74-73)=(147)(1)=147$$

Hence 147 is least among all

Hence the required answer will be

Question 8: The variation in temperatures throughout the day in a desert town was studied on the basis of the record of minimum and maximum temperatures which were 8 and 36 degrees centigrade respectively. What was the standard deviation in degree centigrade?

- A. 12
- B. 22
- C. 14
- D. 28

Answer: min \rightarrow 8 degrees

Max \rightarrow 36 degrees

$$\frac{8 + 36}{2} = 22$$

$$S.D = \sqrt{\frac{\sum(x_i - \mu)}{N}} = \sqrt{\frac{(8 - 22)^2 + (36 - 22)^2}{2}}$$

$$\sqrt{\frac{(14)^2 + (14)^2}{2}} = \sqrt{\frac{2 \times (14)^2}{2}} = 14$$

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QUANTITATIVE APTITUDE (ADVANCED)

Question 9: A sum invested on simple interest grows to Rs 22500/- and Rs 25500/- is seven and nine years respectively. What is the rate percentage of the interest ?

- A. 7.5
- B. 9.6
- C. 12.5
- D. 13.5

=> list price = 128
25% discount on M.P = 25% of 128 = 32
=> 128 - 32 = 96 = S.P
C.P = 100 => SP = 96 => 4% loss

Answer 9: Total Interest of two years
= 25500-22500=3000
Interest of one year= $3000/2 = 1500$
Total Interest = $9 * 1500 = 13500$
Principle = $25500 - 13500 = 12000$
 $R = I * 100/P * t$
= $13500 * 100/1200 * 9 = 12.5$

Question 10: An item was sold at a profit of 12% after giving a discount of 12.5% on the list price. What would be the gain or loss percentage if a discount of 25% is given on the list price ?

- A. 2.5% gain
- B. 2.5% loss
- C. 4% loss
- D. 4% gain

Answer 10:
Cp —————> 100%
Sp —————> 112% (12% profit)
But Sp is 12.5% of M.P => 12.5% discount
=> 87.5% of M.P = 112

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Example

Input

1
4 5
5 7
9 10
2 3
20 30

5] Waiting time is

6
7
35
1

Output

0
0
2
-1
1

[2,3) [4,5) [5,7) [9,10) [20,30)

We can apply merge sort here that will take $n \log n$ time



A part of the code that will help you while coding will be shown at the end of this video

Draw your number here



CNN Max Pooling
in ML



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REASONING ABILITY (ADVANCED)

Question 1: There are five rods K,L,M,N and O. The weight of L is equal to the weight of K and M taken together. The weight of O is K and N taken together. The weight of M is twice the weight of K. The weight of N is the weight of M. If the weight of N is 90 kg. What will be the weight of O?

- A:** 135 kg
- B:** 60 kg
- C:** 120 kg
- D:** 90 kg

Answer 1: Weight of N = 90 Kg

Weight of N = M = 90 Kg

Weight of M = 2K

90 = 2K

K = 45 Kg (weight of K)

Weight of O = K + N = 90 + 45 = 135 Kg

Question 2: Given below is a question followed by two statements, I and II, each containing some information. Decide which of the statements are sufficient to answer the question.

Five friends A, B, C, D, E are sitting in a line facing north. Who is sitting exactly in the middle?

I - C is sitting between A and B. E is at the fourth place to the left of B.

II - E is sitting between A and B. E is at the fourth place to the left of B.

- A.** Statement I alone is sufficient.
- B.** Statement II alone is sufficient.
- C.** The combination of both the statements I and II are not sufficient.
- D.** The combination of both the statement I and II are necessary.

Answer 2: Only Statement I is alone to answer the question

Question 3: Two statements are given followed by three conclusions numbered I, II and III. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.

Statements:

- 1. All animals are plants.
- 2. All plants are shrubs.

Conclusions:

- 1. Some shrubs are plants
- 2. Some animals are not shrubs
- 3. All animals are shrubs

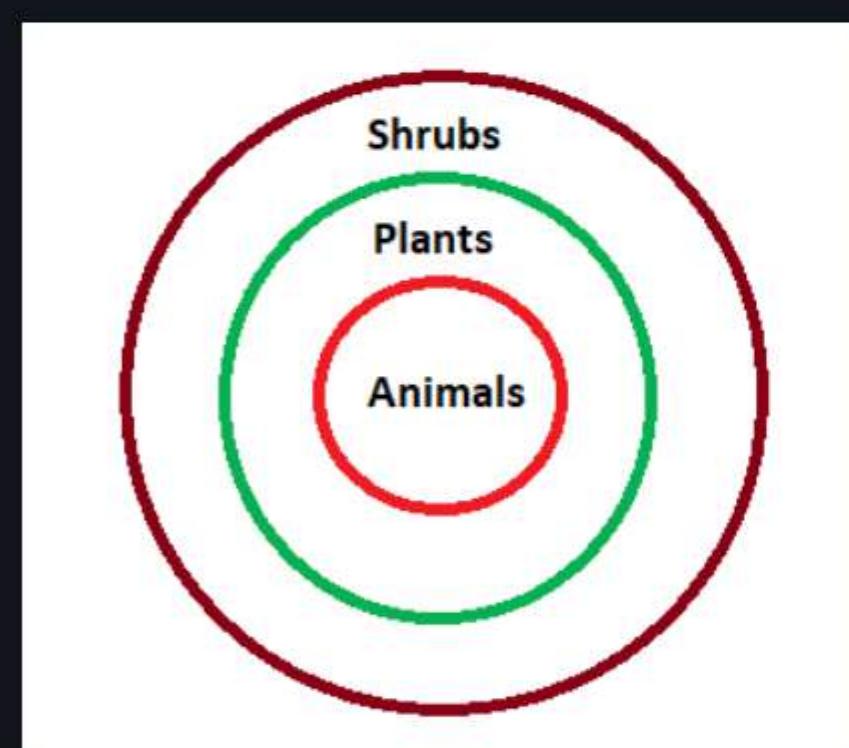
A. None of the conclusions follow.

B. Only conclusion I and III follow

C. Only conclusion I and II follow

D. Only conclusion II and III follow. (not given)

Answer 3:



Only Conclusion I and II follows

Question 4 : A statement is followed by two assumptions numbered I and II. Consider the statement and decide which of the given assumption(s) is/are implicit in the statement.

Statement:

The sale of LED televisions has increased by 20% in this financial year.

Assumptions:

- 1. There was hardly any sale of LED televisions in the previous years.
- 2. LED televisions have been introduced this year.

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REASONING ABILITY (ADVANCED)

Options-

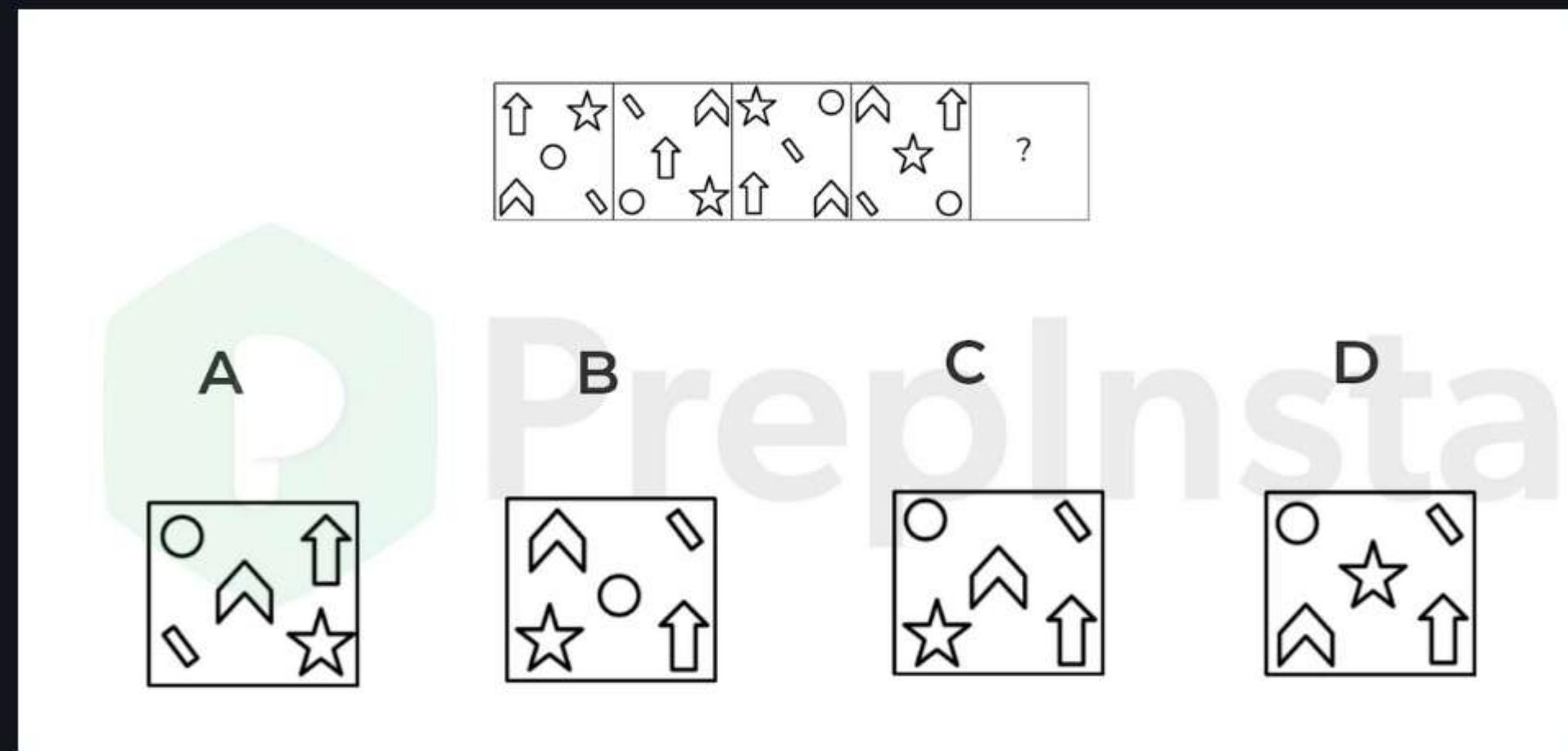
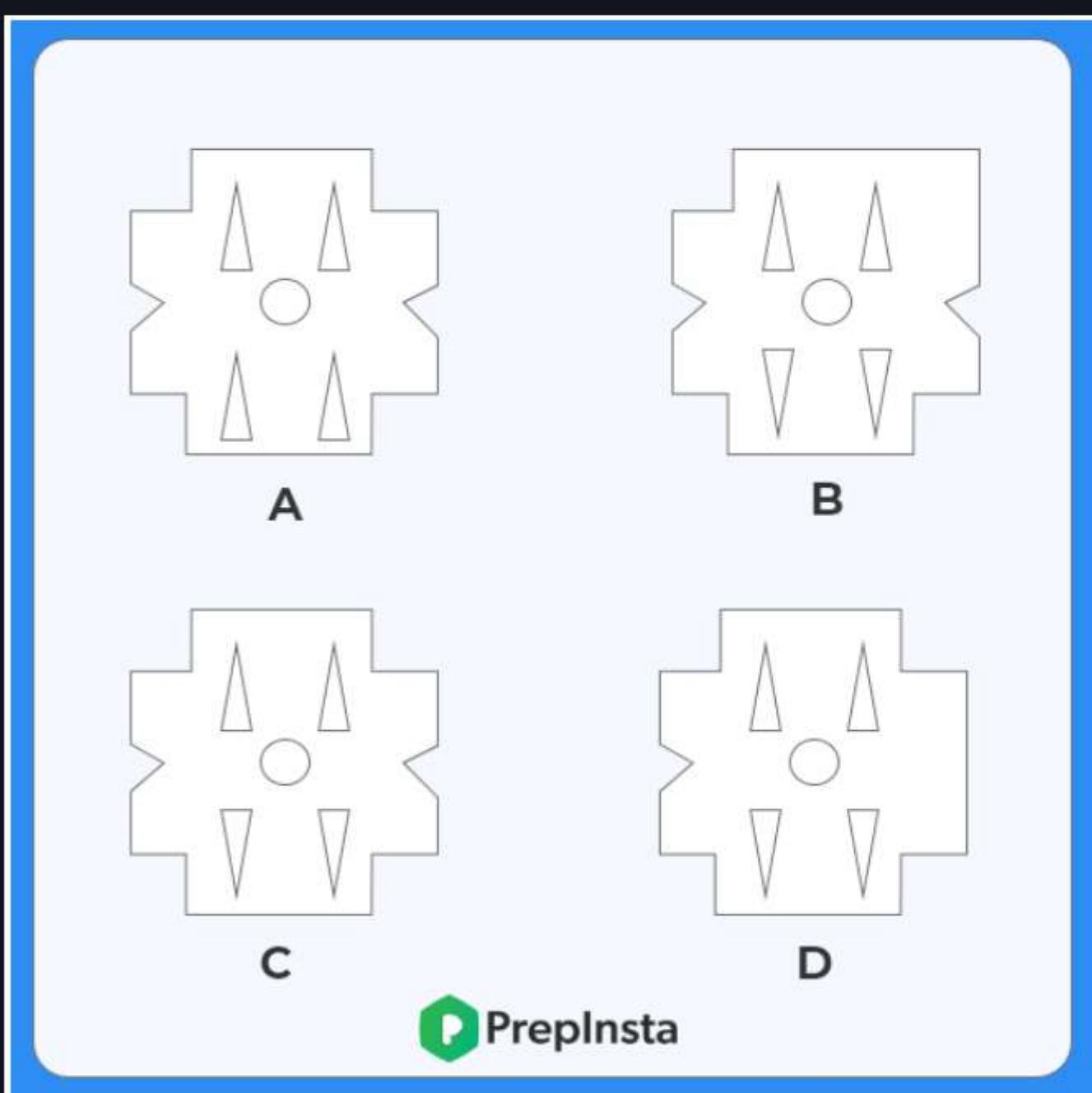
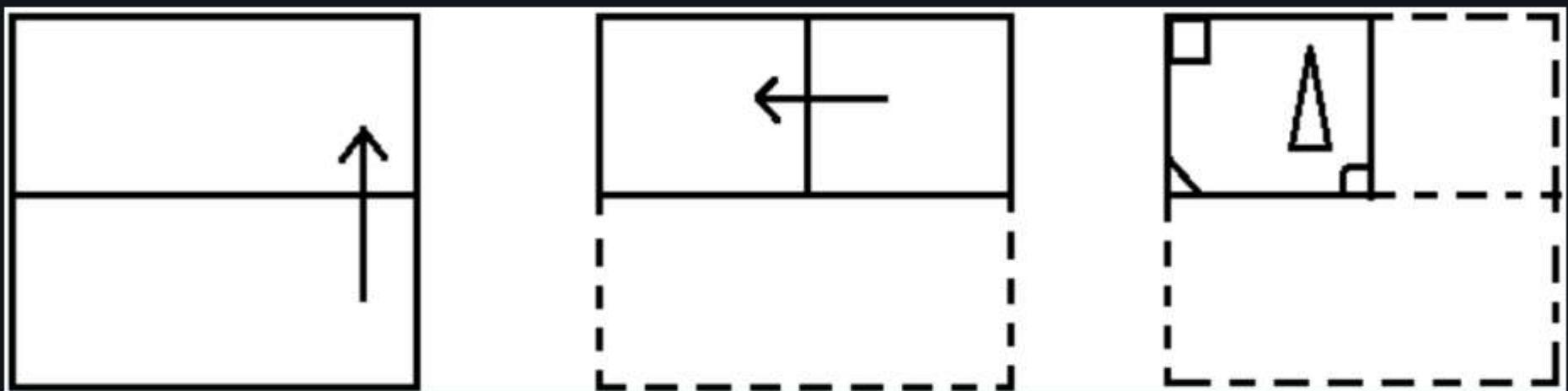
- A. Neither I nor II is implicit
- B. Both I and II are implicit
- C. Only II is implicit
- D. Only I is implicit

Answer 4: Neither I nor II is implicit

- A. A
- B. B
- C. C
- D. D

Answer: Option D

Question 7. Select the figure that will replace the question mark in the following figure series.



Answer: Option C

Question 8. In a certain code, $A \% B$ means 'A is the brother of B', $A \& B$ means 'A is the mother of B', $A @ B$ means 'A is the daughter of B', $A \$ B$ means 'A is the father of B' and $A \# B$ means 'A is the sister of B'.

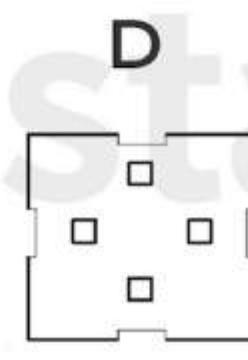
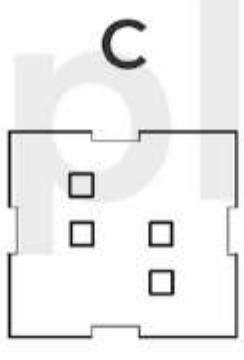
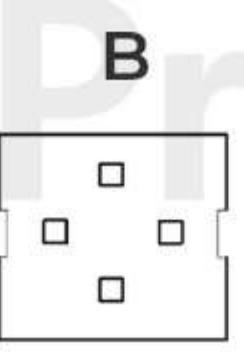
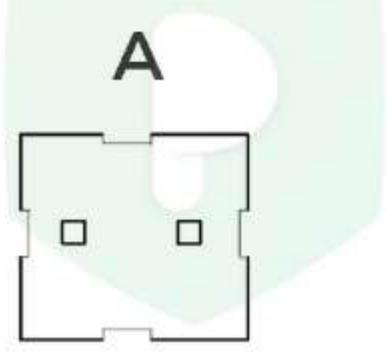
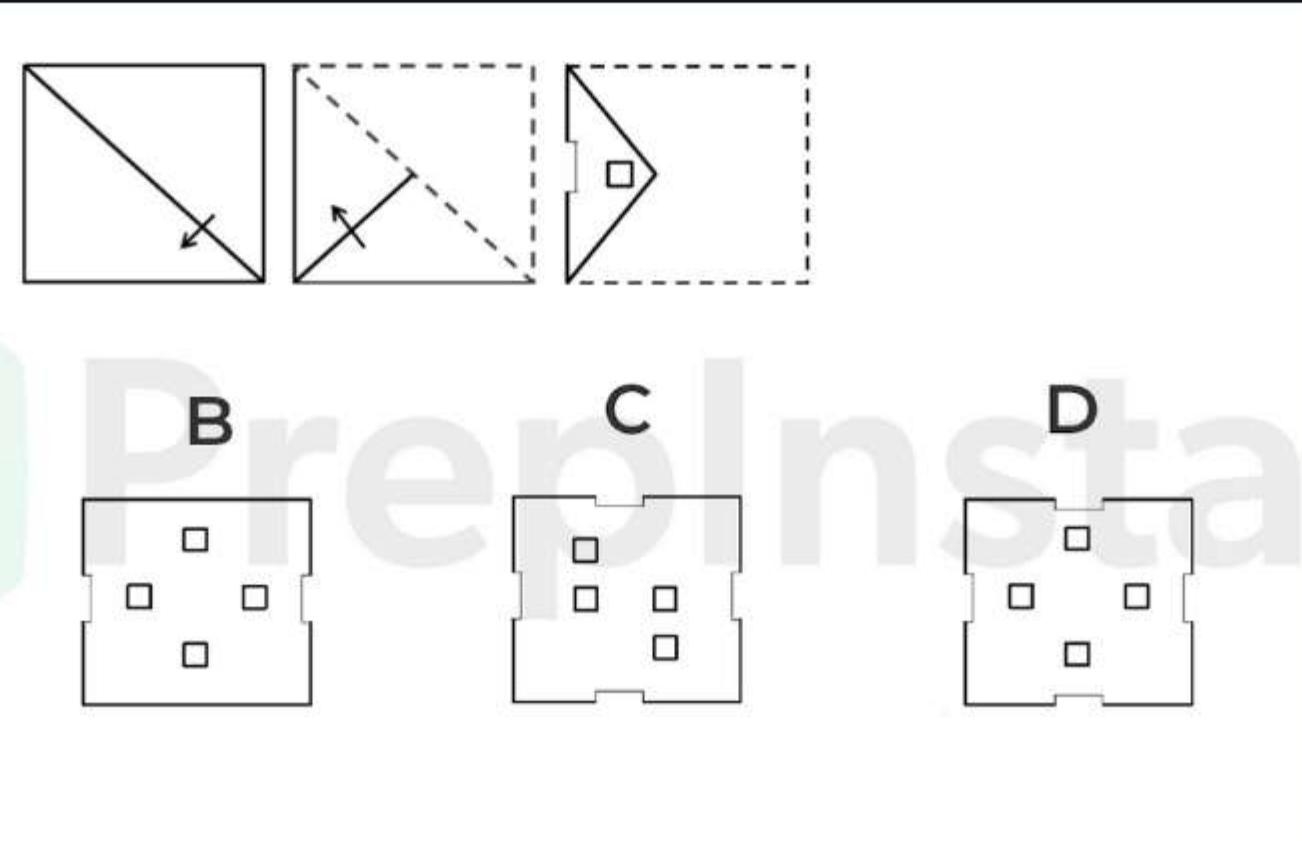
If $K \$ Z \% U \& H \# N @ T$, how is T related to U?

- A. Sister
- B. Husband
- C. Wife
- D. Brother

Answer: Option B

Question 9. Choose the best option.

Statement: Air quality has been polluted due to the increasing number of two-wheelers and four-wheelers.



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REASONING ABILITY (ADVANCED)

Courses of action:

1. There should be a complete ban on the sale of two-wheelers at least for the next 5 years.
2. Monitoring should take place to ensure that the vehicle's owners get their vehicles checked and certified for pollution-control.
3. Four wheelers cause more pollution, hence four-wheelers alone can be banned from running on the roads.

- A. None of the options follow
- B. Only II follows
- C. Only III follows
- D. Only I follows

Answer: Option B

Question 10: Which is the wrong term in the following series ?

axc,cve,fsh,jpm,oyq,udw

- A. Udw
- B. Ojq
- C. Jpm
- D. fsh

Solution 10:

AXC = 1 letter gap between 1st and 3rd letter
CVE = 1 letter gap between 1st and 3rd letter
FSH = 1 letter gap between 1st and 3rd letter
OYQ = 1 letter gap between 1st and 3rd letter
UDW = 1 letter gap between 1st and 3rd letter
JPM= no pattern like above words.
Hence JPM is the wrong term in the series.

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Question 1:

Auction Number

Description

Input

The input has three lines. The first line contains an integer denoting the number of districts in the state. The second line contains two space-separated characters denoting the range of letters that can be used for the third part. For example, if the input says B F, any of the letters B, C, D, E or F may be used in any combination for the third part. The third line contains space-separated integers denoting the range of digits that can be used in the fourth part. For example, if the line contains 1 4, any of the digits 1, 2, 3 or 4 may be used in any order for the last part (repetitions are allowed, but no special numbers may be counted). Output Print the total number of vehicles that can be registered in the state with non-special numbers.

Time Limit 1 Explanation Example 1 Input 1 A B 0 1 Output 24 Explanation Here, only one district is present. Hence, number plate will start from ST 01 AA 0000, ST 01 AA 0001, etc. However, we need to exclude auctionable numbers. After doing so, the overall count of non-special vehicle registration numbers remains 24. For example, ST 01 AA 0011, ST 01 ST 0110 ... so on.

Example 2 Input 2 A C 1 2 Output 108 Explanation Here, two districts are present. Number plate can start from ST 01 or ST 02. Hence, number plate will start from ST 01 AA 1111, ST 01 AA 1112, etc. However, we need to exclude auctionable numbers. After doing so, the overall count of non-special vehicle registration numbers remains 108. For example, ST 02 AC 2121, ST 02 BC 2112, ST 02 AA 1122... so on.

Constraints

1 <= Number of districts < 100

A <= Range of alphabets <= Z

0 <= Range of digits <= 9

Solution in C++:

```
#include<bits/stdc++.h>
#define speed ios_base::sync_with_stdio(false); cin.tie(NULL);
#define booster cout.tie(NULL)
typedef long long int lld;
#define mod 1000000007
using namespace std;

int main()
{
    speed;
    int i;cin>>l;
    string a,b;cin>>a>>b;
    a=min(a,b);b=max(a,b);
    int n=b[0]-a[0]+1;
```

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```
int l,m;
cin>>l>>m;
l=min(l,m);m=max(l,m);
int o=m-l+1;
if(l==m)
{
    cout<<0;
    return 0;
}
//cout<<o<<" o"<<endl;
int ans=pow(o,4)- (4*pow(o,2))+ 3*o;
//cout<<ans<<" ans"<<endl;
ans=ans*l*pow(n,2);

cout<<ans;

return 0;
}
```

Question 2:

Constellation

Three characters { #, *, . } represents a constellation of stars and galaxies in space. Each galaxy is demarcated by # characters. There can be one or many stars in a given galaxy. Stars can only be in the shape of vowels { A, E, I, O, U }. A collection of * in the shape of the vowels is a star. A star is contained in a 3x3 block. Stars cannot be overlapping. The dot(.) character denotes empty space.

Given 3xN matrix comprising of { #, *, . } character, find the galaxy and stars within them.

Note: Please pay attention to how vowel A is denoted in a 3x3 block in the examples section below.

Constraints

3 <= N <= 10^5

Input

Input consists of a single integer N denoting the number of columns.

Output

The output contains vowels (stars) in order of their occurrence within the given galaxy. The galaxy itself is represented by the # character.

Example 1

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Input

18

```
*.*#***#***#***.*.  
*.*#*.#.*.#*****  
***#***#***#***.*
```

Output

U#O#I#EA

Explanation

As it can be seen that the stars make the image of the alphabets U, O, I, E, and A respectively.

Example 2

Input

12

```
*.*#.***#.*.  
*.*#..*.#***  
***#.***#*.*
```

Output

U#I#A

Explanation

As it can be seen that the stars make the image of the alphabet U, I, and A.

Possible solution:

Input:

12

```
*.*#.***#.*.  
*.*#..*.#***  
***#.***#*.*
```

Solution in Python:

```
n=int(input())  
co=[]  
for i in range(3):co.append(list(input().split()))  
l=0  
while l<n-2:  
    if co[0][l]=='#':  
        print("#",end="")
```

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```
I+=1  
continue  
if co[0][I]=='. and co[0][I+1]=='* and co[0][I+2]==':  
    if co[1][I]=='* and co[1][I+1]=='* and co[1][I+2]=='*:  
        if co[2][I]=='* and co[2][I+1]=='. and co[2][I+2]=='*:  
            print('A',end="")  
if co[0][I]=='* and co[0][I+1]=='* and co[0][I+2]=='*:  
    if co[1][I]=='* and co[1][I+1]=='* and co[1][I+2]=='*:  
        if co[2][I]=='* and co[2][I+1]=='* and co[2][I+2]=='*:  
            print('E',end="")  
I+=3  
continue  
elif co[1][I]=='. and co[1][I+1]=='* and co[1][I+2]==':  
    if co[2][I]=='* and co[2][I+1]=='* and co[2][I+2]=='*:  
        print('I',end="")  
I+=3  
continue  
elif co[1][I]=='* and co[1][I+1]=='. and co[1][I+2]=='*:  
    if co[2][I]=='* and co[2][I+1]=='* and co[2][I+2]=='*:  
        print('O',end="")  
I+=3  
continue  
if co[0][I]=='* and co[0][I+1]=='. and co[0][I+2]=='*:  
    if co[1][I]=='* and co[1][I+1]=='. and co[1][I+2]=='*:  
        if co[2][I]=='* and co[2][I+1]=='* and co[2][I+2]=='*:  
            print('U',end="")  
I+=3  
continue  
I+=1
```

Solution in C++:

```
#include<bits/stdc++.h>  
using namespace std;  
  
int main()  
{  
    int n;cin>>n;  
    char co[3][n];
```

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```
for(int i=0;i<3;i++)
{
    for(int j=0;j<n;j++)
        cin>>co[i][j];
}

for(int i=0;i<n-2;i++)
{
    if(co[0][i]=='#') {cout<<"#";continue;}
    if(co[0][i]=='. && co[0][i+1]=='*' && co[0][i+2]=='.')
    {
        if(co[1][i]=='*' && co[1][i+1]=='*' && co[1][i+2]=='*')
        if(co[2][i]=='*' and co[2][i+1]=='. and co[2][i+2]=='*')
            cout<<"A";i+=2;continue;
    }
    if(co[0][i]=='*' and co[0][i+1]=='*' and co[0][i+2]=='*')
    {
        if (co[1][i]=='*' and co[1][i+1]=='*' and co[1][i+2]=='*')
        {
            if (co[2][i]=='*' and co[2][i+1]=='*' and co[2][i+2]=='*')
                {cout<<"E";i+=2;continue;}
        }
        else if(co[1][i]=='. and co[1][i+1]=='*' and co[1][i+2]=='.')
        {
            if (co[2][i]=='*' and co[2][i+1]=='*' and co[2][i+2]=='*')
                {cout<<"I";i+=2;continue;}
        }
        else if(co[1][i]=='*' and co[1][i+1]=='. and co[1][i+2]=='*')
        {
            if(co[2][i]=='*' and co[2][i+1]=='*' and co[2][i+2]=='*')
                {cout<<"O";i+=2;continue;}
        }
    }
    if(co[0][i]=='*' and co[0][i+1]=='. and co[0][i+2]=='*')
    if(co[1][i]=='*' and co[1][i+1]=='. and co[1][i+2]=='*')
    if(co[2][i]=='*' and co[2][i+1]=='*' and co[2][i+2]=='*')
        {cout<<"U";i+=2;continue;}
    }
}
```

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Question 3:

Houses Problem

There are n houses build in a line, each of which contains some value in it.

A thief is going to steal the maximal value of these houses, but he can't steal in two adjacent houses because the owner of the stolen houses will tell his two neighbours left and right side.

What is the maximum stolen value?

Sample Output:

Input: val[] = {6, 7, 1, 3, 8, 2, 5}

Output: 20

Solution in C++:

```
#include <iostream>
using namespace std;
int maxLoot(int *hval, int n);
int main()
{
    int hval[] = {6, 7, 1, 3, 8, 2, 4, 12};
    int n = sizeof(hval)/sizeof(hval[0]);
    cout << "Maximum loot possible : "
        << maxLoot(hval, n);
    return 0;
}
// calculate the maximum stolen value
int maxLoot(int *hval, int n)
{
    if (n == 0)
        return 0;
    if (n == 1)
        return hval[0];
    if (n == 2)
        return max(hval[0], hval[1]);

    // dp[i] represent the maximum value stolen
    // so far after reaching house i.
    int dp[n];
    dp[0] = hval[0];
    dp[1] = max(hval[0], hval[1]);
    for (int i = 2; i < n; i++)
        dp[i] = max(dp[i-2] + hval[i], dp[i-1]);
```

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```
// Initialize the dp[0] and dp[1]
dp[0] = hval[0];
dp[1] = max(hval[0], hval[1]);

// Fill remaining positions
for (int i = 2; i<n; i++)
    dp[i] = max(hval[i]+dp[i-2], dp[i-1]);

return dp[n-1];
}
```

Solution in Python Program:

```
num = list(map(int, input().split()))
sum = num[0]
for i in range(0, len(num)//2):
    sum = sum + int(num[i])
print(sum)
```

Java Program:

```
import java.util.Scanner;
public class Main {

    static int prep(int hval[],int n) {
        if(n==0)
            return 0;
        if(n==1)
            return hval[0];
        if(n==2)
            return Math.max(hval[0],hval[1]);

        int[] dp = new int[n];
        dp[0]=hval[0];
        dp[1]=Math.max(hval[0],hval[1]);
```

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```
for (int i = 2; i < n; i++) {  
    dp[i]=Math.max(hval[i]+dp[i-2],dp[i-1]);  
}  
return dp[n-1];  
  
}  
  
public static void main(String[] args) {  
    Scanner sc = new Scanner(System.in);  
  
    int hval[] = {3,2,4,6,7,1};  
    int n=hval.length;  
    System.out.println("Max loot value :" + prep(hval,n));  
}  
  
}
```

Question 4: Maneuvering a cave:

The task is to count all the possible paths from top left to bottom right of a mXn matrix with the constraints that from each cell you can either move only to right or down.

Input:

First line consists of T test cases. First line of every test case consists of N and M, denoting the number of rows and number of columns respectively.

Output:

Single line output i.e count of all the possible paths from top left to bottom right of a mXn matrix..

Constraints:

1<=T<=100

1<=N<=100

1<=M<=100

Solution in C++:

```
#include <iostream>  
using namespace std;  
int calc(int x, int y) ;
```

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```
int main()
{
    int a,b,n;
    cout<<("Enter the number of test cases");
    cin>>n;
    while(n!=0)
    {
        cout<<("Enter the number of rows of the matrix : ");
        cin>>a;
        cout<<("Enter the number of columns of the matrix : ");
        cin>>b;
        cout << "Number of ways - "<< calc(a,b)<<"\n";
        n--;
    }
    return 0;
}

int calc(int x, int y)
{
    if (x == 1 || y == 1)// If there is a singular matrix
    {
        return 1;
    }
    else
    {
        return calc(x - 1, y) + calc(x, y - 1);
    }
}
```

Solution in C:

```
#include<stdio.h>
int calc(int x, int y);

int main()
{
```

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```
int a,b;  
printf("Enter the number of rows of the matrix : ");  
scanf("%d",&a);  
printf("Enter the number of columns of the matrix : ");  
scanf("%d",&b);  
printf("%d", calc(a,b));  
return 0;  
}  
int calc(int x, int y)  
{  
if (x == 1 || y == 1)// If there is a singular matrix  
{  
    return 1;  
}  
else  
{  
    return calc(x - 1, y) + calc(x, y - 1);  
}  
}
```

Solution in java:

```
import java.util.Scanner;  
public class Main {  
  
    static int path(int m , int n) {  
        if(m==1 || n==1)  
            return 1;  
  
        return path(m-1,n)+path(m,n-1);  
    }  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int a,b,c;  
        System.out.println("Enter test cases : ");  
        c=sc.nextInt();  
        while(c-- > 0)
```

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```
{  
    System.out.println("Enter number of rows and columns : ");  
    a=sc.nextInt();  
    b=sc.nextInt();  
  
    System.out.println(path(a,b));  
  
}  
  
}
```

Solution in Python:

```
a = int(input())  
b = int(input())  
  
def calculate(a, b):  
    if a == 1 or b == 1:  
        return 1  
    else:  
        return calculate(a - 1, b) + calculate(a, b - 1)  
  
print(calculate(a, b))
```

Question 5:

Coin Distribution Problem

Find the minimum number of coins required to form any value between 1 to N, both inclusive. Cumulative value of coins should not exceed N. Coin denominations are 1 Rupee, 2 Rupee and 5 Rupee. Let's understand the problem using the following example. Consider the value of N is 13, then the minimum number of coins required to formulate any value between 1 and 13, is 6. One 5 Rupee, three 2 Rupee and two 1 Rupee coins are required to realize any value between 1 and 13. Hence this is the answer. However, if one takes two 5 Rupee coins, one 2 rupee coin and two 1 rupee coin, then too all values between 1 and 13 are achieved. But since the cumulative value of all coins equals 14, i.e., exceeds 13, this is not the answer.

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Input Format:

A single integer value.

Output Format:

Four space separated integer values.

1st – Total number of coins.

2nd – number of 5 Rupee coins.

3rd – number of 2 Rupee coins.

4th – number of 1 Rupee coins.

Constraints:

$0 < n < 1000$

Refer the sample output for formatting

Sample Input

13

Sample Output

6 1 3 2

Explanation:

The minimum number of coins required is 6 with in it:

minimum number of 5 Rupee coins = 1

minimum number of 2 Rupee coins = 3

minimum number of 1 Rupee coins = 2

Using these coins, we can form any value with in the given value and itself, like below:

Here the given value is 13

For 1 = one 1 Rupee coin

For 2 = one 2 Rupee coin

For 3 = one 1 Rupee coin and one 2 Rupee coins

For 4 = two 2 Rupee coins

For 5 = one 5 Rupee coin

For 6 = one 5 Rupee and one 1 Rupee coins

For 7 = one 5 Rupee and one 2 Rupee coins

For 8 = one 5 Rupee, one 2 Rupee and one 1 Rupee coins

For 9 = one 5 Rupee and two 2 Rupee coins

For 10 = one 5 Rupee, two 2 Rupee and one 1 Rupee coins

For 11 = one 5 Rupee, two 2 Rupee and two 1 Rupee coins

For 12 = one 5 Rupee, three 2 Rupee and one 1 Rupee coins

For 13 = one 5 Rupee, three 2 Rupee and two 1 Rupee coins

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SOLUTION IN C++:

```
#include<bits/stdc++.h>
using namespace std;
int main()
{
    int n,total,five,two,one;
    cin>>n;
    if(!n)
    {cout<<0<<" "<<0<<" "<<0<<" "<<0<<endl;
    }
    int t=n/5;
    int tr=n%5;
    if(n>3 && tr<4)
    {
        tr+=5;
        t-=1;
    }
    int dp[10][3]={{0,0,0},{1,0,0},{2,0,0},{1,1,0},{2,1,0},{1,2,0},{2,2,0},{1,3,0},{2,3,0},{2,1,1}};
    total=t+ dp[tr][0]+dp[tr][1];
    cout<<total<<" "<<t<<" "<<dp[tr][1]<<" "<<dp[tr][0]<<endl;
}
```

SOLUTION IN PYTHON:

```
number = int(input())
if(number ==0):
    print(0,0,0,0)
else:
    five = int((number-4)/5)
    if((number-5*five) % 2) == 0:
        one=2
    else:
        one=1
    two=(number-5*five-one)//2
    print(one+two+five,five,two,one)
```

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SOLUTION IN JAVA:

```
import java.util.*;
public class Main
{
    public static void main(String[] args) {
        System.out.println("Enter the Number");
        Scanner s = new Scanner(System.in);
        int number = s.nextInt();
        int one = 0,two = 0;
        int five = (number-4)/5;
        if(((number-5*five) % 2) == 0){
            one = 2;
        }
        else{
            one = 1;
        }
        two = (number-5*five-one)/2;
        System.out.println(one+two+five);
        System.out.println(five);
        System.out.println(two);
        System.out.println(one);

    }
}
```

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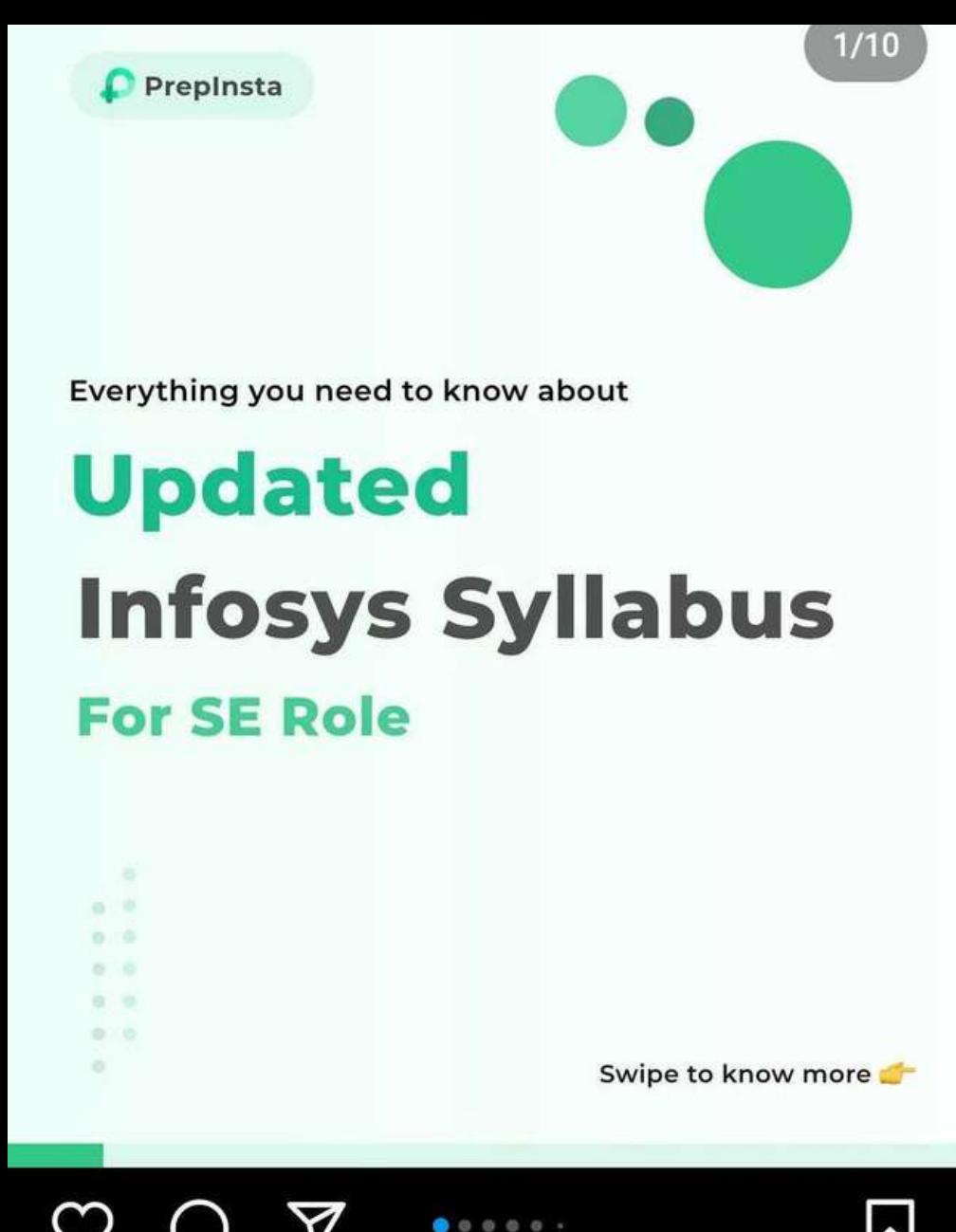
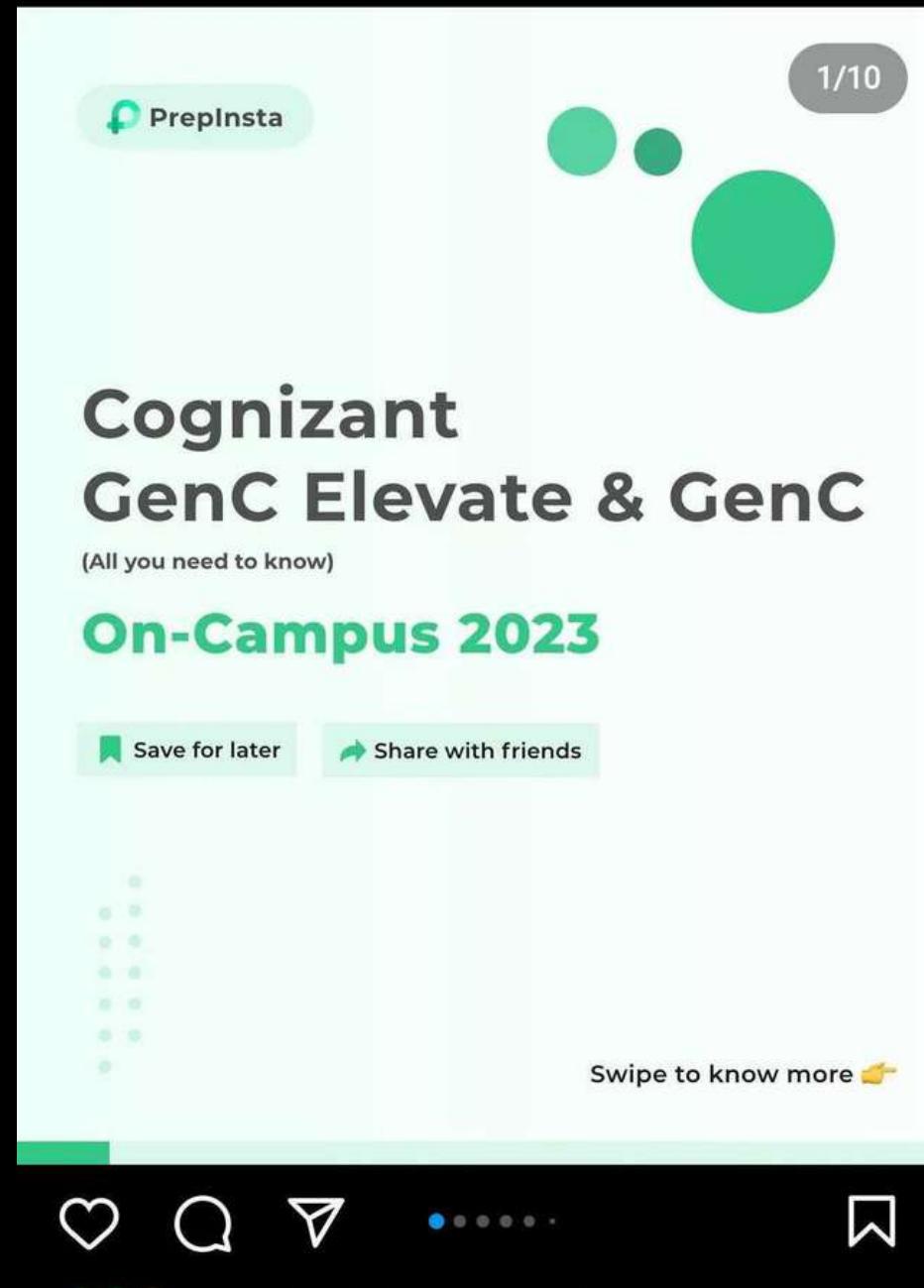
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