



CNSAT

Previous Years' Questions

Coding NSAT Exam Guidelines



Exam Protocol

- Arrive at least 15 minutes early (by 2:45 PM) for exam setup and proctoring checks.
- All three 3 sections are mandatory and include a sectional cutoff that determines passing eligibility
- The exam will be proctored. Unfair means will lead to permanent disqualification.
- For MCQ-type Questions, Positive marking will be (+4) for correct answers, while negative marking (-1) is applicable for incorrect ones.
- There is no negative marking in coding section.



Joining Details & Device Restrictions

- Use a laptop/PC with screen-sharing and microphone access
- **Dual-camera setup required:**
 - Primary camera (webcam) facing your face
 - Secondary camera (mobile/external) showing your workspace
- Mobile phones are only allowed as a secondary camera (not for taking the test)
- Calculators are prohibited; use pen and paper for rough work
- Access the test portal at: <https://www.newtonschool.co/codingnsat>
- Accept the calendar invite sent to you on test day as a reminder
- Maintain a stable internet connection to prevent interruptions during CNSAT
- Keep both cameras ON throughout the test
- **Position cameras properly:**
 - Primary camera: face clearly visible
 - Secondary camera: desk, hands, and screen visible
- Ensure the secondary camera is placed steadily (not handheld)



Preparation

- Visit [Coding NSAT homepage](#) to check compatibility before the exam.
- Use Google Chrome for optimal performance.
- Bring a pen and paper for rough work during the exam.
- Attempt a mock test to understand the exam pattern, for practice, and to confirm your PC compatibility.



Environment Considerations

- Sit in a quiet environment with no background noise to minimize distractions and avoid disqualification.
- Ensure the lighting in the room is appropriate for clear visibility and comfortable reading and writing.

Coding NSAT Sections

Sr. No.	Section Name		No. of Questions
1.	Learnability	Basic Mathematics	3
		Arithmetics	5
		Arithmetics & Logical Comprehension	2
2.	Pseudocoding	Pseudocode to be answered	5
		Pseudocode correction & Code Comprehension	5
3.	Coding	Basic Functions Building	2
		Loops, Basic Strings & Arrays	2
		Algorithmic Building	2

Section 1 - Learnability

Question ID	1
Question Type	MCQ-SC
Difficulty Level	Easy
Topic: Subtopic (concept)	Learnability (Partnership)
Question Details/Question Stem	<p>Three engineers — Riya, Kabir, and Anaya — start a construction project together.</p> <p>Riya invests ₹1,20,000 and remains in the business for the entire 18-month duration.</p> <p>Kabir joins 6 months after Riya and invests ₹1,50,000. After working for 6 months, he increases his investment to ₹2,00,000 for the remaining time.</p> <p>Anaya joins 9 months after Riya with ₹2,40,000 and stays until the end of the project.</p> <p>At the end of the 18 months, what is the ratio of the effective investments of Riya, Kabir, and Anaya?</p>
Choices/Choice A	34:35:32
Choices/Choice B	32:33:35
Choices/Choice C	36:35:36
Choices/Choice D	35:24:36
Solution	C
Explanation	<p>Riya</p> <p>Invested ₹1,20,000 for full 18 months</p> <p>Capital × Time = ₹1,20,000 × 18 = ₹21,60,000</p> <p>Kabir</p> <p>Joins after 6 months → works for 12 months</p> <p>For first 6 months, invests ₹1,50,000</p> <p>Capital × Time = ₹1,50,000 × 6 = ₹9,00,000</p> <p>Then increases capital to ₹2,00,000 for remaining 6 months</p>

	<p>Capital \times Time = ₹2,00,000 \times 6 = ₹12,00,000</p> <p>Total effective investment = ₹9,00,000 + ₹12,00,000 = ₹21,00,000</p> <p>Anaya</p> <p>Joins after 9 months \rightarrow works for 9 months</p> <p>Invests ₹2,40,000</p> <p>Capital \times Time = ₹2,40,000 \times 9 = ₹21,60,000</p> <p>Ratio of Effective Investments</p> <p>Riya: Kabir: Anaya = ₹21,60,000: ₹21,00,000: ₹21,60,000</p> <p>Let's simplify:</p> <p>Divide each term by 60,000: Riya: Kabir: Anaya = 36: 35: 36</p> <p>Hence, the correct option is C.</p>
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Question ID	2
Question Type	MCQ-SC
Difficulty Level	Easy
Topic: Subtopic (concept)	Learnability (Alligation and Mixtures)
Question Details/Question Stem	<p>A juice manufacturer has three types of orange juice concentrates:</p> <ul style="list-style-type: none"> • Juice A contains 70% pure juice • Juice B contains 50% pure juice • Juice C contains 20% pure juice <p>He wants to create 90 liters of a new juice blend that contains 47.5% pure juice by mixing Juice A and Juice C in equal quantities, and the rest from Juice B.</p> <p>How many liters of each juice should he use? How much pure juice is there in the final blend?</p>
Choices/Choice A	Juice A = 22.5 liters, Juice B = 45 liters, Juice C = 22.5 liters, Juice in pure blend = 42.75 liters

Choices/Choice B	Juice A = 20 liters, Juice B =50 liters, Juice C = 20 liters, Juice in pure blend=42.75 liters
Choices/Choice C	Juice A = 24.5 liters, Juice B =48 liters, Juice C = 21.5 liters, Juice in pure blend=43.5 liters
Choices/Choice D	Juice A = 22.5 liters, Juice B =45 liters, Juice C = 22.5 liters, Juice in pure blend=42 liters
Solution	A
Explanation	<p>To solve this problem, let's denote the volumes of the juices used in the blend as follows:</p> <p>Let x be the volume of Juice A (in liters).</p> <p>Let y be the volume of Juice B (in liters).</p> <p>Let z be the volume of Juice C (in liters).</p> <p>According to the problem, we have the following conditions:</p> <p>The total volume of the blend is 90 liters:</p> $x+y+z=90$ <p>The blend contains equal quantities of Juice A and Juice C:</p> $x=z$ <p>The blend contains 47.5% pure juice. The amount of pure juice in the blend can be expressed as follows:</p> <p>Pure juice from Juice A: $0.70x$</p> <p>Pure juice from Juice B: $0.50y$</p> <p>Pure juice from Juice C: $0.20z$</p> <p>The total pure juice in the blend should equal 0.475×90:</p> $1. \quad 0.70x+0.50y+0.20z=0.475 \times 90$ <p>Now, substituting z with x in the equations, we get:</p> <p>From $x+y+z=90$:</p> $x+y+x=90$ $\Rightarrow 2x+y=90 \text{ -----(1)}$

From the pure juice equation:

$$0.70x+0.50y+0.20x=42.75$$

Simplifying this gives:

$$0.90x+0.50y=42.75\text{-----}(2)$$

Now, we have a system of equations (1) and (2):

$$2x+y=90$$

$$0.90x+0.50y=42.75$$

From equation (1), we can express y:

$$y=90-2x$$

Substituting y into equation (2):

$$0.90x+0.50(90-2x)=42.75$$

Expanding this:

$$0.90x+45-x=42.75$$

Combining like terms:

$$-0.10x+45=42.75$$

Solving for x:

$$-0.10x = 42.75 - 45$$

$$-0.10x = -2.25$$

$$x = 22.5 \text{ liters}$$

Finding y and z

Now substituting x back to find y:

$$y=90-2(22.5)=90-45=45 \text{ liters}$$

And since $z=x$:

$$z=22.5 \text{ liters}$$

	<p>Summary of Volumes</p> <p>Juice A: 22.5 liters</p> <p>Juice B: 45 liters</p> <p>Juice C: 22.5 liters</p> <p>Total Pure Juice in the Blend</p> <p>Now, to find the total pure juice in the final blend:</p> $\begin{aligned} \text{Total pure juice} &= 0.70(22.5) + 0.50(45) + 0.20(22.5) \\ &= 15.75 + 22.5 + 4.5 \\ &= 42.75 \text{ liters} \end{aligned}$ <p>Juice A: 22.5 liters Juice B: 45 liters Juice C: 22.5 liters Total pure juice in the blend: 42.75 liters</p> <p>Hence, the correct option is A.</p>
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Question ID	3
Question Type	MCQ-SC
Difficulty Level	Easy
Topic: Subtopic (concept)	Learnability (Permutation)
Question Details/Question Stem	<p>A gardener wants to plant 7 different types of flowering plants in a straight row along a path. However:</p> <ul style="list-style-type: none"> • The rose and tulip must not be planted next to each other. • The sunflower must always be planted in the middle position. <p>How many different ways can the gardener arrange the 7 plants under these conditions?</p>
Choices/Choice A	450
Choices/Choice B	480
Choices/Choice C	240
Choices/Choice D	440

Solution	B
Explanation	<p>Fix the sunflower in the middle</p> <p>In 7 positions (1 to 7), the middle is position 4. So, sunflower is fixed at position 4.</p> <p>Now we're left with 6 plants to arrange: Rose, Tulip, and 4 others (let's call them A, B, C, D).</p> <p>Total arrangements without restriction</p> <p>We are arranging 6 remaining plants in the remaining 6 spots (excluding position 4).</p> <p>So, total unrestricted arrangements = $6! = 720$</p> <p>Think of Rose and Tulip as a block (they can appear in either order: RT or TR)</p> <p>So, we now have 5 blocks to arrange: (RT), A, B, C, D → Number of ways to arrange the 5 blocks = $5! = 120$ → Rose and Tulip can switch within the block = 2 ways</p> <p>So, total arrangements where Rose & Tulip are together = $5! \times 2 = 120 \times 2 = 240$</p> <p>Subtract that from total</p> <p>So, number of valid arrangements where:</p> <ul style="list-style-type: none"> • Sunflower is in the middle, and • Rose and Tulip are not next to each other: <p>$6! - (5! \times 2) = 720 - 240 = 480$</p> <p>Hence, the correct option is B.</p>

Question ID	4
Question Type	MCQ-SC
Difficulty Level	Medium
Topic: Subtopic (concept)	Learnability (Distance and Time)
Question Details/Question Stem	A 300 km railway track connects City A and City B.

	<p>A passenger train starts from City A at 8:00 AM, heading toward City B at a constant speed of 60 km/h.</p> <p>A freight train starts from City B at 9:00 AM, heading toward City A at 40 km/h.</p> <p>A track inspection vehicle starts from City A at 8:30 AM, traveling at 120 km/h.</p> <p>At what time and distance from City A will the passenger train and freight train meet?</p> <p>At what time and distance from City A will the passenger train and track inspection vehicle meet?</p> <p>At what time and distance from City A will the freight train and track inspection vehicle meet?</p>
Choices/Choice A	<p>Passenger Train and Freight Train: 11:24 AM, 204 km Passenger Train and Track Inspection Vehicle: 9:00 AM, 60 km Freight Train and Track Inspection Vehicle: 10:00 AM, 204 km</p>
Choices/Choice B	<p>Passenger Train and Freight Train: 11:20 AM, 204 km Passenger Train and Track Inspection Vehicle: 9:24 AM, 60 km Freight Train and Track Inspection Vehicle: 10:30 AM, 240 km</p>
Choices/Choice C	<p>Passenger Train and Freight Train: 11:24 AM, 204 km Passenger Train and Track Inspection Vehicle: 9:00 AM, 60 km Freight Train and Track Inspection Vehicle: 10:30 AM, 240 km</p>
Choices/Choice D	<p>Passenger Train and Freight Train: 9:00 AM, 60 km Passenger Train and Track Inspection Vehicle: 11:24 AM, 204 km Freight Train and Track Inspection Vehicle: 10:30 AM, 240 km</p>
Solution	C
Explanation	<p>Meeting of Passenger and Freight Trains</p> <p>Let's assume they meet t hours after 9:00 AM, because the freight train starts at 9:00 AM.</p> <p>So, by 9:00 AM:</p> <p>Passenger train has already travelled $1 \text{ hour} \times 60 \text{ km/h} = 60 \text{ km}$.</p> <p>Now they travel toward each other. Their relative speed:</p> <p>$60+40=100 \text{ km/h}$</p>

Distance left between them = $300 - 60 = 240$ km

So, time to meet:

$$t = \frac{240}{100} = 2.4 \text{ hours} = 2 \text{ hours } 24 \text{ minutes}$$

Time of meeting = 9:00 AM + 2h 24min = 11:24 AM

Distance from A = 60 (first hour) + $2.4 \times 60 = 204$ km

They meet at 11:24 AM, 204 km from City A

Meeting of track Inspection vehicle and Passenger Train

A track inspection vehicle starts from City A at 8:30 AM

Let after t hours of starting track Inspection vehicle and Passenger train meets

Passenger train has already been running for 30min \rightarrow 30 km from A

Relative speed = $120 - 60 = 60$ km/h (same directions)

If they meet after t hours from 8:30AM the distance needs to be covered = $30 + 60t$

In t hours the track inspection vehicle covers $120t$

$$120t = 30 + 60t$$

$$60t = 30$$

$$t = 0.5$$

$$t = 0.5 \text{ hours} = 30 \text{ min}$$

Time of meeting = 8:30 AM + 30 min = 9:00 AM

Distance from city A 60 KM

Meeting of track Inspection vehicle and Freight Train

Let's assume they meet t hours after 9:00 AM, because the freight train starts at 9:00 AM.

	<p>So, by 9:00 AM:</p> <p>Track inspection vehicle has already travelled 30min. So the distance travelled</p> $0.5 \text{ hour} \times 120 \text{ km/h} = 60 \text{ km.}$ <p>Now they travel toward each other. Their relative speed:</p> $120+40=160 \text{ km/h}$ <p>Distance left between them = $300 - 60 = 240 \text{ km}$</p> <p>So, time to meet:</p> $t = \frac{240}{160} = 1.5 \text{ hours} = 1 \text{ hour } 30 \text{ minutes}$ <p>Time of meeting = 9:00 AM + 1 h 30 min = 10:30 AM</p> <p>Distance from A = $120 \times 2 = 240 \text{ km}$</p> <p>They meet at 10:30 AM, 240 km from City A.</p> <p>Passenger Train and Freight Train: 11:24 AM, 204 km</p> <p>Passenger Train and Track Inspection Vehicle: 9:00 AM, 60 km</p> <p>Freight Train and Track Inspection Vehicle: 10:30 AM, 240 km</p> <p>Hence, the correct option is C.</p>
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Question ID	5
Question Type	MCQ-SC
Difficulty Level	Medium
Topic: Subtopic (concept)	Learnability (Pathfinding and Navigation)
Question Details/Question Stem	<p>A ranger is navigating a 4×4 square grid representing zones in a wildlife sanctuary. The ranger starts at the bottom-left corner (S) and wants to reach the top-right corner (E). He can move:</p> <ul style="list-style-type: none"> ● Up (↑) ● Right (→) ● Or Diagonally Up-Right

However, there are some blocked zones due to marshland, and a mandatory observation point he must visit.

Visual Grid Layout

	C1	C2	C3	C4
R4	.	.	+	E
R3	.	*	.	.
R2	+	.	.	.
R1	S	.	.	.

Legend:

S: Start point \rightarrow (R1, C1)

E: End point \rightarrow (R4, C4)

* Must visit: **(R3, C2)** = (3,2)

+ Blocked zones (cannot enter): (R2,1), (R4,3)

Conditions:

1. The ranger must visit the observation point at (3,2).
2. The ranger can make at most 2 diagonal moves in total.
3. The ranger cannot pass through blocked zones.
4. The ranger can move only up, right, or diagonally up-right.

Can the ranger reach the destination following all constraints? If yes, show the shortest possible path satisfying all the conditions?

Choices/Choice A

Yes, (1,1) \rightarrow (1,2) \rightarrow (2,2) \rightarrow (2,3) \rightarrow (3,3) \rightarrow (3,4) \rightarrow (4,4)

Choices/Choice B

Yes, (1,1) \rightarrow (1,2) \rightarrow (2,2) \rightarrow (3,2) \rightarrow (3,3) \rightarrow (3,4) \rightarrow (4,4)

Choices/Choice C

No

Choices/Choice D

Yes, (1,1) \rightarrow (1,2) \rightarrow (1,3) \rightarrow (1,4) \rightarrow (2,4) \rightarrow (3,4) \rightarrow (4,4)

Solution

B

Explanation

Phase 1: From Start (1,1) to Observation (3,2)

Option:

(1,1) \rightarrow Right \rightarrow (1,2)

(1,2) \rightarrow Up \rightarrow (2,2)

(2,2) \rightarrow Up \rightarrow (3,2) (*Observation point reached*)

	<p>No diagonals used yet.</p> <p>Phase 2: From (3,2) to End (4,4)</p> <p>Try this path:</p> <p>(3,2) → Diagonal → (4,3) ← BLOCKED So this is invalid.</p> <p>Try an alternate path avoiding (4,3):</p> <p>(3,2) → Right → (3,3)</p> <p>(3,3) → Up → (4,3) ← again BLOCKED</p> <p>Try:</p> <p>(3,2) → Right → (3,3)</p> <p>(3,3) → Right → (3,4)</p> <p>(3,4) → Up → (4,4)</p> <p>This path avoids (4,3) and uses only straight moves</p> <p>Valid Path Summary</p> <p>Let's list all moves step-by-step:</p> <ol style="list-style-type: none"> 1. (1,1) → Right → (1,2) 2. (1,2) → Up → (2,2) 3. (2,2) → Up → (3,2) (<i>Observation point</i>) 4. (3,2) → Right → (3,3) 5. (3,3) → Right → (3,4) 6. (3,4) → Up → (4,4) (<i>End</i>) <p>One possible path: (1,1) → (1,2) → (2,2) → (3,2) → (3,3) → (3,4) → (4,4)</p> <p>The ranger reaches the destination.</p> <p>Hence, the correct option is B.</p>
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Question ID	6
Question Type	MCQ-SC

Difficulty Level	Medium
Topic: Subtopic (concept)	Learnability (Ratio and Proportion)
Question Details/Question Stem	<p>A large residential society has three underground water tanks: Tank A, Tank B, and Tank C.</p> <p>The total capacity of the tanks is 72,000 liters, and the ratio of their capacities is 5 : 4 : 3.</p> <p>Due to maintenance issues:</p> <p>Tank A can only be filled to 80% of its capacity,</p> <p>Tank B can be filled to 90%,</p> <p>Tank C can be filled completely.</p> <p>How much water (in liters) is actually stored in Tank B?</p> <p>Later in the day, due to a water shortage:</p> <p>2,000 liters is transferred from Tank C to Tank A.</p> <p>Then, 40% water from Tank A and 25% of the water from Tank B is used.</p> <p>Finally, Tank C transfers one-fifth of its current water to Tank B.</p> <p>What is the new ratio of water in Tank A: Tank B: Tank C?</p>
Choices/Choice A	24,000 liters, 78:97:64
Choices/Choice B	21,600 liters, 78:97:64
Choices/Choice C	23,800 liters, 97:78:64
Choices/Choice D	21,600 liters, 97:78:64
Solution	B
Explanation	<p>Find the capacities of each tank</p> <p>The total capacity is divided in the ratio 5 : 4 : 3. So, we first find the total parts:</p> <p>Total parts = $5 + 4 + 3 = 12$ parts</p> <p>Now, we can find the capacity of each tank:</p> <p>Capacity of Tank A = $(5/12) \times 72,000 = 30,000$ liters</p> <p>Capacity of Tank B = $(4/12) \times 72,000 = 24,000$ liters</p>

Capacity of Tank C = $(3/12) \times 72,000 = 18,000$ liters

Calculate the actual amount of water in each tank

Now we use the given percentages to find how much water is actually stored in each tank:

Water in Tank A = 80% of 30,000 = $0.80 \times 30,000 = 24,000$ liters

Water in Tank B = 90% of 24,000 = $0.90 \times 24,000 = 21,600$ liters

Water in Tank C = 100% of 18,000 = 18,000 liters

2,000 liters is transferred from Tank C to Tank A

New water levels:

Tank C: $18,000 - 2,000 = 16,000$ liters

Tank A: $24,000 + 2,000 = 26,000$ liters

This is valid since Tank A's max capacity is 30,000 liters

40% of Tank A's water is used

40% of 26000 = $0.40 \times 26000 = 10,400$ liters

New Amount in Tank A = $26000 - 10400 = 15600$

25% of Tank B's water is used

25% of 21,600 = $0.25 \times 21,600 = 5,400$ liters

New amount in Tank B = $21,600 - 5,400 = 16,200$ liters

Tank C transfers one-fifth of its current water to Tank B

Tank C now has 16,000 liters $\rightarrow \frac{1}{5} \times 16,000 = 3200$ liters

Tank C after transfer = $16,000 - 3200 = 12800$ liters

Tank B after receiving = $16,200 + 3200 = 19400$ liters

Final Water Levels (Rounded to 2 decimals)

Tank A = 15600 liters

	<p>Tank B = 19400 liters</p> <p>Tank C = 12800 liters</p> <p>Final Ratio</p> <p>Tank A: B: C = 15600: 19400: 12800=78:97:64</p> <p>Hence, the correct option is B.</p>
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Question ID	7
Question Type	MCQ-SC
Difficulty Level	Medium
Topic: Subtopic (concept)	Learnability (Simple Interest)
Question Details/Question Stem	<p>Ravi invested a total of ₹50,000 in two different schemes offering simple interest, Scheme A and Scheme B. Scheme A offered a simple interest rate of 6% per annum, while Scheme B offered 8% per annum.</p> <p>He invested part of the money in Scheme A for 3 years, and the rest in Scheme B for 2 years.</p> <p>Later, he found that if he had interchanged the amounts invested in Scheme A and Scheme B, he would have received ₹600 more in total interest.</p> <p>How much money did Ravi invest in each scheme?</p>
Choices/Choice A	Scheme A=₹30,000, Scheme B=₹20,000
Choices/Choice B	Scheme A=₹10,000, Scheme B=₹40,000
Choices/Choice C	Scheme A=₹40,000, Scheme B=₹10,000
Choices/Choice D	Scheme A=₹30,000, Scheme B=₹10,000
Solution	B
Explanation	<p>To solve the problem, let's denote:</p> <p>x = amount invested in Scheme A</p> <p>y = amount invested in Scheme B</p> <p>From the problem, we know:</p> <p>The total investment is ₹50,000:</p>

$$x+y=50000\text{----- (1)}$$

The interest from Scheme A after 3 years at 6%:

$$\text{Interest from A} = \frac{x \times 6 \times 3}{100} = \frac{18x}{100} = 0.18x$$

The interest from Scheme B after 2 years at 8%:

$$\text{Interest from B} = \frac{y \times 8 \times 2}{100} = \frac{16y}{100} = 0.16y$$

The total interest earned from both schemes is:

$$\text{Total Interest} = 0.18x + 0.16y\text{-----(2)}$$

If Ravi had interchanged the amounts invested, the interest from Scheme A would now be calculated at 8% for 2 years and from Scheme B at 6% for 3 years. Thus:

New interest from Scheme A (now Scheme B) for 2 years at 8%:

$$\text{New Interest from A} = 0.16x$$

New interest from Scheme B (now Scheme A) for 3 years at 6%:

$$\text{New Interest from B} = 0.18y$$

The total interest from this interchange would be:

$$\text{Total New Interest} = 0.16x + 0.18y\text{-----(3)}$$

According to the problem, the difference between the new total interest and the original total interest is ₹600:

$$(0.16x + 0.18y) - (0.18x + 0.16y) = 600$$

Simplifying this gives:

$$-0.02x + 0.02y = 600$$

Dividing through by 0.02:

$$-x + y = 30000\text{-----(4)}$$

Solving the System of Equations

	<p>Now we have the following system of equations:</p> $x+y=50000 \text{ (Equation 1)}$ $-x+y=30000 \text{ (Equation 4)}$ <p>We can solve these equations simultaneously. Adding equations (1) and (4):</p> $(x + y) + (-x + y) = 50000 + 30000$ $2y = 80000$ $y = 40000$ <p>Now substituting y back into equation (1):</p> $40000 + x = 50000$ $x = 50000 - 40000$ $x = 10000$ <p>Amount invested in Scheme A: ₹10,000 Amount invested in Scheme B: ₹40,000 Hence, the correct option is B.</p>
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Question ID	8
Question Type	MCQ-SC
Difficulty Level	Medium
Topic: Subtopic (concept)	Learnability (Combination)
Question Details/Question Stem	<p>A school is organizing a volleyball tournament and needs to select a team of 9 players from a pool of 14 students. The available students are divided into two groups:</p> <p>10 male students 4 female students</p> <p>The coach needs to select the team with the following conditions:</p> <p>The team must consist of at least 2 female players and at least 4 male players.</p>

	How many distinct ways can the coach select a team of 8 players under these conditions?
Choices/Choice A	2478
Choices/Choice B	2748
Choices/Choice C	2847
Choices/Choice D	2487
Solution	A
Explanation	<p>We know the team will have exactly 8 players:</p> <p>The team must consist of at least 2 female players and at least 4 male players.</p> <p>The possible gender distributions for the 8 players are:</p> <p>Case 1: 2 females and 6 males</p> <p>Case 2: 3 females and 5 males</p> <p>Case 3: 4 females and 4 males</p> <p>Calculate the Combinations for Each Case</p> <p>Case 1: 2 females and 6 males</p> <p>The captain is already chosen, so we need to select 2 more females from the 4 remaining females:</p> $\binom{4}{2} = 6$ <p>We need to select 6 males from the 10 available male students:</p> $\binom{10}{6} = \frac{10 \times 9 \times 8 \times 7}{4 \times 3 \times 2 \times 1}$ $= 210$ <p>Total for Case 1: $\binom{4}{2} \times \binom{10}{6} = 6 \times 210 = 1260$</p> <p>3 females and 5 males</p>

The captain is already chosen, so we need to select 3 more females

from the 4 remaining females: $\binom{4}{3} = 4$

We need to select 5 males from the 10 available male students:

$$\binom{10}{5} = \frac{10 \times 9 \times 8 \times 7 \times 6}{5 \times 4 \times 3 \times 2 \times 1} = 252$$

Total for Case 2:

$$\binom{4}{3} \times \binom{10}{5} = 4 \times 252 = 1008$$

4 females and 4 males

The captain is already chosen, so we need to select 4 more females from the 4 remaining females:

$$\binom{4}{4} = 1$$

We need to select 4 males from the 10 available male students:

$$\begin{aligned} \binom{10}{4} &= \frac{10 \times 9 \times 8 \times 7}{4 \times 3 \times 2 \times 1} \\ &= 210 \end{aligned}$$

$$\text{Total for Case 3: } \binom{4}{4} \times \binom{10}{4} = 1 \times 210 = 210$$

Add up the Total Number of Combinations

Now, we sum the total combinations from all three cases:

$$1260 + 1008 + 210 = 2478$$

Hence, the correct option is A.

Question Type	MCQ-SC
Difficulty Level	Hard
Topic: Subtopic (concept)	Learnability (Work and time)
Question Details/Question Stem	<p>A company is constructing a building foundation using three teams: Team X, Team Y, and Team Z.</p> <ul style="list-style-type: none"> • Team X can complete the job in 12 days, working 6 hours per day. • Team Y can complete the job in 16 days, working 8 hours per day. • Team Z is a specialized team that works only 4 hours per day, but very efficiently—they can complete the entire job in 20 days at that pace. <p>The company starts the project with only Team X and Team Y working together for the first 4 days.</p> <p>From Day 5 onward, Team Z joins, but with a twist:</p> <ul style="list-style-type: none"> • Team Z only works on alternate days, starting from Day 5. • On every 6th day, Team X takes a full day off, and Team Y works half-time (4 hours). <p>The goal is to complete the job as quickly as possible.</p> <p>How many days will it take to complete the entire construction foundation under these conditions?</p>
Choices/Choice A	Day 6
Choices/Choice B	Day 7
Choices/Choice C	Day 8
Choices/Choice D	Day 9
Solution	B
Explanation	<p>We are building a foundation that takes:</p> <p>Team X: $12 \text{ days} \times 6 \text{ hrs/day} = 72 \text{ hours} \rightarrow \text{Rate} = 1/72 \text{ per hour}$</p> <p>Team Y: $16 \text{ days} \times 8 \text{ hrs/day} = 128 \text{ hours} \rightarrow \text{Rate} = 1/128 \text{ per hour}$</p> <p>Team Z: $20 \text{ days} \times 4 \text{ hrs/day} = 80 \text{ hours} \rightarrow \text{Rate} = 1/80 \text{ per hour}$</p> <p>We want to find out how many days it takes to complete 1 full job (i.e., the entire foundation), given the varying team availability and working conditions.</p> <p>Work done on Days 1 to 4</p>

Only Team X and Team Y are working.

Let's calculate daily work for each:

Team X: $6 \text{ hrs} \times 1/72 = 1/12$ of the job per day

Team Y: $8 \text{ hrs} \times 1/128 = 1/16$ of the job per day

Combined work per day = $1/12 + 1/16$

LCM of 12 and 16 = 48

$\Rightarrow (4 + 3)/48 = 7/48$ of the job per day

So, for 4 days, total work done = $4 \times 7/48 = 28/48 = 7/12$

By end of Day 4, $7/12$ of the work is completed.

Work done from Day 5 onward

From Day 5, Team Z joins. But now we have to consider alternating schedules and interruptions.

We'll simulate each day starting from Day 5 until the total reaches 1 full job.

Day 5

- Team X: $6 \text{ hrs} \rightarrow 1/12$
- Team Y: $8 \text{ hrs} \rightarrow 1/16$
- Team Z: works today (alternate days), $4 \text{ hrs} \rightarrow 1/20$

Add them:

$1/12 + 1/16 + 1/20$

LCM = 240 $\rightarrow (20 + 15 + 12)/240 = 47/240$

Cumulative work so far:

$7/12 + 47/240 = (140 + 47)/240 = 187/240$

$187/240 \approx 0.779$ of the job done.

Day 6

It's the 6th day, so:

Team X: off today

Team Y: works half-time $\rightarrow 4 \text{ hrs} \rightarrow 4 \times 1/128 = 1/32$

	<p>Team Z: off (alternate days)</p> <p>Total = $1/32$</p> <p>Cumulative: $187/240 + 1/32 =$ Convert to LCM (960): $(187 \times 4 + 30)/960 = (748 + 30)/960 = 778/960 = 194.5/240 \approx 0.81$</p> <p>Day 7</p> <ul style="list-style-type: none"> • All teams back to normal • Team Z works today (Day 7 = alternate day) <p>Work = Team X: $1/12$ Team Y: $1/16$ Team Z: $1/20$ → Same as Day 5 = $47/240$</p> <p>Add: $194.5/240 + 47/240 = 241.5/240$ → Work is now more than complete. So, on 7th day the work is completed.</p> <p>So, the job will be fully completed on Day 7, nearly by the end of the day.</p> <p>Hence, the correct option is B.</p>
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Question ID	10
Question Type	MCQ-SC
Difficulty Level	Hard
Topic: Subtopic (concept)	Learnability (Pipes and Cisterns)
Question Details/Question Stem	<p>At a sports complex, a large rectangular swimming pool needs to be filled every morning before training begins. The pool has two inlet pipes and one drainage pipe (outlet). The management uses a timed schedule for water conservation.</p> <p>Pipe X can fill the pool in 6 hours and is turned on from 5 AM to 9 AM.</p> <p>Pipe Y can fill the pool in 8 hours and is turned on from 6 AM until the pool is full.</p> <p>Pipe Z is a drainage pipe that can empty the full pool in 12 hours, and it is left open accidentally from 7 AM to 8 AM only.</p>

	<p>The total capacity of the swimming pool is 9600 liters.</p> <p>At 5 AM, the pool is completely empty.</p> <p>All pipes have constant flow rates, and their opening/closing times are instant and accurate.</p> <p>At what exact time will the pool be completely filled?</p> <p>The next day, the maintenance team needs to refill the pool partially after routine cleaning.</p> <p>At 6:00 AM, the pool is only half full (i.e., contains 4800 liters).</p> <p>All three pipes are involved again, but with revised operating times:</p> <p>Pipe X is turned on from 6 AM to 8 AM</p> <p>Pipe Y is turned on from 7 AM to until the pool is filled</p> <p>Pipe Z is accidentally left open from 8 AM to 9 AM</p> <p>The goal is to completely fill the pool to 9600 liters.</p> <p>At what exact time will the pool be filled under this new schedule?</p>
Choices/Choice A	9:00 AM, 9:10 AM
Choices/Choice B	9:20 AM, 9:00 AM
Choices/Choice C	9:20 AM, 9:10 AM
Choices/Choice D	9:00 AM, 9:20 AM
Solution	B
Explanation	<p>Pool Capacity = 9600 liters</p> <p>Pipe X fills in 6 hrs \rightarrow Rate = $9600 \div 6 = 1600$ L/hr</p> <p>Pipe Y fills in 8 hrs \rightarrow Rate = $9600 \div 8 = 1200$ L/hr</p> <p>Pipe Z empties in 12 hrs \rightarrow Rate = $9600 \div 12 = 800$ L/hr (outlet)</p> <p>Now we'll go hour by hour starting at 5 AM (when the pool is empty) and calculate how much is filled in each period.</p> <p>5–6 AM</p>

- Only Pipe X is on
- Net inflow = 1600 L
- Cumulative = 1600 L

6–7 AM

- Pipe X + Pipe Y = 1600 + 1200 = 2800 L/hr
- Cumulative = 1600 + 2800 = 4400 L

7–8 AM

- Pipe X + Pipe Y = 2800 L/hr
- Pipe Z (outlet) = -800 L/hr
- Net inflow = 2800 - 800 = 2000 L
- Cumulative = 4400 + 2000 = 6400 L

8–9 AM

- Pipe X + Pipe Y = 2800 L/hr
- (Pipe Z is now OFF)
- Cumulative = 6400 + 2800 = 9200 L

9 AM onwards

- Pipe X is OFF
- Pipe Y remains ON (1200 L/hr)
- Pool has 9200 L
- Remaining = 9600 - 9200 = 400 L

Time to fill 400 L at 1200 L/hr: $\frac{400}{1200} = \frac{1}{3}$ hr = 20 minutes

So, at 9:20 am the pool will be completely filled

Part II:

Total pool capacity = 9600 L

At 6:00 AM, pool is half full = 4800 L remaining to be filled

Pipe Rates:

- Pipe X: 1600 L/hr (6–8 AM)
- Pipe Y: 1200 L/hr (7–until filled)
- Pipe Z: drains 800 L/hr (8–9 AM only)

6–7 AM

Active: Pipe X only

- Inflow = 1600 L
- Pool = 4800 + 1600 = 6400 L

7–8 AM

Active: Pipe X + Pipe Y

- Inflow = 1600 + 1200 = 2800 L
- Pool = 6400 + 2800 = 9200 L

8–9 AM

Active: Pipe Y (1200 L/hr), Pipe Z (–800 L/hr)

- Net inflow = 1200 – 800 = 400 L
- Pool = 9200 + 400 = 9600 L

The pool becomes completely full at exactly 9:00 AM.

Hence, the correct option is B.

Section 2 - Pseudocoding

Question ID	11
Question Type	MCQ-SC
Difficulty Level	
Topic: Subtopic (concept)	Pseudocoding
Question Details/Question Stem	<p>Which of the following series will be printed by the given pseudocode?</p> <p>Integer a, b, c Set b = 4, c = 5 for(each a from 2 to 4) print c b = b - 1 c = c + b end for</p> <p>For is inclusive from 2 to 4. [2,4]</p>
Choices/Choice A	5 8 10
Choices/Choice B	1 3 6
Choices/Choice C	8 9 10
Choices/Choice D	5 8 11
Solution	5 8 10

Question ID	12
Question Type	MCQ-SC
Difficulty Level	
Topic: Subtopic (concept)	Pseudocoding
Question Details/Question Stem	<p>What will be the output of following pusedocode ?</p> <p>Integer x = 1, y = 1 z = 1</p> <p>x = y * z</p> <p>z = y - z</p>

	$y = z / y$ Print x, y, z
Choices/Choice A	1 0 1
Choices/Choice B	1 0 0
Choices/Choice C	1 2 1
Choices/Choice D	2 1 0
Solution	1 0 0

Question ID	13
Question Type	MCQ-SC
Difficulty Level	
Topic: Subtopic (concept)	Pseudocoding
Question Details/Question Stem	<p>What will be the output of following psuedocode ?</p> <pre> x = 10 y = 20 IF x > y THEN PRINT x ELSE IF y > x THEN x = x + y PRINT x ELSE PRINT 0 </pre>
Choices/Choice A	20
Choices/Choice B	10
Choices/Choice C	0
Choices/Choice D	30
Solution	30

Question ID	14
Question Type	MCQ-SC
Difficulty Level	
Topic: Subtopic (concept)	Pseudocoding
Question Details/Question Stem	<p>What will be the output of following psuedocode ?</p> <p>Integer $x = 1, y = 2, z = 3$</p> <p>$x = y + z$</p> <p>$z = x - y$</p> <p>$z = z + x$</p> <p>$z = y + z$</p> <p>$y = y + z$</p> <p>Print x, y, z</p>
Choices/Choice A	5 12 10
Choices/Choice B	5 10 12
Choices/Choice C	1 12 10
Choices/Choice D	5 12 9
Solution	5 12 10

Question ID	15
Question Type	MCQ-SC
Difficulty Level	
Topic: Subtopic (concept)	Pseudocoding
Question Details/Question Stem	<p>What is output of the following code ?</p> <p>Integer x, y</p> <p>Set $x = 15, y = 12$</p> <p>$y = x - 1$</p> <p>do{</p> <p> Print x</p> <p> $x = y + (x - 2)$</p> <p>}</p> <p>while($x < 40$)</p> <p>end do while</p>

Choices/Choice A	15 28 39
Choices/Choice B	15 27 39
Choices/Choice C	15 27 28
Choices/Choice D	15 28 38
Solution	15 27 39

Question ID	16
Question Type	MCQ-SC
Difficulty Level	
Topic: Subtopic (concept)	Pseudocoding
Question Details/Question Stem	<p>What will be the output of following psuedocode ?</p> <pre>stars = 0 FOR i FROM 1 TO 4 FOR j FROM 1 TO i stars = stars + 1 FOR k FROM i TO 4 stars = stars + 2 PRINT stars</pre> <p>For is inclusive. $i \rightarrow [1,4]$, $j \rightarrow [1,i]$, $k \Rightarrow [i,4]$</p>
Choices/Choice A	25
Choices/Choice B	24
Choices/Choice C	32
Choices/Choice D	30
Solution	30

Question ID	17
Question Type	MCQ-SC
Difficulty Level	
Topic: Subtopic (concept)	Pseudocoding
Question Details/Question Stem	<p>What will be the output of following psuedocode ?</p> <pre>arr = [2, 5, 7, 8, 10, 13]</pre>

	<pre> sum = 0 FOR i FROM 0 TO LENGTH(arr) - 1 IF i MOD 2 = 1 THEN FOR j FROM 0 TO i sum = sum + arr[i] - j PRINT sum </pre>
Choices/Choice A	98
Choices/Choice B	100
Choices/Choice C	99
Choices/Choice D	97
Solution	98

Question ID	18
Question Type	MCQ-SC
Difficulty Level	
Topic: Subtopic (concept)	Pseudocoding
Question Details/Question Stem	<p>What will be the output of following psuedocode ?</p> <pre> n = 5 sum = 0 sign = 1 WHILE n > 0 sum = sum + sign * n sign = sign * -1 n = n - 1 PRINT sum </pre>
Choices/Choice A	3
Choices/Choice B	4
Choices/Choice C	3
Choices/Choice D	5
Solution	3

Question ID	19
Question Type	MCQ-SC
Difficulty Level	
Topic: Subtopic (concept)	Pseudocoding
Question Details/Question Stem	<p>What will be the output of following psuedocode ?</p> <pre> n = 5 i = 1 WHILE i ≤ n: j = 1 WHILE j ≤ n: PRINT i * j PRINT " " j = j + 1 PRINT newline i = i + 1 </pre>
Choices/Choice A	<p>1 2 3 4 5</p> <p>2 4 6 8 10</p> <p>3 6 9 12 15</p> <p>4 8 12 16 20</p> <p>5 10 15 20 25</p>
Choices/Choice B	<p>1 4 9 16 25</p> <p>2 8 18 32 50</p> <p>3 12 27 48 75</p> <p>4 16 36 64 100</p> <p>5 20 45 80 125</p>
Choices/Choice C	<p>1 2 3 4 5</p> <p>1 2 3 4 5</p> <p>1 2 3 4 5</p>

	1 2 3 4 5 1 2 3 4 5
Choices/Choice D	1 2 3 4 5 2 8 18 32 50 3 12 27 48 75 4 16 36 64 100 5 20 45 80 125
Solution	1 2 3 4 5 2 4 6 8 10 3 6 9 12 15 4 8 12 16 20 5 10 15 20 25

Question ID	20
Question Type	MCQ-SC
Difficulty Level	
Topic: Subtopic (concept)	Pseudocoding
Question Details/Question Stem	What will be the output of following psuedocode ? a = 20 b = 1 count = 0 WHILE a > 0 temp = b WHILE temp > 0 a = a - 1 count = count + 1 temp = temp - 1 b = b + 1

	PRINT count
Choices/Choice A	20
Choices/Choice B	21
Choices/Choice C	19
Choices/Choice D	22
Solution	21

Section 3 - Coding

Question ID	21
Question Type	
Difficulty Level	Easy
Topic: Subtopic (concept)	Coding (Divisible or Not)
Question Details/Question Stem	You are given a positive integer N, and you need to print all numbers between 1 and N (inclusive), which are divisible by 3.
Input	The first line will contain a positive integer N.
Constraints	$N \geq 3$
Output	Print all such numbers from 1 to N, each number on a new line.
Solution	<pre># Read input from stdin import sys n = int(sys.stdin.read().strip()) # Loop from 1 to n and print numbers divisible by 3 for i in range(1, n + 1): if i % 3 == 0: print(i)</pre>

Question ID	22
Question Type	
Difficulty Level	Easy
Topic: Subtopic (concept)	Coding (Garba Night)
Question Details/Question Stem	<p>Anuj attended a lively Garba night the previous evening, and now he is worried about his grades in two subjects: Physics and Maths.</p> <p>He received the following marks:</p> <ul style="list-style-type: none"> • Marks obtained in Physics: P • Marks obtained in Maths: M • The minimum marks required to obtain grade A in each of the subjects: a_grade <p>Print the number of subjects in which Anuj will get an A grade.</p>
Input	<ul style="list-style-type: none"> • The first line contains an Integer P (Marks in Physics) • The second line contains an Integer M (Marks in Maths) • The third line contains the cutoff for grade A a_grade
Output	Print a single Integer representing the number of subjects in which Anuj has obtained A Grade.
Example	<p>Input:</p> <p>90 90 90</p> <p>Output:</p> <p>2</p>

	<p>Input: 90 89 90</p> <p>Output: 1</p> <p>Input: 80 80 81</p> <p>Output: 0</p>
<p>Solution (python)</p>	<pre># Read input values P = int(input()) M = int(input()) a_grade = int(input()) # Initialize counter count = 0 # Check if Anuj gets A grade in Physics if P >= a_grade: count += 1 # Check if Anuj gets A grade in Maths if M >= a_grade: count += 1 # Print the final count print(count)</pre>

Question ID	23
Question Type	
Difficulty Level	Medium
Topic: Subtopic (concept)	Coding (Similar-Strings)
Question Details/Question Stem	<p>Two characters x and y are called similar characters if and only if one of the following conditions is satisfied:</p> <ol style="list-style-type: none"> 1. x and y are the same character 2. One of x and y is # and the other is m 3. One of x and y is * and the other is n <p>Two strings S and T, each of length N, are called similar strings if and only if for all positions i ($1 \leq i \leq N$), the i-th character of S and the i-th character of T are similar characters.</p>
Input	<ul style="list-style-type: none"> • The first line consists of a single integer N – the size of both the strings. • The second line contains a string S. • The third line contains a string T.
Constraints	$1 \leq N \leq 100$
Output	Print Yes if both the strings are similar, otherwise print No .
Example	<p>Input:</p> <pre>3 m*w #nw</pre> <p>Output:</p> <pre>Yes</pre>

	<p>Input:</p> <p>3 abc arc</p> <p>Output:</p> <p>No</p> <p>Input:</p> <p>4 onk* o*kn</p> <p>Output:</p> <p>Yes</p>
<p>Solution (python)</p>	<pre># Read input values N = int(input()) S = input() T = input() # Function to check if two characters are similar def are_similar(x, y): if x == y: return True if (x == '#' and y == 'm') or (x == 'm' and y == '#'): return True if (x == '*' and y == 'n') or (x == 'n' and y == '*'): return True return False # Compare each character for i in range(N): if not are_similar(S[i], T[i]): print("No")</pre>

	<pre>break else: print("Yes")</pre>
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In the Coding NSAT Exam - You can use any of the common programming languages such as C++, Python, Java, and JavaScript in the Coding Test.

Question ID	24
Question Type	
Difficulty Level	Medium
Topic: Subtopic (concept)	Coding (Three Musketeers)
Question Details/Question Stem	<p>In a small village, there are three brothers named Gladden, Kunal, and Animay. Their ages are related in specific ways, indicated by three symbols: RAB, RAC, and RBC. The meanings are:</p> <ul style="list-style-type: none"> • If RAB is <, then Gladden is younger than Kunal; if RAB is >, then Gladden is older than Kunal. • If RAC is <, then Gladden is younger than Animay; if RAC is >, then Gladden is older than Animay. • If RBC is <, then Kunal is younger than Animay; if RBC is >, then Kunal is older than Animay.
Input	<p>Three lines, each containing one of the comparison symbols < or > in the following order:</p> <ol style="list-style-type: none"> 1. RAB 2. RAC 3. RBC
Output	Print the name of the middle brother based on their ages.
Example	<p>Input:</p> <pre>< < <</pre>

	<p>Output:</p> <p>Kunal</p>
<p>Solution (python)</p>	<pre> # Read comparisons RAB = input().strip() # Gladden vs Kunal RAC = input().strip() # Gladden vs Animay RBC = input().strip() # Kunal vs Animay # Assign age scores (higher = older) ages = {"Gladden": 0, "Kunal": 0, "Animay": 0} # RAB: Gladden vs Kunal if RAB == "<": ages["Kunal"] += 1 else: ages["Gladden"] += 1 # RAC: Gladden vs Animay if RAC == "<": ages["Animay"] += 1 else: ages["Gladden"] += 1 # RBC: Kunal vs Animay if RBC == "<": ages["Animay"] += 1 else: ages["Kunal"] += 1 # Sort by age score to find the middle one sorted_ages = sorted(ages.items(), key=lambda x: x[1]) print(sorted_ages[1][0]) </pre>

In the Coding NSAT Exam - You can use any of the common programming languages such as C++, Python, Java, and JavaScript in the Coding Test.

Question ID	25
Question Type	
Difficulty Level	Hard

Topic: Subtopic (concept)	Coding (Hour-Glass Pattern)
Question Details/Question Stem	<p>You are given an integer n and you need to print the following pattern:</p> <p>Each line contains numbers separated by at least one space.</p>
Input	A single integer n.
Output	Print the required pattern exactly as shown in the example. Each number must be followed by a space , and lines must be indented correctly.
Example	<p>Example Pattern for n = 5:</p> <pre> 1 2 3 4 5 2 3 4 5 3 4 5 4 5 5 4 5 3 4 5 2 3 4 5 1 2 3 4 5 </pre>
Solution (python)	<pre> # Read input n = int(input().strip()) # Top half of the hourglass for i in range(n): # Print i spaces followed by numbers from i+1 to n line = ' ' * i + '.join(str(num) for num in range(i + 1, n + 1)) print(line) # Bottom half of the hourglass for i in range(n - 2, -1, -1): # Print i spaces followed by numbers from i+1 to n line = ' ' * i + '.join(str(num) for num in range(i + 1, n + 1)) print(line) </pre>

In the Coding NSAT Exam - You can use any of the common programming languages such as C++, Python, Java, and JavaScript in the Coding Test.



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