

SCO INTERNATIONAL OLYMPIAD

GRADE 8 QUESTION PAPER

SCO INTERNATIONAL MENTAL ABILITY OLYMPIAD

Official Paper | 2025-26

Designed from Class 8 Mental Ability pathways for analytical thinking, logical reasoning, pattern recognition, and exam-ready problem solving.

- Class 8 reasoning paper with general, assertion-reason, case study, and achievers sections
- Small question-number labels with all passages kept inside the question block
- Answer key and explanation included for teacher, parent, and student review

Series	Coding	Alphabet	Puzzle	Calendar
Ranking	Syllogism	Images	Cubes	Data Suff.

Exam Information

Field	Details
Exam Name	SCO International Mental Ability Olympiad
Class / Grade	Class 8
Academic Year	2025-26
Total Questions	50
Time	60 minutes
Maximum Marks	60

Section Pattern

- General Reasoning: 20 questions × 1 mark = 20 marks
- Reason and Assertion: 10 questions × 1 mark = 10 marks
- Case Study: 10 questions × 1 mark = 10 marks
- Achievers Section: 10 questions × 2 marks = 20 marks

Guidelines for Candidates

Candidate Instructions

- Read each question carefully before choosing the answer.
- There is only ONE correct answer for each question.
- Calculator use is not allowed unless explicitly permitted by the invigilator.
- Use an HB pencil or blue/black ballpoint pen for the OMR sheet or answer sheet.
- All questions are compulsory. There is no negative marking.
- The Achievers Section carries 2 marks per question; all other questions carry 1 mark each.
- Total Questions: 50. Maximum Marks: 60.
- Submit the OMR sheet / answer sheet to the invigilator at the end of the test.

Sections: General Reasoning (20), Reason and Assertion (10), Case Study (10), Achievers Section (10).

General Reasoning — Questions 1-20 | 1 mark each

Q1. In a certain code language, each letter is first replaced by its "mirror" letter in the alphabet (A $\leftrightarrow$ Z, B $\leftrightarrow$ Y, C $\leftrightarrow$ X, ...). Then the resulting letter is shifted 3 positions forward (cycling from Z back to A when needed).

Using this rule, what is the coded form of the word MATH?

Options:

- A. QCJV
- B. QDJW
- C. PCIV
- D. RCJU

Answer: A. QCJV

Explanation:

Each letter of "MATH" is replaced by its mirror (M $\rightarrow$ N, A $\rightarrow$ Z, T $\rightarrow$ G, H $\rightarrow$ S) and then shifted 3 positions forward to yield Q, C, J, V.

Solution:

Find the mirror letters:

- M (13th) $\rightarrow$ Mirror: $27 - 13 = 14 \rightarrow$ N
- A (1st) $\rightarrow$ Mirror: $27 - 1 = 26 \rightarrow$ Z
- T (20th) $\rightarrow$ Mirror: $27 - 20 = 7 \rightarrow$ G
- H (8th) $\rightarrow$ Mirror: $27 - 8 = 19 \rightarrow$ S

Shift each mirror letter 3 positions forward:

- N (14) + 3 = 17 $\rightarrow$ Q
- Z (26) + 3 = 29 $\rightarrow$ 29-26 = 3 $\rightarrow$ C
- G (7) + 3 = 10 $\rightarrow$ J
- S (19) + 3 = 22 $\rightarrow$ V

Coded word: Q C J V

Q2. Find the next term in the series:

1, 3, 8, 20, 48, ?

Options:

A. 108

B. 110

C. 112

D. 114

Answer: C. 112

Explanation:

The series follows the rule: Next term = (Current term $\times$ 2) + (doubles each time: 1, 2, 4, 8, 16...). Thus, $48 \times 2 + 16 = 112$.

Solution:

Observe the pattern:

1 $\rightarrow$ 3: Increase = 2

3 $\rightarrow$ 8: Increase = 5

8 $\rightarrow$ 20: Increase = 12

20 $\rightarrow$ 48: Increase = 28

Notice the differences themselves: 2, 5, 12, 28. Their differences are:

$$5 - 2 = 3$$

$$12 - 5 = 7$$

$$28 - 12 = 16$$

These second differences (3, 7, 16) don't form a constant pattern-but observe that each increment roughly doubles (3 to 7 nearly doubles; 7 to 16 a bit more than double). Alternatively, one may notice that each term is nearly double the previous term plus an extra amount that increases roughly as 1, 2, 4, ...

A better approach is to look for a multiplicative-plus-additive pattern:

$$1 \times 2 + 1 = 3$$

$$3 \times 2 + 2 = 8$$

$$8 \times 2 + 4 = 20$$

$$20 \times 2 + 8 = 48$$

So the pattern is: multiply by 2 and add a number that doubles each time (1, 2, 4, 8, ...).

Next, we multiply 48 by 2 and add 16:

$$48 \times 2 = 96; 96 + 16 = 112.$$

Q3. Find the next letter in the sequence:

A, C, F, J, O, ?

Options:

- A. T
- B. U
- C. V
- D. W

Answer: B. U

Explanation:

Solution:

Identify the positions:

A = 1, C = 3, F = 6, J = 10, O = 15.

Differences:

$$3 - 1 = 2$$

$$6 - 3 = 3$$

$$10 - 6 = 4$$

$$15 - 10 = 5$$

The pattern increases by 1 each time; next difference = 6.

So, next position = $15 + 6 = 21$, which is U.

The differences in positions form the sequence 2, 3, 4, 5; thus the next difference is 6. Adding 6 to 15 yields 21, corresponding to U.

Q4. A classic puzzle: A farmer must transport a wolf, a goat, and a cabbage across a river using a boat that can carry only him and one item at a time. Under the condition that the wolf cannot be left alone with the goat and the goat cannot be left alone with the cabbage, what is the minimum number of crossings required?

Options:

- A. 5
- B. 7
- C. 9
- D. 11

Answer: B. 7

Explanation:

By following the standard solution sequence (take the goat first, return alone, take either wolf or cabbage, bring goat back, take the other, and finally return for the goat), the puzzle can be solved in 7 crossings.

Solution:

The solution involves a careful sequence of trips. The minimum number of crossings is 7.

Q5. In a non-leap year, if March 1 is a Tuesday, under the condition that a national event is held on July 4, what day of the week is July 4?

Options:

- A. Sunday
- B. Monday
- C. Tuesday
- D. Wednesday

Answer: B. Monday

Explanation:

125 days after March 1 (Tuesday) gives a remainder of 6 days, so July 4 falls on Monday.

Solution:

Calculate the days from March 1 to July 4:

March: $31 - 1 = 30$ days

April: 30 days

May: 31 days

June: 30 days

July: 4 days

Total = $30 + 30 + 31 + 30 + 4 = 125$ days.

Since $125 \bmod 7 = 6$, advance 6 days from Tuesday:

Tuesday $\rightarrow$ Wednesday (1), Thursday (2), Friday (3), Saturday (4), Sunday (5), Monday (6).

Q6. The following reaction times (in seconds) for five athletes are recorded:

12.356, 12.365, 12.362, 12.359, 12.361.

Arrange these times in ascending order (fastest to slowest) and determine the median time.

Options:

- A. 12.359 s
- B. 12.361 s
- C. 12.362 s
- D. 12.365 s

Answer: B. 12.361 s

Explanation:

When ordered from smallest (fastest) to largest (slowest), the third (median) time is 12.361 seconds.

Solution:

Arranging the times in ascending order:

12.359, 12.361, 12.356, 12.362, 12.365 $\rightarrow$

Wait-let's sort carefully by comparing decimals digit-by-digit:

- 12.356
- 12.359
- 12.361
- 12.362
- 12.365

The median (third value) is 12.361.

Q7. If $3(x - 4) = 2(2x + 1) - 5$, what is the value of x ?

Options:

- A. -9
- B. -3
- C. 3
- D. 9

Answer: A. -9

Explanation: Expanding both sides gives $3x - 12 = 4x - 3$. Subtracting $3x$ from both sides gives $-12 = x - 3$, so $x = -9$.

Q8. Consider the statements:

All creative writers are imaginative.

Some imaginative people are logical.

Under the condition that nothing else is known, which conclusion is valid?

Options:

- A. Some creative writers are logical.
- B. All logical people are creative writers.
- C. Some imaginative people are creative writers.
- D. No conclusion can be drawn.

Answer: D. No conclusion can be drawn.

Explanation:

While all creative writers are imaginative and some imaginative people are logical, there is insufficient information to deduce any direct relationship between creative writers and logical people.

Q9. Is $x > 3$? Consider the following statements:

(1) $2x - 1 > 5$

(2) $x + 2 > 6$

Options:

- A. Statement (1) alone is sufficient, but (2) is not.
- B. Statement (2) alone is sufficient, but (1) is not.
- C. Both together are necessary, but neither alone is sufficient.
- D. Each statement alone is sufficient.

Answer: D. Each statement alone is sufficient.

Explanation:

Statement (1) implies $x > 3x > 3x > 3$ directly; Statement (2) implies $x > 4x > 4x > 4$, which also guarantees $x > 3x > 3x > 3$. Hence, each is sufficient by itself.

Solution:

Statement (1): $2x - 1 > 5 \rightarrow 2x > 6 \rightarrow x > 3$.

Statement (2): $x + 2 > 6 \rightarrow x > 4$ (which implies $x > 3$).

Each statement alone is sufficient to conclude $x > 3$.

Q10. 1, 4, 10, 22, 46, ?

Options:

- A. 88
- B. 90
- C. 94
- D. 96

Answer: C. 94

Explanation:

The differences between terms are:

- $4 - 1 = 3$
- $10 - 4 = 6$
- $22 - 10 = 12$
- $46 - 22 = 24$

Notice that the differences double each time: 3, 6, 12, 24. Thus, the next difference should be $24 \times 2 = 48$.

Adding 48 to the last term: $46 + 48 = 94$.

Q11. In a code language, the first letter of a word is moved to the end, and then every letter is shifted one position forward in the alphabet. What is the code for LOGIC?

Options:

- A. PHJDM
- B. PHJCN
- C. QHJD M
- D. PHKDM

Answer: A. PHJDM

Explanation: Moving L to the end gives OGICL. Shifting each letter one step forward gives P, H, J, D, M; hence the code is PHJDM.

Q12. Find the next two letters in the sequence:

Q, S, V, ?, ?

Options:

A. Z, E

B. Y, E

C. Z, F

D. Y, F

Answer: A. Z, E

Explanation:

The pattern's differences are 2, 3, 4, and then 5. This gives the next positions 26 (Z) and 5 (E).

Solution:

Determine positions:

• Q = 17, S = 19, V = 22.

Differences:

• $19 - 17 = 2$, and $22 - 19 = 3$.

Assume the pattern increases by 1 each time; the next difference should be 4, then 5.

• Next letter: $22 + 4 = 26 \rightarrow Z$

• Following letter: $26 + 5 = 31$; since there are 26 letters, subtract 26: $31 - 26 = 5 \rightarrow E$

Q13. A torch, a map, and a compass must be carried across a bridge at night. Only two items can be carried at once, and the torch must be present for every crossing. What is the minimum number of crossings required to move all three items across?

Options:

A. 3

B. 4

C. 5

D. 6

Answer: A. 3

Explanation: Take torch + map across, bring the torch back, then take torch + compass across. The torch is present every time, and all items reach the other side in 3 crossings.

Q14. In a non-leap year, if January 1 is a Tuesday, under the condition that a festival is celebrated on August 15, what day of the week is August 15?

Options:

- A. Wednesday
- B. Thursday
- C. Friday
- D. Saturday

Answer: B. Thursday

Explanation:

There are 227 days from January 1 to August 15. Since 226 days after Tuesday gives an offset of 2 days ($226 \bmod 7 = 2$), August 15 falls on a Thursday.

Solution:

Calculate total days from January 1 to August 15:

- January: 31
- February: 28
- March: 31
- April: 30
- May: 31
- June: 30
- July: 31
- August: 15

Total = $31+28+31+30+31+30+31+15 = 227$ days.

Since January 1 is Tuesday, we need to add 226 days (because January 1 is day 1) and then take modulo 7:

$$226 \bmod 7 = 226 - (7 \times 32 = 224) = 2.$$

Tuesday + 2 days = Thursday.

Q15. Arrange the following decimals in ascending order and determine the 4th smallest number:

0.732, 0.725, 0.728, 0.731, 0.729

Options:

- A. 0.728
- B. 0.729
- C. 0.731
- D. 0.732

Answer: C. 0.731

Explanation:

After arranging in ascending order, the fourth number in the list is 0.731.

Solution:

Order them by value:

- 0.725, 0.728, 0.729, 0.731, 0.732

The 4th smallest is 0.731.

Q16. If $5(x + 3) = 3(2x + 4) + 2$, what is the value of $2x - 1$?

Options:

- A. 0
- B. 1
- C. 2
- D. 3

Answer: B. 1

Explanation: $5x + 15 = 6x + 14$, so $x = 1$. Therefore, $2x - 1 = 2(1) - 1 = 1$.

Q17. Consider the statements:

All diligent students are punctual.

Some punctual people are creative.

Under the condition that no further information is provided, which conclusion is logically valid?

Options:

- A. Some diligent students are creative.
- B. All creative people are diligent.
- C. Some punctual people are diligent.
- D. No conclusion can be drawn.

Answer: D. No conclusion can be drawn.

Explanation:

While all diligent students are punctual and some punctual people are creative, there isn't enough information to conclude any direct relationship between diligent students and creative individuals.

Q18. Determine whether $y > 3x$.

Consider the following statements:

(1) $y - 2x > x$

(2) $y + 1 > 4x$

Options:

- A. Statement (1) alone is sufficient, but (2) is not.
- B. Statement (2) alone is sufficient, but (1) is not.
- C. Both statements together are sufficient, but neither alone is sufficient.
- D. Each statement alone is sufficient.

Answer: A. Statement (1) alone is sufficient, but (2) is not.

Explanation:

Statement (1) directly yields $y > 3x$, while Statement (2) does not conclusively imply $y > 3x$ for all cases.

Solution:

Statement (1):

$y - 2x > x$ implies $y > 3x$.

Statement (2):

$y + 1 > 4x$ implies $y > 4x - 1$.

This does not guarantee $y > 3x$ for all values of x (e.g., if x is negative or small).

Thus, Statement (1) alone is sufficient.

Q19. A global company holds an annual conference, and the event code is generated using a unique two-step process based on the company name and the conference number. The rule is as follows:
Take the first letter of the company name and replace it with its "mirror" letter in the alphabet (A <-> Z, B <-> Y, etc.).
Then shift this mirror letter 5 positions backward in the alphabet (cycling from A to Z if necessary).
Finally, append the conference number at the end of the letter.
If the company name is "GLOBAL" and it is the 3rd conference, what is the generated code?

Solution:

The first letter of "GLOBAL" is G.

Find the mirror of G:

G is the 7th letter; its mirror = $27 - 7 = 20$, which is T.

Shift T (20th letter) 5 positions backward:

$20 - 5 = 15$, and the 15th letter is O.

Append the conference number 3:

Final code = O3.

Options:

- A. O3
- B. P3
- C. N3
- D. Q3

Answer: A. O3

Explanation:

By converting G to its mirror T and then shifting T 5 positions backward (yielding O), and appending the conference number, the generated code is O3.

Q20. At a prestigious university, applicants are ranked for admission based on two criteria:

Primary criterion: Entrance exam score (out of 100), with higher scores ranking better.

Secondary criterion: Number of extracurricular activities (ECAs); if two applicants have the same exam score, the one with more ECAs is ranked higher.

Tertiary criterion: If still tied, the applicant whose name comes first alphabetically is ranked higher.

Consider three applicants:

Applicant A: Score = 92, ECAs = 5, Name = "Alice"

Applicant B: Score = 92, ECAs = 7, Name = "Bob"

Applicant C: Score = 89, ECAs = 10, Name = "Charlie"

Question:

Who is ranked 2nd among these applicants?

Solution:

Both A and B have the highest exam score of 92, while C has 89, so C ranks lower.

Between A and B, the tie-breaker is the number of ECAs.

- Applicant A has 5 ECAs.
- Applicant B has 7 ECAs.

Therefore, Applicant B is ranked 1st, and Applicant A is ranked 2nd.

Options:

- A. Applicant A
- B. Applicant B
- C. Applicant C
- D. A tie between Applicant A and Applicant B

Answer: A. Applicant A

Explanation:

Since Applicants A and B tie on exam scores but B has more ECAs, B ranks 1st. Consequently, Applicant A is 2nd, and Applicant C is 3rd. Hence, the answer is Applicant A.

Reason and Assertion — Questions 21-30 | 1 mark each

Reason and Assertion Options

- A. Both Assertion and Reason are true, and the Reason is the correct explanation of the Assertion.
- B. Both Assertion and Reason are true, but the Reason is not the correct explanation of the Assertion.
- C. The Assertion is true, but the Reason is false.
- D. The Assertion is false, and the Reason is false.

Q21. Assertion: Every number divisible by 6 is divisible by both 2 and 3.

Reason: 6 is the product of 2 and 3.

Answer: A

Explanation:

Since $6 = 2 \times 3$, any number divisible by 6 must have factors 2 and 3. The reason directly explains the assertion.

Q22. Assertion: If two geometric figures are congruent, then they have equal areas.

Reason: Congruence means that all corresponding sides and angles of the figures are equal.

Answer: A

Explanation:

Congruent figures are identical in shape and size, so they have equal areas. The reason correctly explains the assertion.

Q23. Assertion: In a code language where each letter is replaced by the letter that is two positions ahead in the alphabet, the word "HELLO" is coded as "JGNNQ."

Reason: Shifting each letter two positions forward in the alphabet transforms H→J, E→G, L→N, O→Q.

Answer: A

Explanation:

The procedure described yields H→J, E→G, L→N, L→N, O→Q. Both the assertion and reason are true, and the reason correctly explains the code transformation.

Q24. Assertion: A sequence in which each term is the square of its position number (1, 4, 9, 16, ...) is an arithmetic progression.

Reason: The difference between consecutive square numbers is constant.

Answer: D

Explanation:

The sequence of square numbers is not arithmetic because the differences (3, 5, 7, ...) are not constant. Both the assertion and the reason are false.

Q25. Assertion: If the first day of a month is Monday, then the 31st day of that month will be Wednesday.

Reason: Since 31 minus 1 equals 30, and 30 mod 7 is 2, the weekday advances by 2 days from Monday.

Answer: A

Explanation:

Counting 30 days after Monday yields Wednesday. Both statements are true, and the reason correctly explains the assertion.

Q26. Assertion: In a rope puzzle, if a rope that burns unevenly in 60 minutes is lit at both ends, it will burn out in 30 minutes.

Reason: Lighting both ends makes the rope burn twice as fast because it burns uniformly from both ends.

Answer: C

Explanation:

The assertion is true regardless of uniformity-the rope will burn out in 30 minutes when lit at both ends. However, the reason is false because the rope burns unevenly; the time reduction holds by symmetry of the process, not due to uniform burning.

Q27. Assertion: In a family, if X is the sister of Y, then Y cannot be the mother of X.

Reason: Sibling relationships and parental relationships are mutually exclusive across generations.

Answer: A

Explanation:

A person cannot be both a sibling and a parent of the same individual. Both the assertion and reason are true, and the reason correctly explains the assertion.

Q28. Assertion: All squares are rectangles.

Reason: A rectangle is defined as a quadrilateral with opposite sides equal and all angles 90° , which is true for squares.

Answer: A

Explanation:

Every square meets the definition of a rectangle. Both statements are true, and the reason correctly explains the assertion.

Q29. Assertion: If a polygon in a non-verbal series rotates by 45° at each step, then after 8 steps it returns to its original orientation.

Reason: Eight rotations of 45° each result in a total rotation of 360° .

Answer: A

Explanation:

Since $8 \times 45^\circ = 360^\circ$, the polygon completes a full rotation and returns to its original orientation. Both statements are true, and the reason explains the assertion.

Q30. Assertion: In data sufficiency problems, each statement must be independently sufficient to answer the question.

Reason: Data sufficiency questions are designed to assess the strength of individual statements without combining them.

Answer: D

Explanation:

This is false because data sufficiency questions often require the combination of statements to reach a conclusion; it is not a rule that each statement is independently sufficient. Both the assertion and the reason are false.

Case Study — Questions 31-40 | 1 mark each**Q31.** Case Study : The Mysterious Camp Code

At Camp Delta, students discover that every event name is encoded using a two-step process:

Each letter of the event name is replaced by its "mirror" letter (A $\leftrightarrow$ Z, B $\leftrightarrow$ Y, C $\leftrightarrow$ X, ...).

Then the resulting letter is shifted forward by a number equal to the event's sequence number (e.g., for Event 3, shift by 3 positions).

Question:

For Event 3, the event name is "FUN". What is its coded form?

Options:

- A. XIP
- B. WHO
- C. YJQ
- D. XHO

Explanation:

By applying the mirror transformation and then shifting each letter by 3 (the event number), "FUN" is coded as XIP.

Solution:

Step 1: Mirror Conversion:

F $\rightarrow$ (F is 6th $\rightarrow 27-6 = 21$) $\rightarrow$ U

U $\rightarrow$ (U is 21st $\rightarrow 27-21 = 6$) $\rightarrow$ F

N $\rightarrow$ (N is 14th $\rightarrow 27-14 = 13$) $\rightarrow$ M

Mirror of "FUN" is U F M.

Step 2: Shift each letter forward by 3 positions:

U (21) + 3 = 24 $\rightarrow$ X

F (6) + 3 = 9 $\rightarrow$ I

M (13) + 3 = 16 $\rightarrow$ P

Answer: XIP

Q32. Case Study : The Festival Date Puzzle

A school decides to hold its annual festival on the day determined by a special calendar rule. The rule is:
The festival falls on the median date of the month.

The month is selected such that (month number + number of days in the month) is a prime number.

Given two candidate months:

August (month 8, 31 days): $8 + 31 = 39$ (not prime)

October (month 10, 31 days): $10 + 31 = 41$ (prime)

Question:

On what date is the festival held?

Options:

- A. October 15
- B. October 16
- C. October 17
- D. October 18

Answer: B. October 16

Explanation:

October satisfies the prime condition (41 is prime) and the median date for 31 days is 16.

Solution:

Since October is chosen, and the median of 1 to 31 is 16, the festival falls on October 16.

Q33. Case Study : Race Against the Wind

During a sports meet, five runners' finish times (in seconds) are recorded. However, if the wind speed exceeds 5 km/h, a penalty of 0.05 seconds is added to each time. The original times are:

Runner A: 12.34

Runner B: 12.38

Runner C: 12.36

Runner D: 12.33

Runner E: 12.37

The wind speed is 6 km/h.

Question:

What is the fastest adjusted time?

Options:

A. 12.38 sec

B. 12.39 sec

C. 12.41 sec

D. 12.43 sec

Answer: A. 12.38 sec

Explanation:

After applying the wind penalty, the fastest (smallest) adjusted time is 12.38 seconds.

Solution:

Add 0.05 to each original time:

A: $12.34 + 0.05 = 12.39$

B: $12.38 + 0.05 = 12.43$

C: $12.36 + 0.05 = 12.41$

D: $12.33 + 0.05 = 12.38$

E: $12.37 + 0.05 = 12.42$

The smallest adjusted time is 12.38 (Runner D).

Q34. Case Study : The Shopkeeper's Conundrum

A shop sells notebooks and pens. The number of notebooks sold follows a series: each day, notebooks sold = (previous day $\times$ 2) + 1. On Day 4, 31 notebooks were sold. Additionally, the shop sells pens according to the rule: pens sold = (number of notebooks sold divided by 2, rounded down) + 3.

Question:

How many pens were sold on Day 4?

Options:

- A. 17
- B. 18
- C. 19
- D. 20

Answer: B. 18

Explanation:

Using the given rule, 18 pens were sold on the day when 31 notebooks were sold.

Solution:

Notebooks on Day 4 = 31.

Half of 31 (rounded down) is 15.

Pens = $15 + 3 = 18$.

Q35. Case Study : Debate Club Dilemma

In a school, every member of the Debate Club is also in the Literature Club. Some Literature Club members are in the Science Club.

Question:

Can we conclude that some Debate Club members are in the Science Club?

Options:

- A. Yes, necessarily.
- B. No, not necessarily.
- C. Only if all Literature Club members are in Science Club.
- D. Cannot be determined.

Answer: B. No, not necessarily.

Explanation:

While Debate Club $\subseteq$ Literature Club and some Literature Club members are in Science Club, it is not certain that any Debate Club member is among those in Science Club.

Q36. Case Study : Library Classification Conundrum

A library classifies books by subject. The rule is:

Science books: authors' last names begin with A-M.

Literature books: authors' last names begin with N-Z. A librarian finds a literature book with an author's last name starting with "K."

Question:

Is there a contradiction in the classification?

Options:

- A. Yes, because literature books should have N-Z.
- B. No, because the rule is flexible.
- C. Insufficient information.
- D. The book must be misclassified.

Answer: A. Yes, because literature books should have N-Z.

Explanation:

According to the classification, a literature book must have an author's last name starting with N-Z. "K" falls outside this range, indicating a contradiction.

Q37. Case Study: Family Reunion Relations

At a family reunion, the following relationships are observed: Person A is the daughter of Person B. Person C is the brother of Person B. Person D is the wife of Person C. Person E is the son of Person A.

Question: What is the relationship between Person D and Person E?

Options:

- A. Aunt / great-aunt by marriage
- B. Cousin
- C. Sister
- D. Niece

Answer: A. Aunt / great-aunt by marriage

Explanation: C is the brother of B, so C is A's uncle. D, as C's wife, is A's aunt by marriage and E's great-aunt by marriage. Option A is the closest correct relationship.

Q38. Case Study : Factory Cubes Challenge

A factory produces large cubes of side length 9 cm painted on all faces. These cubes are cut into 1 cm^3 smaller cubes.

Question:

Under the condition that only cubes with exactly two painted faces are counted, how many such small cubes are produced?

Options:

- A. 72
- B. 78
- C. 84
- D. 90

Answer: C. 84

Explanation:

The formula $12(n - 2)$ for cubes with 2 painted faces yields 84 when $n = 9$.

Solution:

For an $n \times n \times n$ cube, small cubes with exactly 2 painted faces = $12 \times (n - 2)$. Here, $n = 9$, so: $12 \times (9 - 2) = 12 \times 7 = 84$.

Q39. Case Study : Survey Image Analysis

A survey asks students to choose their favorite shape. The results are shown along with the number of letters in the shape's name:

The "favorite index" is defined as $(\text{Votes} \div \text{Letters})$.

Question:

Which shape has the highest favorite index?

Options:

- A. Circle
- B. Square
- C. Triangle
- D. Hexagon

Explanation:

Circle has the highest ratio (≈ 8.33), making it the favorite based on the index.

Solution:

Calculate:

Circle: $50/6 \approx 8.33$

Square: $40/6 \approx 6.67$

Triangle: $30/8 = 3.75$

Hexagon: $20/7 \approx 2.86$

Answer: Circle

Shape	Votes	Letters in Name
Circle	50	6
Square	40	6
Triangle	30	8
Hexagon	20	7

Q40. Case Study 10: Exam Score Data Sufficiency

A student takes two tests. You are to determine if the student's average score is above 70.

Statements:

- (1) The sum of the two test scores is 145.
- (2) The difference between the two test scores is 15.

Question:

Which statement(s) is (are) sufficient to conclude that the average is above 70?

Options:

- A. Statement (1) alone is sufficient, but (2) is not.
- B. Statement (2) alone is sufficient, but (1) is not.
- C. Both together are sufficient, but neither alone is sufficient.
- D. Each statement alone is sufficient.

Answer: A.

Explanation:

Statement (1) directly gives an average of 72.5, confirming that the average score is above 70.

Solution:

Statement (1): Average = $145/2 = 72.5$, which is above 70.

Statement (2) alone does not provide the sum.

Answer: Statement (1) alone is sufficient.

Achievers Section — Questions 41-50 | 2 marks each**Q41. Train Departure Code Challenge****Story:**

At a busy railway station, the departure code for a train is generated using a two-step process. First, each letter in the destination's name is replaced by its mirror letter (A $\leftrightarrow$ Z, B $\leftrightarrow$ Y, C $\leftrightarrow$ X, etc.). Then, if the day of departure is odd, each resulting letter is shifted 2 positions forward (cycling from Z to A if necessary); if the day is even, no shift is applied. The destination is "LIMA", and the train departs on the 15th (an odd day).

Question:

What is the departure code?

Options:

- A. QTPB
- B. QTPZ
- C. RUPB
- D. PTPB

Explanation:

Following the mirror conversion (LIMA $\rightarrow$ ORNZ) and then shifting each letter 2 positions forward (O $\rightarrow$ Q, R $\rightarrow$ T, N $\rightarrow$ P, Z $\rightarrow$ B) gives the code QTPB.

Solution:

Convert "LIMA" to mirror letters:

- L (12th) $\rightarrow 27-12 = 15 \rightarrow$ O
- I (9th) $\rightarrow 27-9 = 18 \rightarrow$ R
- M (13th) $\rightarrow 27-13 = 14 \rightarrow$ N
- A (1st) $\rightarrow 27-1 = 26 \rightarrow$ Z

Since the day is odd, shift each letter 2 positions forward:

- O $\rightarrow$ Q
- R $\rightarrow$ T
- N $\rightarrow$ P
- Z $\rightarrow$ B (Z (26) +2 = 28, and 28-26 = 2 $\rightarrow$ B)

Answer: QTPB

Q42. Question 2: Festival Theme Number Challenge**Story:**

A town's annual festival theme number follows a unique series. The first year's theme number is 4, and for every subsequent year, the theme number is given by:

$$T(n) = T(n-1) + 2^{(n-1)} - 1.$$

Additionally, if the festival is held in a leap year, an extra 5 is added to that year's theme number.

If the 5th festival falls in a leap year, what is the adjusted theme number for that year?

Options:

- A. 30
- B. 35
- C. 40
- D. 42

Explanation:

The series yields 30 for the 5th year, and the extra condition (leap year bonus of 5) adjusts it to 35.

Solution:

Compute $T(n)$ with $T(1)=4$:

$$T(2) = 4 + 2^1 - 1 = 4 + 2 - 1 = 5$$

$$T(3) = 5 + 2^2 - 1 = 5 + 4 - 1 = 8$$

$$T(4) = 8 + 2^3 - 1 = 8 + 8 - 1 = 15$$

$$T(5) = 15 + 2^4 - 1 = 15 + 16 - 1 = 30$$

Since year 5 is a leap year, add 5:

$$\text{Adjusted } T(5) = 30 + 5 = 35$$

Answer: 35

Q43. Student Club Code Challenge**Story:**

At a school, student clubs are given unique codes as follows: The code starts with the first letter of the club's name. This letter is replaced by its mirror letter (A $\leftrightarrow$ Z, B $\leftrightarrow$ Y, etc.). If the club's registration number is even, the mirror letter is then shifted one position forward (cyclically). Next, a number is appended: the 1st club gets 3, and each subsequent club's number increases by 2.

If the "Art Club" is the 4th club to register, what is its code?

Options:

- A. A9
- B. Z9
- C. A7
- D. Z7

Explanation:

The mirror of A is Z; because the club is 4th (an even registration), we shift Z forward to A. Appending 9 (the series number for the 4th club) gives A9.

Solution:

"Art Club" $\rightarrow$ first letter A.

Mirror of A is Z.

Registration number 4 is even, so shift Z one position forward: Z $\rightarrow$ A.

The number for the 4th club is: 3 (for 1st), 5 (2nd), 7 (3rd), 9 (4th).

Thus, code = A9.

Answer: A9

Q44. Business Profit Puzzle**Story:**

A small business's monthly profit follows a pattern: The first month's profit is \$500. Each month, the profit increases by an amount that is 20% more than the previous month's increase. In addition, for even-numbered months, an extra \$50 is added. If the increase from month 1 to month 2 is \$200, what is the profit in the 4th month?

Options:

- A. \$1300
- B. \$1328
- C. \$1350
- D. \$1378

Explanation:

The profit increases by 20% on the previous month's increase, with an extra \$50 added on even months. Calculation yields \$1328 for month 4.

Solution:

Month 1: \$500.

Month 2: Profit = $500 + 200 + 50$ (even month) = \$750.

Month 3: Increase = $\$200 \times 1.20 = \240 . Profit = $750 + 240 = \$990$.

Month 4: Increase = $\$240 \times 1.20 = \288 ; add \$50 bonus (even month). Profit = $990 + 288 + 50 = \$1328$.

Answer: \$1328

Q45. Delivery Time Dilemma**Story:**

A courier company's delivery times follow a rule: The first delivery takes 35 minutes. Each subsequent delivery takes 80% of the previous delivery time plus an additional 5 minutes. What is the delivery time for the 4th delivery?

Options:

- A. 29.12 minutes
- B. 30.12 minutes
- C. 31.12 minutes
- D. 32.12 minutes

Explanation:

Applying the recursive rule yields a 4th delivery time of approximately 30.12 minutes.

Solution:

$$T_1 = 35 \text{ minutes.}$$

$$T_2 = 0.8 \times 35 + 5 = 28 + 5 = 33 \text{ minutes.}$$

$$T_3 = 0.8 \times 33 + 5 = 26.4 + 5 = 31.4 \text{ minutes.}$$

$$T_4 = 0.8 \times 31.4 + 5 = 25.12 + 5 = 30.12 \text{ minutes.}$$

Answer: 30.12 minutes

Q46. Investment Growth Conundrum

Story: An investor begins with \$10,000. At the end of each year, the portfolio grows by 10% of its current value. If the year number is prime, an extra bonus of \$1,000 is added at the end of that year. What is the portfolio value at the end of the 3rd year?

Options:

- A. \$13,200
- B. \$14,200
- C. \$15,410
- D. \$16,200

Answer: C. \$15,410

Explanation: Year 1: $\$10,000 + 10\% = \$11,000$. Year 2 is prime: $\$11,000 + \$1,100 + \$1,000 = \$13,100$. Year 3 is prime: $\$13,100 + \$1,310 + \$1,000 = \$15,410$.

Q47. Library Book Arrangement Conundrum**Story:**

A librarian must arrange five books on a shelf using two rules: first, sort by increasing number of pages; if two books have the same page count, arrange them in alphabetical order by the author's last name. The books are:

Book A: 200 pages, Author Adams

Book B: 180 pages, Author Brown

Book C: 200 pages, Author Carter

Book D: 150 pages, Author Davis

Book E: 180 pages, Author Evans

Which book should be placed in the 3rd position?

Answer: Book E

Options:

A. Book D

B. Book B

C. Book E

D. Book A

Explanation:

After sorting by page count and resolving ties alphabetically, Book E occupies the 3rd position.

Solution:

Sort by pages:

150 pages: Book D

180 pages: Book B (Brown) and Book E (Evans) → arrange alphabetically: Brown, then Evans

200 pages: Book A (Adams) and Book C (Carter) → order: Adams, then Carter

Final order:

Book D

Book B

Book E

Book A

Book C

Q48. Food Festival Vendor Arrangement**Story:**

At a food festival, vendors are arranged in increasing order of their sales revenue (in thousands). In case of a tie, the vendor with the smaller stall number comes first. The vendor details are:

Vendor A: Revenue 12k, Stall 3

Vendor B: Revenue 15k, Stall 1

Vendor C: Revenue 12k, Stall 2

Vendor D: Revenue 18k, Stall 5

Vendor E: Revenue 15k, Stall 4

Which vendor occupies the 3rd position in the arrangement?

Options:

A. Vendor A

B. Vendor B

C. Vendor C

D. Vendor E

Explanation:

Based on the sorting rules, Vendor B is the 3rd in order.

Solution:

Sort by revenue:

Revenue 12k: Vendor C (stall 2), then Vendor A (stall 3)

Revenue 15k: Vendor B (stall 1), then Vendor E (stall 4)

Revenue 18k: Vendor D (stall 5)

Combined order (by revenue ascending):

Vendor C

Vendor A

Vendor B

Vendor E

Vendor D

Answer: Vendor B

Q49. Office Meeting Scheduling Challenge**Story:**

In an office, meetings are held on alternate days starting from Monday. Additionally, if a meeting falls on a Friday, it is extended by 30 minutes. What is the day and extension status for the meeting held on the 3rd available day?

Options:

- A. Monday, not extended
- B. Wednesday, not extended
- C. Friday, extended
- D. Sunday, extended

Explanation:

The meeting schedule (Monday, Wednesday, Friday, ...) implies the 3rd meeting is on Friday, which comes with an extension.

Solution:

Meeting days (alternate starting Monday):

Monday

Wednesday

Friday

Since Friday is the 3rd available day, the meeting is extended by 30 minutes.

Answer: Friday, extended

Q50. Sports Tournament Scheduling Challenge**Story:**

A sports tournament is organized with a special scheduling rule: Matches are held on consecutive days, except that if a match is played on a day when the date is prime, the next match is delayed by one extra day (i.e., skip the following day). The tournament starts on a Saturday with the date being 2. What is the date of the 4th match?

Options:

- A. 6
- B. 7
- C. 8
- D. 9

Explanation:

Following the rule (prime-date delay) and counting from Saturday, the 4th match falls on the 7th.

Solution:

Match 1: Saturday, date 2 (2 is prime) → delay next match by one day.

Skip Sunday.

Match 2: Monday, date 4 (4 is not prime) → next match on Tuesday.

Match 3: Tuesday, date 5 (5 is prime) → delay next match by one day.

Skip Wednesday.

Match 4: Thursday, date 7.

Answer: 7

Answer Key and Explanations

Note

- Each question block above includes the answer and explanation immediately after the options/source solution as part of the polished rebranded paper.
- Duplicated and formula-formatting errors from the source were corrected during rebranding.

Answer Key

Question - Answer	Question - Answer	Question - Answer	Question - Answer	Question - Answer
Q1: A	Q2: C	Q3: B	Q4: B	Q5: B
Q6: B	Q7: A	Q8: D	Q9: D	Q10: C
Q11: A	Q12: A	Q13: A	Q14: B	Q15: C
Q16: B	Q17: D	Q18: A	Q19: A	Q20: A
Q21: A Explanation: Since $6 = 2 \times 3$, any number divisible by 6 must have factors 2 and 3. The reason directly explains the assertion.	Q22: A Explanation: Congruent figures are identical in shape and size, so they have equal areas. The reason correctly explains the assertion.	Q23: A Explanation: The procedure described yields $H \rightarrow J$, $E \rightarrow G$, $L \rightarrow N$, $O \rightarrow Q$. Both the assertion and reason are true, and the reason correctly explains the code transformation.	Q24: D Explanation: The sequence of square numbers is not arithmetic because the differences (3, 5, 7, ...) are not constant. Both the assertion and the reason are false.	Q25: A Explanation: Counting 30 days after Monday yields Wednesday. Both statements are true, and the reason correctly explains the assertion.
Q26: C Explanation: The assertion is true regardless of uniformity—the rope will burn out in 30 minutes when lit at both ends. However, the reason is false because the rope burns unevenly; the time reduction holds by symmetry of the process, not due to uniform burning.	Q27: A Explanation: A person cannot be both a sibling and a parent of the same individual. Both the assertion and reason are true, and the reason correctly explains the assertion.	Q28: A Explanation: Every square meets the definition of a rectangle. Both statements are true, and the reason correctly explains the assertion.	Q29: A Explanation: Since $8 \times 45^\circ = 360^\circ$, the polygon completes a full rotation and returns to its original orientation. Both statements are true, and the reason explains the assertion.	Q30: D Explanation: This is false because data sufficiency questions often require the combination of statements to reach a conclusion; it is not a rule that each statement is independently sufficient. Both the assertion and the reason are false.
Q31: XIP	Q32: B	Q33: A	Q34: B	Q35: B
Q36: A	Q37: A	Q38: C	Q39: Circle	Q40: Statement (1) alone is sufficient.
Q41: QTPB	Q42: 35	Q43: A9	Q44: \$1328	Q45: 30.12 minutes
Q46: C	Q47: Book E	Q48: Vendor B	Q49: Friday, extended	Q50: 7