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SCO INTERNATIONAL OLYMPIAD

CLASS 7 MENTAL ABILITY OLYMPIAD OFFICIAL QUESTION PAPER

Official question paper with answer key and explanations

Designed from Class 7 Mental Ability syllabus pathways and aligned with SCO's exam practice, reporting, and future-ready academic reasoning growth.

- compact question labels with passages and diagrams placed inside question blocks
- answer key and explanations included for transparent student learning

Series	Coding	Alphabet	Puzzles	Reasoning
Calendar	Ranking	Cubes	Verbal	Achievers

SCO International Mental Ability Olympiad - Class 7

Total Questions: 50	**Time: 60 minutes**
Class: 7	**Set: A**

Name: .....

Registration ID: ..... **Contact No.:** .....

General Reasoning

Q1. Find the missing number in the series: 3, 6, 18, 72, ?, 2160.

A) 288
B) 360
C) 432
D) 576

Answer: **B) 360**
Explanation: The terms are multiplied by 2, 3, 4, 5 and 6 respectively. Therefore, 72 × 5 = 360 and 360 × 6 = 2160.

Q2. In a code language, each letter is shifted 3 places forward. If GARDEN is written as JDUGHQ, how is PLANTS written?

A) SODQWV
B) SORFQU
C) SOLFQW
D) SODQWU

Answer: **A) SODQWV**
Explanation: P→S, L→O, A→D, N→Q, T→W, and S→V. Therefore, PLANTS becomes SODQWV.

Q3. Arrange the words in dictionary order: 1. Pumpkin 2. Publish 3. Puppet 4. Public 5. Purple.

A) 4, 2, 1, 3, 5
B) 1, 5, 4, 2, 3
C) 4, 1, 2, 3, 5
D) 2, 4, 1, 5, 3

Answer: **A) 4, 2, 1, 3, 5**
Explanation: The correct order is Public, Publish, Pumpkin, Puppet, Purple.

Q4. If the operation @ is defined as x @ y = 2x + 3y, find 6 @ 5.

A) 24
B) 27
C) 29
D) 31

Answer: **B) 27**
Explanation: 6 @ 5 = 2×6 + 3×5 = 12 + 15 = 27.

Q5. A clock strikes once at 1 o'clock, twice at 2 o'clock, and so on. How many times will it strike in 24 hours?

A) 78
B) 132
C) 156
D) 180

Answer: **C) 156**
Explanation: In 12 hours, the clock strikes 1+2+...+12 = 78 times. In 24 hours, it strikes 78 × 2 = 156 times.

Q6. If 15 August 2023 was a Tuesday, what day was 15 August 2024?

A) Wednesday
B) Thursday
C) Friday
D) Saturday

Answer: **B) Thursday**
Explanation: Since 2024 is a leap year and the date is after February, the day shifts by 2. Tuesday + 2 = Thursday.

Q7. In a class of 60 students, Rahul ranks 18th from the top. What is his rank from the bottom?

A) 41st
B) 42nd
C) 43rd
D) 44th

Answer: **C) 43rd**
Explanation: Rank from bottom = Total − Rank from top + 1 = 60 − 18 + 1 = 43.

Q8. A father is twice as old as his son. Ten years ago, the father was three times as old as the son. What is the father's present age?

A) 30 years
B) 40 years
C) 50 years
D) 60 years

Answer: **B) 40 years**
Explanation: Let son's age be x. Father's age is 2x. Ten years ago: 2x−10 = 3(x−10). So x = 20 and father = 40.

Q9. A woman introduces a man as "the son of my mother's only daughter." How is the man related to the woman?

A) Nephew
B) Son
C) Brother
D) Uncle

Answer: **B) Son**
Explanation: The woman's mother's only daughter is the woman herself. The son of herself is her son.

Q10. A cube is painted on all faces and cut into 64 equal smaller cubes. How many small cubes have exactly three painted faces?

A) 4
B) 6
C) 8
D) 12

Answer: **C) 8**
Explanation: Cubes with exactly three painted faces are only the corner cubes. A cube has 8 corners.

Q11. Find the next number: 3, 8, 15, 24, 35, ?

A) 46
B) 48
C) 50
D) 52

Answer: **B) 48**
Explanation: The differences are 5, 7, 9, 11; the next difference is 13. Hence 35 + 13 = 48.

Q12. For each letter in SCHOOL, find its mirror letter, subtract the original position from the mirror position, add 4, and if the result is not positive, add 26. What is the code?

A) SYOAAG
B) SYOAAH
C) SYOABG
D) SYNAAG

Answer: **A) SYOAAG**
Explanation: Applying the rule letter by letter gives S, Y, O, A, A, G.

Q13. Starting with D, each next letter is obtained by adding the sum of the digits of the previous letter's alphabet position. What is the 5th letter?

A) A
B) B
C) C
D) D

Answer: **B) B**
Explanation: D(4)→H(8)→P(16)→W(23)→B(28−26=2). Therefore the fifth letter is B.

Q14. Define a ∆ b = (a − b)^2 + (a + b). Find 8 ∆ 6.

A) 16
B) 18
C) 20
D) 22

Answer: **B) 18**
Explanation: (8−6)^2 + (8+6) = 4 + 14 = 18.

Q15. A drawer contains 6 pairs of socks. What is the minimum number of socks to pick without looking to ensure at least 3 complete pairs?

A) 8
B) 9
C) 10
D) 11

Answer: **B) 9**
Explanation: In the worst case, the first 6 socks are one from each pair. The next 3 socks guarantee 3 pairs. Total = 9.

Q16. In a common year, if January 1 is Wednesday, what day will October 15 be?

A) Monday
B) Tuesday
C) Wednesday
D) Thursday

Answer: **C) Wednesday**
Explanation: The offset from January 1 to October 15 is 287 days, and 287 is divisible by 7. So the weekday remains Wednesday.

Q17. Arrange 3.456, 3.465, 3.4567, 3.463, 3.460 in descending order. What is the median?

A) 3.463
B) 3.460
C) 3.4567
D) 3.456

Answer: **B) 3.460**
Explanation: Descending order: 3.465, 3.463, 3.460, 3.4567, 3.456. The middle value is 3.460.

Q18. A father is three times as old as his son. Eight years ago, he was five times as old as his son. What is the son's present age?

A) 12 years
B) 16 years
C) 18 years
D) 20 years

Answer: **B) 16 years**
Explanation: Let the son's age be x. Father = 3x. Eight years ago: 3x−8 = 5(x−8), so x = 16.

Q19. P is the sister of Q. Q is the mother of R. R is the cousin of S. S is the daughter of T, who is the sibling of Q. How is P related to S?

A) Aunt
B) Cousin
C) Sister
D) Niece

Answer: **A) Aunt**
Explanation: Since T and Q are siblings, and P is also Q's sister, P is S's aunt.

Q20. A cube painted on all faces is divided into 64 equal smaller cubes. How many have exactly one face painted?

A) 16
B) 20
C) 24
D) 28

Answer: **C) 24**
Explanation: A 4×4×4 cube has (4−2)^2 = 4 one-painted cubes per face. Across 6 faces, 6×4 = 24.

Reason and Assertion

Q21. Assertion: In a sequence T(n)=2T(n−1)+1 starting from an odd number, every term is odd. Reason: Doubling an odd number gives an even number, and adding 1 gives an odd number.

A) Both are true and Reason explains Assertion
B) Both are true but Reason does not explain Assertion
C) Assertion true but Reason false
D) Both are false

Answer: **A) Both are true and Reason explains Assertion**
Explanation: The reason directly shows why the oddness continues from one term to the next.

Q22. Assertion: Reversing a palindrome after mirror coding keeps a symmetric pattern. Reason: Mirror mapping changes letters but does not disturb positional symmetry.

A) Both are true and Reason explains Assertion
B) Both are true but Reason does not explain Assertion
C) Assertion true but Reason false
D) Both are false

Answer: **A) Both are true and Reason explains Assertion**
Explanation: A palindrome remains symmetric when every matching position is transformed using the same rule.

Q23. Assertion: If the first day of a 31-day month is Monday, the last day is Wednesday. Reason: There are 30 days after the first day, and 30 mod 7 = 2.

A) Both are true and Reason explains Assertion
B) Both are true but Reason does not explain Assertion
C) Assertion true but Reason false
D) Both are false

Answer: **A) Both are true and Reason explains Assertion**
Explanation: Monday plus 2 weekdays is Wednesday.

Q24. Assertion: When an n×n×n cube painted outside is cut, the number of unpainted cubes is (n−2)^3. Reason: Only the interior cube of side n−2 remains unpainted.

A) Both are true and Reason explains Assertion
B) Both are true but Reason does not explain Assertion
C) Assertion true but Reason false
D) Both are false

Answer: **A) Both are true and Reason explains Assertion**
Explanation: Removing the outer painted layer leaves an interior cube of dimensions (n−2)×(n−2)×(n−2).

Q25. Assertion: If a student ranks 15th from the top in a class of 60, the rank from bottom is 46th. Reason: Rank from bottom = total − rank from top + 1.

A) Both are true and Reason explains Assertion
B) Both are true but Reason does not explain Assertion
C) Assertion true but Reason false
D) Both are false

Answer: **A) Both are true and Reason explains Assertion**
Explanation: 60 − 15 + 1 = 46.

Q26. Assertion: In a series formed by adding consecutive primes, every consecutive difference is prime. Reason: The construction itself uses the next prime as each step.

A) Both are true and Reason explains Assertion
B) Both are true but Reason does not explain Assertion
C) Assertion true but Reason false
D) Both are false

Answer: A) Both are true and Reason explains Assertion
Explanation: Since the step added is prime each time, the difference between consecutive terms is prime.

Q27. Assertion: If Statement 1 says $x > 7$ and Statement 2 says $x > 5$, each statement alone is sufficient to conclude $x > 5$. Reason: Any number greater than 7 is also greater than 5.

A) Both are true and Reason explains Assertion
B) Both are true but Reason does not explain Assertion
C) Assertion true but Reason false
D) Both are false

Answer: A) Both are true and Reason explains Assertion
Explanation: Statement 2 directly gives $x>5$; Statement 1 also implies $x>5$.

Q28. Assertion: If race times are measured to the nearest hundredth of a second, a difference of 0.005 second may be treated as indistinguishable. Reason: It is smaller than the stated precision.

A) Both are true and Reason explains Assertion
B) Both are true but Reason does not explain Assertion
C) Assertion true but Reason false
D) Both are false

Answer: A) Both are true and Reason explains Assertion
Explanation: A difference below the measurement precision should not be over-interpreted.

Q29. Assertion: Replacing each digit by its 9's complement makes the digit-wise sum equal to 9. Reason: $d + (9-d) = 9$ for every digit d.

A) Both are true and Reason explains Assertion
B) Both are true but Reason does not explain Assertion
C) Assertion true but Reason false
D) Both are false

Answer: A) Both are true and Reason explains Assertion
Explanation: Each original digit and its complement add to 9.

Q30. Assertion: A valid conclusion drawn from entirely true premises is necessarily true. Reason: Deductive validity preserves truth from premises to conclusion.

A) Both are true and Reason explains Assertion
B) Both are true but Reason does not explain Assertion
C) Assertion true but Reason false
D) Both are false

Answer: A) Both are true and Reason explains Assertion
Explanation: This is the basic rule of deductive reasoning.

Case Study / Data Reasoning

Q31. A factory produces 100 units in Month 1. Each next month equals previous production × 1.2 plus 15. What is the production in Month 3?

A) 171
B) 177
C) 183
D) 189

Answer: **B) 177**
Explanation: Month 2 = 100×1.2+15 = 135. Month 3 = 135×1.2+15 = 177.

Q32. A company encodes product names by replacing each letter with its mirror and then shifting 2 positions forward. What is the code for BRAND?

A) AKBOY
B) AJBOY
C) AKBPY
D) BKCOY

Answer: **A) AKBOY**
Explanation: B,R,A,N,D mirror to Y,I,Z,M,W; shifting forward 2 gives A,K,B,O,Y.

Q33. A bus leaves at 7:20 AM and normally takes 40 minutes. On a rainy day it leaves 5 minutes late and travel time increases by 25%. What is the new arrival time?

A) 8:05 AM
B) 8:10 AM
C) 8:15 AM
D) 8:20 AM

Answer: **C) 8:15 AM**
Explanation: Departure is 7:25 AM. Travel time becomes 40×1.25 = 50 minutes. Arrival is 8:15 AM.

Q34. A store's revenue increases by 25% each month. Month 1 revenue is $400. What is Month 3 revenue?

A) $625
B) $650
C) $675
D) $700

Answer: **A) $625**
Explanation: Month 2 = 400×1.25 = 500. Month 3 = 500×1.25 = 625.

Q35. Books are sorted by page count and then author surname alphabetically: X: 300/King, Y: 250/Adams, Z: 300/Brown, W: 250/Carter. Which book is third?

A) Book Y
B) Book W
C) Book Z
D) Book X

Answer: **C) Book Z**
Explanation: Order: Y(250, Adams), W(250, Carter), Z(300, Brown), X(300, King).

Q36. A fruit survey records Apples 60 votes, Bananas 45 votes, and Cherries 30 votes. Popularity index = votes ÷ number of letters in the fruit name. Which is highest?

A) Apples
B) Bananas
C) Cherries
D) All equal

Answer: **A) Apples**
Explanation: Apples: 60/6 = 10; Bananas: 45/7 ≈ 6.43; Cherries: 30/8 = 3.75.

Q37. A father says, “I am twice as old as my daughter. Five years ago I was three times as old as she was.” What is the daughter’s current age?

A) 10
B) 12
C) 15
D) 20

Answer: **A) 10**
Explanation: Let daughter be x. Father is 2x. 2x−5 = 3(x−5), so x = 10.

Q38. A cube is painted on all sides and divided into 125 equal smaller cubes. How many smaller cubes have exactly one face painted?

A) 25
B) 27
C) 54
D) 64

Answer: **C) 54**
Explanation: 125 means a 5×5×5 cube. One-painted cubes = 6×(5−2)^2 = 6×9 = 54.

Q39. An event rule says: if the 1st of a month is Sunday, hold the event on the 15th; otherwise on the 20th. If the 1st is Wednesday, when is the event?

A) 15th
B) 18th
C) 20th
D) 22nd

Answer: **C) 20th**
Explanation: Since the 1st is not Sunday, the “otherwise” condition applies.

Q40. Teams are ranked by higher points and, if tied, fewer fouls. A: 78/12, B: 78/10, C: 82/15, D: 74/8, E: 82/13. Which team ranks second?

A) Team A
B) Team B
C) Team C
D) Team D

Answer: **C) Team C**
Explanation: E ranks first among 82-point teams due to fewer fouls; C is next with 82 points, so C ranks second.

Achievers Section

Q41. A school's enrollment starts at 300 in September. Each next month adds 20×n students for month n. In which month does enrollment first exceed 660, and what is the weekday of the 1st if September 1 is Monday?

A) January; Saturday
B) February; Sunday
C) February; Monday
D) March; Tuesday

Answer: **B) February; Sunday**
Explanation: Enrollment becomes 700 in Month 6, February. Month starts shift by +2, +3, +2, +3, +3 days: February 1 is Sunday.

Q42. A discount code uses the first two letters of BOOK. Mirror each letter, shift 2 forward, then multiply the final alphabet positions. What is the code number?

A) 14
B) 26
C) 28
D) 30

Answer: **A) 14**
Explanation: B→Y→A and O→L→N. Positions A=1 and N=14; product = 14.

Q43. Arrange D, H, M, Q, Z alphabetically. Remove the median letter, then shift each remaining letter forward by its original rank. What is the final sequence?

A) EJUE
B) EJUJ
C) FJUE
D) EKVE

Answer: **A) EJUE**
Explanation: Remove M. D rank1→E, H rank2→J, Q rank4→U, Z rank5→E.

Q44. Define a ◊ b = (a−b)^2 + (a+b). If x ◊ y = 30 and x = y + 2, find x and y.

A) x=14, y=12
B) x=15, y=13
C) x=16, y=14
D) x=13, y=11

Answer: **A) x=14, y=12**
Explanation: (x−y)^2 = 4 and x+y = 2y+2. So 4+2y+2 = 30, giving y=12 and x=14.

Q45. Workshop start times in minutes after 9:00 are 15, 30, 50, 75, ?. Differences increase by 5 minutes. If the last workshop ends at 11:00, what are the missing start time and total duration?

A) 100 min; 95 min
B) 105 min; 105 min
C) 110 min; 115 min
D) 105 min; 95 min

Answer: **B) 105 min; 105 min**
Explanation: Differences are 15, 20, 25, then 30, so the last starts at 105 minutes. Durations total 15+20+25+30+15 = 105.

Q46. A product named SUGAR uses the first two letters. Mirror each letter, shift 2 forward, and multiply final alphabet positions. What is the code?

A) 64
B) 72
C) 80
D) 88

Answer: **C) 80**
Explanation: S→H→J (10) and U→F→H (8). Product = 10×8 = 80.

Q47. A fundraiser starts with $50. The first increase is $10, and each next increase is $5 more. What is the total of the first 7 donations?

A) $725
B) $735
C) $745
D) $755

Answer: **B) $735**
Explanation: Donations: 50, 60, 75, 95, 120, 150, 185. Sum = 735.

Q48. P is the sister of Q. Q is the mother of R. R is the cousin of S. S is the daughter of T, who is sibling of Q. How is P related to S?

A) Aunt
B) Cousin
C) Sister
D) Niece

Answer: **A) Aunt**
Explanation: P is a sibling in the parent generation of S, so P is S's aunt.

Q49. A 6×6×6 cube is painted on all faces. Let F(2) be cubes with exactly two painted faces and F(3) with exactly three painted faces. Find 3×F(2) − F(3).

A) 128
B) 134
C) 136
D) 138

Answer: **C) 136**
Explanation: F(2)=12×(6−2)=48 and F(3)=8. So 3×48−8 = 136.

Q50. Two students A and B have scores adding to 160. A scored 10 more than B. Is A's score above 85?

A) Yes, above 85
B) No, exactly 85
C) Cannot be determined
D) Insufficient information

Answer: **B) No, exactly 85**
Explanation: Let B=x, A=x+10. Then 2x+10=160, x=75, so A=85. It is not above 85.

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Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	A	3	A	4	B	5	C
6	B	7	C	8	B	9	B	10	C
11	B	12	A	13	B	14	B	15	B
16	C	17	B	18	B	19	A	20	C
21	A	22	A	23	A	24	A	25	A
26	A	27	A	28	A	29	A	30	A
31	B	32	A	33	C	34	A	35	C
36	A	37	A	38	C	39	C	40	C
41	B	42	A	43	A	44	A	45	B
46	C	47	B	48	A	49	C	50	B

Consolidated Explanation Notes

Q1. The terms are multiplied by 2, 3, 4, 5 and 6 respectively. Therefore, 72 × 5 = 360 and 360 × 6 = 2160.
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