TNPSC Group I — Aptitude & Reasoning

Revision Pack · quick notes + practice MCQs with answer key
Verified content · 100% free · no login · braingrain.in

A. Quick Revision Notes

Number system & simplification

Numbers are classified as natural, whole, integers, rational and irrational, and as prime or composite. Divisibility: by 2 (even last digit), by 3 (digit sum divisible by 3), by 5 (ends in 0 or 5), by 9 (digit sum divisible by 9), by 11 (alternating digit-sum difference divisible by 11). For any two numbers, LCM times HCF = product of the numbers. Simplify using BODMAS order: Brackets, Of, Division, Multiplication, Addition, Subtraction. Useful sums: 1 + 2 + ... + n = n(n+1)/2; sum of first n squares = n(n+1)(2n+1)/6.

Percentage, ratio & average

A percentage is a fraction out of 100: x% of y = (x/100) times y. Convert a fraction to a percentage by multiplying by 100. Percentage increase = (increase/original) times 100. A ratio a:b compares quantities; to combine a:b and b:c, make b common to get a:b:c. In a proportion a:b = c:d, the product of extremes equals the product of means (a times d = b times c). Average = (sum of all values)/(number of values). For a weighted average, multiply each value by its weight, add, and divide by the total weight.

Time, speed & distance

Speed = distance/time; distance = speed times time; time = distance/speed. Convert km/hr to m/s by multiplying by 5/18, and m/s to km/hr by multiplying by 18/5. Average speed = total distance/total time; for equal distances covered at speeds x and y, average speed = 2xy/(x + y). Relative speed is the sum of speeds when objects move in opposite directions and the difference when in the same direction. A train crossing a pole takes (length/speed); two trains crossing take (sum of lengths)/(relative speed). Work problems use work = rate times time.

Profit, loss & interest

Profit = Selling Price minus Cost Price; Loss = Cost Price minus Selling Price. Profit% = (profit/CP) times 100 and Loss% = (loss/CP) times 100, always on cost price. SP = CP times (100 + gain%)/100. Discount is calculated on the Marked Price. Simple Interest SI = (P times R times T)/100, and Amount = P + SI. Compound Interest: Amount = P times (1 + R/100) raised to T; CI = Amount minus P. For 2 years, the difference between CI and SI = P times (R/100) squared.

Logical reasoning

Common types: analogy (find the relationship in a pair), classification (spot the odd one out), syllogisms (all/some/no statements — solve with Venn diagrams), blood relations (draw a family tree), directions (track turns using North-East-South-West), seating arrangement (linear or circular), ranking, and statement-and-conclusion or statement-and-assumption. General method: identify the underlying rule or pattern, apply it consistently, test each option, and eliminate those that do not fit. Read carefully — small words like 'only', 'all' or 'some' change the answer.

Series & coding-decoding

In a number series, find the pattern — addition, subtraction, multiplication, squares, cubes, alternating terms or primes — then supply the missing or wrong term. For letter series, use letter positions A = 1 to Z = 26 (and reverse, where A pairs with Z). In coding-decoding, work out how the code relates to the word: a fixed letter shift (for example +1 turns CAT into DBU), position numbering, or substitution. Compare the positions of matching letters between the word and its code to crack the rule, then apply it.

Data interpretation

Data interpretation asks you to read tables, bar graphs, line graphs and pie charts and compute answers. In a pie chart the whole circle is 360 degrees = 100%, so a sector's value = (its percentage/100) times the total, and its angle = (value/total) times 360 degrees. Percentage change = (new minus old)/old times 100. You may also be asked for averages and ratios from the data. Always check the units and the legend, read the correct row or bar, and approximate where possible to save time.

Geometry & mensuration

The angles of a triangle sum to 180 degrees and of a quadrilateral to 360 degrees. Pythagoras' theorem: in a right triangle, hypotenuse squared = base squared + height squared. Areas: rectangle = length times breadth; square = side squared; triangle = 1/2 times base times height; circle = pi times r squared, with circumference = 2 times pi times r. Perimeter of a rectangle = 2 times (length + breadth). Volumes: cube = side cubed; cuboid = l times b times h; cylinder = pi times r squared times h; sphere = 4/3 times pi times r cubed. Take pi as 22/7.

B. Practice MCQs (25)

1. What is the HCF of 252, 378 and 630?

(A) 63
(B) 42
(C) 189
(D) 126

2. Simplify: 3/4 + (5/6 - 1/3) * 2.

(A) 11/6
(B) 5/4
(C) 7/4
(D) 13/8

3. What is the least positive integer by which 180 must be multiplied to make it a perfect square?

(A) 3
(B) 10
(C) 5
(D) 2

4. Evaluate: square root of 1296 + cube root of 343 - 11.

(A) 30
(B) 34
(C) 36
(D) 32

5. The average of 12 observations is 18; if one observation 24 is replaced by 36, what is the new average?

(A) 19
(B) 18.5
(C) 19.5
(D) 20

6. The angles of a triangle are in the ratio 2 : 3 : 4. What is the largest angle?

(A) 60 degrees
(B) 80 degrees
(C) 70 degrees
(D) 90 degrees

7. A marked price of Rs. 800 is first discounted by 15% and then GST of 10% is added on the discounted price. What is the final price?

(A) Rs. 740
(B) Rs. 760
(C) Rs. 728
(D) Rs. 748

8. In a class, the ratio of boys to girls is 5 : 4; after 6 girls join, the ratio becomes 1 : 1. How many boys are in the class?

(A) 30
(B) 40
(C) 36
(D) 24

9. An aeroplane travels 2781.20 km in 6 hours. What is its average speed, rounded to two decimal places?

(A) 473.53 km/h
(B) 463.53 km/h
(C) 453.53 km/h
(D) 483.53 km/h

10. A bus goes 180 km at 45 km/h and returns the same distance at 60 km/h. What is the average speed for the whole journey?

(A) 51.43 km/h
(B) 54 km/h
(C) 50 km/h
(D) 52.5 km/h

11. A 150 m long train crosses a pole at 54 km/h. How many seconds does it take to cross the pole?

(A) 10 seconds
(B) 8 seconds
(C) 12 seconds
(D) 9 seconds

12. For a fixed distance, if speed is increased by 25%, by what percentage is the time reduced?

(A) 20%
(B) 15%
(C) 25%
(D) 30%

13. An article costs Rs. 800 and is sold at a marked price of Rs. 1000 after a 10% discount. What is the profit percentage?

(A) 20%
(B) 12.5%
(C) 15%
(D) 10%

14. Find the simple interest on Rs. 5000 for 2.5 years at 8% per annum.

(A) Rs. 800
(B) Rs. 900
(C) Rs. 1000
(D) Rs. 1200

15. A chair is sold for Rs. 960 at a profit of 20%. What was its cost price?

(A) Rs. 800
(B) Rs. 768
(C) Rs. 820
(D) Rs. 840

16. A principal of Rs. 10000 is compounded annually at 10% for 2 years. What is the compound interest?

(A) Rs. 2500
(B) Rs. 2200
(C) Rs. 2000
(D) Rs. 2100

17. Five persons R, S, P, Q and T sit in a row facing north; R is at the left end, S is immediately to the right of R, P is immediately to the right of S, Q is immediately to the right of P, and T is immediately to the right of Q. Who sits in the middle?

(A) T
(B) P
(C) Q
(D) S

18. If all squares are rectangles and all rectangles are quadrilaterals, which conclusion follows?

(A) No square is a quadrilateral
(B) All squares are quadrilaterals
(C) All quadrilaterals are squares
(D) All rectangles are squares

19. A person walks 6 m east and then 8 m north. What is the shortest distance from the starting point?

(A) 8 m
(B) 12 m
(C) 14 m
(D) 10 m

20. Find the next term in the Fibonacci-type series: 13, 21, 34, 55, __.

(A) 91
(B) 89
(C) 76
(D) 81

21. In a code, each letter is shifted three places forward in the alphabet, so PHONE is coded as SKRQH. How is CODE coded?

(A) FRGH
(B) DPGH
(C) EQFG
(D) FQGH

22. In Atbash coding, A is replaced by Z, B by Y, C by X, and so on. What is the code for MATH?

(A) NZGS
(B) NZHT
(C) MZGS
(D) NBGH

23. Find the next number in the series: 2, 6, 12, 20, 30, __.

(A) 44
(B) 40
(C) 42
(D) 36

24. A shop sold apples over four days as follows: Monday 40, Tuesday 55, Wednesday 65, Thursday 40. What was the average daily sale?

(A) 45
(B) 50
(C) 55
(D) 48

25. In a class of 50 students, favourite games are recorded as cricket 18, football 12, kabaddi 8 and chess 12. What percentage of students chose kabaddi?

(A) 16%
(B) 14%
(C) 12%
(D) 18%

C. Answer Key & Explanations

1. (D) Since 252 = 126 * 2, 378 = 126 * 3 and 630 = 126 * 5, the greatest common factor is 126.
2. (C) First 5/6 - 1/3 = 1/2, and 3/4 + 1/2 * 2 = 3/4 + 1 = 7/4.
3. (C) Since 180 = 2^2 * 3^2 * 5, multiplying by 5 pairs the unpaired factor and gives 900 = 30^2.
4. (D) The square root of 1296 is 36 and the cube root of 343 is 7, so 36 + 7 - 11 = 32.
5. (A) The total increases by 36 - 24 = 12, so the new total is 12 * 18 + 12 = 228 and the new average is 228/12 = 19.
6. (B) The 9 equal parts make 180 degrees, so one part is 20 degrees and the largest angle is 4 * 20 = 80 degrees.
7. (D) The discounted price is 800 * 85/100 = 680, and adding 10% gives 680 * 110/100 = Rs. 748.

8. (A) Let boys and girls be 5x and 4x; then 5x = 4x + 6, so x = 6 and boys = 5 * 6 = 30.
9. (B) Average speed = distance/time = 2781.20/6 = 463.53 km/h approximately.
10. (A) Total distance is 360 km and total time is 180/45 + 180/60 = 4 + 3 = 7 hours, so average speed is 360/7 = 51.43 km/h.
11. (A) Since 54 km/h = 15 m/s, time = distance/speed = 150/15 = 10 seconds.
12. (A) The new time is 100/125 = 4/5 of the old time, so the reduction is 1/5 = 20%.
13. (B) The selling price is 1000 - 10% of 1000 = Rs. 900, so profit is Rs. 100 and profit percentage is 100/800 * 100 = 12.5%.
14. (C) Simple interest = P * R * T / 100 = 5000 * 8 * 2.5 / 100 = Rs. 1000.
15. (A) If Rs. 960 is 120% of the cost price, then cost price = 960 * 100/120 = Rs. 800.
16. (D) The amount is 10000 * 1.10 * 1.10 = Rs. 12100, so compound interest is 12100 - 10000 = Rs. 2100.
17. (B) The order from left to right is R, S, P, Q, T, so the middle position is occupied by P.
18. (B) The chain square -> rectangle -> quadrilateral shows that every square must be a quadrilateral.
19. (D) The path forms a right triangle, so the shortest distance is square root of (6^2 + 8^2) = square root of 100 = 10 m.
20. (B) Each term is the sum of the previous two terms, so 34 + 55 = 89.
21. (A) Shifting C, O, D and E three letters forward gives F, R, G and H.
22. (A) Using reversed alphabet pairs, M maps to N, A to Z, T to G and H to S, giving NZGS.
23. (C) The terms follow n * (n + 1): 1*2, 2*3, 3*4, 4*5, 5*6, so the next is 6*7 = 42.
24. (B) The total sale is 40 + 55 + 65 + 40 = 200, so the average is 200/4 = 50.
25. (A) Kabaddi was chosen by 8 out of 50 students, so the percentage is 8/50 * 100 = 16%.