General Aptitude for GATE

Short notes for 1st year B.Tech (all branches) · BCA · GATE

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1. About the GA Section

- General Aptitude (GA) is common to all GATE papers and carries **15 marks** (out of 100).
- 10 questions: 5 of 1 mark + 5 of 2 marks. Negative marking for MCQs: -1/3 (1 mark), -2/3 (2 marks). No negative marks for NAT.
- Four areas: **Verbal**, **Quantitative**, **Analytical**, **Spatial** aptitude.

TIP GA is the easiest 15 marks in GATE. Aim for 12+. Attempt it first, in about 15–20 minutes.

2. Verbal Aptitude

➤ Grammar points that are asked

- Articles, prepositions, tenses, subject–verb agreement, adjectives and adverbs.
- "The number of students **is**..." (singular). "A number of students **are**..." (plural).
- "Neither of them **is** ready." "Hardly had he left **when** it rained."
- Comparatives: "better **than**", "superior **to**", "prefer tea **to** coffee".

➤ Vocabulary

- Synonyms, antonyms, word in context, analogies.
- **Analogy**: find the relation in the first pair, apply it to the second.

EXAMPLE Pen : Write :: Knife : ? → Pen is used to write, knife is used to cut.

➤ Reading comprehension and inference

- Read the question first, then the passage.
- Answer only from what the passage says or clearly implies. Avoid options with "always", "never", "only" unless the passage says so.

- **Sentence ordering**: find the opening line (introduces the topic, no pronoun like "this" or "he"), then link pairs.

Word	Meaning
Ambiguous	Having more than one meaning
Mitigate	Make less severe
Pragmatic	Practical, realistic
Ubiquitous	Found everywhere
Ephemeral	Lasting a very short time
Candid	Frank, honest

3. Quantitative Aptitude: Numbers and Percentages

➤ Number basics

- Divisibility: by 3 if digit sum divisible by 3; by 4 if last two digits divisible by 4; by 8 if last three; by 9 if digit sum divisible by 9; by 11 if (sum of odd-place digits - sum of even-place digits) is 0 or a multiple of 11.
- **HCF x LCM = product** of two numbers.
- Unit digit cycle of powers repeats every 4: 2 → 2, 4, 8, 6.

EXAMPLE Unit digit of 7^45: cycle of 7 is 7, 9, 3, 1. 45 mod 4 = 1 ⇒ unit digit = 7.

➤ Percentages

- x% of y = xy/100.
- Successive change a% and b%: net = a + b + ab/100.
- If price rises by r%, the cut in use to keep spending same = r/(100 + r) x 100%.

EXAMPLE Price up 20%, then down 20%. Net = 20 + (-20) + (20)(-20)/100 = -4% (a loss of 4%).

Profit, loss, interest

FORMULA Profit% = (SP - CP)/CP x 100. Simple interest = PRT/100. Compound amount A = P(1 + R/100)^T.

- Difference between CI and SI for 2 years = P (R/100)^2.

4. Quantitative Aptitude: Ratio, Time, Work, Speed

Ratio and average

- If a : b = 2 : 3 and b : c = 4 : 5, then a : b : c = 8 : 12 : 15.
- Average = sum / count. Weighted average = Σ wx / Σ w.

Time and work

FORMULA If A does a job in a days and B in b days, together they take ab/(a + b) days.

EXAMPLE A takes 10 days, B takes 15 days. Together = 150/25 = 6 days.

- Pipes and cisterns: same as work, but a leak or outlet is negative work.

Time, speed, distance

FORMULA Speed = distance / time. km/h to m/s: multiply by 5/18.

- Average speed for equal distances at u and v = 2uv/(u + v) (not (u + v)/2).
- Relative speed: same direction u - v, opposite direction u + v.
- Train crossing a pole: time = train length / speed. Crossing a platform: (train + platform length) / speed.
- Boats: downstream = b + s, upstream = b - s.

EXAMPLE A train 200 m long at 72 km/h crosses a 300 m platform. Speed = 72 x 5/18 = 20 m/s. Time = 500/20 = 25 s.

Mixtures (alligation)

- Cheaper : dearer = (dearer price − mean) : (mean − cheaper price).

5. Quantitative Aptitude: Counting, Probability, Data

Permutation and combination

- nPr = n!/(n − r)!, nCr = n!/(r!(n − r)!).
- Arrangements of n items with p alike = n!/p!. Circular arrangements of n = (n − 1)!.

EXAMPLE Arrangements of the letters of LEVEL: 5!/(2! × 2!) = 120/4 = 30 (two L's, two E's).

Probability

- P = favourable / total. P(not A) = 1 − P(A).
- P(at least one) = 1 − P(none).

EXAMPLE 3 coins tossed. P(at least one head) = 1 − 1/8 = 7/8.

Data interpretation

- Tables, bar charts, pie charts, line graphs. Pie chart: angle = (value/total) × 360°.
- Percentage growth = (new − old)/old × 100. Approximate when options are far apart.

Algebra and geometry basics

- (a + b)^2 = a^2 + 2ab + b^2. a^2 − b^2 = (a + b)(a − b).
- Sum of first n natural numbers = n(n + 1)/2. AP nth term = a + (n − 1)d. GP sum = a(r^n − 1)/(r − 1).
- Logarithms: log(ab) = log a + log b, log(a^n) = n log a.
- Area: triangle = (1/2) b h, circle = πr^2, sphere surface = 4πr^2, sphere volume = (4/3)πr^3.

6. Analytical Aptitude

Logic

- **Statement and conclusion / assumption**: accept only what must follow from the statement.
- **Syllogism**: draw Venn diagrams. "All A are B" and "Some B are C" does NOT give "Some A are C".
- **Deduction vs induction**: deduction = general rule to certain result; induction = examples to a likely rule.

Series and coding

EXAMPLE Series 2, 6, 12, 20, 30, ? Differences 4, 6, 8, 10, next 12 ⇒ 42. (Also $n(n+1)$.)

EXAMPLE If CAT = 24 (3 + 1 + 20), then DOG = 4 + 15 + 7 = 26.

Blood relations, direction, seating

- Draw a family tree with + for male and - for female.
- Directions: draw N up. Turning right from North = East. Distance by Pythagoras.

EXAMPLE Walk 3 km North, then 4 km East. Distance from start = sqrt(9 + 16) = 5 km, direction North-East.

- Seating: fix one person first, then place others clue by clue. Use the most certain clue first.

Calendar and clock

- Odd days: ordinary year = 1, leap year = 2. Century leap if divisible by 400.
- Clock angle at H hours M minutes: $\theta = \text{abs}(30H - 5.5M)$.

EXAMPLE Angle at 3:40 = abs(90 - 220) = 130°.

7. Spatial Aptitude

- Introduced in GATE from 2021. Tests how you see shapes in your mind.

- Topics: **rotation** and **mirror image** of figures, **paper folding and cutting**, **counting** shapes, **assembling** pieces, **cube nets**, patterns.

➤ Cube facts

- A cube has 6 faces, 12 edges, 8 corners.
- In a net, faces that are one gap apart in a straight line are opposite.
- Painted cube cut into n x n x n small cubes:

Painted faces	Count
3 faces	8 (corners)
2 faces	12 (n - 2)
1 face	6 (n - 2)^2
0 faces	(n - 2)^3

EXAMPLE n = 4: 3 faces = 8, 2 faces = 24, 1 face = 24, none = 8. Total 64 = 4^3. Correct.

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Cube net (cross shape):     Opposite pairs:
      [1]                     1 - 5
  [2] [3] [4]                 2 - 4
      [5]                     3 - 6
      [6]
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TIP For mirror images, left and right swap but top and bottom stay. For water images, top and bottom swap.

8. Most Asked Questions (practice)

1. Choose the word closest in meaning to "candid" from given options.
2. Arrange four jumbled sentences into a meaningful paragraph.
3. A shopkeeper marks 25% above cost and gives 10% discount. Find profit %.
4. A and B can do a work in 12 and 18 days. They work alternately starting with A. Find the days.
5. A car goes to a city at 40 km/h and returns at 60 km/h. Find the average speed.
6. In how many ways can 5 people sit around a round table?
7. Two dice are thrown. Find the probability that the sum is a prime number.
8. Find the angle between the hands of a clock at 7:20.

9. From given statements, decide which conclusions follow (syllogism).
10. Identify the cube that can be folded from a given net.

> **TIP** Solve the last 5 years of GATE GA papers; patterns repeat a lot. Verbal and spatial questions are quick marks, so never leave them blank.