Quantitative Aptitude Formula Sheet

Number System

- Sum of first 'n' natural numbers: $S\_n = n(n+1)/2$
- Sum of squares of first 'n' natural numbers: $S\_{n^2} = n(n+1)(2n+1)/6$
- Sum of cubes of first 'n' natural numbers: $S\_{n^3} = (n(n+1)/2)^2$
- Divisibility Rule for 7: Double the last digit and subtract it from the rest of the number.
- Divisibility Rule for 11: Difference of digit sums at odd/even positions must be 0 or divisible by 11.
- Product of two numbers = HCF × LCM

Percentage

- Fraction to percentage: $(a/b) * 100$ %
- Increase by x%: New value = $(100 + x)$% of original
- Decrease by x%: New value = $(100 - x)$% of original
- Net change after increase x% and decrease y%: $x - y - (xy/100)$%

Profit and Loss

- Gain = Selling Price - Cost Price
- Loss = Cost Price - Selling Price
- Gain% = (Gain / Cost Price) * 100
- Loss% = (Loss / Cost Price) * 100
- S.P. with gain: SP = ((100 + Gain%) / 100) * CP
- S.P. with loss: SP = ((100 - Loss%) / 100) * CP

Simple and Compound Interest

- Simple Interest (SI) = $(P × R × T) / 100$
- Amount in SI = P + SI
- Compound Interest (CI) = $P(1 + R/100)^T - P$
- Amount in CI = $P(1 + R/100)^T$
- CI - SI for 2 years = $P(R/100)^2$
- CI - SI for 3 years = $P(R/100)^2(R/100 + 3)$

Ratio and Proportion

- If a/b = c/d, then ad = bc
- Componendo and Dividendo: $(a+b)/(a-b) = (c+d)/(c-d)$
- If a:b and b:c, then a:b:c = $ab : b^2 : bc$

Time and Work

- A's 1 day work = 1/n (if A finishes in n days)
- If A is 3 times as good as B: Work ratio = 3:1
- Total Work = Days × Efficiency

Time, Speed, and Distance

- Speed = Distance / Time
- km/hr to m/s: × (5/18)
- m/s to km/hr: × (18/5)
- Average speed = $2xy / (x + y)$
- Relative speed (opposite) = S1 + S2
- Relative speed (same) = |S1 - S2|

Averages

- Average = Sum of observations / Number of observations
- Weighted Average = $(w_1x_1 + w_2x_2 + ... + w_nx_n) / (w_1 + w_2 + ... + w_n)$

Permutation and Combination

- Permutation: nPr = n! / (n - r)!
- Combination: nCr = n! / (r!(n - r)!)
- n! = n × (n-1) × ... × 1

Probability

- P(E) = Favorable outcomes / Total outcomes
- $0 \leq P(E) \leq 1$
- P(E) + P(not E) = 1

Mensuration

- Square: Area = side², Perimeter = 4 × side
- Rectangle: Area = l × b, Perimeter = 2(l + b)
- Circle: Area = πr^2, Circumference = $2\pi r$
- Triangle: Area = ½ × base × height
- Cube: Surface Area = 6 × side², Volume = side³
- Cuboid: Surface Area = 2(lb + bh + hl), Volume = l × b × h
- Cylinder: Curved Area = $2\pi rh$, Volume = $\pi r^2 h$
- Cone: Curved Area = πrl, Volume = $(1/3)\pi r^2 h$
- Sphere: Surface Area = $4\pi r^2$, Volume = $(4/3)\pi r^3$