APTITUDE

- aptitude for campus placements
- types of ques
    - quantitive apt., maths
        - number system
        - profit, loss, interest
        - time and work
        - speed, distance, time, etc.
    - logical apt., critical thinking
        - series
        - odd one out
        - blood relations
        - clock, etc.
- https://www.sheryians.com/courses/courses-details/Aptitude%20&%20Reasoning%20for%20Campus%20Placements confirm syllabus

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Quantitative Aptitude

Time and Work

```
- given persons who do same work in some times individually
- now if all person work together, how much time they would take ?
- eg:
  - A work => 2days
    - meaning
      - 1day => 1/2work
  - 1day => 1/2work
  - A work  => 3days
    - meaning
      - 1day => 1/3work
      - 1day => 1/3work
      - 1day => 1/3work
  - Together work => x hrs
    - then, Together 1hr => 1/x work
- thus if person A does work in x days, work done per day => 1/x work
- also, A work = A work ALONE
- also, A work ALONE + B work ALONE != A&B Together Work
- A&B Together Work = A&B working simuntaneously as WHOLE SYNERGY
- A work => x days; so A 1day => 1/x work
```

```
  - also, A y days => y*(1/x) work
  - eg:
    - B work => 40 days
    - so B 1day => 1/40 work
    - thus, B 23 days => 23*(1/40) work
- case where someone ditch in the way
  - Together A&B for x days + B ALONE 23 days(suppose) = total work = 1
- now if 4 A 1 work => 20 days
  - then, 1 A 1 work => 20/4 days INCORRECT REASONING
  - the thing is that 4 people even identical are working SYNERGY TOGETHER and
complete work in 20 days, they didn't split days for each person, everone work
daily
  - then, 4 A 1 day => 1/20 work CORRECT
  - then, 1 A 1 day => 1/(20*4) work CORRECT
  - always divide the work , not the time
```

```
- LCM
  - LCM stands for Least Common Multiple.
  - It is the smallest multiple that two or more numbers have in common.
  - A multiple of a number is the product of that number and an integer.
  - For example, multiples of 2 are: 2, 4, 6, 8, 10...
  - Multiples of 3 are: 3, 6, 9, 12, 15...
  - Common multiples of 2 and 3 are: 6, 12, 18...
  - The smallest of these common multiples is 6.
  - Therefore, LCM of 2 and 3 is 6.
  - To find LCM, you can list the multiples of each number and choose the smallest
common one.
  - Another method is prime factorization: multiply the highest power of all prime
factors.
  - Example:
    - Find LCM of 18 and 24 by prime factorization.
      - 18 = 2 × 3²
      - 24 = 2³ × 3
      - Take highest powers: 2³ and 3²
      - LCM = 2³ × 3² = 8 × 9 = 72
- Q. How to add fractions using LCM (Least Common Multiple)?
  - Step 1: Find the LCM of the denominators of the fractions.
  - Step 2: Rewrite each fraction with the denominator equal to the LCM.
  - Step 3: Adjust the numerators accordingly by multiplying with what was done to
the denominators.
  - Step 4: Add the numerators and keep the common denominator.
  - Step 5: Simplify the fraction if possible.
  - Example:
    - Add 1/3 + 2/5
      - Denominators: 3 and 5
      - LCM of 3 and 5 = 15
      - Rewrite fractions with denominator 15:
        (1 × 5) / 15 + (2 × 3) / 15
        = 5/15 + 6/15
      - Add numerators: 5 + 6 = 11
      - Result: 11/15 (already simplified)
```

```
- when dividing ugly numbers eg: 153/17, start multiple count backwards
  - 17 × 10 = 170 → too big
  - 17 × 9 = 153 → perfect
  - => 153/17 = 9
```

```
- Have clean calculation for acurate calculation
```

> Q. A can do a piece of work in 12 hours and B alone can do it in 15 hours. In how much time will they finish the whole SYNERGY work, working together?

```
- A work => 12hrs
- B work => 15hrs
- A 1hr => 1/12 work
- B 1hr => 1/15 work
- Together 1hr => A & B 1hr => A 1hr + B 1hr
- A & B 1hr => 1/12 + 1/15
  - = (15 + 12) / (12 * 15)
  - = 27 / 180
  - = 9 / 60
  - = 3 / 20
- Together 1hr => 3/20 work
- Together work => 1/(3/20) hrs [like A work => 12hrs;So, A 1hr => 1/12 work ]
- Total time
  - => Together work
  - => 1 /
  - = 1 / (3/20)
  - = 20/3hrs
  - = 6hrs 40 mins
```

> Q. A and B together can do a piece of work in 12 days. B alone can do it in 30 days. In how many days will A alone finish the work?

```
- A & B work => 12 days
- B work => 30 days

- A & B 1 day => 1/12 work
- B 1 day => 1/30 work

- A 1 day => A & B 1 day - B 1 day
  - = 1/12 - 1/30
  - = (30 - 12) / (12 * 30)
  - = 18 / 360
  - = 1 / 20
```

```
- A 1 day => 1/20 work
- A work => 20 days
```

> Q. A & B → 18 days, B & C → 24 days, C & A → 36 days; A, B & C → ?, A → ?

```
- A & B => 18 days
- B & C => 24 days
- C & A => 36 days

- A & B 1 day => 1/18 work
- B & C 1 day => 1/24 work
- C & A 1 day => 1/36 work

- Sum => 1/18 + 1/24 + 1/36
  - = (4 + 3 + 2) / 72          [LCM 72]
  - = 9 / 72
  - = 1 / 8

- Sum = (A & B)1day + (B & C)1day + (C & A)1day
  - = 2 * (A + B + C)1day

- 2 * (A + B + C)1day => 1/8
- (A + B + C)1day => 1/16

- A, B & C => 1 / (1/16)
  - = 16 days

- A 1 day => (A + B + C)1day - (B + C)1day
  - = 1/16 - 1/24
  - = (3 - 2) / 48
  - = 1 / 48
- A work => 48 days

- B 1 day => (A + B + C)1day - (C + A)1day
  - = 1/16 - 1/36
  - = (9 - 4) / 144
  - = 5 / 144
- B work => 1 / (5/144)
  - = 144 / 5 days
  - = 28 4/5 days
  - = 28 days 19 hrs 12 mins

- C 1 day => (A + B + C)1day - (A + B)1day
  - = 1/16 - 1/18
  - = (9 - 8) / 144
  - = 1 / 144
- C work => 144 days
```

> Q. A & B can do a piece of work in 45 & 40 days respectively. They began the work together but A leaves after some days & B finished the remaining work in 23 days. After how many days did A leave?

- case where someone ditch in the way
- Together A&B for x days + B ALONE 23 days = total work = 1

- Together work
- A work => 45 days
- B work => 40 days

- A 1 day => 1/45 work
- B 1 day => 1/40 work
- B 23 days => (1/40)*3 work

- Together 1 day => A 1 day + B 1 day
  - = 1/45 + 1/40
  - = (40 + 45) / (45 * 40)
  - = 85 / 1800
  - = 17 / 360

- Suppose A left after x days
- Work done in x days by (A + B) => x * (17/360)
- Work done in 23 days by B ALONE => 23 * (1/40) = 23/40

- Total work = 1
- Equation => (17x / 360) + (23 / 40) = 1

- Take LCM 360
  - (17x / 360) + (207 / 360) = 1
  - (17x + 207) / 360 = 1
  - 17x + 207 = 360
  - 17x = 153
  - x = 9

- when dividing ugly numbers eg: 153/17, start multiple count backwards
  - 17 × 10 = 170 → too big
  - 17 × 9 = 153 → perfect
  - => 153/17 = 9

- also, A work = A work ALONE
- also, A work ALONE + B work ALONE != A&B Together Work
- A&B Together Work = A&B working simuntaneously as WHOLE SYNERGY
- A work => x days; so A 1day => 1/x work
  - also, A y days => y*(1/x) work
  - eg:
    - B work => 40 days
    - so B 1day => 1/40 work
    - thus, B 23 days => 23*(1/40) work

> Q. If 4 men or 6 boys can finish a piece of work in 20 days, in how many days can 6 men & 11 boys finish it?

```
- 4 men => 20 days
- 6 boys => 20 days

- 4 men 1 day => 1/20 work
- 1 man 1 day => 1/(20×4) = 1/80 work

- 6 boys 1 day => 1/20 work
- 1 boy 1 day => 1/(20×6) = 1/120 work

- 6 men & 11 boys 1 day => 6*(1/80) + 11*(1/120)
  - = 6/80 + 11/120
  - = 9/120 + 11/120      [LCM 240]
  - = 20/240
  - = 1/12

- 6 men & 11 boys => 1 / (1/12)
  - = 12 days

- Have clean calculation for acurate calculation
- now if 4 A 1 work => 20 days
  - then, 1 A 1 work => 20/4 days INCORRECT REASONING
  - the thing is that 4 people even identical are working SYNERGY TOGETHER and
complete work in 20 days, they didn't split days for each person, everone work
daily
  - then, 4 A 1 day => 1/20 work CORRECT
  - then, 1 A 1 day => 1/(20*4) work CORRECT
  - always divide the work , not the time
```

> Practice

> Q1. If Roger can do a piece of work in 8 days and Antony can do the same work in 5 days, in how many days will both of them do it together?

> Q2. To complete a piece of work, A takes 50% more time than B. If together they take 18 days to complete the work, how much time shall B take to do it alone?

> Q3. A takes 3 days to complete a work while B takes 2 days. Both of them finish a work and earn Rs. 150. What is A's share of money? (Hint - money should be divided.. in the ratio of how much work a person does in 1 day) Rs 70 Rs 30 Rs 60 Rs 75

> Q4. An exam was conducted and the following was analyzed. 4 men were able to check some exam papers in 8 days working 5 hours regularly. What is the total number of hours taken by 2 men in 20 days to check double the number of exam papers?

```
Q1.
- Roger => 8 days
```

```
- Antony => 5 days

- Roger 1 day => 1/8 work
- Antony 1 day => 1/5 work

- (Roger + Antony) 1 day => 1/8 + 1/5
  - = (5 + 8) / 40        [LCM 40]
  - = 13 / 40

- (Roger + Antony) => 1 / (13/40)
  - = 40 / 13 days
  - = 3 days + (1/13) day
  - = 3 days 1 hour 50 minutes 46 seconds

Q2.
- A takes 50% more time than B ⇒ A = 1.5 × B

- Let B => x days
- Then A => 1.5x days

- A 1 day => 1/(1.5x) = 2/(3x) work
- B 1 day => 1/x work

- (A + B) 1 day => 2/(3x) + 1/x
  - = (2 + 3) / (3x)       [LCM 3x]
  - = 5 / (3x)

- (A + B) time => 1 / (5/(3x)) = 3x / 5 days
- Given together they take 18 days:
  - 3x / 5 = 18
  - x = 18 × 5 / 3
  - x = 30

- B => 30 days

Q3.
- A => 3 days
- B => 2 days

- A 1 day => 1/3 work
- B 1 day => 1/2 work

- Ratio of daily work (A : B) => 1/3 : 1/2
  - = (multiply by 6) => 2 : 3

- Total money = Rs. 150
- A's share => 2 / (2 + 3) × 150
  - = 2/5 × 150
  - = Rs. 60

- Correct option: Rs 60

Q4.
- 4 men => 8 days × 5 hours/day to check N papers
```

```
- Total man-hours for N papers => 4 × 8 × 5
  - = 160 man-hours

- Double the papers => 2N => required man-hours = 2 × 160
  - = 320 man-hours

- 2 men working 20 days for 2N papers:
  - Let daily hours per man = h
  - Total man-hours available = 2 × 20 × h = 40h
  - 40h = 320
  - h = 8 hours/day

- Total number of hours taken by 2 men in 20 days (man-hours) => 2 × 20 × 8
  - = 320 hours

- Answer: 320 hours (i.e., each works 8 hours/day for 20 days)
```