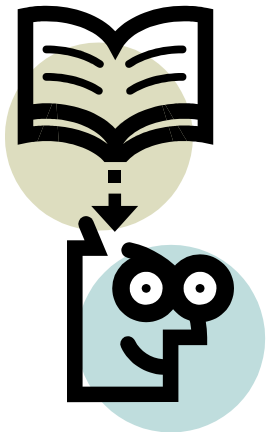

GENERAL APTITUDE

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Chain Rule

- In earlier problems the rate of doing work of each person or pipe varied.
- In chain rule problems all entities are of the same efficiency or work capacity.
- The entities may be men, women, tractors, engines, pumps, horses, lawn mowers etc.
- Work Done = No. of Men x Days x Hrs/day
- W = MxDxH
- W1 = M1xD1xH1, W2=M2xD2xH2
- $\frac{W1}{W2} = \frac{M1xD1xH1}{M2xD2xH2}$

Chain Rule

Q. 18 men working for 5 hours per day can complete a job in 8 days. How many men working for 8 hours a day for 6 days will be required?

A. 24 B. 15 C. 16 D. 17

Men x Days x Hrs/day = Work Done

Case 1

18 x 8 x 5 = 720 man-hrs

Case 2

M x 6 x 8 = 720 man-hrs

M x 6 x 8 = 18 x 8 x 5

M = 15

Ans B

Chain Rule

Q. 36 men working for 12 hours a day can build a wall 45 mt long, 52 mt high & 63 mt broad in 91 days. In how many days will 80 men working for 9 hours a day build a wall 50 mt long, 72 mt high & 30 mt broad ?

A. 24 days B. 35 days C. 40 days D. 47 days

Men x Days x Hrs/day = Work Done (Volume of Wall)

Case 1

36 x 91 x 12 = 45 x 52 x 63

Case 2

$$\frac{80 \times D \times 9}{36 \times 91 \times 12} = \frac{50 \times 72 \times 30}{45 \times 52 \times 63}$$

D = 40 days

Ans C

Chain Rule

Q. 20 men or 40 women working for 9 hours a day can finish a work in 80 days. In how many days will 10 men & 10 women working together for 12 hours a day finish the work?

A. 60 days B. 70 days C. 80 days D. 90 days

Men x Days x Hrs/day = Work Done

Also 20 Men = 40 Women → 1M = 2 W(convert to one unit i.e. women or children)

20 men ---- 40 women

1men ------ ? (2women)

Case 1

40W x 80 x 9 = work

Case 2

(20W +10W) x D x 12 = work

30W x D x 12 = 40W x 80 x 9

D = 80 days

Ans C

Chain Rule

Q. 8 men or 12 women or 16 children working for 8 hours a day can finish a work in 52 days. In how many days will 1 man & 1 woman & 1 child working together for 8 hours a day finish the work?

- A. 180 days B. 192 days C. 216 days D. 164 days
- **Men x Days x Hrs/day = Work Done**
- Also 8 Men = 16 children → 1M = 2 C
- And 12 Women = 16 children → 1W = 4/3 C
- **Case 1**
- 16C x 52 x 8 = work
- **Case 2**
- (2C +4/3C+C) x D x 8 = work
- (2C +4/3C+C) x D x 8 = 16C x 52 x 8
- 13C/3 x D x 8 = 16C x 52 x 8
- D = 192 days

Ans: B

Chain Rule(Assignment)

Q. 24 workers working 8 hours a day can construct a wall in 5 days. In how many days can 45 workers working 4 hours a day construct 3 such walls?

A. 18 days B. 16 days C. 4 days D. 7 days

Ans : B

Chain Rule(Assignment)

Q. 24 workers working 5 hours a day can construct a bungalow in 8 days. In how many days can 40 workers working 8 hours a day construct 2 such bungalows?

A. 3 days B. 6 days C. 4 days D. 8 days

Ans : B

Chain Rule(Assignment)

Q. 32 painters working 5 hours a day can paint a building in 10 days. In how many days can 40 workers working 6 hours a day paint 3 such buildings?

A. 10 days B. 16 days C. 20 days D. 28 days

Ans : C

Chain Rule(Assignment)

Q. 8 men or 12 women can construct a wall in 33 days . In how many days can 10men and 21 women construct the wall.

A. 10 days B. 11 days C. 22 days D. 15 days

Ans : B

Chain Rule(Assignment)

Q. 12 men or 18 women can construct a wall in 33 days . In how many days can 20men and 24 women construct the wall.

A. 10 days B. 11 days C. 22 days D. 15 days

Ans : B

Time & Distance

- **Speed = Distance / Time**
- **Distance = Speed x Time**
- Ram travels from A to B traveling distance of 10 km in 4 hrs. His speed is
- **10/4 = 2.5 km/hr**
- Ram moves from Pune to Satara at the same speed taking 1 day & 10 hrs. The distance between Pune & Satara is
- **(24+10) x 2.5 = 34 x 2.5 = 85 km**
- Ram now wants to reach back to Pune in 17 hours So he should travel back at a speed of
- **85/17 = 5 km/hr**

Time & Distance

- If the same distance is traveled at different speeds S1 & S2 then average speed is given by

  Sa = (2 x S1 x S2) / (S1 + S2)

- **Imp : Convert every term to same units**
- **1 Km/hr = 5/18 m/s & 1 m/s = 18/5 km/hr**
- If a bowler has a run up of 100 m & he runs at a speed of 36 km/hr the time he takes to complete his runup is
- **36 x 5/18 m/s = 10m/s**
- **100m ÷10 m/s = 10 s**

Time & Distance

- **Speed & distance are directly proportional.**
- **S α D**
- **Distance & Time are directly proportional.**
- **D α T**
- **Speed & time are inversely proportional.**
- **S α 1/T**
- **Relative speed** is **defined** as the **speed** of a moving object with respect to another. When two objects are moving in the same direction, **relative speed** is calculated as their difference and if objects are moving in opposite direction then calculate as their sum.
- **Relative speed = X-Y (same direction)**
- **Relative speed = X+Y (opposite direction)**

Time & Distance

Q. A certain distance is covered by a car at a certain speed. If a motorcycle covers half the distance in double time, the ratio of the speed of the motorcycle to the car is

Soln:

- **Let Car cover distance d in time t → Sc = d÷t**
- **Motorcycle covers dist d/2 in time 2t→ Sm = d/2÷2t**
- **→ Sm = d/4t**
- **→ Sm : Sc = d/t : d/4t = 1:4**

Time & Distance

Q. A car traveled 20% of the time at 30 km/hr, 50% of the time at 40 km/hr and rest of the journey at 50 km/hr. What is the average speed of the car over the whole journey?

A. 40 km/hr B. 35 km/hr C. 41 km/hr D. 45 km/hr

Soln:

Avg Speed = total dist / total time

Assume Journey = T hr

Total Distance = (0.2Tx30 + 0.5Tx40 + 0.3Tx50)

= 6T + 20T + 15T

= 41T

Average Speed = 41T/T = 41 kmph

Ans: C

Time & Distance

Q. At 7:30 am two trains start from their respective stations A & B in opposite direction, 930 km apart at speeds of 60 km/hr & 90 km/hr respectively. At what time do they meet?

A.12:30 pm B. 1:30 pm C. 1:42 pm D. 1:50 am

Soln:

- Time = Distance/ Speed
- Time = 930 km / (60+90)km/hr (relative Speed adds up)
- Time = 6.20 hours = 6 hrs 12 min
- Time of meeting 1:42 pm

Ans: C

Time & Distance

Q. Two trains start from their respective stations A & B in opposite direction, 834 km apart at speeds of 80 km/hr & 70 km/hr at 6:00 am & 6:45 am respectively. At what distance from A do they meet?

A.425.5 km B. 525.8 km C. 575.6 km D. 472.8 km

Soln:

DistanceA + DistanceB = Total Distance (At meeting pt)

S1xT1 + S2xT2 = 834

80 x T1 + 70 x (T1-0.75) = 834

80T1 + 70T1 – 52.5 = 834 → 150T1 = 886.5→

T1 = 88.65/15 = 5.91 hrs

Distance from A = 80 x 8865/1500= 472.8 km

Ans: D

Time & Distance

Q. A train starts from Mumbai towards Nagpur at 7:00 am with a speed of 60 kmph while another train starts from Mumbai in the same direction at 8:30 am at 80 kmph. At what distance from Mumbai do they meet?

A.225 km B. 300 km C. 360 km D. 400 km

Soln:

DistanceA = DistanceB (At meeting pt)

S1xT1 = S2xT2

60 x T1 = 80 x (T1-1.5)

60T1 = 80T1 - 120 → T1 = 6 hrs

D from Mumbai = 6x 60 = 360 km

Ans: C

Time & Distance

Q. A man covers half of his journey at 6 km/h and the remaining half at 3 km/h. His average speed is-

A. 9 km/hr B. 4.5 km/hr C. 4 km/hr D. 3 km/hr

Soln:

- Average speed= $\frac{2xy}{x+y} = \frac{2 \times 6 \times 3}{6+3} = \frac{36}{9}$ = 4 km/hr

Ans: C

Time & Distance

Q. One day a person travels to office at 5/6 of his usual speed. He takes t minutes more than normal time. What is his normal time?

A. 2t B. 3t C. 4t D. 5t

Soln:

	Original	New
Speed	S	5S/6
Time	T	T+t

Speed x Time = Distance is constant

→ST = 5S/6 x (T+t)

→T = 5/6 x (T+t)

→6T/5= T+t

→T/5 = t → Normal Time T = 5t

- **Ans: C**

Time & Distance(Assignment)

Q. Walking at a speed of 4/5 of the original speed a person reaches office 8 min late. Find the time required usually.

A.24 min B. 30 min C. 32 min D. 44 min

Ans: C

Time & Distance(Assignment)

Q. On a journey, across Delhi, a Taxi averages 30 kmph for 60% of the distance, 20 kmph for 20% of it and 10kmph for the remainder. The average speed for the whole journey is :

A. 20km/hr B. 22.5 km/hr C. 24.625km/hr D. 25km/hr

Ans: A

Time & Distance(Assignment)

Q. A distance is covered by a cyclist at a certain speed. If a jogger covers half of the distance in double the time, the ratio of the speed of the jogger to that of the cyclist is :

A. 1 : 4 B. 4 : 1 C. 1 : 2 D. 2 : 1

Ans: A

Trains

- **Trains**
- Let S1 = speed of train, S2 = Speed of Object
  L1 = length of the train, L2 = Length of the object.
  t = time taken by train to completely pass the object

Case A : Stationary object without considerable length

L1 = S1x t

Case B : Stationary object with considerable length

L1+L2 = S1x t

Case C : Moving object without considerable length

L1 = (S1±S2) x t

Case D : Moving Object with considerable length

L1+L2 = (S1±S2) x t

Time & Distance

Q. Two trains of same length cross an electric pole in 12 sec & 20 sec respectively. Find in how much time do they cross each other while traveling in same direction?

A.45 sec B. 50 sec C. 60 sec D. 75 sec

Soln:

Case A : **L1 = S1x t** (Trains passing the pole)

L1 = S1 x 12 → S1 = L1/12

L1 = S2 x 20 → S2 = L1/20

Case B : **L1+L2 = (S1±S2) x t** (Train passing other train)

2L1 = (L1/12 –L1/20) x t

2 = (1/12 – 1/20) x t

2 = 1/30 x t → t = 60 sec.

Ans: C

Time & Distance

Q. A train of length 600 mt crossed a man going in the same direction at 12 km/hr in 45 sec while the same train crossed another man coming from the opposite direction on a bike in 20 sec. Find the speed of the bike.

A.24 km/hr B. 36 km/hr C. 40 km/hr D. 48 km/hr

Soln:

12 km/hr = 12 x 5/18 = 10/3 m/s

Case A : **L1 = (St-Sm) x t** (Train passing man)

600 = (St-10/3) x 45

St = 50/3 m/s

Case B : **L1 = (St+Sb) x t** (Train passing the bike)

600 = (50/3-Sb) x 20

Sb = 40/3 m/s x 18/5 = 48 km/hr

Ans: D

Time & Distance

Q. Two trains of lengths 200 mt & 400 mt cross each other completely in 15 sec & 1.25 min respectively while going in opposite & same direction. Find the speed of the slower train.

A.24 m/s B. 16 m/s C. 40 m/s D. 8 m/s

Soln:

Case A : **L1+L2 = (S1+S2) x t** (Trains passing opp direction)

200+400 = (S1+ S2) x 15

S1+S2 = 40 m/s ……(1)

Case B : **L1+L2 = (S1-S2) x t** (Trains passing same direction)

200+400 = (S1-S2) x 75

S1-S2 = 8 m/s …….(2)

2S1 = 48 → S1 = 24, S2=16

Ans B

Time & Distance

Q. A train of length 600 m crosses a man standing on a platform in 45 sec & the same train crosses the complete platform in 2 min. What is the length of the platform?

A. 500 m B. 700 m C. 900 m D. 1000 m

- Soln:
- Case A : **L1 = S1x t** (Train passing the man)
- 600 = S1 x 45
  S1 = 600/45
  = 40/3
- Case B : **L1+L2 = S1x t** (Train passing the platform)
- 600+L2 = 40/3 x 120
- L2 = 1600 -600
- L2 = 1000 m
- **Ans D**

- **Boats & Streams**
- If Speed of boat in still water = **x kmph**
- Speed of the stream = **y kmph** then

- Speed of the boat downstream **Sd = (x+y) kmph**
- Speed of the boat upstream **Su = (x-y) kmph**

- Speed of Boat in still water **X = ½ (Sd + Su)**
- Speed of the stream **Y = ½ (Sd – Su)**

Time & Distance

Q. A person covers 200 m in 15 sec while going upstream & 5 km in 3 min while going downstream. Find the speed of boat in still water.

A. 44 m/s B. 74 m/s C. 74 km/hr D. 80 km/hr

Soln

Case A : **Su = 200/15 = 40/3**

Case B : **Sd = 5000/180 = 500/18 = 250/9**

Sw = ½(Sd+Su)

= ½(250/9 +40/3)

= ½(370/9)

= 370/18 m/s x 18/5

= 74 km/hr

Ans C

Time & Distance

Q. A man rows at the rate of 5 kmph in still water. If the river flows at 1.5 kmph it takes him 1 hr to row to a place & back. What is the distance between the two places?

A. 2 km B. 2.5 km C. 2.75 Km D. 2.275 km

Soln

Sd = 5 + 1.5 = 6.5 kmph

Su = 5 – 1.5 = 3.5 kmph

If distance between two places is x,

Time for downstream = Td & Upstream = Tu,

Total time = Td + Tu

= x/Sd + x/Su

Total time = (x / 6.5 + x / 3.5)

1 = (x / 6.5 + x / 3.5)

X = 2.275 km.

Ans D

Time & Distance

Q. A boat goes 16 km upstream & returns back to original place in 6 hrs. If the speed of water is 2 kmph. Find the speed of boat in still water.

A.3 kmph B. 4 kmph C. 6 kmph D. 8 kmph

Soln

Let speed of boat = x, Speed of water y = 2

Case A : **Su = x-2**

Case B : **Sd = x+2**

Total time = Tu + Td

6 = 16/(x -2) + 16/(x+2)

6(x-2)(x+2) = 16(x+2) + 16(x-2)

6x^2 -24 = 16(2x)

6x^2 – 32x -24 =0

3x^2 -16x – 12 =0 → 3x^2 -18x + 2x -12 =0 → (3x+2)(x-6)=0

→ X = 6 kmph

Ans C

Time & Distance

Q. A man notices that it takes him thrice the time to row up than to row down the same distance. Find the speed of the boat in still water if the speed of water is 5 kmph?

A. 8 kmph B. 8.5 kmph C. 10 Kmph D. 10.5 kmph

Soln

Td : Tu = 1 : 3 → Sd : Su = 3 : 1

Let speed of boat = x, Speed of water = 5

→Sd = x+5, Su = x-5

→Sd/Su = (x+5)/(x-5)

→3/1 = (x+5)/(x-5)

→3(x-5) = x+5

→3x-15 = x+5 → 2x =20 → x= 10 kmph.

- **Ans C**

Time & Distance(Assignment)

Q. Person crosses a 600 m long street in 5 minutes. What is his speed in km per hour?

A. 3.6 B. 7.2 C. 8.4 D. 10

Ans: B

Time & Distance(Assignment)

Q. An aeroplane covers a certain distance at a speed of 240 kmph in 5 hours. To cover the same distance in 1 2/3 hours, it must travel at a speed of:

A. 300 kmph B. 360 kmph C. 600 kmph D. 720 kmph

Ans: D

Time & Distance(Assignment)

Q. The ratio between the speeds of two trains is 7 : 8. If the second train runs 400 km in 4 hours, then the speed of the first train is:

A. 70 km/hr B. 75 km/hr C. 84 km/hr D. 87.5 km/hr

Ans: D

Time & Distance(Assignment)

Q. A man on tour travels first 160 km at 64 km/hr and the next 160 km at 80 km/hr. The average speed for the first 320 km of the tour is:

A. 35.55 km/hr B. 36 km/hr C. 71.11 km/hr D. 71 km/hr

Ans: C

Trains(Assignment)

Q. A train running at the speed of 60 km/hr crosses a pole in 9 seconds. What is the length of the train ?

A. 120 metres B. 180 metres C. 324 metres D. 150 metres

Ans : D

Trains(Assignment)

Q. A train 125 m long passes a man, running at 5 km/hr in the same direction in which the train is going, in 10 seconds. The speed of the train is:

A. 45 km/hr B. 50 km/hr C. 54 km/hr D. 55 km/hr

Ans: B

Boats & Streams(Assignment)

Q. A man rows at the rate of 12 kmph in still water. It takes him 4 hr 16 min to row to a place 24 km away & back. What is the speed of water?

A. 3 kmph B. 2.5 kmph C. 2 Kmph D. 1.5 kmph

Ans : A

THANK YOU