GENERAL APTITUDE

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Todays topics

1. Time & Work
2. Wages (Man days)
3. Pipes & Cisterns
4. Permutations & Combinations

Time & Work

- Work (Effort) = Manpower x time.
- If A can do a piece of work in x days then work done by A in one day is equal to 1/x of the entire work.
- If A is twice as good a workman as B then A will take half the time taken by B to do a same piece of work.
- If number of people to do a certain work is increased (or decreased) the time taken to do the same work will decrease (or increase)
- Total work = LCM
- Efficiency = (Total work)/(Total time)
- OR
- Total work = Efficiency x Total time

Time & Work

A and B can do a piece of work in 6 and 12 days, respectively. They (both) will complete the work in how many days?

A. 9

B. 18

C. 6

D. 4

.Total time $= \frac{TW}{Tefficieny}$

Ans: D

Time & Work

- $T_{A+B} = \frac{TW}{Tefficieny} = \frac{axb}{a+b}$

- Works only for A + B
- Does not work for A+B+C

Work & Time

Q1. If Raj and Kiran together can complete a work in 18 days, Raj and Sharad together in 12 days, and Kiran and Sharad together in 9 days, then Kiran alone can do the work in:

A. 18 days

B. 24 days

C. 30 days

D. 40 days

Ans: B

Total work = Days x units/day

Work & Time

Q2. Shankar can complete a piece of work in 18 days, Sham in 20 days and Rahul in 30 days, Sham and Rahul together start the work and forced to leave after 2 days. The time taken by Shankar alone to complete the remaining work is:

A. 10 days

B. 12 days

C. 15 days

D. 16 days

Ans: C

Work & Time

Q3. Sheela can complete a piece of work in 36 days, Meena in 54 days and Tina in 72 days. All the three began the work the work together but Sheela left 8 days before the completion of the work and Meena 12 days before the completion of work. Only Tina worked up to the end. In how many days was the work completed?

A. 24 days

B. 25 days

C. 27 days

D. 30 days

Ans: A

Work & Time

Q4. Shubham, Seema and Viraj completed a work costing Rs. 1800. Shubham work for 6 days, Seema for 4 days and Viraj for 9 days. If their daily wages are in the ratio of 5 : 6 : 4, how much amount will be received by Shubham?

A. Rs. 800

B. Rs. 600

C. Rs. 900

D. Rs. 750

Ans: B

Work & Time

Q5. Nayan can do a piece of work in 20 days, Nayan and Kamal together can do in 12 days. If Kamal does the work only for half a day daily then in how many days the work will be completed ?

A. 14

B. 17

C. 12

D. 15

Ans: D

Work & Time

Q6. A,B,C together earn Rs.150 per day, while A & C together earn Rs.94 and B & C together earn Rs.76. The daily earning of C is?

A. Rs.70

B. Rs.20

C. Rs.50

D. Rs.40

Ans: B

Time & Work

- Efficiency = capacity to do work
- Efficiency and time are inversely proportional
- Efficiency $\propto \frac{1}{T}$
- Efficiency and work are directly proportional
- Efficiency $\propto$ W

Chain Rule

Q7. If 10 men can do a job in 20 days, then 20 men with twice the efficiency can do the same job in:

A. 5 days

B. 40 days

C. 10 days

D. 20 days

Ans: A

Total work = Day × Efficiency × Men

Chain Rule

- 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

Q8. 2men and 1women together can complete a piece of work in 14days,while 4women and 2men together can do it in 8 days. If a man gets Rs.600 per day, how much should a women get per day?

A. Rs.400

B. Rs.600

C. Rs.240

D. Rs.200

Ans: A

Work & Time

Q9. A can do a piece of work in 70 days and B is 40% more efficient than A. The number of days taken by B to do the same work is?

A. 50 days

B. 40 days

C. 30 days

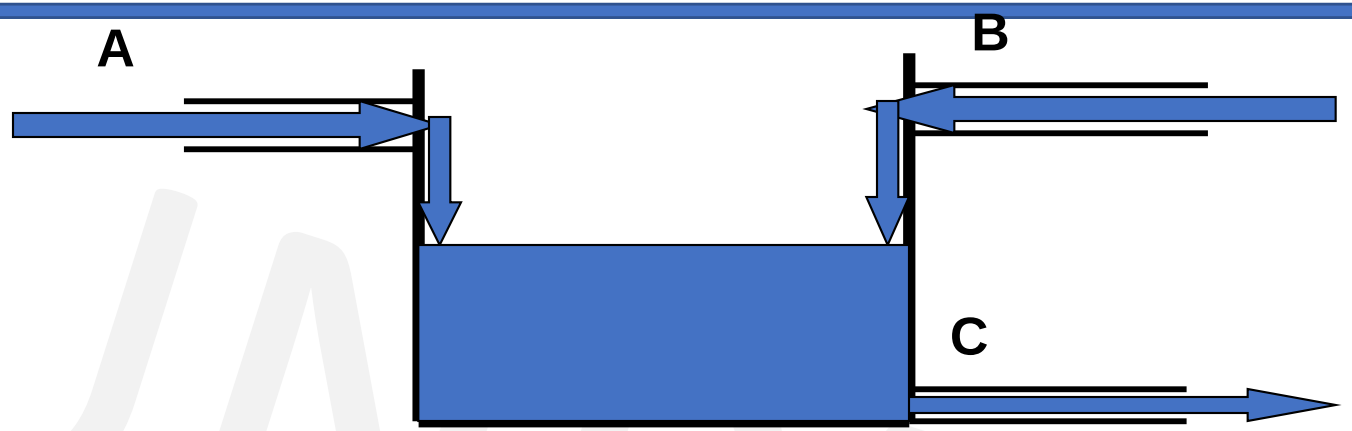
D. 20 days

Ans: A

A is 50% more efficient than B

	A	B
• Eff (Ratio)	150%	100%
• time(Ratio)	100%	150%

Pipes & Cisterns



- A cistern may have inlet pipe or outlet pipe.
- Conventionally filling a tank is treated as positive work and emptying a tank as negative work.
- Net work done = (Sum of work done by inlets) – (sum of work done by outlets)

Pipes & Cisterns

Q10. Two pipes, P and Q can fill a cistern in 12 and 15 minutes respectively. Both are opened together, but at the end of 4 minutes, P is turned off. In how many more minutes will Q fill the cistern?

A. 11 minutes

B. 6 minutes

C. 12 minutes

D. 10 minutes

Ans: B

Total time needed to fill the cistern = 10mins

Pipes & Cisterns

Q11. Pipes A and B can fill a tank in 5 and 6 hours respectively. Pipe C can empty it in 12 hours. If all the three pipes are opened together, then the tank will be filled in:

A. 1 13/17 hours

B. 2 8/11 hours

C. 3 9/17 hours

D. 4 1/2 hours

Ans: C

Pipes & Cisterns

Q12. A container can empty the full tank in 9 hours. An inlet pipe fills water at the rate of 4 liters a minute. When the tank is full, the inlet is opened and due to the leak, the tank is empty in 12 hours. How many liters does the container hold?

A. 8640 lit

B. 1440 lit

C. 9250 lit

D. 2880 lit

Ans: A

- Time taken by the leak at the bottom to empty the full tank alone $= \frac{XY}{Y - X}$
- where, X = number of hrs to fill/empty tank , Y = number of hrs to fill/empty tank with leakage

Pipes & Cisterns

Q13. Two pipes A and B can fill a tank with water in 30 minutes and 45 minutes respectively. The third pipe C can empty the tank in 36 minutes. First A and B are opened. After 12 minutes C is opened. Total time (in minutes) in which the tank will be filled up is -

A. 12 minutes

B. 24 minutes

C. 30 minutes

D. 36 minutes

Ans: B

Chain Rule

Q14. If 2 men or 3 women or 4 boys can do a piece of work in 52 days, then the same piece of work will be done by 1 man and 1 woman and 1 boy in:

A. 48 days

B. 36 days

C. 45 days

D. 50 days

Ans: A

Chain Rule

Q15. If 3 men or 4 women can plough a field in 43 days, how long will 7 men and 5 women take to plough it?

A. 10 days

B. 11 days

C. 9 days

D. 12 days

Ans: D

Pipes & Cisterns

Q16. A tank is filled in 8 hours by three pipes A, B and C. The pipe C is twice as fast as B and B is twice as fast as A. How much time will pipe A alone take to fill the tank?

A. 60 hours

B. 49 hours

C. 56 hours

D. None of these

Ans : C

Permutation & Combination

- What is permutation?
- It is the number of ways a group of things can be arranged.

E.g: Consider 3 letters A,B,C . In how many ways they can be arranged?

- A B C
- A C B
- B A C
- B C A
- C A B
- C B A

6 ways to arrange these 3 letters

- For 3 letter / 4 letter words its possible but for more number of letters we need a formula-
- $nPr = \frac{n!}{(n-r)!}$

Permutation & Combination - Remember

0! = 1

1 ! = 1

2! = 2 x 1 = 2

3! = 3 x 2 x 1 = 6

4! = 4 x 3 x 2 x 1 = 24

5! = 5 x 4 x 3 x 2 x 1 = 120

6! = 6 x 5 x 4 x 3 x 2 x 1 = 720

7! = 7 x 6 x 5 x 4 x 3 x 2 x 1 = 5040

Permutation & Combination

Q17. In how many different ways can the letters of the word 'OPTICAL' be arranged so that the vowels always come together?

A. 120

B. 720

C. 4320

D. 2160

Ans: B

Permutation & Combination

Q18. How many words can be formed using letters of the word ‘POLITICS’?

A. 208 ways

B. 1467 ways

C. 19076 ways

D. 20160 ways

Ans: D

Permutation & Combination

Q19. There are five girls and six boys in a group. From this group a committee of 4 is to be chosen. How many different ways can a committee be formed that contain atleast three girls ?

A. 55

B. 65

C. 25

D. 192

Ans: B

Permutation & Combination

Q20. In how many ways 4 men and 3 women can be seated in a row so that they are alternate.

A. 144

B. 288

C. 12

D. 256

Ans: A

Difference between permutation and combination

What is permutation?

Permutation: The various ways of arranging a given number of things by taking some or all at a time are all called as permutations.
Permutation includes word formation, number formation, circular permutation, etc. **In permutation, objects are to be arranged in particular order.** It is denoted by $^{n}P_{r}$ **or P(n, r).**

Example: Arrange the given 3 numbers 1, 2, 3 by taking two at a time.
Now these numbers can be arranged in 6 different ways: **(12, 21, 13, 31, 23, 32).**

Here,

12 and 21, 13 and 31 or 23 and 32 do not mean the same, because here order of numbers is important.

Difference between permutation and combination

- **What is combination?**

  Combination: Each of different groups or selections formed by taking some or all number of objects is called a combination.

  Combination is used in different cases which include team/group/committee.

  In combination, objects are selected randomly and here order of objects doesn't matter. It is denoted by **$^{n}C_{r}$ or C(n, r) or $^{n}C_{r} = {}^{n}C_{(n-r)}$.**

  Example: If we have to select two girls out of 3 girls X, Y, Z, then find the number of combinations possible.

  Now only two girls are to be selected and arranged. Hence, this is possible in 3 different ways: **(XY, YZ, XZ,).**

  Here,
  You cannot make a combination as XY and YX, because these combinations mean the same.


THANK
YOU!