Time and Work Questions for CAT

Questions

Instructions

For the following questions answer them individually

Question 1

Three wheels can complete 60, 36 and 24 revolutions per minute. There is a red spot on each wheel that touches the ground at time zero. After how much time, all these spots will simultaneously touch the ground again?

A $\frac{5}{2}$ s

B $\frac{5}{3}$ s

C 5 s

D 7.5 s

Answer: C

Video Solution

Explanation:

The first wheel completes a revolution in $\frac{60}{60} = 1$ second

The second wheel completes a revolution in $\frac{60}{36} = 1\frac{2}{3}$ second

The third wheel completes a revolution in $\frac{60}{24} = 2\frac{1}{2}$ second

The three wheels touch the ground simultaneously at time which are multiples of the above three times.

Hence, the required number is $LCM(1, \frac{5}{3}, \frac{5}{2}) = 5$ seconds.

So, the correct option is option (c)

Question 2

Navjivan Express from Ahmedabad to Chennai leaves Ahmedabad at 6:30 am and travels at 50km per hour towards Baroda situated 100 kms away. At 7:00 am Howrah - Ahmedabad express leaves Baroda towards Ahmedabad and travels at 40 km per hour. At 7:30 Mr. Shah, the traffic controller at Baroda realises that both the trains are running on the same track. How much time does he have to avert a head-on collision between the two trains?

A 15 minutes

B 20 minutes

C 25 minutes

D 30 minutes

Answer: B

Video Solution

Explanation:

The distance between Ahmedabad and Baroda is 100 Km

Navjivan express starts at 6:30 am at 50 Km/hr and Howrah expresses starts at 7:00 am at 40 Km/hr.

Distance covered by Navjivan express in 30 minutes (by 7 am) is 25 Km/hr.

So, at 7 am, the distance between the two trains is 75 Kms and they are travelling towards each other a relative speed of 50+40=90 Km/hr.

So, time taken them to meet is 75/90*60 = 50 minutes.

As, Mr. Shah realizes the problem after thirty minutes, time left to avoid collision is 50-30 = 20 minutes

Question 3

A person can complete a job in 120 days. He works alone on Day 1. On Day 2, he is joined by another person who also can complete the job in exactly 120 days. On Day 3, they are joined by another person of equal efficiency. Like this, everyday a new person with the same efficiency joins the work. How many days are required to complete the job?

Answer:15

Video Solution

Explanation:
Let the rate of work of a person be x units/day. Hence, the total work = 120x.

It is given that one first day, one person works, on the second day two people work and so on.

Hence, the work done on day 1, day 2,... will be x, 2x, 3x, ... respectively.

The sum should be equal to 120x.

$120x = x * \frac{n(n+1)}{2}$

$n^2 + n - 240 = 0$

n = 15 is the only positive solution.

Hence, it takes 15 days to complete the work.

Question 4

A tank has an inlet pipe and an outlet pipe. If the outlet pipe is closed then the inlet pipe fills the empty tank in 8 hours. If the outlet pipe is open then the inlet pipe fills the empty tank in 10 hours. If only the outlet pipe is open then in how many hours the full tank becomes half-full?

A 20

B 30

C 40

D 45

Answer: A

Video Solution

Explanation:
Let the time taken by the outlet pipe to empty = x hours
Then, $\frac{1}{8} - \frac{1}{x} = \frac{1}{10}$
=> $x = 40$
Hence time taken by the outlet pipe to make the tank half-full = 40/2 = 20 hour

Question 5

Amal can complete a job in 10 days and Bimal can complete it in 8 days. Amal, Bimal and Kamal together complete the job in 4 days and are paid a total amount of Rs 1000 as remuneration. If this amount is shared by them in proportion to their work, then Kamal's share, in rupees, is

A 100

B 200

C 300

D 400

Answer: A

Video Solution

Explanation:
Let the time take by kamal to complete the task be x days.
Hence we have $\frac{1}{10}+\frac{1}{8}+\frac{1}{x}=\frac{1}{4}$
=> x = 40 days.
Ratio of the work done by them = $\frac{1}{10}:\frac{1}{8}:\frac{1}{40}$ = 4 : 5 : 1
Hence the wage earned by Kamal = 1/10 * 1000 = 100

Question 6

Humans and robots can both perform a job but at different efficiencies. Fifteen humans and five robots working together take thirty days to finish the job, whereas five humans and fifteen robots working together take sixty days to finish it. How many days will fifteen humans working together (without any robot) take to finish it?

A 45

B 36

C 32

D 40

Answer: C

Video Solution

Explanation:
Let the efficiency of humans be 'h' and the efficiency of robots be 'r'.
In the first case,
Total work = (15h + 5r) * 30......(i)
In the second case,
Total work = (5h + 15r) * 60......(ii)
On equating (i) and (ii), we get
(15h + 5r) * 30 = (5h + 15r) * 60
Or, 15h + 5r = 10h + 30r
Or, 5h = 25r
Or, h = 5r
Total work = (15h + 5r) * 30 = (15h + h) * 30 = 480h
Time taken by 15 humans = $\frac{480h}{15h}$ days= 32 days.
Hence, option C is the correct answer.

CAT Previous Papers PDF

Question 7

Point P lies between points A and B such that the length of BP is thrice that of AP. Car 1 starts from A and moves towards B. Simultaneously, car 2 starts from B and moves towards A. Car 2 reaches P one hour after car 1 reaches P. If the speed of car 2 is half that of car 1, then the time, in minutes, taken by car 1 in reaching P from A is

Answer:12

Video Solution

Explanation:
Let the distance between A and B be 4x.

Length of BP is thrice the length of AP.
=> AP = x and BP = 3x

Let the speed of car 1 be s and the speed of car 2 be 0.5s.
Car 2 reaches P one hour (60 minutes) after Car 1 reaches P.

=> x/s + 60 = 3x/0.5s
x/s + 60 = 6x/s
5x/s = 60
x/s = 12

Time taken by car 1 in reaching P from A = x/s = 12 minutes.
Therefore, 12 is the correct answer.

Question 8

When they work alone, B needs 25% more time to finish a job than A does. They two finish the job in 13 days in the following manner: A works alone till half the job is done, then A and B work together for four days, and finally B works alone to complete the remaining 5% of the job. In how many days can B alone finish the entire job?

A 20

B 22

C 16

D 18

Answer: A

Video Solution

Explanation:
Let us assume that A can complete 'a' units of work in a day and B can complete 'b' units of work in a day.
A works alone till half the work is completed.
A and B work together for 4 days and B works alone to complete the last 5% of the work.
=> A and B in 4 days can complete 45% of the work.

Let us assume the total amount of work to be done to be 100 units.
4a + 4b = 45 ---------(1)
B needs 25% more time than A to finish a job.
=> 1.25*b = a ----------(2)

Substituting (2) in (1), we get,
5b+4b = 45
9b = 45
b = 5 units/day

B alone can finish the job in 100/5 = 20 days.
Therefore, option A is the right answer.

Question 9

A tank is fitted with pipes, some filling it and the rest draining it. All filling pipes fill at the same rate, and all draining pipes drain at the same rate. The empty tank gets completely filled in 6 hours when 6 filling and 5 draining pipes are on, but this time becomes 60 hours when 5 filling and 6 draining pipes are on. In how many hours will the empty tank get completely filled when one draining and two filling pipes are on?

Answer:10

Video Solution

Explanation:

Let the efficiency of filling pipes be 'x' and the efficiency of draining pipes be '-y'.
In the first case,
Capacity of tank = (6x - 5y) * 6..........(i)
In the second case,
Capacity of tank = (5x - 6y) * 60.....(ii)
On equating (i) and (ii), we get
(6x - 5y) * 6 = (5x - 6y) * 60
or, 6x - 5y = 50x - 60y
or, 44x = 55y
or, 4x = 5y
or, x = 1.25y

Capacity of the tank = (6x - 5y) * 6 = (7.5y - 5y) * 6 = 15y
Net efficiency of 2 filling and 1 draining pipes = (2x - y) = (2.5y - y) = 1.5y

Time required = $\frac{15y}{1.5y}$ hours = 10 hours.

Hence, 10 is the correct answer.

Question 10

A water tank has inlets of two types A and B. All inlets of type A when open, bring in water at the same rate. All inlets of type B, when open, bring in water at the same rate. The empty tank is completely filled in 30 minutes if 10 inlets of type A and 45 inlets of type B are open, and in 1 hour if 8 inlets of type A and 18 inlets of type B are open. In how many minutes will the empty tank get completely filled if 7 inlets of type A and 27 inlets of type B are open?

Answer:48

Video Solution

Explanation:
Let the efficiency of type A pipe be 'a' and the efficiency of type B be 'b'.
In the first case, 10 type A and 45 type B pipes fill the tank in 30 mins.

So, the capacity of the tank = $\frac{1}{2}$(10a + 45b)........(i)

In the second case, 8 type A and 18 type B pipes fill the tank in 1 hour.
So, the capacity of the tank = (8a + 18b)..........(ii)
Equating (i) and (ii), we get
10a + 45b = 16a + 36b
=>6a = 9b
From (ii), capacity of the tank = (8a + 18b) = (8a + 12a) = 20a
In the third case, 7 type A and 27 type B pipes fill the tank.
Net efficiency = (7a + 27b) = (7a + 18a) = 25a

Time taken = $\frac{20a}{25a}$ hour = 48 minutes.

Hence, 48 is the correct answer.

Question 11

A tank is emptied everyday at a fixed time point. Immediately thereafter, either pump A or pump B or both start working until the tank is full. On Monday, A alone completed filling the tank at 8 pm. On Tuesday, B alone completed filling the tank at 6 pm. On Wednesday, A alone worked till 5 pm, and then B worked alone from 5 pm to 7 pm, to fill the tank. At what time was the tank filled on Thursday if both pumps were used simultaneously all along?

A 4:48 pm

B 4:12 pm

C 4:24 pm

D 4:36 pm

Answer: C

Video Solution

Explanation:
Let 't' pm be the time when the tank is emptied everyday. Let 'a' and 'b' be the liters/hr filled by pump A and pump B respectively.

On Monday, A alone completed filling the tank at 8 pm. Therefore, we can say that pump A worked for (8 - t) hours. Hence, the volume of the tank = a*(8 - t) liters.

Similarly, on Tuesday, B alone completed filling the tank at 6 pm. Therefore, we can say that pump B worked for (6 - t) hours. Hence, the volume of the tank = b*(6 - t) liters.

On Wednesday, A alone worked till 5 pm, and then B worked alone from 5 pm to 7 pm, to fill the tank. Therefore, we can say that pump A worked for (5 - t) hours and pump B worked for 2 hours. Hence, the volume of the tank = a*(5 - t)+2b liters.

We can say that a*(8 - t) = b*(6 - t) = a*(5 - t) + 2b

a*(8 - t) = a*(5 - t) + 2b

⇒ 3a = 2b   ... (1)

a*(8 - t) = b*(6 - t)

Using equation (1), we can say that

$$a*(8-t) = \frac{3a}{2}*(6-t)$$

$$t = 2$$

Therefore, we can say that the tank gets emptied at 2 pm daily. We can see that A takes 6 hours and pump B takes 4 hours alone.

Hence, working together both can fill the tank in = \dfrac{6*4}{6+4} = 2.4 hours or 2 hours and 24 minutes.

The pumps started filling the tank at 2:00 pm. Hence, the tank will be filled by 4:24 pm.

Question 12

Ramesh and Ganesh can together complete a work in 16 days. After seven days of working together, Ramesh got sick and his efficiency fell by 30%. As a result, they completed the work in 17 days instead of 16 days. If Ganesh had worked alone after Ramesh got sick, in how many days would he have completed the remaining work?

A 14.5

B 11

C 13.5

D 12

Answer: C

Video Solution

Explanation:
Let 'R' and 'G' be the amount of work that Ramesh and Ganesh can complete in a day.

It is given that they can together complete a work in 16 days. Hence, total amount of work = 16(R+G) ... (1)

For first 7 days both of them worked together. From 8th day, Ramesh worked at 70% of his original efficiency whereas Ganesh worked at his original efficiency. It took them 17 days to finish the same work. i.e. Ramesh worked at 70% of his original efficiency for 10 days.

⇒ 16(R+G) = 7(R+G)+10(0.7R+G)

⇒ 16(R+G) = 14R+17G

⇒ R = 0.5G ... (2)

Total amount of work left when Ramesh got sick = 16(R+G) - 7(R+G) = 9(R+G) = 9(0.5+G) = 13.5G

Therefore, time taken by Ganesh to complete the remaining work = $\frac{13.5G}{G}$ = 13.5 days.

Question 13

Two ants A and B start from a point P on a circle at the same time, with A moving clock-wise and B moving anti-clockwise. They meet for the first time at 10:00 am when A has covered 60% of the track. If A returns to P at 10:12 am, then B returns to P at

A 10:25 am

B 10:45 am

C 10:18 am

D 10:27 am

Answer: D

Video Solution

Explanation:
When A and B met for the first time at 10:00 AM, A covered 60% of the track.

So B must have covered 40% of the track.

It is given that A returns to P at 10:12 AM i.e A covers 40% of the track in 12 minutes

60% of the track in 18 minutes

B covers 40% of track when A covers 60% of the track.

B covers 40% of the track in 18 minutes.

B will cover the rest 60% in 27 minutes, hence it will return to B at 10:27 AM

Question 14

One can use three different transports which move at 10, 20, and 30 kmph, respectively to reach from A to B. Amal took each mode of transport for $\frac{1}{3}^{rd}$ of his total journey time, while Bimal took each mode of transport for $\frac{1}{3}^{rd}$ of the total distance. The percentage by which Bimal's travel time exceeds Amal's travel time is nearest to

A 22

B 20

C 19

D 21

Answer: A

Video Solution

Explanation:
Assume the total distance between A and B as d and time taken by Amal = t

Since Amal travelled $\frac{1}{3}^{rd}$ of his total journey time in different speeds
d = $\frac{t}{3} \times 10 + \frac{t}{3} \times 20 + \frac{t}{3} \times 30 = 20t$

$$\text{Total time taken by Bimal} = \frac{d_1}{s_1} + \frac{d_2}{s_2} + \frac{d_3}{s_3}$$

$$= \frac{20t}{3} \times \frac{1}{10} + \frac{20t}{3} \times \frac{1}{20} + \frac{20t}{3} \times \frac{1}{30} = \frac{20t(6+3+2)}{3 \times 30} = \frac{11}{9}t$$

Hence, the ratio of time taken by Bimal to time taken by Amal = $\frac{\frac{11t}{9}}{t} = \frac{11}{9}$

Therefore, Bimal will exceed Amal's time by $\frac{\frac{11t}{9}-t}{t} \times 100 = 22.22$

Question 15

At their usual efficiency levels, A and B together finish a task in 12 days. If A had worked half as efficiently as she usually does, and B had worked thrice as efficiently as he usually does, the task would have been completed in 9 days. How many days would A take to finish the task if she works alone at her usual efficiency?

A 36

B 24

C 18

D 12

Answer: C

Video Solution

Explanation:
Assuming A completes a units of work in a day and B completes B units of work in a day and the total work = 1 unit

Hence, 12(a+b)=1.........(1)

Also, 9($\frac{a}{2}$ +3b)=1 ....(2)

Using both equations, we get, 12(a+b)= 9($\frac{a}{2}$ +3b)

=> 4a+4b= $\frac{3a}{2}$ +9b

=> $\frac{5a}{2}$ =5b

=> a=2b

Substituting the value of b in equation (1),

12($\frac{3a}{2}$)=1

=> a= $\frac{1}{18}$

Hence, the number of days required = 1/($\frac{1}{18}$)=18

Top-500 Free CAT Questions (With Solutions)

Question 16

Three men and eight machines can finish a job in half the time taken by three machines and eight men to finish the same job. If two machines can finish the job in 13 days, then how many men can finish the job in 13 days?

Answer:13

Video Solution

Explanation:
Consider the work done by a man in a day = a and that by a machine = b

Since, three men and eight machines can finish a job in half the time taken by three machines and eight men to finish the same job, hence the efficiency will be double.

=> 3a+8b = 2(3b+8a)

=> 13a=2b

Hence work done by 13 men in a day = work done by 2 machines in a day.

=> If two machines can finish the job in 13 days, then same work will be done 13 men in 13 days.

Hence the required number of men = 13

Question 17

Two persons are walking beside a railway track at respective speeds of 2 and 4 km per hour in the same direction. A train came from behind them and crossed them in 90 and 100 seconds, respectively. The time, in seconds, taken by the train to cross an electric post is nearest to

A 87

B 82

C 78

D 75

Answer: B

Video Solution

Explanation:
Let the length of the train be $lkms$ and speed be $skmph$. Base on the two scenarios presented, we obtain:

$\frac{l}{s-2} = \frac{90}{3600}$....(i) and $\frac{l}{s-4} = \frac{100}{3600}$...(ii)

On dividing (ii) by (i) and simplifying we acquire the value of s as $22kmph$. Substituting this value in (i), we have $l = \frac{90}{3600} \times 20\ kms$ {keeping it in km and hours for convenience}

Since we need to find $\frac{l}{s}$, let this be equal to x. Then, $x = 90 \times \frac{20}{22} = 81.81 \approx 82\ \sec onds$

Hence, Option B is the correct choice.

Question 18

A contractor agreed to construct a 6 km road in 200 days. He employed 140 persons for the work. After 60 days, he realized that only 1.5 km road has been completed. How many additional people would he need to employ in order to finish the work exactly on time?

Answer:40

Video Solution

Explanation:
Let the desired efficiency of each worker '6x' per day.

140*6x*200= 6 km ...(i)

In 60 days 60/200*6=1.8 km of work is to be done but actually 1.5km is only done.

Actual efficiency 'y'= 1.5/1.8 *6x =5x.

Now, left over work = 4.5km which is to be done in 140 days with 'n' workers whose efficiency is 'y'.

=> n*5x*140=4.5 ...(ii)

(i)/(ii) gives,

$\frac{(140 \cdot 6x \cdot 200)}{(n \cdot 5x \cdot 140)} = \frac{6}{4.5}$

=> n=180.

.'. Extra 180-140 =40 workers are needed.

Question 19

John takes twice as much time as Jack to finish a job. Jack and Jim together take one-thirds of the time to finish the job than John takes working alone. Moreover, in order to finish the job, John takes three days more than that taken by three of them working together. In how many days will Jim finish the job working alone?

Answer:4

Video Solution

Explanation:
Let Jack take "t" days to complete the work, then John will take "2t" days to complete the work. So work done by Jack in one day is (1/t) and John is (1/2t) .

Now let Jim take "m" days to complete the work. According to question, $\frac{1}{t} + \frac{1}{m} = \frac{3}{2t}\ or\ \frac{1}{m} = \frac{1}{2t}\ or\ m = 2t$ Hence Jim takes "2t" time to complete the work.

Now let the three of them complete the work in "p" days. Hence John takes "p+3" days to complete the work.

$\frac{1}{2t}(m+3) = \left(\frac{4}{2t}\right)m$

$\frac{1}{2t}(m+3) = \left(\frac{4}{2t}\right)m$

or m=1. Hence JIm will take (1+3)=4 days to complete the work. Similarly John will also take 4 days to complete the work

Logical Reasoning for CAT Questions (download pdf)

Quantitative Aptitude for CAT Questions (download pdf)

Know the CAT Percentile Required for IIM Calls

Join MBA Telegram Group

Enroll for Excellent CAT/MBA courses

Cracku CAT Success Stories

Subscribe to MBA Exams Youtube Channel

Join CAT 2022 Online Coaching