IPMAT Sample Paper for Time, Speed & Distance

Q1. Yogesh and Nishant bad gone to visit Wakanda, which is a seaside town and also known for the presence of the historical nuns of an ancient kingdom. They stayed in a hotel which is exactly 250 meters away from the railway station. At the hotel, Yogesh and Nishant learnt from a tourist information booklet that the distance between the sea-beach and the gate of the historical ruins is exactly 1 km. Next morning they visited the sea-beach to witness sunrise and afterwards decided to have a race from the beach to the gate of the ruins. Nishant defeated Yogesh in the race by 60 meters or 12 seconds. The following morning they had another round of race from the railway station to the hotel. How long did Nishant take to cover the distance on the second day?
a) 53 seconds
b) 47 seconds
c) 51 seconds
d) 45 seconds

Q2. It takes 15 seconds for a train travelling at 60 km/hour to cross entirely another train half its length and travelling in opposite direction at 48 km/hour. It also passes a bridge in 51 seconds. The length of the bridge is
a) 550 m
b) 450 m
c) 500 m
d) 600 m

Q3. The Howrah-Puri express can move at 45 km/hour without its rake, and the speed is diminished by a constant that varies as the square root of the number of wagons attached. If it is known that with 9 wagons, the speed is 30 km/hour, what is the greatest number of wagons with which the train can just move?
a) 63
b) 64
c) 80
d) 81

Q4. If 5 Snakes can catch five frogs in five minutes. How many frogs can hundred snakes catch in 100 minutes?
a) 100
b) 1000
c) 500
d) 2000

Q5. David gets on the elevator at the 11th floor of a building and rides up at the rate of 57 floors per minute. At the same time Albert gets on an elevator at the 51 it floor of the same building and rides down at the rate of 63 floors per minute. If they continue traveling at these rates, then at which floor will their elevators meet?
a) 19
b) 30
c) 28
d) 37

Q6. Starting from his house one day, a student walks at a speed of 2(1/2) kmph and reaches his school 6 minutes late. Next day he increases his speed by 1 kmph and reaches his school 6 minutes early. How far is the school from the house?
a) 1 km
b) 1 (1/2) km
c) 1(3/4) km
d) 2 km

Q7. Meera and Sameera start moving from the same point. Meera goes 4 kms west followed by 3 kms north. Sameera goes 4 kms east and then a right turn and keeps going for 3 kms. What is the shortest distance between the two of them?
a) 10 kms
b) 12 kms
c) 8 kms
d) 14 kms

Q8. Two persons are climbing up on two moving escalators which have 120 steps. The ratio of 1st person's speed to that of 1st escalator is 2:3 (steps). The ratio of 2nd person's speed to that of 2nd escalator is 3:5 (steps). Find the total number of steps they both have taken together.
a) 85
b) 93
c) 80
d) 75

Q9. Two identical trains A and B running in opposite directions at same speed take 2 minutes to cross each other completely. The number of bogies of A are increased from 12 to 16. How much more time would they now require to cross each other?
a) 40s
b) 50s
c) 60s
d) 20s

Q10. A cyclist drove one kilometer, with the wind in his back, in three minutes and drove the same way back, against the wind in four minutes. If we assume that the cyclist always puts constant force on the pedals, how much time would it take him to drive one kilometer without wind?
a) 2(1/3)
b) 3(3/7)
c) 2(3/7)
d) 3(7/12)

Q11. A train 108 m long moving at a speed of 50 km/hr crosses a train 112 m long coming from opposite direction in 6 seconds. The speed of the second train is,
a) 48 km/hr
b) 54 km/hr
c) 66 km/hr
d) 82 km/hr

Q12. In a 100 M race, if A gives B a start of 20 meters, then A wins the race by 5 seconds. Alternatively, if A gives B a start of 40 meters the race ends in a dead heat. How long does A take to run 200 M?
a) 10 seconds
b) 20 seconds
c) 30 seconds
d) 40 seconds

Q13. A train travelling at 36 kmph crosses a platform in 20 seconds and a man standing on the platform in 10 seconds. What is the length of the platform in meters?
a) 240 meters
b) 100 meters
c) 200 meters
d) 300 meters

Q14. By walking at 4/5th of his usual speed, a man reaches office 10 minutes later than usual. What is his usual time?
a) 20 min
b) 40 min
c) 30 min
d) 50 min

Q15. A man and a woman 81 miles apart from each other, start travelling towards each other at the same time. If the man covers 5 miles per hour to the women's 4 mile per hour, how far will the woman have travelled when they meet?
a) 27
b) 36
c) 45
d) None of these

Q16. Two people were walking in opposite directions. Both of them walked 6 miles forward then took right and walked 8 miles. How far is each from starting positions?
a) 14 miles and 14 miles
b) 10 miles and 10 miles
c) 6 miles and 6 miles
d) 12 miles and 12 miles

Q17. An aeroplane takes off 30 minutes later than the scheduled time and in order to reach its destination 1500 km away in time, it has to increase its speed by 250 km/h from its usual speed. Find its usual speed.
a) 1000 km/h
b) 750 km/h
c) 850 km/h
d) 650 km/h

Q18. On a journey across Kolkata, a taxi averages 40 kmph for 60% of distance, 30 kmph for 20% of the distance, and 10 kmph for the remainder. The average speed of the whole journey is
a) 25 kmph
b) 26 kmph
c) 24 kmph
d) 30 kmph

Q19. A train passes a station platform in 36 seconds and a man standing on the platform in 20 seconds. If the speed of the train is 54 km/h, then find the length of the platform.
a) 225 m
b) 235 m
c) 230 m
d) 240 m

Q20. The jogging track in a sports complex is 726 metres in circumference. Pradeep and his wife start from the same point and walk in opposite directions at 4.5 km/h and 3.75 km/h, respectively. They will meet for the first time in
a) 5.5 min
b) 6.0 min
c) 5.28 min
d) 4.9 min

Answer Key & Explanation

1. Correct Answer: b
Solution:
Distance between sea Beach & the Gate of Ruins = 1000 m.
Nishant defeated Yogesh by 60m or 12 sec => Yogesh takes 12sec to cover 60m.
Yogesh takes 200sec to cover 1000m.
Nishant takes 188 sec to cover 1000m.
Now distance between hotel and the Railway Station is 250m.
Nishant takes 188/4= 47 sec to cover 250m.

2. Correct answer: a
Solution:
Relative speed of the two trains = 60 + 48 = 108 km/hr = 30 m/s
Therefore, time taken to cross another train, 15 s = (L + 0.5L)/30
$\Rightarrow$ L = 450/1.5 = 300 m
Similarly, time taken to cross the bridge, 51 = (300 + LB)/(50/3)

$\Rightarrow$ LB = (51×50/3) − 300 = 850 − 300 = 550 m is the length of the bridge.

3. Correct Answer: c
Solution:
Reduction in speed = Constant × √Number of wagons attached
$\Rightarrow$ 45 − 30 = K × √9 $\Rightarrow$ K = 15/3 = 5
Now, when the speed is reduced to zero (because of max. wagons),
Then, 45 − 0 = 5 × √W $\Rightarrow$ √W = 45/5 = 9
$\Rightarrow$ W = 81.
But with 81 wagons attached, the speed will be zero.
Therefore, the greatest no. of wagons with which the train can just move is 80.

4. Correct Answer: d
Solution:
One snake catches one frog in 5 minutes.
=> 100 snakes catches 100 frog in 5 minutes.

=> In 100 minutes 100 × 20 = 2000 frogs will be caught.

5. Correct Answer: b
Solution:

(b) Relative velocity = 57 + 63 = 120 fl/min.

Distance to be covered = 50 floors

Time required $= \dfrac{40}{120}$

No. of floors travelled by David $= \dfrac{40}{120} \times 57 = 19$

∴ Required answer = 11 + 19 = 30

6. Correct Answer: c
Solution:

(c) $\dfrac{d}{2.5} - \dfrac{d}{3.5} = \dfrac{12}{60}$

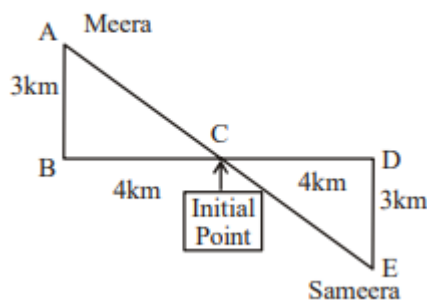$\Rightarrow \dfrac{2d}{5} - \dfrac{2d}{7} = \dfrac{12}{60}$

$\Rightarrow 14d - 10d = \dfrac{1}{5} \times 5 \times 7 = 7$

$\Rightarrow d = \dfrac{7}{4} = 1\dfrac{3}{4}$ km.

7. Correct Answer: a
Solution:

(a) In Δ ABC or Δ CDE AC or CE will be = 5

Shortest distance

$= AE = \sqrt{AB^2 + BC^2} + \sqrt{DE^2 + CD^2} = 10$ kms

8. Correct Answer: b
Solution:

(b) 2 steps of 1st person = 3 steps of escalators
Hence steps for 1st person

$= \left(\dfrac{2}{3} \times \dfrac{120}{1 + \frac{2}{3}} \right) = 120 \times \dfrac{3}{5} \times \dfrac{2}{3} = 72 \times \dfrac{2}{3} = 48$

Similarly, steps for 2nd person

$= \dfrac{3}{5} \times \dfrac{120}{1 + \frac{3}{5}} = \dfrac{3}{5} \times 120 \times \dfrac{5}{8} = 45$

Total steps taken together = 48 + 45 = 93

9. Correct Answer: d
Solution:

(d) Total bogies initially is 12 + 12 = 24, since train move in opposite direction.
Additional bogies = 16 − 12 = 4, so total bogies = 28
24 bogies take 2 minutes, so, 28 bogies will take

$\dfrac{2 \times 60}{24} \times 28 = 140$ seconds, so, 20 seconds will take

more times.

10. Correct Answer: b
Solution:

Time taken by cyclist in the direction of the wind is 3 minutes.
Let the cyclist's speed be v km/min.
Let the speed of the wind be u km/min.

$\dfrac{v + u}{v - u} = \dfrac{4}{3}$

$\dfrac{v}{u} = \dfrac{7}{1}$

∴ $v = 7u$

We have $(v - u) \times 4 = 1$

Thus, $24u = 1$

Thus, $u = \dfrac{1}{24}$ and $v = \dfrac{7}{24}$

Time taken to travel without wind would be

$= \dfrac{\text{Distance}}{\text{Speed}}$

$= \dfrac{24}{7} = 3\dfrac{3}{7}$ minutes.

Hence, **option 2.**

11. Correct Answer: d
Solution:

Length of first train = 0.108 km
Length of second train = 0.112 km.
Let the speed of second train be *x*.
As the trains are moving towards each other,

$$\frac{0.108 + 0.112}{50 + x} = \frac{6}{60 \times 60}$$

∴ *x* = 82 km/hr.
Hence, **option 4.**

12. Correct Answer: c
Solution:
Let V_a and V_b be the speed of A and B respectively.

$$\frac{V_a}{100} + 5 = \frac{80}{V_b} \quad \ldots \text{(I)}$$

$$\frac{V_a}{100} = \frac{60}{V_b} \quad \ldots \text{(II)}$$

Solving I and II, we get,
$V_b = 4$, $V_a = 100/15$
Hence, A will take;

$$\frac{200}{\frac{100}{15}} = 30 \text{ seconds}$$

Hence, **option 3.**

13. Correct Answer: b
Solution:
Speed of train = 36 kmph = 36 × 5 /18 = 10 m/s
Let the length of the platform be P and length of the train be T.
Now, the train crosses the platform in 20 seconds and the man in 10 seconds.
Hence, the train traveled P + T in 20 seconds and T in 10 seconds.
Hence, it traveled P distance in 20 – 10 = 10 seconds.
Hence, P = 10 × 10 = 100 meters.
Hence, option b.

14. Correct Answer: b
Solution:
Let "t" be the usual time taken by the man.
Now, if he travels at 4/5th of his usual speed then time taken by him will be 5/4 × t
Hence, 5/4 × t = t + 10
Hence, t = 40
Hence, option b.

15. Correct Answer: b
Solution:
Relative speed of man and woman is 9 kmph.
Hence, time required to cover 81 km = 81/9 = 9 hours.
In 9 hours, the woman will travel 9 × 4 = 36 km.
Hence, option b.

16. Correct Answer: b
Solution:
Assume that one of them walked 6 km towards east and then 8 km south.
Hence, he is 6 km east and 8 km south of the original position.
Hence, he is √(6^2 + 8^2) = 10 km from his original position.
Similarly, we can prove that the other person is also 10 km from his original position.
Hence, option b.

17. Correct Answer: b

18. Correct Answer: c
Solution:
(c)   Let total distance be d.

time taken for 60% distance = $\frac{0.6d}{40} = \frac{3d}{200}$ h

time taken for 20% distance = $\frac{0.2d}{30} = \frac{d}{150}$ h

time taken for remaining 20% distance
$= \frac{0.2d}{10} = \frac{d}{50}$ h

average speed = $\dfrac{d}{\frac{3d}{200} + \frac{d}{150} + \frac{d}{50}}$

$= \frac{200 \times 150 \times 50}{22500 + 10000 + 30000} = \frac{200 \times 150 \times 50}{62500}$

$= 24$ kmph

19. Correct Answer: d
Solution:
Train takes 20 seconds to cover its length and 36 seconds to cross the platform, it mean it has taken 16 second at 54 km/hr to cross the length of platform.

Length of the platform = Distance × Time =

54 × 16 km / hr   20. Correct Answer: c

= 54 × 16 × 5/18 m/sec = 240 m

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