MBA PIONEER 2024

QUANTITATIVE APTITUDE

Distance Time and Speed – 1

Q1 A train covers 340 km in $3\frac{2}{5}$ hours with a uniform speed. The time taken, in hours, to cover 460 km with the same speed is:
(A) $4\frac{2}{5}$
(B) $3\frac{1}{5}$
(C) $4\frac{3}{5}$
(D) $3\frac{2}{5}$

Q2 A cyclist travelled $\frac{2}{5}$th of his journey at 25 km per hour and the remaining $\frac{3}{5}$th at 35 km per hour. What was his average speed for the whole journey?
(A) 25 kmph
(B) $30\frac{5}{29}$ kmph
(C) 35 kmph
(D) $40\frac{5}{29}$ kmph

Q3 A train X leaves station A at 10:30 AM and reaches station B at 12:30 PM on the same day. Another train Y leaves station B at 10:00 AM and reaches station B at 12:48 PM on the same day. How long after train X started, did train Y take to meet train X?
(A) 48 min   (B) 36 min 20 sec
(C) 1hr 2 min   (D) 57 min 30 sec

Q4 Rubi went to the school from her home. She travelled 45% of the total distance at 50 km/h, 25% of total distance at 40 km/h and the remaining distance at 20 km/h. Find her average speed through the whole journey (in the nearest integer).
(A) 48 km/h   (B) 45 km/h

(C) 40 km/h   (D) 33 km/h

Q5 Two trains are moving with speeds in the ratio 3: 2. The Faster train covers 552 km in 11 hours 30 minutes. In how much time will the slower train cover 32 km less distance than that covered by faster train?
(A) 16 hours 15 minutes
(B) 16 hours 25 minutes
(C) 17 hours 10 minutes
(D) 17 hours 20 minutes

Q6 If Rocky runs at 15 km/hr, he arrives at his home at night at 1:30 a.m. If Rocky runs at 20 km/hr from the same starting point and starting at the same time, he will arrive at his home at night at 11:30 p.m. What should be the speed of Rocky to get there at midnight given that his starting time is the same?
(A) $16\frac{4}{13}$ km/h
(B) $17\frac{5}{13}$ km/h
(C) $18\frac{6}{13}$ km/h
(D) $19\frac{7}{13}$ km/h

Q7 Speed of the Bugatti is 40 km/hr more than the speed of the Tesla. The time taken by Bugatti to cover 450 km is equal to the time taken by Tesla to cover 360 km. Find the speed of Bugatti.
(A) 200 km/hr   (B) 220 km/hr
(C) 190 km/hr   (D) 150 km/hr

Q8 Adani's company office is 54 km away from his house. He usually goes to the office at a speed of V km/h. If he travels with 80% more speed,

then takes 18 minutes less to reach the office. What is the value of V?

(A) 60   (B) 80

(C) 54   (D) 68

Q9 Kang is riding a One-wheeler from point X to Y, but he is returning by his Jeep. By this, he takes a total of 12 hrs. If he goes and returns by using his Jeep, then he takes 2 hrs less to reach. Find the ratio of speed on his journey by One-wheeler and Jeep.

(A) 9:4   (B) 5:7

(C) 4:7   (D) 2:3

Q10 Hindenburg starts from his office at a speed of 45 km/h and takes 12 minutes more than the scheduled time to reach his factory. If he travels at 30 km/h from his office and takes 18 minutes more than the scheduled time to reach his factory, then what is the distance between office and his factory?

(A) 9 km   (B) 18 km

(C) 6 km   (D) 12 km

Q11 A Tesla car with low battery runs at the speed of 75 kmph and with full battery runs at 125 kmph. After full charge of its battery, the Tesla covers a certain distance in 12 hr. How much time will the Tesla take to cover the same distance in case it's in the low battery?

[Note that the Tesla car can be driven for at most 1 day in low battery mode.]

(A) 12 hr   (B) 14 hr

(C) 18 hr   (D) 20 hr

Q12 Two cars are respectively on mutually perpendicular roads. Initially, the black car was 26 km away from the intersection and the red car was 24 km away from the intersection. The black car was traveling towards the intersection at 70 km/hr. The red car was going away from

the intersection at 55 km/hr. How much distance (in km) apart are they after 12 minutes?

(A) 35   (B) 36

(C) 37   (D) 47

Q13 From his laboratory, Prof. Hardy reaches home at 9:05 pm if he travels at 6 km/h. If he leaves his laboratory at the same time, he reaches home at 8:50 pm travelling at 15 km/h. If he leaves his laboratory at 8:20 pm, at what speed (in km/h) must he travel so that he reaches home exactly at 9:10 pm?

(A) 3 km/h   (B) 6 km/h

(C) 9 km/h   (D) 12 km/h

Q14 A person is running from point A to B and but he is returning by car, he takes total of 10 hrs. If he goes and returns by using his car, then he takes 2 hrs less. Find the ratio of velocity of his running and driving.

(A) 9:4   (B) 4:9

(C) 3:2   (D) 2:3

Q15 A car runs at the speed of 40 kmph when it is not serviced and runs at 80 kmph when it is serviced. After servicing the car covers a certain distance in 8 hr. How much time will the car take to cover the same distance when it is not serviced?

(A) 12 hr   (B) 14 hr

(C) 16 hr   (D) 18 hr

Q16 Speed of car A is 20 km/hr more than the speed of car B. The time taken by car A to cover 300 km is equal to the time taken by car B to cover 250 km. Find the speed of car A.

(A) 100 km/hr   (B) 120 km/hr

(C) 90 km/hr   (D) 150 km/hr

Q17 Sneha went to a market from her home. She travelled 50% of total distance at 50 km/h, 40%

of total distance at 40 km/h and remaining distance at 20 km/h. Then for whole journey, what was her average speed (in km/h)?

Q18 Aarav's school is 30 km away from his house. He usually go to school with a speed of S km/h. If he travels with 60% more speed, then takes 15 minutes less to reach the school. What is the value of S?

Q19 A bus blows horn twice at an interval of 24 seconds. A man is running towards the bus heard the sounds of the horns at an interval of 22 seconds. If the speed of sound is 330 m/s, what is the running speed of the man (in m/s)?

Q20 Abbasi rides motorcycle at a speed of 30 km/h and after 1 hr, Rashid starts from the same place from where Abbasi started at 40 km/h. After how much time from when Abbasi started, Rashid will catch him?
(A) 3 hrs
(B) 4 hrs
(C) 2.5 hrs
(D) None of the above

Q21 The distance between Ambala and Chandigarh is approximately 50 kms. A car starts from Ambala at a speed which is 10 km/h more than its usual speed. The same car returned from Chandigarh at a speed which is 10 kmph less than its usual speed. The total journey time is 12 hours. Calculate how much time did it travel at slower speed?
(A) 10 hrs   (B) 2 hrs
(C) 8 hrs   (D) 6 hrs

Q22 Alok starts from his school at speed of 40 km/h and takes 15 minutes more than the scheduled time to reach his coaching. If he travels at 36 km/h from his school then he takes 24 minutes

more than the scheduled time to reach his coaching, then what is the distance between school and his coaching?
(A) 90 km   (B) 18 km
(C) 36 km   (D) 54 km

Q23 Mohan covers one-third of the distance by train at the speed of 120 km/hr, half of the remaining distance by bus at the speed of 90 km/hr, and the remaining distance by car at the speed of 60 km/hr. What is the approximate average speed for the entire journey?
(A) 75 km/hr   (B) 78 km/hr
(C) 80km/hr   (D) 83 km/hr

Q24 Starting at the same time from Howrah and Solapur stations respectively, two trains T_1 and T_2 are coming towards each other at speeds of 45 kmph and 55 kmph respectively. At the time of their meeting, the second train has travelled 130 km more than the first one. What is the distance between Howrah and Solapur stations?
(A) 1250 km   (B) 1350 km
(C) 1300 km   (D) 1500 km

Q25 Abhishek and Amit start their journey from their offices at Park Street (P), Alipore-Road (A) towards each other's offices at the same time at speeds of 20 km/h and 25 km/h respectively. The distance between their offices is 40 km. After reaching the opposite locations, they retrace their path and start moving towards each other again. What is the total distance travelled by Abhishek when he meets Amit for the second time?
(A) 50 km
(B) $51\frac{1}{3}$ km
(C) 52 km
(D) $53\frac{1}{3}$ km

Q26 Two buses start from the stoppage X and Y heading towards each other. The bus from stoppage X starts at 10 p.m. and reaches stoppage Y at 2 p.m. the next day. The Bus from the stoppage Y starts at 9 p.m. the same day on which the bus starts from stoppage X and reaches to the stoppage X at 7 a.m. the next day. At what time (approximately) will they cross each other?

(A) 4 a.m.   (B) 3:32 a.m.
(C) 2:51 a.m.   (D) 3.51 a.m.

Q27 Pathan rides a motorcycle at a speed of 42 km/h and after 30 mins, Sultan starts from the same point from where Pathan started at 48 km/h. After how much time from when Pathan starts, Sultan will catch him?

(A) 6 hrs   (B) 4 hrs
(C) 6.5 hrs   (D) 8 hrs

Q28 Prateek started from point A at a speed of 24 km/hr towards point B which is 120 km away. After 20 minutes, Qutub started from point B at the speed of 36 km/hr towards point A. What is the distance between the point they will meet at and the point they would have met at had both of them started simultaneously?

(A) 4.2 km   (B) 4.8 km
(C) 5.4 km   (D) 5.6 km

Q29 Sheetal started her journey from Agra to Lucknow by a cab. The actual speed of the cab is 180 km/hr. If the driver of the cab reduces the speed of the cab by 30 km/hr, then she will arrive at Lucknow 15 minutes late from the actual time. Calculate the total distance from Agra to Lucknow

(A) 240 Km   (B) 140 Km
(C) 225 Km   (D) 150 Km

Q30 Two cyclists Ram and Shyam start cycling from an intersection along two mutually perpendicular directions in the morning at 6 O'clock and 8 O'clock respectively. If at 2:00 p.m., the distance between the cyclists is 140 km, then find the speed (in km/h) of each cyclist. Assume that they were cycling at the same speed.

Answer Key

Q1	(C)		Q16	(B)
Q2	(B)		Q17	40
Q3	(D)		Q18	45
Q4	(D)		Q19	30
Q5	(A)		Q20	(B)
Q6	(C)		Q21	(A)
Q7	(A)		Q22	(D)
Q8	(B)		Q23	(D)
Q9	(B)		Q24	(C)
Q10	(A)		Q25	(D)
Q11	(D)		Q26	(B)
Q12	(C)		Q27	(B)
Q13	(A)		Q28	(B)
Q14	(D)		Q29	(C)
Q15	(C)		Q30	14

Hints & Solutions

Q1 **Text Solution:**

Topic - Time, Speed and Distance

Speed of train = $\frac{340}{3\frac{2}{5}}$ = $\frac{340}{\frac{17}{5}}$ kmph = 100 kmph

Now, distance = 460 km

Required time = $\frac{460}{100}$ = $\frac{23}{5}$ = $4\frac{3}{5}$ hours.

Q2 **Text Solution:**

Topic - Time, Speed and Distance

Let's assume the total distance is 150 km (We can assume any number).

Since $\frac{2}{5}$th of the journey is = 150 × $\frac{2}{5}$ = 60 km

Remaining journey ($\frac{3}{5}$th of the journey) is = 90 km.

The time taken for $\frac{2}{5}$th journey at 25 kmph,

t_1 = $\frac{\text{Distance}}{\text{Speed}}$ = $\frac{60}{25}$ = $\frac{12}{5}$ hrs.

The time taken for $\frac{3}{5}$th journey at 35 kmph, t_2 = $\frac{18}{7}$ hrs.

Total time = $\frac{12}{5}$ + $\frac{18}{7}$ = $\frac{174}{35}$ hrs.

Hence, average speed = $\frac{\text{Total distance}}{\text{Total time}}$

= $\frac{150}{\frac{174}{35}}$ = $30\frac{5}{29}$ kmph

So, Option (b) is correct.

Q3 **Text Solution:**

Topic - Time, Speed and Distance

Let distance between 2 stations be 14 km (One can take any distance. To make calculation easy here we have taken a distance of 14 km.)

Therefore, the speed of train X and Y will be 7 kmph and 5 kmph respectively.

Now distance travelled by Y till 10:30 is 2.5km, remaining distance to be covered = 14 − 2.5 = 11.5 km

Relative speed = 7 + 5 = 12 kmph.

Time in which Y will meet X = 11.5 × $\frac{60}{12}$ = 57 min 30 sec

Hence, option D is correct.

Q4 **Text Solution:**

Topic - Time, Speed and Distance

Let the total distance = 100x km

Total time taken

= $\frac{(45\% \text{ of } 100x)}{50}$ + $\frac{(25\% \text{ of } 100x)}{40}$ + $\frac{(100x - 45\% \text{ of } 100x - 25\% \text{ of } 100x)}{20}$

= $\frac{45x}{50}$ + $\frac{25x}{40}$ + $\frac{30x}{20}$

= $\frac{121x}{40}$ hours

Hence, average speed = $\frac{100x}{\frac{121x}{40}}$ ≈ 33 km/h

Q5 **Text Solution:**

Topic - Time, Speed and Distance

11 hours 30 minutes = 11.5 hours

Speed of faster train = $\frac{552}{11.5}$ = 48 km/h

Speed of slower train = 48 × $\frac{2}{3}$ = 32 km/h

Therefore, time taken by slower train to cover 32 km less distance than that covered by faster train

= $\frac{552-32}{32}$

= 16.25 hours

= 16 hours + 0.25 × 60 minutes

= 16 hours 15 minutes

Q6 **Text Solution:**

Topic - Time, Speed and Distance

Let the distance covered by the man each time be 'd' km and time taken by him to cover 'd' km at a speed of 15 km/h be 't' hours.

Then, $\frac{d}{t}$ = 15 and $\frac{d}{t-2}$ = 20

Equating the value of d:

15 × t = 20 × (t − 2)

⇒ t = 8 hours

∴ Required speed = $\frac{d}{t-1.5}$ = $\frac{15t}{t-1.5}$

[Note that, midnight means = 12 AM, so required time = (12:00 a.m - 1:30 a.m = 1.5 hrs]

= $\frac{15 \times 8}{6.5}$

$= \frac{240}{13}$ Km/hr

$= 18 \frac{6}{13}$ km/h

Q7 Text Solution:

Topic – Time, Speed and Distance

Let speed of Bugatti = (X + 40) km/hr

Then speed of Tesla = X km/hr

According to the question,

$\frac{360}{X} = \frac{450}{X+40}$

=> 5X = 4X + 160

=> X = 160

Hence, the speed of the Bugatti = 160 + 40 = 200 km/hr.

Q8 Text Solution:

Topic – Time, Speed and Distance

Let the actual time taken = t hours

We know, distance covered = speed × time

Now, 54 = V × t ....(i)

Also, 54 = (100 + 80)% of V × $\left(t - \frac{18}{60}\right)$

$54 = \frac{9V}{5} \times (t - 0.3)$ ....(ii)

From (i) and (ii), we get

$Vt = \frac{9V}{5} \times (t - 0.3)$

t = 1.8t – 0.54

0.8t = 0.54

$t = \frac{27}{40}$

And, 54 = V × $\frac{27}{40}$

V = 80 km/h

Q9 Text Solution:

Topic – Time, Speed and Distance

Let the speed of his One-wheeler = v_1

Speed of his Jeep = v_2

The distance between X and Y = a

According to question,

$\frac{a}{v_1} + \frac{a}{v_2} = 12$ .... (1)

and $\frac{2a}{v_2} = 10$, therefore $\frac{a}{v_2} = 5$

and $\frac{a}{v_1} = 7$ (putting $\frac{a}{v_2}$ in eq. (1))

$v_1 = \frac{a}{7}$ and $v_2 = \frac{a}{5}$

Therefore, the required ratio

$= \frac{a}{7} : \frac{a}{5}$

= 5 : 7

Q10 Text Solution:

Topic – Time, Speed and Distance

Let distance between office and his factory = d km and time taken = t hours

So, by the given condition,

$\frac{d}{45} = t + \frac{12}{60}$

=> t = $\frac{d}{45} - \frac{1}{5}$

And, $\frac{d}{30} = t + \frac{18}{60}$

=> $\frac{d}{30} = \frac{d}{45} - \frac{1}{5} + \frac{3}{10}$

=> $\frac{d}{90} = \frac{1}{10}$

=> d = 9 km.

Q11 Text Solution:

Topic – Time, Speed and Distance

After full charge, the Speed of Tesla car = 125 kmph.

Then, in this case, the time taken = 12 hrs.
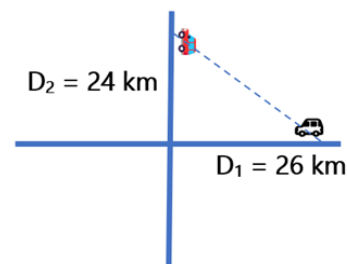
Total distance covered = 125 × 12 = 1500 km.

So, the Tesla in low battery, take time to cover the same distance

$= \frac{1500}{75}$

= 20 hr

Q12 Text Solution:

Topic – Time, Speed and Distance

Let the initial distance of the black car and the red car from intersection is D_1 and D_2 respectively as shown in the diagram below.

The black car is moving at a speed of 70km/hr towards the point of intersection.

In 12 minutes i.e., $\frac{1}{5}$ hrs, it would have travelled a distance of

$70 \times \frac{1}{5}$ = 14 km.

So, after 12 minutes, the distance between the black car and the point of intersection = 26 – 14 = 12 km

The red car is moving away from the point of intersection at a speed of 55km/hr.

In 12 minutes i.e., $\frac{1}{5}$ hrs, it would have travelled a distance of 11 km.

So, the distance of the red car from the point of intersection = 24 + 11 = 35 km

Hence, after 12 minutes, the distance between the two cars

$= \sqrt{12^2 + 35^2}$ = 37 km

Hence, option (C) is correct.

Q13 Text Solution:

Topic – Time, Speed and Distance

The timings of reaching the home at the speeds of 6 km/h and 15 km/h, are 9:05 PM and 8:50 PM, respectively.

Hence, the difference in the time taken = 15 minutes

Let the distance from the home to the lab be x km.

So, we have the relation to calculate time as:

$\frac{x}{6} - \frac{x}{15} = \frac{15}{60}$

$\Rightarrow \frac{x}{10} = \frac{1}{4}$

$\Rightarrow x = \frac{5}{2}$

$\Rightarrow x = 2.5$ km

He needs to reach the home by travelling for (8:20 pm to 9:10 pm) = 50 minutes

The required speed = $\frac{2.5}{\frac{50}{60}}$ = 3 km/h

Option (A) is correct.

Q14 Text Solution:

Topic – Time, Speed and Distance

Let the velocity of running = v_1

Velocity of driving = v_2

distance between A and B = x

according to question,

$\frac{x}{v_1} + \frac{x}{v_2} = 10$ .... (1)

and $2\frac{x}{v_2} = 8$, therefore $\frac{x}{v_2} = 4$

and $\frac{x}{v_1} = 6$ (putting $\frac{x}{v_2}$ in eq. (1))

$v_1 = \frac{x}{6}$ and $v_2 = \frac{x}{4}$

Therefore ratio = 2:3

Q15 Text Solution:

Topic – Time, Speed and Distance

Speed of car after servicing = 80 kmph.

Time taken = 8 hrs.

Distance covered = 80 × 8 = 640 km.

So, time taken when not serviced = $\frac{640}{40}$ =16 hr

Q16 Text Solution:

Topic – Time, Speed and Distance

Let speed of car A = (X + 20) km/hr

Then speed of car B = X km/hr

Time = $\frac{\text{Distance}}{\text{Speed}}$

According to the question,

$\frac{250}{x} = \frac{300}{(x + 20)}$

5X+ 100 = 6X

X = 100

Hence, the speed of the car A = 100 +20 = 120 km/hr.

Q17 Text Solution:

Topic – Time, Speed and Distance

Let total distance = 100x km

Total time taken = $\frac{50x}{50} + \frac{40x}{40} + \frac{10x}{20}$ = 2.5x hours

Hence, average speed = $\frac{100x}{2.5x}$ = 40 km/h

Q18 Text Solution:

Topic – Time, Speed and Distance

Let the actual time taken = t hours

We know, distance covered = speed × time

Now, 30 = S × t ....(i)

Also, 30 = (100+60) % of S× (t – $\frac{15}{60}$)

30 = ($\frac{8S}{5}$)× (t – 0.25) ....(ii)

From (i) and (ii), we get

$St = (\frac{8S}{5}) \times (t - 0.25)$

$5t = 8t - 2$

$3t = 2$

$t = \frac{2}{3}$

And $30 = S \times \frac{2}{3}$

$S = 45$

Q19 Text Solution:

Topic – Time, Speed and Distance

In 2 s, sound travels 330 m/s × 2 s = 660 m. The time compression from 24 s to 22 s would happen if the man is 660 m closer to the bus when the sound of the 2nd horn reached it than it was when the 1st horn reached it. So, the man's speed was

$\frac{660}{22} = 30$ m/s.

Q20 Text Solution:

Topic – Time, Speed and Distance

Abbasi started before 1hr which means he had already covered 30 kms.

For Rashid to catch him he need to travel 30 kms with a relative speed of = 40 km/hr – 30 km/hr = 10 km/hr

TIME = $\frac{\text{DISTANCE}}{\text{SPEED}}$

$T = \frac{30}{10} = 3$ Hrs.

Since Abbasi started 1 hr before Rashid the total time from Abbasi's start is 4 hrs.

Option B is correct.

Q21 Text Solution:

Topic – Time, Speed and Distance

Total time taken = 12 hours

Time = $\frac{\text{Distance}}{\text{Speed}}$

Time taken from Ambala to Chandigarh = $\frac{50}{(x+10)}$

x = usual speed

And time taken from Chandigarh to Ambala = $\frac{50}{(x-10)}$

$\frac{50}{(x-10)} + \frac{50}{(x+10)} = 12$

Solving we get x = 15

slower speed = 15 – 10 = 5 km/h

Time taken = $\frac{50}{5}$ = 10 hours

Q22 Text Solution:

Topic – Time, Speed and Distance

Let distance between school and his coaching = d km and time taken = t hours

So, $\frac{d}{40} = t + \frac{15}{60}$

=> $t = \frac{d}{40} - \frac{1}{4}$

And $\frac{d}{36} = t + \frac{24}{60}$

=> $\frac{d}{36} = \frac{d}{40} - \frac{1}{4} + \frac{2}{5}$

=> $\frac{d}{360} = \frac{(8-5)}{20}$

=> $d = 360 \times \frac{3}{20}$

=> d = 54

Q23 Text Solution:

Topic – Time, Speed and Distance

Let the total distance be– d km.

Distance covered by 120 km/hr = $\frac{d}{3}$

Distance covered by 90 km/hr = $\frac{1}{2}(d - \frac{d}{3}) = \frac{d}{3}$

Distance covered by 60 km/hr = $d - \frac{d}{3} - \frac{d}{3} = \frac{d}{3}$

Average speed =

$\frac{d}{\frac{d}{3(120)} + \frac{d}{3(90)} + \frac{d}{3(60)}} = \frac{d}{\frac{d}{360} + \frac{d}{270} + \frac{d}{180}} = \frac{d}{\frac{13d}{1080}} = \frac{1080}{13}$

≈83 km/h.

Q24 Text Solution:

Topic – Time, Speed and Distance

Let both trains meet after t hours.

Distance = speed × time

55t − 45t = 130

10t = 130

t = 13 hours

Required distance = 55t + 45 t

= 100t

= 100 × 13 = 1300 km

Hence, option (3) is correct.

Q25 Text Solution:

Topic – Time, Speed and Distance

Abhishek covers first time the distance PA (40 km) in $\frac{40}{20}$ = 2 hrs.

Amit covers distance in 2 hrs. = 25×2 = 50 km

Extra distance Amit covers after end 50–40=10 km

Remaining distance they both have to cover to =40–10 km= 30 km

They are in opposite direction so speed = 20+25 = 45 km/h

Time taken in after stopping at ends

$= \frac{30}{45}$

$= \frac{2}{3}$ hrs.

Distance covered by Abhishek in $\frac{2}{3}$ hrs.

$= \frac{40}{3}$ km

Total distance covered by Amit is 40 km + $\frac{40}{3}$ km

$= \frac{160}{3}$ km = $53\frac{1}{3}$ km

Option (4) is correct.

Q26 **Text Solution:**

Topic – Time, Speed and Distance

We see that the buses take 16 hr and 10 hr respectively to complete their journeys.

Let the distance between the stoppages be LCM (16, 10), i.e., 80 km.

∴ Speed of the first bus = 5 km/hr.

Speed of the second bus = 8 km/hr.

By the time the bus from X starts, bus from Y already would have travelled 8 km in 1 hr.

Now the distance between the buses = 80 – 8 = 72 km.

Relative speed of the buses = 8 + 5 = 13 km/hr.

Therefore, they will take $\frac{72}{13}$ hr. after 10 p.m.

i.e., approximately at 3:32 a.m.

Option (2) is correct.

Q27 **Text Solution:**

Topic – Time, Speed and Distance

Both travel the same distance.

Let Pathan travel in 't' hrs time while Sultan in (t $- \frac{1}{2}$) hrs.

42t = 48(t $- \frac{1}{2}$)

=> 42t = 48t – 24

=> 6t = 24

=> t = 4 hrs

So, after 4 hours, Sultan will catch Pathan.

Q28 **Text Solution:**

Topic – Time, Speed and Distance

If they would have started simultaneously:

Initial separation between them = 120 km

Relative speed = 24 + 36 = 60 km/hr

Time taken to meet = $\frac{120}{60}$ = 2 hr

Distance travelled by Qutub in 2 hr = 36 × 2 = 72 km

So, they would have met 72 km away from point B

In actual case:

Distance travelled by Prateek in 20 minutes = 24 × $\frac{20}{60}$ = 8 km

Initial separation between them = 120–8= 112 km

Relative speed = 24 +36= 60 km/hr

Time taken to meet after Qutub starts = $\frac{112}{60}$ = $\frac{28}{15}$ hr

Distance travelled by Qutub in $\frac{28}{15}$ hr = 36 × $\frac{28}{15}$ = 67.2 km

So, they met 67.2 km away from B

Required distance between the 2 meeting points = 72 – 67.2 = 4.8 km

Option (2) is correct.

Q29 **Text Solution:**

Topic – Time, Speed and Distance

The actual speed of the cab = 180 Km/hr

The new speed of the cab after reducing the speed 30 Km/hr

= (180 – 30) = 150 Km/hr

Thus,

Initial : New

Speed 180 : 150

Rate of Time 150 : 180

Time Left 5a : 6a

Speed and time are inversely proportional to each other when distance is constant. So, if the speeds are in ratio m:n then time taken will be in ratio n:m.

Thus, the actual time = 5a and new time = 6a

Now, according to the question

(6a – 5a) = 15 min

a = 15 min

So, new time taken by Sheetal = 6a

= 6 × 15 = 90 min

= $\frac{3}{2}$ Hour

So, the distance covered by Sheetal:

D = S × T

= 150 × $\frac{3}{2}$ = 75 ×3 = 225 Km

Q30 Text Solution:

Topic – Time, Speed and Distance

The cyclists are moving perpendicular to one another, the distance between the cyclists can be found by Pythagoras theorem.
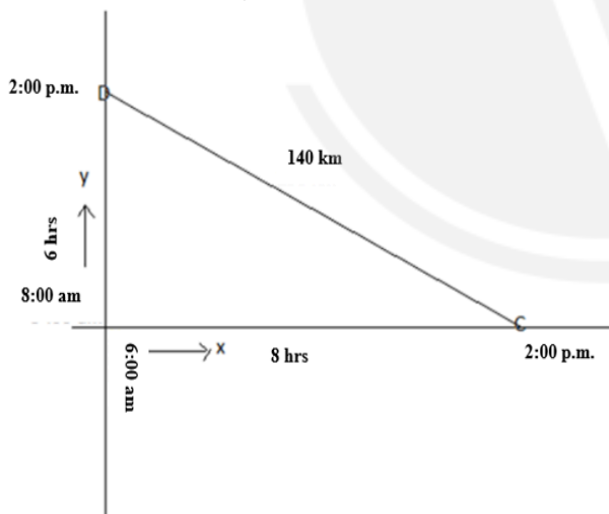
Let the speed of the cyclists be v as they are moving with the same speed.

Then, the distance travelled by the cyclists are,

x =vt_1 and y=vt_2

Given that, t_1 =6 a.m. to 2:00 p.m. = 8 hrs. and t_2 = 8 a.m. to 2: 00 p.m. = 6 hrs.

Thus, $(vt_1)^2+(vt_2)^2 = 140^2$

$v^2(t_1^2+t_2^2) =140^2$

$v^2(8^2+6^2) = 140^2$

$v^2= 196$

v=14 km/h