Time Speed and Distance

Q.No.	Ans	Solution
1	C	**Option C** **Solution:** Distance of first part of his journey = x Distance of first part of his journey = y x/30 + y/60 = (x + y)/40 6x + 2y = 3x + 3y x/y = 3:1
2	D	**Option D** **Solution:** Walking + Riding = 7 hours 40 minutes Walking + Walking = 8 hours 40 minutes So Walking = 4 hours 20 minutes Riding + Riding = 6 hours 40 minutes
3	B	**Option B** **Solution:** Total hours = 10 hours Average Speed = 2xy/(x+y) = 2*22*18/(40) = 19.8 kmph Total Journey in Km = 19.8 * 10 = 198 km
4	A	**Option A** **Solution:** Distance covered in 10 minutes at 40 kmph = distance covered in 8 minutes at (40+x) kmph. 40*10/60 = 8/60 * (40+x) 20 * 5 = 80 + 2x x = 10 kmph
5	D	**Option D** **Solution:** 3/4 of speed = 4/3 of original time 4/3 of original time = original time + 18 minutes; 1/3rd of original time = 18 minutes; Thus, original time = 18*3 = 54 minutes.
6	B	**Option B** **Solution:** Assume Total distance = 100 km. So speed = 100/[(40/20)+(50/25)+(10/10]; speed = 100/[(2)+(2)+(1)]; = 100/[5] = 20 kmph.
7	D	**Option D** **Solution:** Total distance = 18*10 = 180 Journey traveled by auto = x hours 30 * x + (10-x)10 = 180 30x + 100 – 10x = 180 20x = 80 x = 4 hours Distance traveled by auto = 4 * 30 = 120 km
8	A	**Option A** **Solution:** Distance covered in 6 minute = 6*(1000/60) = 100 She has to cover (500+100) meters in 24 minutes Required speed = (600/1000)/(24/60) = 1.5kmph
9	E	**Option E** **Solution:** Let speed of faster rabbit = x & speed of slower rabbit = y x + y = 60/1.2 x + y = 50 —- (A) 60/y – 60/x = 1 —- (B) Solve equations, we get y = 150 and 20 bt y cannot be 120 as x+y = 50. So y = 20 kmph and x = 30 kmph

10	**E**	**Option E** **Solution:** 3/2 of speed = 2/3 of original time 2/3 of original time = original time – 40 minutes; 1/3rd of original time = 40 minutes; Thus, original time = 40*3 = 120 minutes = 2 hours
11	**C**	**Option C** **Solution:** length of the train = (Difference in speeds * Product of time) / Difference in Time S1 = 8 * 5/18 = 20/9 m/s S2 = 12 * 5/18 = 30/9 m/s length of the train = (10/9)* 9 *10 /1 = 100m
12	**D**	**Option D** **Solution:** Speed of train B = Speed of train A * Square root of (t1/t2) Speed of train B = 80 * Square root of ((39/2)/26/3) Speed of train B = 80 * 3/2 = 120 kmph
13	**B**	**Option B** **Solution:** Distance between Stations P and Q = [Relative Speed]/Difference of Speed * d Distance = (200/40) * 80 = 400 km
14	**A**	**Option A** **Solution:** Distance = Difference in time *[Product of speeds / Difference in speeds] Distance = 45/60 * [(80*120)/40] = 180 km
15	**D**	**Option D** **Solution:** First train speed = a ; Second train speed = b Time taken to meet = (Distance (+/-) t(b))/Relative Speed If the second train started after the first train then [+t] Time taken to meet = (Distance + t(b))/Relative Speed Time taken to meet = (280 + 1(120))/200 = 2h Time both trains meet at = 6.00 pm + 2h = 8:00 pm
16	**B**	**Option B** **Solution:** First train speed = a ; Second train speed = b Time taken to meet = (Distance (+/-) t(b))/Relative Speed If the second train started before the first train then [-t] Time taken to meet = (Distance – t(b))/Relative Speed Time taken to meet = (280 – 1(120))/200 = 48 minutes Time both trains meet at = 7.00 pm + 48 minutes = 7:48 pm
17	**D**	**Option D** **Solution:** The distance of the point where the two trains meet is “x” x/80 – (250 – x)/120 = 1/2 3x – 2(250 – x) =1/2 * 240 3x – 500 + 2x = 120 5x = 620 x = 124 km.
18	**A**	**Option A** **Solution:** Speed of slower train = x Speed of faster train = x+6 Relative speed = 2x + 6 240/2x + 6 = 8 240 = 16x – 48 16x = 192 x = 12 kmph
19	**E**	**Option E** **Solution:** d/x = 4 d/x-4 = 5

		4x = 5x – 20 x = 20 kmph
20	**E**	**Option E** **Solution:** d/x = 5 d/x-5 = 6 5x = 6x – 30 x = 30 kmph Reduced speed = x -5 = 30 – 5 = 25 kmph d = 150
21	**C**	**Option C** **Solution:** With 80 km/hr, distance travelled in 1 n half hours (9:30AM – 8AM) is 3/2 * 80 = 120 Km Now second train also starts, and at this time distance between both trains is (545-120) = 425 km Relative speed = 80+90 = 170 km/hr (when travelling in opposite direction, add speed) So time when they meet = 425/170 = 2.5 hrs So after 9:30 AM they meet after 2.5 hrs, so 12 AM
22	**B**	**Option B** **Solution:** Speed of bus = 560/8 = 70 km/hr So speed of car = 8/7 * 70 = 80 km/hr So speed of train = 130 km/hr So time taken by train to cover 520 km = 520/130 = 4 hours
23	**A**	**Option A** **Solution:** Let total distance be d km, speed = u, and time = t hours So case 1: 30 km with speed u, (d-30) with speed 1 – 1/5 = 4/5 of u If he would have travelled (d-30) by speed u, then time = (d-30)/u But now time is = (d-30)/(4u/5) = 5(d-30)/4u And difference in timings is 45 minutes = 3/4 hour So 5(d-30)/4u – (d-30)/u = 3/4 Solve (d-30)/u = 3 case 2: 48 km with speed u, (d-48) with speed 1 – 1/5 = 4/5 of u If he would have travelled (d-48) by speed u, then time = (d-48)/u But now time is = (d-48)/(4u/5) = 5(d-48)/4u And difference in timings is 36 minutes = 3/5 hour So 5(d-48)/4u – (d-48)/u = 3/5 Solve (d-48)/4u = 3/5 Divide both equations, d = 120 km
24	**C**	**Option C** **Solution:** Let speeds be x km/hr and y km/hr So 225/(x+y) = 3 And 225/(x/2 + 2y/3) = 5 Solve, x = 30, y = 45
25	**D**	**Option D** **Solution:** Speed of Bhavna = x km/hr, of priya = (x+10) km/hr Distance covered by Priya = 60+12 = 72 km And by Bhavna = 60-12 = 48 km So 72/(x+10) = 48/x Solve, x = 20
26	**E**	**Option E** **Solution:** Let the speed of the train is s km/hr and its length is a m. So a/[(s-5)*(5/18)] = 12; [In same direction relative speed is obtained by subtracting. Also changing km/hr to m/s]

<table>
<tr><td></td><td></td><td>Solve 3a = 10s – 50 . . . . . (i)
And also
a/[(s-8)*(5/18)] = 15;
6a = 25s-200 . . . . (ii)
Solve (i) and (ii)
s = 20 km/hr</td></tr>
<tr><td>27</td><td>B</td><td>Option B
Solution:
Let speed of the 2nd train is s m/sec.
80 km/hr = (80*5)/18 = 200/9 m/sec.
Trains are travelling in same direction. So
(200/9) – s = 150/20
Solve, s = 265/18 m/sec = 265/18 * 18/5 = 53 km/hr</td></tr>
<tr><td>28</td><td>B</td><td>1. Option B
Solution:
When A runs 500 m, B runs 470 m
So when A runs 200 m, B runs 470/500 * 200 = 188 m
When B runs 400 m, C runs 280 m
So when B runs 188 m, C runs, 280/400 * 188 = 131.6 m
So A will beat C by (200-131.6) = 68.4 m</td></tr>
<tr><td>29</td><td>E</td><td>Option E
Solution:
Let speed of the slower train is x km/hr, then speed of faster is (x+10) kmph.
Let faster train takes t hours to cover the distance 300 km, then slower one takes (t+8) hours.
Distance is same. So
x/(x+10) = t/(t+8)
Solve, 4x = 5t</td></tr>
<tr><td>30</td><td>D</td><td>Option D
Solution:
Use formula:
4 AM + (6-4)*(8-4)/[(6-4)+(8-5)]
gives 4 AM + 8/5
8/5 hours = 1 3/5 hours = 1 3/5*60 = 1 hour 36 minutes
So 4 AM + 1 hour 36 minutes = 5:36 AM</td></tr>
<tr><td>31</td><td>C</td><td>Correct Option: C
<table><tr><td>Day</td><td>Total distance</td><td>By bus</td></tr><tr><td>Day1</td><td>25% of 3000 = 750 km</td><td>30% of 750 = 225 km</td></tr><tr><td>Day2</td><td>15% of 3000 = 450 km</td><td>25% of 450 = 112.5 km</td></tr><tr><td>Day3</td><td>20% of 3000 = 600 km</td><td>45% of 600 = 270 km</td></tr><tr><td>Day4</td><td>10% of 3000 = 300 km</td><td>20% of 300 = 60 km</td></tr><tr><td>Day5</td><td>18% of 3000 = 540 km</td><td>15% of 540 = 81 km</td></tr><tr><td>Day6</td><td>12% of 3000 = 360 km</td><td>18% of 360 = 64.8 km</td></tr><tr><td></td><td></td><td>Total = 813.3 km</td></tr></table>
Hence, option C is correct.</td></tr>
<tr><td>32</td><td>C</td><td>Correct Option: C
The total distance travelled by Ola = 1084.2 km
Speed = 40 km per hr

Time = $\frac{1084.2}{40}$ = 27.105 hours = approximately 27 hours

<table><tr><td>Day</td><td>Total distance</td><td>By Ola</td></tr><tr><td>Day1</td><td>25% of 3000 = 750 km</td><td>45% of 750 = 337.5 km</td></tr><tr><td>Day2</td><td>15% of 3000 = 450 km</td><td>35% of 450 = 157.5 km</td></tr><tr><td>Day3</td><td>20% of 3000 = 600 km</td><td>15% of 600 = 90 km</td></tr><tr><td>Day4</td><td>10% of 3000 = 300 km</td><td>20% of 300 = 60 km</td></tr><tr><td>Day5</td><td>18% of 3000 = 540 km</td><td>60% of 540 = 324 km</td></tr><tr><td>Day6</td><td>12% of 3000 = 360 km</td><td>32% of 360 = 115.2 km</td></tr><tr><td></td><td></td><td>Total = 1084.2 km</td></tr></table></td></tr>
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33	**C**	Correct Option: C The total distance travelled by Ola = 1084.2 km The total distance travelled by Uber = 3000 – 813.3 – 1084.2 = 1102.5 KM The reqd. % = $\frac{1084.2 \times 100}{1102.5}$ = 98.34% Hence, option C is correct.
34	**A**	Correct Option: A The distance travelled by bus = 813.3 km The distance travelled by Ola = 1084.2 km The distance travelled by Uber = 1102.5 km The required Ratio = 8133 : 10842 : 11025 = 2711 : 3614 : 3675 Hence, option A is correct.
35	**D**	Correct Option: D The average speed of bus is 30 km per hour then the average speed of Ola = $\frac{30 \times 125}{100}$ = 37.5 km The total distance travelled by bus = 813.3 km The reqd. time = $\frac{813.3}{30} - \frac{813.3}{37.5}$ = 813.3 × $\frac{7.5}{30 \times 37.5}$ = 5.422 hours = 5.4 hours approximately Hence, option D is correct.