15. TIME, DISTANCE & SPEED

- Distance = Speed x Time
- To convert speed from kmph to m/sec, multiply it with (5/18).
- To convert speed from m/sec to kmph, multiply it with (18/5).
- If distance is constant, $\frac{S_1}{S_2} = \frac{T_2}{T_1}$
- If time is constant, $\frac{D_1}{D_2} = \frac{S_1}{S_2}$
- If speed is constant, $\frac{D_1}{D_2} = \frac{T_1}{T_2}$
- Average speed of a body travelling at different speeds is NEED NOT BE EQUAL to the average of the speeds.
- Average Speed= $\frac{\text{Total distance travelled}}{\text{Total time taken}}$
- If a body covers two equal distances with different speeds X kmph and Y kmph, then average speed for the entire journey is $\frac{2XY}{X-Y}$
- If the ratio of distances travelled by the body and the ratio of the speeds maintained are same, then ***average speed = average of the speeds***.

EXERCISE

1. Convert the following speeds.
(a) 15 m/s into km/hr:
(1) 45 (2) 48 (3) 54 (4) 60
(b) 144 km/hr into m/s:
(1) 45 (2) 30 (3) 40 (4) 35
(c) 22.5 m/s
(1) 81 (2) 72 (3) 77 (4) 70

2. If Amarnadh runs at 12 metres per second, what distance will he cover in 2 hours 30 minutes?
(1)108 km (2)30 km (3)72 km (4)96 km

3. Manish can travel a distance in 6 hrs if he drives at 45 kmph. At what speed must he drive in order to complete the journey in 5 hrs? (In kmph)
(1) 45 (2) 48 (3) 54 (4) 60

4. A train covers 300 km at a constant speed. If its speed was 10 kmph more it would have taken 1hour less to travel the distance. Find the speed of the train. (in kmph)
(1)60 (2) 50 (3) 75 (4) 80

5. A train travels for 5 hours. The first half of the distance at 40 kmph and remaining distance at 60 kmph. Find the distance (in Km).
(1)180 (2) 240 (3) 300 (4) 250

6. A person walking 5/6 of his usual rate is 40 minutes late. What is his usual time?
(1) 120min (2) 180min (3) 160min (4) 200min

7. A person saves 5 minutes by increasing his speed by 20%. What is the time taken to cover the distance at his usual speed? (in min)
(1) 25 (2) 30 (3) 45 (4) 5

8. By traveling 25% faster than his usual speed, Nitu takes 10 minutes less to travel from her home to office. Find the time she takes to reach her office if she travels at twice her usual speed.
(1) 25min (2) 20min (3)15min (4)30min

9. Walking at 8 kmph a student reaches his college from his house 20 minutes early and walking at 6 kmph he is late by 10 minutes. What is the distance (in km) between his college and his house?

(1) 6 (2) 12 (3) 24 (4) 8

10. In the above question, what is the time taken by the student to reach school on time?(in min)
(1) 50 (2) 110 (3) 100 (4) 120

11. In question no.9, what speed he should maintain in order to reach the school on time? (in kmph)
(1) 5 (2) 5.5 (3) 4.8 (4) 6.5

12. The distance of a journey is 120 km. If Raj goes by 60 kmph and comes back at 40kmph, find his average speed during the journey (kmph).
(1) 50 (2) 52 (3) 48 (4) 45

13. A car travels 150 km at 60 kmph and then travels another 300 km at 40 kmph. Find its average speed over the entire distance. (in kmph)
(1) 45 (2) 48 (3) 50 (4) 56

14. Seema covers the distance from A to B at uniform speed of 60 kmph and the distance from B to C at uniform speed of 40 kmph. What is her average speed for the entire journey if the ratio of the distances AB and BC is 3: 2? (in kmph)
(1) 45 (2) 48 (3) 50 (4) 60

15. If Rajdeep travels in a car at a speed of 40 km/hr he would reach his destination in time. He covers half of the journey in 4/5th time. What should be his speed for the remaining part of the journey so that he reaches his destination in time? (in kmph)
(1) 70 (2) 90 (3) 75 (4) 100

16. A person traveled from A to B by bus at the rate of 40 kmph and walked back to A at the rate of 6 kmph. The whole journey took 13 hours and 48 minutes. What is the distance between A and B? (in km)
(1) 60 (2) 64 (3) 70 (4) 72 (5) 80

17. If Teju cycles at 8 km/hr, he would arrive at his destination at 11 a.m. If he cycles at 10 km/hr, he would arrive at his destination at 10 a.m. At what speed should he cycle to arrive at his destination at 8:30 a.m.? (In km/hr)
(1) 16 (2) 12 (3) 14 (4) 18

18. A man goes from A to B on foot and returns from B to A in a taxi and takes a total of 3.20 hours for the travel. If he takes 5.4 hours to walk both the ways, then how much time will he take if he hires a taxi from P to Q and back (in min)?
(1) 60 (2) 50 (3) 100 (4) 30

19. Pralok covers a certain distance by car in 9 hours. He covers two-thirds of the distance at 40 km/hr and the remaining distance at 60 km/hr. What is the total distance of the journey (in km)?
(1) 180 (2) 240 (3) 360 (4) 405

20. A man misses a train by 40 minutes, if he travels at 30 kmph. If he travels at 40 kmph, then also he misses the train by 10 minutes. What is the minimum speed required to catch the train on time?
1) 50 kmph 2) 45 kmph 3) 48 kmph 4) 45 kmph

21. Raj, traveling on his cycle, has calculated to reach a point at 2 pm. if he travels at 10 kmph. He would reach there by 12 noon if he travels at 15 kmph. At what speed must he travel to reach the same place at 1 pm
(1) 12 kmph (2) 14 kmph (3) 15 kmph (4) 18 kmph

22. A car driver driving at a speed of 68 kmph locates a truck 40 meters ahead of him. After 10 seconds, the truck is 60 meters behind. The speed of truck is _____
(1) 30 km/hr (2) 32 km/hr (3) 23 km/hr (4) 3 km/hr

23. If a man can cover 12 meters in one second, how many kilo meters can be cover in 3 hours 45 minutes?
(1) 168 km (2) 162 km (3) 150 km (4) 156 km

24. If a man running at 15 kmph, crosses a bridge in 5 minutes, then the length of the bridge is
(1) 1230 m (2) 1240 m (3) 1250 m 4) 1220 m

25. A man takes 5 hours 45 minutes in walking to a certain place and riding back. He could have gained 2 hours by riding both ways. The time he would take to walk both ways is _____
(1) 12 hrs (2) 11 hrs 45minutes (3) 7 hrs 45 minutes (4) 3 hrs

Time, Distance & Speed									
1	3,3,1	**6**	4	**11**	4	**16**	4	**21**	1
2	1	**7**	2	**12**	3	**17**	1	**22**	2
3	3	**8**	1	**13**	1	**18**	1	**23**	2
4	2	**9**	2	**14**	3	**19**	4	**24**	3
5	2	**10**	2	**15**	4	**20**	2	**25**	3