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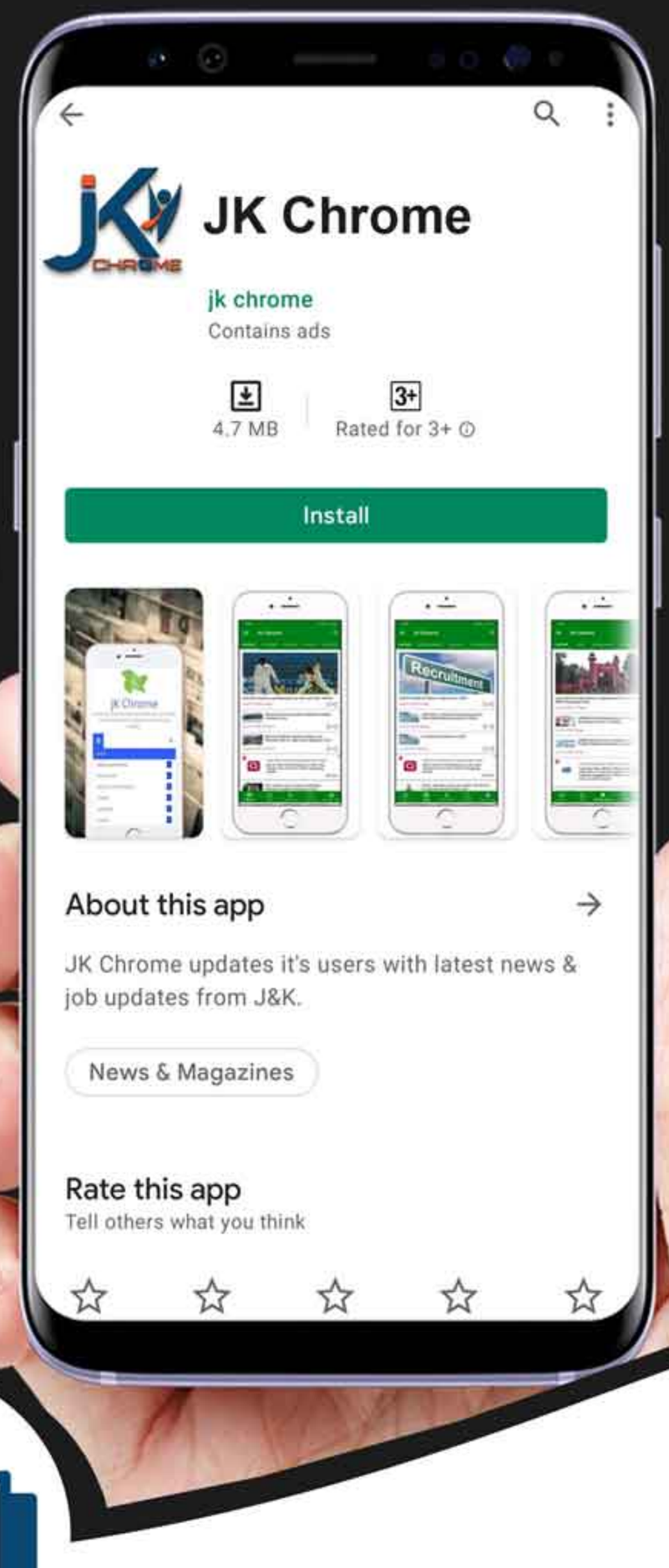

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CHAPTER

10 Time, Speed & Distance (Boat and Streams)

1. Buses start from a bus terminal with a speed of 20 km/hr at intervals of 10 minutes. What is the speed of a man coming from the opposite direction towards the bus terminal if he meets the buses at intervals of 8 minutes ?
(SSC CGL 1st Sit. 2010)
(a) 3 km/hr (b) 4 km/hr
(c) 5 km/hr (d) 7 km/hr

2. By walking at $\frac{3}{4}$ of his usual speed, a man reaches his office 20 minutes later than his usual time. The usual time taken by him to reach his office is **(SSC CGL 1st Sit. 2010)**
(a) 75 minutes (b) 60 minutes
(c) 40 minutes (d) 30 minutes

3. A train, 300 m long, passed a man, walking along the line in the same direction at the rate of 3 km/hr in 33 seconds. The speed of the train is **(SSC CGL 1st Sit. 2010)**
(a) 30 km/hr (b) 32 km/hr
(c) $32\frac{8}{11}$ km/hr (d) $35\frac{8}{11}$ km/hr

4. In a 100m race, Kamal defeats Bimal by 5 seconds. If the speed of Kamal is 18 Kmph, then the speed of Bimal is
(SSC CGL 2nd Sit. 2010)
(a) 15.4 kmph (b) 14.5 kmph
(c) 14.4 kmph (d) 14 kmph

5. A train, 240 m long crosses a man walking along the line in opposite direction at the rate of 3 kmph in 10 seconds. The speed of the train is **(SSC CGL 2nd Sit. 2010)**
(a) 63 kmph (b) 75 kmph
(c) 83.4 kmph (d) 86.4 kmph

6. A boatman rows 1 km in 5 minutes, along the stream and 6 km in 1 hour against the stream. The speed of the stream is
(SSC CGL 2nd Sit. 2010)
(a) 3 kmph (b) 6 kmph
(c) 10 kmph (d) 12 kmph

7. A man can row 6 km/h in still water. If the speed of the current is 2 km/h, it takes 3 hours more in upstream than in the down–stream for the same distance. The distance is
(SSC CGL 1st Sit. 2011)
(a) 30 km (b) 24 km (c) 20 km (d) 32 km

8. A student goes to school at the rate of $2\frac{1}{2}$ km/h and reaches 6 minutes late. If he travels at the speed of 3 km/h. he is 10 minutes early. The distance (in km) between the school and his house is **(SSC CGL 1st Sit. 2011)**
(a) 5 (b) 4 (c) 3 (d) 1

9. Walking at $\frac{6\text{th}}{7}$ of his usual speed a man is 25 minutes too late. His usual time to cover this distance is
(SSC CGL 2nd Sit. 2011)
(a) 2 hours 30 minutes (b) 2 hours 15 minutes
(c) 2 hours 25 minutes (d) 2 hours 10 minutes

10. Walking at 5 km/hr a student reaches his school from his house 15 minutes early and walking at 3 km/hr he is late by 9 minutes. What is the distance between his school and his house? **(SSC CGL 2nd Sit. 2011)**
(a) 5 km (b) 8 km (c) 3 km (d) 2 km

11. A thief is noticed by a policeman from a distance of 200 m. The thief starts running and the policeman chases him. The thief and the policeman run at the rate of 10 km and 11 km per hour respectively. The distance (in metres) between them after 6 minutes is **(SSC CGL 1st Sit. 2012)**
(a) 190 (b) 200 (c) 100 (d) 150

12. A train overtakes two persons who are walking in the same direction in which the train is running, at the rate of 2 kmph and 4 kmph and passes them completely in 9 and 10 seconds respectively. The length of the train (in metres):
(SSC CGL 2nd Sit. 2012)
(a) 72 (b) 45 (c) 54 (d) 50

13. With average speed of 40 km/hour, a train reaches its' destination in time. If it goes with an average speed of 35 km/hour, it is late by 15 minutes. The total journey is
(SSC CGL 1st Sit. 2012)
(a) 30 km (b) 40 km (c) 70 km (d) 80 km

14. A ship is moving at a speed of 30 km/hr. To know the depth of the ocean beneath it, it sends a radiowave which travels at a speed 200 m/s. The ship receives the signal after it has moved 500 m. The depth of the ocean is
(SSC CGL 1st Sit. 2012)
(a) 6 km (b) 12 km
(c) $\sqrt{6}$ m (d) 8 km

15. A car covers four successive 6 km stretches at speeds of 25 kmph, 50 kmph, 75 kmph and 150 kmph respectively. Its average speed over this distance is **(SSC CGL 2nd Sit. 2012)**
(a) 25 kmph (b) 50 kmph
(c) 75 kmph (d) 150 kmph

16. A man walks a certain distance and rides back taking a total time of 37 minutes. He could walk both ways in 55 minutes. How long would he take to ride both ways?
(SSC Sub. Ins. 2012)
(a) 9.5 minutes (b) 18 minutes
(c) 19 minutes (d) 20 minutes

17. A man walks 'a' km in 'b' hours. The time taken to walk 200 metres is: **(SSC CHSL 2012)**

(a) $\frac{200b}{a}$ hours (b) $\frac{b}{5a}$ hours

(c) $\frac{b}{a}$ hours (d) $\frac{ab}{200}$ hours

18. A train 100 metres long meets a man going in opposite Directions at 5 km/hr and passes him in $7\frac{1}{5}$ seconds. What is the speed of the train in km/hr ? **(SSC CHSL 2012)**

(a) 45 km/hr (b) 60 km/hr
(c) 55 km/hr (d) 50 km/hr

19. The minute hand of a big wall-clock is 35 cm long. Taking $\pi = \frac{22}{7}$, length of the arc, its extremity moves in 18 seconds is : **(SSC CHSL 2012)**

(a) 11 cm (b) 1.1 cm (c) 6.6 cm (d) 6 cm

20. Walking at a speed of 5 km/hr, a man reaches his office 6 minutes late. Walking at 6 km/hr, he reaches there 2 minutes early. The distance of his office is **(SSC Multi-Tasking 2013)**

(a) 2 km (b) 3 km (c) 4 km (d) 3.5 km

21. Two trains 108 m and 112 m in length are running towards each other on the parallel lines at a speed of 45 km/hr and 54 km/hr respectively. To cross each other after they meet, it will take **(SSC Multi-Tasking 2013)**

(a) 10 sec (b) 12 sec (c) 9 sec (d) 8 sec

22. On a journey across Kolkata, a taxi averages 50 km per hour for 50% of the distance. 40 km per hour for 40% of it and 20 km per hour for the remaining. The average speed in km/hour, for the whole journey is : **(SSC Sub. Ins. 2013)**

(a) 42 (b) 40 (c) 35 (d) 45

23. A train 270 metre long is running at a speed of 36 km per hour, then it will cross a bridge of length 180 metres in : **(SSC Sub. Ins. 2013)**

(a) 40 sec (b) 45 sec
(c) 50 sec (d) 35 sec

24. Water flows at the rate of 10 metres per minute from a cylindrical pipe 5 mm in diameter. How long it lake to fill up a conical vessel whose diameter at the base is 30 cm and depth 24 cm? **(SSC Sub. Ins. 2013)**

(a) 28 minutes 48 seconds (b) 51 minutes 12 seconds
(c) 51 minutes 24 seconds (d) 28 minutes 36 seconds

25. A train is moving at a speed of 80 km/h and covers a certain distance in 4.5 hours. The speed of the train to cover the same distance in 4 hours is **(SSC CHSL 2013)**

(a) 90 km/h (b) 100 km/h
(c) 70 km/h (d) 85 km/h

26. A man can swim 3 km/hr. in still water. If the velocity of the stream is 2 km/hr. The time taken by him to swim to a place 10 km upstream and back is: **(SSC CGL 1st Sit. 2013)**

(a) $8\frac{1}{3}$ hr. (b) $9\frac{1}{3}$ hr.
(c) 10 hr. (d) 12 hr.

27. A train moving at a rate of 36 km/hr. crosses a standing man in 10 seconds. It will cross a platform 55 metres long, in: **(SSC CGL 1st Sit. 2013)**

(a) $5\frac{1}{2}$ seconds (b) 6 seconds

(c) 7 seconds (d) $15\frac{1}{2}$ seconds

28. A man rides at the rate of 18 km/hr, but stops for 6 mins. to change horses at the end of every 7th km. The time that he will take to cover a distance of 90 km is **(SSC CGL 2nd Sit. 2013)**

(a) 6 hrs. (b) 6 hrs. 12 min.
(c) 6 hrs. 18 min. (d) 6 hrs 24 min.

29. A man rows down a river 15 km in 3 hrs. with the stream and returns in $7\frac{1}{2}$ hrs. The rate at which he rows in still water is **(SSC CGL 1nd Sit. 2013)**

(a) 2.5 km/hr (b) 1.5 km/hr
(c) 3.5 km/hr (d) 4.5 km/hr

30. Two cars are moving with speeds v_1, v_2 towards a crossing along two roads. If their distances from the crossing be 40 metres and 50 metres at an instant of time then they do not collide if their speeds are such that **(SSC CGL 1st Sit. 2013)**

(a) $v_1 : v_2 \neq 5 : 4$ (b) $v_1 : v_2 = 25 : 16$
(c) $v_1 : v_2 = 16 : 25$ (d) $v_1 : v_2 \neq 4 : 5$

31. A certain distance is covered at a certain speed. If half of this distance is covered in double the time, the ratio of the two speeds is **(SSC CGL 1st Sit. 2013)**

(a) 1 : 4 (b) 2 : 1
(c) 1 : 2 (d) 4 : 1

32. Anil calculated that it will take 45 minutes to cover a distance of 60 km by his car. How long will it take to cover the same distance if the speed of his car is reduced by 15 km/hr? **(SSC CGL 1st Sit. 2013)**

(a) 36 min (b) 55.38 min
(c) 48 min (d) 40 min

33. A train 100 metres long moving at a speed of 50 km/hr. crosses a train 120 metres long coming from opposite direction in 6 sec. The speed of the second train is **(SSC CGL 1st Sit. 2013)**

(a) 60 km/hr. (b) 82 km/hr.
(c) 70 km/hr. (d) 74 km/hr.

34. A man performs $\frac{2}{15}$ of the total journey by train, $\frac{9}{20}$ by bus and the remaining 10 km on foot. His total journey in km is **(SSC CGL 1st Sit. 2013)**

(a) 15.6 (b) 24 (c) 16.4 (d) 12.8

35. By walking at $\frac{3}{4}$ of his usual speed, a man reaches his oflice 20 minutes later than usual. His usual time is **(SSC CGL 1st Sit. 2013)**

(a) 30 min. (b) 75 min.
(c) 90 min. (d) 60 min.

36. A railway train 100 metres long is running at the speed of 30 km/hr. In what time does it pass a man standing near a line ? **(SSC Multi-Tasking 2014)**

(a) 10 seconds (b) 13 seconds
(c) 12 seconds (d) 15 seconds

37. Raju has to cover a distance of 240 km in 4 hours. If he covers one-third of the journey in $\frac{2}{7}$ th time, what is his speed at the beginning of the journey ? **(SSC Multi-Tasking 2014)**

(a) 70 km/hr (b) 75 km/hr
(c) 60 km/hr (d) 65 km/hr

38. A student goes to school at the rate of $\frac{5}{2}$ km/hr and reaches 6 minutes late. If he travels at the speed of 3 km/hr, he reaches 10 minutes earlier. The distance of the school is **(SSC Sub. Ins. 2014)**

(a) 45 km (b) 20 km (c) 10 km (d) 4 km

39. A train 50 metre long passes a platform 100 metre long in 10 sec. The speed of the train in km/hr is **(SSC Sub. Ins. 2014)**

(a) 10 (b) 54 (c) 15 (d) 100

40. A is twice as fast as B and B is thrice as fast as C is. The journey covered by C in 1½ hours will be covered by A in **(SSC CHSL 2014)**

(a) 15 minutes (b) 20 minutes
(c) 30 minutes (d) 1 hour

41. A horse take 2½ seconds to complete a round around a circular field. If the speed of the horse was 66 m/sec, then the radius of the field is, [Given $\pi = \frac{22}{7}$] **(SSC CHSL 2014)**

(a) 25.62 m (b) 26.52 m
(c) 25.26 m (d) 26.25 m

42. It takes 8 hours for a 600 km journey, if 120 km is done by train and the rest by car. It takes 20 minutes more if 200 km is down by train and the rest by car. The ratio of the speed of the train to that of the car is **(SSC CGL 2014)**

(a) 2 : 3 (b) 3 : 2 (c) 3 : 4 (d) 4 : 3

43. If a train runs at 70 km/hour, it reaches its destination late by 12 minutes. But if it runs at 80 km/hour, it is late by 3 minutes. The correct time to cover the journey is **(SSC CGL 2014)**

(a) 58 minutes (b) 2 hours
(c) 1 hour (d) 59 minutes

44. A bus moving at 40km per hour covers a distance in 6 hours 15 minutes. If it travels the same distance at 50 km per hour how long will it take to cover the distance? **(SSC Sub. Ins. 2015)**

(a) 6 hours (b) 2 hours (c) 4 hours (d) 5 hours

45. How many seconds will a train 120 metres long running the rate of 36km/ hr take to cross a bridge of 360 metres in length? **(SSC Sub. Ins. 2015)**

(a) 48 sec (b) 36 sec (c) 40 sec (d) 46 sec

46. A train 150 m long passes a pole in 30 seconds and another train of the same length travelling in opposite direction in 10 seconds. The speed of the second train is: **(SSC CHSL 2015)**

(a) 125 km/hr (b) 25 km/hr
(c) 90 km/hr (d) 75 km/hr

47. The speed of a car is 54 km/hr. What is its speed in m/sec? **(SSC CHSL 2015)**

(a) 150 m/sec (b) 19.44 m/sec
(c) 194.4 m/sec (d) 15 m/sec

48. A ship after sailing 12km towards south from a particular place covered 5 km more towards east. Then the straightway distance of the ship from that place is **(SSC CGL 1st Sit. 2015)**

(a) 18 km (b) 15 km (c) 13 km (d) 11km

49. A farmer travelled a distance of 61 km in 9 hrs. He travelled partly on foot at the rate of 4 km/hr and partly on bicycle at the rate of 9 km/hr. The distance travelled on foot is **(SSC CGL 1st Sit. 2015)**

(a) 17 km (b) 16 km (c) 15km (d) 14 km

50. Walking at the rate of 4 kmph a man covers certain distance in 2hrs 45 min. Running at a speed of 16.5 kmph the man will cover the same distance in how many minutes ? **(SSC CGL 1st Sit. 2015)**

(a) 35 min. (b) 40 min. (c) 45 min. (d) 50 min.

51. A train runs at an average speed of 75 km/hr. If the distance to be covered is 1050 km. How long will the train take to cover it ? **(SSC CGL 1st Sit. 2015)**

(a) 13 hrs (b) 12 hrs (c) 14 hrs (d) 15 hrs

52. A train 180 m long is running at a speed of 90 km/hr. How long will it take to pass a post ? **(SSC CGL 1st Sit. 2015)**

(a) 8.2 secs (b) 7.8 secs
(c) 8 secs (d) 7.2 secs

53. A man goes to a place on bicycle at speed of 16 km/hr and comes back at lower speed. If the average speed is 6.4 km/hr in total, then the return speed (in km/hr) is **(SSC CGL 1st Sit. 2016)**

(a) 10 (b) 8 (c) 6 (d) 4

54. A man covers a total distance of 100 km on bicycle. For the first 2 hours, the speed was 20 km/hr and for the rest of the journey, it came down to 10 km/hr. The average speed will be **(SSC CGL 1st Sit. 2016)**

(a) $12\frac{1}{2}$ km/hr (b) 13 km/hr
(c) 15 1/8 km/hr (d) 20 Km/hr

55. A train, 200 m long, is running at a speed of 54 km/hr. The time in seconds that will be taken by train to cross a 175 m long bridge is **(SSC CGL 1st Sit. 2016)**

(a) 12.5 (b) 20 (c) 25 (d) 10

56. Points A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction, they meet in 5 hours. If the cars travel towards each other, they meet in 1 hour. What is the speed of the faster car? **(SSC Sub. Ins. 2016)**

(a) 70 km/hour (b) 40 km/hour
(c) 60 km/hour (d) 80 km/hour

57. A man travelled a distance 72 km in 12 hour. He tavelled partly on foot at 5 km/hour and partly on bicycle at 10 km/hour. The distance travelled foot is **(SSC Sub. Ins. 2016)**

(a) 46 km (b) 52 km
(c) 50 km (d) 48 km

58. A boat goes 15 km upstream and $10\frac{1}{2}$km downstream in 3 hours 15 minutes. It goes 12 km upstream and 14 km downstream in 3 hours. What is the speed of the boat in still water? **(SSC CGL 2017)**

(a) 4 (b) 6 (c) 10 (d) 14

59. A train travels 40% faster than a car. Both start from point A at the same time and reach point B, 140 km away at the same time. On the way the train takes 25 minutes for stopping at the stations. What is the speed (in km/hr) of the train? **(SSC CGL 2017)**

(a) 67 (b) 134.4
(c) 145.9 (d) 160

60. A train leaves Delhi at 10 a.m. and reaches Jaipur at 4 p.m. on same day. Another train leaves Jaipur at 12 p.m. and reaches Delhi at 5 p.m. on same day. What is the time of day (approximately) when the two trains will meet? **(SSC CGL 2017)**

(a) 1 : 42 p.m. (b) 1 : 27 p.m.
(c) 2 : 04 p.m. (d) 1 : 49 p.m.

61. A bus starts running with the initial speed of 21 km/hr and its speed increases every hour by 3 km/hr. How many hours will it take to cover a distance of 252 km? **(SSC CGL 2017)**

(a) 3 (b 5 (c) 8 (d) 10

62. Two cars travel from city A to city B at a speed of 36 km/hr and 48 km/hr respectively. If one car takes 3 hours lesser time than the other car for the journey, then the distance between City A and City B is **(SSC CHSL 2017)**

(a) 518 km (b) 432 km (c) 648 km (d) 346 km

63. If a train maintains an average speed of 42 km per hour, it arrives at its destination at the right time, if however, the average speed is 40 km per hour, it arrives 15 minutes late. Find the length of the journey? **(SSC MTS 2017)**

(a) 210 km (b) 205 km
(c) 209 km (d) 200 km

64. A train covers a distance of 12 km in 10 minutes. If it takes 6 seconds to pass a telegraph post, then the length of the train is: **(SSC MTS 2017)**

(a) 120 m (b) 90 m (c) 100 m (d) 140 m

65. A motorcylist left $6\frac{6}{9}$ minutes later than the scheduled time but in order to reach its destination 21km away in time, he had to increase his speed by 12 km/hr from the usual speed. What is usual speed (in km/hr) of the motorcyclist? **(SSC Sub. Ins. 2017)**

(a) 28 (b) 35 (c) 42 (d) 64

66. A bus starts running with the initial speed of 33 km/hr and its speed increases every hour by certain amount. If it takes 7 hours to cover a distance of 315 km, then what will be hourly increament (in km/hr) in the speed of the bus? **(SSC Sub. Ins. 2017)**

(a) 1 (b) 2 (c) 3 (d) 4

67. If a train runs with the speed of 48 km/h, it reaches its destination late by 12 minutes. However, if its speed in 64 km/h it is late by 3 minutes only. The right time for the train to cover its journey (in minutes) is: **(SSC Sub. Ins. 2018)**

(a) 20 (b) 22 (c) 24 (d) 18

68. A boat can go 30 km downstream and 24 km upstream in 2 hours 27 minutes. Also, it can go 10 km downstream and 4 km upstream in 37 minutes. What is the speed of the boat upstream (in km/h)? **(SSC Sub. Ins. 2018)**

(a) 22 (b) 18 (c) 20 (d) 24

69. Given that lengths of the paths of a ball thrown with different speeds by two boys are the same, and that the average speed for the first and second throws are respectively 90 km/h and 162 km/h, then what is the time taken by the first throw to cover the length if the same for the second thrown is one second? **(SSC CHSL 2018)**

(a) $\frac{3}{2}$ sec (b) 1 sec (c) $\frac{9}{5}$ sec (d) $\frac{2}{3}$ sec

70. A train without stoppage travels with an average speed of 50 km/h, and with stoppage, it travels with an average speed of 40 km/h. For how many minutes does the train stop on an average per hour? **(SSC CGL 2018)**

(a) 12 (b) 13 (c) 14 (d) 15

71. Walking at $\frac{7}{9}$ of his usual speed, a person reaches his office 10 minutes later than the usual time. His usual time in minutes is: **(SSC CGL 2018)**

(a) 35 (b) 27 (c) 42 (d) 30

72. A train starts from A at 6 AM and reaches B at 11 AM on the same day. Another train starts from B at 8 AM and reaches A at 3 PM on the same day. At what time the two trains will have crossed each other? **(SSC MTS 2018)**

(a) 9 : 45 AM (b) 8 : 45 AM
(c) 10 : 30 AM (d) 7 : 45 AM

73. A man goes from C to D at 40 km/h and he returns from D to C at x km/h. If the average speed of the man for the whole journey is 60 km/h, then what is the value of x? **(SSC MTS 2018)**

(a) 100 (b) 120 (c) 110 (d) 80

74. A train crosses a pole in 12 sec, and a bridge of length 170 m in 36 sec. Then the speed of the train is : **(SSC CGL 2019-20)**

(a) 30.75 km/h (b) 10.8 km/h
(c) 25.5 km/h (d) 32.45 km/h

75. A travels 15 km with a speed of 30 km/h. He travels another 25 km with a speed of 10 km/h. What is his average speed for the entire journey? **(SSC MTS 2019-20)**

(a) $\frac{40}{3}$ km/h (b) $\frac{80}{3}$ km/h

(c) 20 km/h (d) 12 km/h

76. A man leaves from P at 6 am and reaches Q at 2 pm on the same day. Another man leaves Q at 8 am and reaches P at 3 pm on the same day. At what time do they meet? **(SSC MTS 2019-20)**

(a) 11 : 46 am (b) 11 : 24 am

(c) 10 : 48 am (d) 11 : 00 am

77. A man divided his journey into three parts of distances of 18 km, 20 km and 27 km. He travelled the distances at the speeds of 6 km/h, 5 km/h and 9 km/h respectively. What was his average speed during the entire journey? **(SSC CHSL 2019-20)**

(a) 6.5 km/h (b) 4.5 km/h

(c) 7.5 km/h (d) 5.5 km/h

78. A runner is running at a speed of 40 km/h. If he runs at a speed of 30 km/h, then what will the decrease in the percentage of his speed be? **(SSC CHSL 2019-20)**

(a) 30% (b) 25% (c) 20% (d) 15%

79. A train is to cover 370 km at a uniform speed. After running 100 km, the train could at a speed 5 km/h less than its normal speed due to some technical fault. The train got delayed by 36 minutes. What is the normal speed of the train, in km/h? **(SSC CGL 2020-21)**

(a) 45 (b) 50 (c) 40 (d) 48

80. A car takes 50 minutes to cover a certain distance at a speed of 54 km/h. If the speed is increased by 25%, then how long will it take to cover three-fourth of the same distance? **(SSC CHSL 2020-21)**

(a) 40 minutes (b) 25 minutes

(c) 35 minutes (d) 30 minutes

81. An aeroplane covers a certain distance at a speed of 190 km/h in 7 hours. To cover the same distance in $4\frac{2}{4}$ hours, it must travel at a speed (in km/h) of: **(SSC MTS 2020-21)**

(a) 240 (b) 300 (c) 275 (d) 280

82. Two train of the same length are running on parallel trackes in the same direciton at 44 km/h and 32 km/h. The faster train passes the other train in 72 seconds. What is the length (in m) of each train? **(SSC MTS 2020-21)**

(a) 100 (b) 120 (c) 135 (d) 75

83. A takes 2 hours 30 minutes more than B to walk 40 km. If A doubles his speed, then he can make it in 1 hour less than B. How much time (in hours) does A require for walking a 40 km distance? **(SSC Sub-Inspector 2020-21)**

(a) 6 (b) 7 (c) 9 (d) 5

84. A train x running at 74 km/h crosses another train y running at 52 km/h in the opposite direction in 12 seconds. If the length of y is two-thirds that of x, then what is the length of x (in m)? **(SSC Sub-Inspector 2020-21)**

(a) 210 (b) 200 (c) 252 (d) 168

1. (c) Distance coverd in 10 minutes at 20kmph = distance covered in 8 minutes at (20 + x) kmph

$\Rightarrow 20\times\frac{10}{60}=\frac{8}{60}(20+x)$ $\Rightarrow 200 = 160 + 8x$

$\Rightarrow 8x = 40$ $\Rightarrow x=\frac{40}{8}=5$ kmph

2. (b) $\frac{4}{3}$ of usual time = Usual time + 20 minutes

$\therefore \frac{1}{3}$rd of usual time $= 20$ minutes

$\therefore$ Usual time $= 20\times 3 = 60$ minutes

3. (d) If the speed of the train be x kmph, then relative speed

$= (x - 3)$ kmph. $= (x-3)\times\frac{5}{18}$ m/sec

$\therefore \frac{300}{(x-3)\times\frac{5}{18}}=33$

$\Rightarrow 5400 = 33 \times 5\,(x - 3) \Rightarrow 360 = 11\,(x - 3)$

$\Rightarrow 11x - 33 = 360$

$\Rightarrow x=\frac{393}{11}=35\frac{8}{11}$ kmph

4. (c) Time taken by Kamal $=\frac{100}{18\times\frac{5}{18}}=20$

$\therefore$ Time taken by Bimal = 20 + 5 = 25

$\therefore$ Bimal's speed $=\frac{100}{25}=4$ m/s $=\frac{4\times 18}{5}$ kmph

$= 14.4$ kmph.

5. (c) Let train speed be x

relative speed = (x + 3) kmph

$\therefore$ Time $=\frac{\text{Length of the train}}{\text{Relative speed}}$

$\Rightarrow \frac{10}{3600}=\frac{\frac{\cancel{240}}{1000}}{(x+3)}=\frac{240}{1000(x+3)}$

$\Rightarrow x + 3 = 86.4 \Rightarrow x = 83.4$ kmph

6. (a) Speed of current

$=\frac{1}{2}$ (Rate downstream – Rate upstream)

$=\frac{1}{2}(12-6)$ kmph $=\frac{1}{2}\times 6 = 3$ kmph

7. (b) Let the required distance be x km.

$\therefore \frac{x}{6-2}-\frac{x}{6+2}=3$

$\Rightarrow \frac{x}{4}-\frac{x}{8}=3 \Rightarrow \frac{2x-x}{8}=3 \Rightarrow x = 3\times 8 = 24$ km.

8. (b) Let the required distance be x km.

$\frac{x}{\frac{5}{2}}-\frac{x}{3}=\frac{16}{60} \Rightarrow \frac{2x}{5}-\frac{x}{3}=\frac{4}{15}$

$\Rightarrow \frac{6x-5x}{15}=\frac{4}{15} \Rightarrow x = 4$ km.

9. (a) $\frac{S_2}{S_1}=\frac{6}{7}$ $\frac{T_2}{T_1}=\frac{7}{6}$

$\therefore 7x - 6x = 25$

$x = 25$ min

$T_1 = 6x = 6\times\frac{25}{60}$ hr = 2hr 30 min

10. (c) Let the required distance be x km.

$\therefore \frac{x}{3}-\frac{x}{5}=\frac{24}{60}$

$\Rightarrow \frac{5x-3x}{15}=\frac{2}{5} \Rightarrow \frac{2x}{3}=2$

$\Rightarrow 2x = 2 \times 3 \Rightarrow x = 3$ km

11. (c) Relative speed = 11 – 10 = 1 kmph

Distance covered in 6 minutes $=\frac{1000}{60}\times 6$ minute

$= 100$ metre

$\therefore$ Remaining distance = 200 – 100 = 100 metre

12. (d) Let the length of train be x km and its speed by y kmph.

$\therefore \frac{x}{y-2}=\frac{9}{3600}=\frac{1}{400}$ ...(i)

$\frac{x}{y-4}=\frac{10}{3600}=\frac{1}{360}$ ...(ii)

By dividing equation (i) by (ii),

$\frac{y-4}{y-2}=\frac{360}{400}=\frac{9}{10}$

$\Rightarrow 10y - 40 = 9y - 18 \Rightarrow y = 40 - 18 = 22$

From equation (i),

$\frac{x}{22-2}=\frac{1}{400}$

$\Rightarrow x=\frac{1}{20}$km $=\frac{1000}{20}=50$ metre

Alternate Method:

Let Speed of train be x km/h

According to question

$(x-2)\frac{5}{18}\times 9=(x-4)\frac{5}{18}\times 10$

$9x - 18 = 10x - 40 \Rightarrow x = 22$km/h

Required length $=(22-2)\frac{5}{18}\times 9 = 50$ m

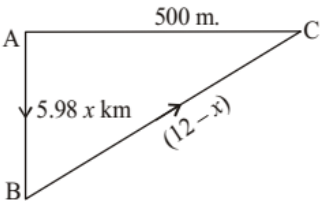
13. **(c)** If the total length of journey be x km, then

$$\frac{x}{35}-\frac{x}{40}=\frac{15}{60}$$

$$\Rightarrow \frac{8x-7x}{280}=\frac{1}{4} \Rightarrow \frac{x}{280}=\frac{1}{4}$$

$$\Rightarrow x=\frac{1}{4}\times 280=70 \text{ km}$$

14. **(a)**



Sheep speed = 30 km/hr. $=30\times\frac{5}{18}=\frac{25}{3}\text{m/sec.}$

Time taken by the sheep to travel

500 m $=\frac{500\times 3}{25}=60\text{sec.}$

Distance travelled by the signal

$= 60 \times 200 = 12000$ m. $= 12$ km.

Let the depth of the sea is x km.

then from ΔABC, AB $= x$ km, BC $= (12 - x)$ km.

AC = 500m, = 0.5km.

Now, $(BC)^2 = (AB)^2 + (AC)^2$

$(12 - x)^2 = x^2 + (0.5)^2$.

$144 - 24x = 0.25$.

$x = 6$km.

15. **(b)** Average Speed $=\frac{\text{Total Distance Covered}}{\text{Total Time Taken}}$

$$=\frac{6+6+6+6}{\frac{6}{25}+\frac{6}{50}+\frac{6}{75}+\frac{6}{150}} \Rightarrow \frac{24}{6\left[\frac{1}{25}+\frac{1}{50}+\frac{1}{75}+\frac{1}{150}\right]}$$

$$=\frac{24\times 300}{6\times 24} \Rightarrow 50 \text{ km/hr}$$

16. **(c)** To walk both ways, duration = 55 minutes

$\therefore$ To walk one way, duration $=\frac{55}{2}$ minutes

To walk one way + To ride one way = 37 minutes

$\therefore$ To ride both ways $=2\times\frac{19}{2}=19$ minutes

17. **(b)** 1 km = 1000 m

D = S × T

a km = S × b hr

$S=\frac{a\times 1000}{b}$

Now, D = 200 m

Time taken $=\frac{D}{S}=\frac{200}{a\times 1000}\times b=\frac{b}{5a}\text{hrs}$

18. **(a)** Let speed of train = x km/hr

Distance travelled by train

= Relative speed of train × Time

100 m = (x + 5) km/hr $\times \frac{36}{5}$ seconds

$$\frac{100}{1000}\text{km}=(x+5)\times\left(\frac{36}{5}\times\frac{1}{3600}\right)\text{hrs}$$

$\Rightarrow$ x + 5 = 50

$\therefore$ x = 45 km/hr

19. **(b)** Length of arc in 18 seconds $=\left(\frac{18}{3600}\right)\times$ circumference

$$=\frac{18}{3600}\times 2\times\frac{22}{7}\times 35=1.1 \text{ cm}$$

20. **(c)** Let the required distnace be x km.

Difference in the times taken at two speeds

$= 8\text{min} = \frac{8}{60}\text{ hr} = \frac{2}{15}\text{ hr}$

$\therefore \frac{x}{5}-\frac{x}{6}=\frac{2}{15}$

$\frac{6x-5x}{30}=\frac{2}{15}$; $x=\frac{2}{15}\times 30=4$

Hence, the required distance is 4km.

21. **(d)** Relative speed $=(45+54)=99\text{km/hr}=\frac{99\times 5}{18}\text{m/sec}$

Distance covered in crossing each other = (108+112) = 220m

Required time $=\frac{220}{99}\times\frac{18}{5}=8\text{sec}$

22. **(b)** Total distance = 100 km.

Total time $=\frac{50}{50}+\frac{40}{40}+\frac{10}{20}=1+1+\frac{1}{2}=\frac{5}{2}$ hours

$\therefore$ Average speed $=\frac{100\times 2}{5}=40$ kmph

23. **(b)** Speed of train = 36 kmph

$=\left(36\times\frac{5}{18}\right)\text{m/sec.}=10$ m/sec.

Required time $=\frac{\text{length of train + Bridge}}{\text{Speed of train}}$

$=\frac{270+180}{10}=45$ seconds

24. **(a)** Volume of water flowing from the pipe in 1 minute $=\pi\times 0.25\times 0.25\times 1000\text{cu.cm.}$

Volume of conical vessel $=\frac{1}{3}\pi\times 15\times 15\times 24$ cu.cm.

$\therefore$ Required time $=\frac{\pi\times 15\times 15\times 24}{3\pi\times 0.25\times 0.25\times 1000}$

= 28 minutes 48 seconds

25. **(a)** Distance covered in 4.5 h = 80 × 4.5 = 360 km

Speed $=\frac{360}{4}km = 90\ km/h$

26. **(d)** Downstream speed = 5 kmph

Upstream speed = 1 kmph

$\therefore$ Required time $=\frac{10}{5}+\frac{10}{1}=12$ hours

27. (d) Speeds of train = 36 kmph = $36 \times \frac{5}{18} = 10$ m/sec

Length of train = $10 \times 10 = 100$ metre

$\therefore$ Required time = $\frac{100+55}{10}$

= 15.5 seconds $\Rightarrow 15\frac{1}{2}$ seconds.

28. (b) Number of stoppages = $\frac{90}{7} \cong 12$

$\therefore$ Total time = $\left(\frac{90}{18}\right)$ hours + $\frac{12\times6}{60}$ minutes

= 6 hours 12 minutes

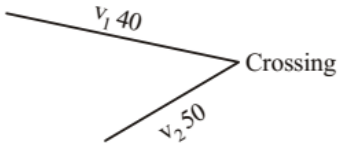
29. (c) Speed of person in still water = x kmph and speed of current = y kmph

$\therefore x + y = \frac{15}{3} = 5$ kmph

$x - y = \frac{15}{\frac{15}{2}} = 2$ kmph

On adding, $2x = 7 \Rightarrow x = \frac{7}{2} = 3.5$ kmph

30. (d)



If $\frac{40}{v_1} = \frac{50}{v_2}$ then they will collide i,e. cars will reach at the same time.

$\therefore \frac{v_1}{v_2} \neq \frac{40}{50} = \frac{4}{5}$

31. (d) If the original speed be S_1 units and time = t_1 units and distance = D, then

$\frac{\frac{D}{2}}{2t_1} = S_2$

$\therefore S_2 = \frac{D}{4t_1}$ and $S_1 = \frac{D}{t_1}$

$\therefore \frac{S_1}{S_2} = \frac{\frac{D}{t_1}}{\frac{D}{4t_1}} = \frac{4}{1}$

32. (b) D = S × T

$60 = S \times \left(\frac{45}{60}\right)$hr

$S = \frac{60\times60}{45} \Rightarrow 80$km/hr

Now, new speed = 80 – 15 = 65 km/hr.

$\therefore$ Time = $\frac{\text{Distance}}{\text{Speed}} = \frac{60}{65}$ hr.

or $\frac{60}{65} \times 60$ min = 55.38 min.

Hence, Time to taken by car to travel same distance is 55.38 min.

33. (b) Let speed of the second train = x km/hr.

Relative speed of trains = $(50 + x)$ km/hr.

Distance travelled by trains = (100 + 120) = 220 metres

Distance = Speed × Time

$\left(\frac{220}{1000}\right)$km = $(50+x)$ km/hr. $\times \left(\frac{6}{3600}\right)$hr

$50 + x = \frac{220\times3600}{1000\times6}$

$50 + x = 132$

$x = 132 - 50 = 82$ km/hr

34. (b) If the total journey be of x km, then

$\frac{2x}{15} + \frac{9x}{20} + 10 = x \Rightarrow x - \frac{2x}{15} - \frac{9x}{20} = 10$

$\Rightarrow \frac{60x - 8x - 27x}{60} = 10 \Rightarrow \frac{25x}{60} = 10$

$\Rightarrow x = \frac{60\times10}{25} = 24$ km

35. (d) New speed = $\frac{3}{4}$ × usual speed

$\therefore$ New time = $\frac{4}{3}$ × usual time

$\therefore \frac{1}{3}$ × usual time = 20 minutes

$\Rightarrow$ Usual time = 3 × 20 = 60 minutes

36. (c) Time taken by train = $\frac{100}{30\times\frac{5}{18}}$s = 12 seconds

37. (a) Distance = $\frac{1}{3} \times 240$ km = 80 km

Time = $\frac{2}{7} \times 4$h = $\frac{8}{7}$h

Speed = $\frac{80}{8/7} = 70$ km/h

38. (d) Let original time taken by student be x hours.

$\frac{5}{2} \times \left(x + \frac{6}{60}\right) = 3 \times \left(x - \frac{10}{60}\right)$

$5x + \frac{1}{2} = 6x - 1$

$x = \frac{3}{2}$hours

$\therefore$ Distance of school = $\frac{5}{2} \times \left(\frac{3}{2} + \frac{1}{10}\right) = 4$km

39. (b) Total distance = (100 + 50) m = 150 m

Speed of the train = $\frac{150\times3600}{1000\times10} = 54$ km/hr

40. (a) Let C's speed = x km/h
Then, B's speed = 3x km/h
and A's speed = 6x km/h
Ratio of speeds of A, B, C = 6x : 3x : x = 6 : 3 : 1

Ratio of time taken $= \frac{1}{6} : \frac{1}{3} : 1 = 1 : 2 : 6$

It C's 90 minutes
Hence, 6x = 90
x = 15 minutes
Hence, A should take 15 minutes.

41. (d) Total distance covered by horse in $2\frac{1}{2}$ seconds

$= 66 \times \frac{5}{2} = 165\text{m}$

Radius of the field $= \frac{165}{2\pi} = \frac{165 \times 7}{2 \times 22} = 26.25\text{m}$

42. (c) Let T be the speed of train and C be the speed of car.

$$\frac{120}{T} + \frac{480}{C} = 8 \Rightarrow \frac{1}{T} + \frac{4}{C} = \frac{1}{15} \quad \ldots (1)$$

$$\frac{200}{T} + \frac{400}{C} = 8 + \frac{20}{60} \Rightarrow \frac{1}{T} + \frac{2}{C} = \frac{1}{24} \quad \ldots (2)$$

Subtracting (2) from (1)

$$\frac{2}{C}(2-1) = \frac{1}{15} - \frac{1}{24} \; ; \; \frac{2}{C} = \frac{1}{40} \Rightarrow C = 80$$

$$\frac{1}{T} = \frac{1}{15} - \frac{4}{80} \; ; \; \frac{1}{T} = \frac{1}{60} \Rightarrow T = \mathbf{60}$$

Required ratio = 60 : 80 = 3 : 4

43. (c) Let correct time to cover journey be t hours

$$70\left(t + \frac{12}{60}\right) = 80\left(t + \frac{3}{60}\right)$$

70t + 14 = 80t + 4
10t = 10
t = 1 hour

44. (d) Distance covered = Speed × Time = $40 \times \frac{25}{4} = 250$ km

New speed = 50 km/hour

$\therefore$ Time taken to cover same distance $= \frac{250}{50} = 5\text{h}$

45. (a) Total distance = Length of train + Length of bridge
= 120 + 360 = 480 m

Speed = 36 km/h $= \frac{36 \times 1000}{3600} = 10\text{ m/sec}$

So time $= \frac{\text{Distance}}{\text{Speed}} = \frac{480}{10} = 48$ sec

46. (c) Speed of first train $= \frac{150}{30} = 5\text{m/sec}$

Let the speed of second train be x m/sec
Relative speed = (5 + x) m /sec

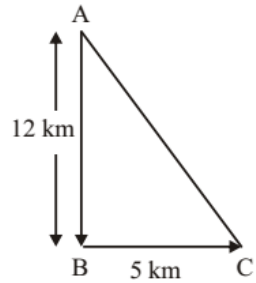
$\therefore \frac{300}{5+x} = 10$

50 + 10x = 300

$x = \frac{300 - 50}{10} = 25\text{m/sec} = 25 \times \frac{18}{5} = 90\text{km/h}$

47. (d) Speed of car in m/sec = $54 \times \frac{5}{18} = 15\text{m/sec}$

48. (c) Given, AB = 12 km, BC = 5 km



Straight way distance of ship

$AC = \sqrt{AB^2 + BC^2} = \sqrt{12^2 + 5^2} = \sqrt{169} = 13$ km

49. (b) Let the distance travelled as foot be x km.
Then, distance travelled by bicycle = (61 –x) km

So, $\frac{x}{4} + \frac{61 - x}{9} = 9$

9x + 4 (61 –x) =9 × 36
9x – 4x = 324 – 244
5x = 80
x = 16 km

50. (b) When distance is contant, then speed is inversely proportional

$S_1 : S_2 = T_2 : T_1$
$4 : 16.5 = T_2 : 165$
or $\frac{4}{16.5} = \frac{T_2}{165}$

$T_2 = \frac{165 \times 4}{16.5} = 40\text{ min}$

51. (c) Average speed = 75km/h
Distance = 1050 km

Time taken to cover the distance $= \frac{1050}{75} = 14$ hrs.

52. (d) Speed = $90 \times \frac{5}{18} = 25$ m/sec

Time $= \frac{d}{v} = \frac{180}{25} = 7.2$ sec.

53. (d) Average speed when speed x and y are given $= \frac{2xy}{x+y}$

$\frac{2 \times 16 \times x}{x+16} = 6.4$

32 x = 6.4(x + 16)
x = 0.2(x + 16)
0.8x = 3.2
x = 4

54. (a) Total Distance = 100 km
Distance travelled in first 2hr = 2 × 20 = 40 km
Remaining distance = 100 – 40 = 60 km

Time taken $= \frac{60}{10} = 6$ hr

Average speed $= \frac{\text{Total distance}}{\text{Total time}} = \frac{100}{8} = 12\frac{1}{2}$ Km/hr

55. (c) $\text{Time} = \dfrac{\text{Distance}}{\text{Speed}}$

$$\text{Time} = \frac{200+175}{54\times\frac{5}{18}} = \frac{375}{15} = 25 \text{ sec}$$

56. (c) Let the speed of car be x and other be y
Distance covered from A in 5 hrs = 5x
Distance covered from B in 5 hrs = 5y
ATQ
when they travel in same direction
then $5x - 5y = 100$
$x - y = 20$ ...(i)
When they travel towards each other
then ATQ
$x + y = 100$ ...(ii)
Now, adding eqn. (i), & (ii)
$2x = 120$
$x = 60$ km/hr

57. (d) Let distance travelled by foot = x km/hr
Let distance travelled by bicycle = 72 – x km/hr

$$\frac{x}{5}+\frac{(72-x)}{10}=12$$

$2x + 72 - x = 120$
$x = 120 - 72 = 48$ km

58. (c) Let speed of the boat in still water be x km/h and speed of current be y km/h.
Then,
upstream speed = (x – y) km/h
and down stream speed = (x + y) km/h
Now,

$$\frac{15}{(x-y)}+\frac{21}{2(x+y)}=3\frac{1}{4} \quad ...(i)$$

$$\frac{12}{(x-y)}+\frac{14}{(x+y)}=3 \quad ...(ii)$$

From Equation (i) and (ii)
$x = 10$ km/hr and $y = 4$ km/hr.

59. (b) Let speed of car = x

$$\therefore \text{ Speed of train } = x+\frac{x\times 40}{100}=\frac{7x}{5}$$

According to question,

$$\frac{140}{x}=\frac{140\times 5}{7x}+\frac{25}{60} \; ; \; \frac{140}{x}-\frac{700}{7x}=\frac{25}{60}$$

$$x=\frac{280\times 60}{25\times 7} = 96 \text{ km/hr}$$

$$\therefore \text{ Speed of train } = \frac{7x}{5}=\frac{7\times 96}{5} = 134.4 \text{ km/hr}$$

60. (d) Suppose distance between Delhi and Jaipur is 30 km.
Then,

$$\text{Speed of first train } = \frac{30}{6} = 5 \text{km/hr}$$

$$\text{Speed of second train } = \frac{30}{5} = 6 \text{km/hr}$$

If trains met after t hours from 10 a.m. then
$5t + 6 \times (t - 2) = 30 \Rightarrow 5t + 6t - 12 = 30 \; 11t = 42$

$$t = \frac{42}{11} \text{ hours} = 3 \text{ hours } 49 \text{ minutes}$$

$\therefore$ Trains meet 3 hours 49 minutes after 10 a.m. i.e. at 1:49 pm.

61. (c) Since speed of bus increases every hour by 3 km/hr.
$\because$ Initial speed = 21 km/hr
Total distance = 252 km
According to Arithmatic Progression
$a = 21, d = 3, s_n = 252$ n = ?

$$S_n = \frac{n}{2}([2a+(n-1)d])$$

$$252 = \frac{n}{2}(42+3n-3)$$

$$504 = n(3n+39)$$

$3n^2 + 39n - 504 = 0$
$n^2 + 21n - 8n - 168 = 0$
$\Rightarrow n(n + 21) - 8 (n + 21) = 0$
$\therefore (n - 8) (n + 21)$
$\Rightarrow n = 8, n \neq -21$
$\therefore$ So, 8 hours will it take to cover a distance of 252 km.

62. (b) According to question,
Speed of cars = 36 km/hr and 48 km/hr
So,
$36 \times t = 48 (t - 3)$
$36t = 48t - 48 \times 3$
$12t = 48 \times 3$

$$\therefore t = \frac{48\times 3}{12} = 12 \text{ hours}$$

$\therefore$ Distance = $12 \times 36 = 432$ km.

63. (a) Let Length of Journey = x km.
According to question,

$$\frac{x}{40}-\frac{x}{42}=\frac{15}{60}$$

$$\frac{21x-20x}{840}=\frac{1}{4}$$

$$x=\frac{840}{4} = 210 \text{ km}$$

$\therefore$ Length of Journey is = 210 km

64. (a) $\text{Speed of train } = \dfrac{12}{\frac{10}{60}}$ km/hr

$$= \frac{12\times 60}{10} = 72\times\frac{5}{18} = 20 \text{ m/sec}$$

$\therefore$ Length of train = speed × time
= 20 × 6 = 120 m.

65. (c) Let usual speed of the motorcyclist = x
According to question,

$$\frac{21}{x}-\frac{21}{(x+12)}=\frac{60}{9\times 60}\text{hour}$$

$$\frac{21x+252-21x}{x(x+12)}=\frac{1}{9} \Rightarrow \frac{252}{x^2+12x}=\frac{1}{9}$$

$\Rightarrow$ $x^2 + 12x = 2268 \Rightarrow x^2 + 12x - 2268 = 0$
$\Rightarrow$ $x^2 + 54x - 42x - 2268 = 0 \Rightarrow x(x+54) - 42(x+54)$
$\Rightarrow$ $(x - 42)(x + 54)$
$\therefore$ $x - 42 = 0$ $\quad\therefore\quad x = 42$
$x + 54 = 0$ $\quad\therefore\quad x = -54$
$\therefore$ Usual speed of motorcyclist = 42 km/hr.

66. (d) Here,
$S_n = 315$, $n = 7$, $a = 33$ $\quad d = ?$
According to A.P

$$S_n = \frac{n}{2}[2a + (n-1)d]$$

$$315 = \frac{7}{2}[2 \times 33 + (7-1)d] \Rightarrow \frac{315 \times 2}{7} = (66 + 6d)$$

$90 = 66 + 6d \Rightarrow 6d = 90 - 66 = 24$

$$\therefore\ d = \frac{24}{6} = 4$$

$\therefore$ Required hourly increment (in km/hr) in the speed of bus = 4 km/hr.

67. (c) Let the right time to reach the distination is t hr.
Then, ATQ,

$$48\left(t + \frac{12}{60}\right) = 64\left(t + \frac{3}{60}\right)\ ;\ 3\left(t + \frac{1}{5}\right) = 4\left(t + \frac{1}{20}\right)$$

$$4t - 3t = \frac{3}{5} - \frac{1}{5}\ ;\ t = \frac{2}{5} \text{ hours } = \frac{2}{5} \times 60 = 24 \text{ minutes.}$$

68. (c) Let boat speed is u km/hr and stream speed = v km/hr
ATQ,

$$\frac{30}{u+v} + \frac{24}{u-v} = 2 + \frac{27}{60} \qquad \text{....(i)}$$

$$\frac{10}{u+v} + \frac{4}{u-v} = \frac{37}{60} \qquad \text{....(ii)}$$

Multiply equation (ii) by 3 and subtract from (i),

$$\frac{24-12}{u-v} = 2 + \frac{27}{60} - \frac{37 \times 3}{60}$$

$$\frac{12}{u-v} = 2 - \frac{84}{60}$$

$$u - v = \frac{12 \times 60}{36} = 20 \text{km / hr.}$$

69. (c) We know that length = speed × time
For same length,
$s_1 \times t_1 = s_2 \times t_2$

$$90 \times t_1 = 162 \times \frac{1}{3600}$$

$$(\because\ t_2 = 1 \text{ second} = \frac{1}{360°} \text{hour})$$

$$t_1 = \frac{162}{90 \times 3600}$$

$$\text{time } t_2 \text{ (in sec.)} = \frac{162}{90 \times 3600} \times 3600 = \frac{9}{5} \text{sec.}$$

70. (a) Distance travelled by the train in one hour
without stopage = 50 km
with stopage = 40 km
Extra distance = 50 – 40 = 10 km
Hence, stopage time in one hour

$$= \frac{10}{50} \times 60 = 12 \text{minutes}$$

71. (a) Let usual time is t minute and his speed is s m/min.
then ATQ,

$$s.t = \frac{7}{9} s.(t + 10)$$

$9t = 7\ (t + 10)$
$2t = 70 \Rightarrow t = 35$ minute

72. (a) Le the distance between A to B is d km.
Time of travel of first train = 11 – 6 = 5 hr.
Time of travel of second train = 3 p.m. – 8 a.m. = 7 hr.

then Speed of first train = $\frac{d}{5}$ km/hr.

Speed of second train = $\frac{d}{7}$ km/hr.

Now, again we suppose that two train meet after t hr. from 8 a.m.

then, $\frac{d}{5}(2+t) + \frac{d}{7}(t) = \text{d}$

$$\frac{2+t}{5} + \frac{t}{7} = 1 \Rightarrow \frac{12t+14}{35} = 1 \Rightarrow 12t = 35 - 14$$

$$t = \frac{21}{12} = \frac{7}{4} = 1 \text{ hr. } 45 \text{ min.}$$

Hence, time when two train meets
= 8 + (1 hr 45 min) = 9:45 am.

73. (b) $C \xrightarrow[a=40 \text{ km/h}]{} D$
$C \xleftarrow[b=x \text{km/h}]{} D$

Average speed of the man = $\frac{2ab}{a+b}$

We have given the average speed of the man = 60 km/h

$$\frac{2ab}{a+b} = 60$$

$$\Rightarrow \frac{2 \times 40 \times x}{40 + x} = 60 \Rightarrow \frac{80x}{40+x} = 60$$

$\Rightarrow 80x = 2400 + 60x$
$80x - 60x = 2400$
$20x = 240$
$x = 120$

74. (c) According to question,
Let length of train = l

$$V = \frac{l}{t} = \frac{l}{12} \qquad \text{...(i)}$$

$$\text{Again, } V = \frac{l+170}{36} \qquad \text{...(ii)}$$

From equation (i) and (ii)

$$\frac{l}{12} = \frac{l+170}{36} \quad \therefore \quad 3l = l + 170$$

$\therefore$ $l = 85$ m

$\therefore \quad V = \frac{85}{12} = \frac{85}{12} \times \frac{18}{5}$

$= \frac{51}{2} = 25.5$ km/hr.

75. (a) Total distance = 40 km

Total time $= \frac{15}{30} + \frac{25}{10}$

$= \frac{1}{2} + \frac{5}{2} = 3$ hrs

Average speed $= \frac{\text{Total distance}}{\text{Total time}} = \frac{40}{3}$ km/h

76. (c) Let total distance = 56
Time taken by first person = 8 hrs
Time taken by another person = 7 hrs
Speed of first person = 7
Speed of another person = 8

Meet $= \frac{56-14}{15}$

$= \frac{42}{15} = \frac{14}{5} = 2$ hr 48 min.

Meeting time = 8 + 2 hr : 48 min = 10 : 48 am

77. (a) Time taken to cover 18 km with speed of 6 km/h.

Time, $t_1 = \frac{18}{6} = 3$ hours

Time, $t_2 = \frac{20}{5} = 4$ hours

Time, $t_3 = \frac{27}{9} = 3$ hours

Total time of travel = 3 + 4 + 3 = 10 hours

Average speed $= \frac{\text{Total distance}}{\text{Total time}}$

$= \frac{18+20+27}{10} = 6.5$ km/hr.

78. (b) Percent decrease in speed

$= \frac{(40-30)}{40} \times 100 = 25\%$.

79. (b) Let the speed of train is a km/h and it takes 't' hours to cover the distance with original speed.

With normal speed $\rightarrow \frac{370}{a} = t$

After technical fault $\rightarrow \frac{100}{a} + \frac{270}{a-5}$

$= t + 36$ minutes

With the help of option, let the speed is 50 km/h

With normal speed $\frac{370}{50} = 7.4$ hrs $\Rightarrow$ 7 hrs 24 minutes

After technical fault $\frac{100}{50} + \frac{270}{45}$

= 2 + 6 = 8 hrs

So, it takes 36 minutes more.

$\therefore$ Original speed of the train is 50 km/hr.

80. (d) Total distance $= 54 \times \frac{5}{6}$ $\left(\because 50 \text{ minutes} = \frac{50}{60} \text{hr}\right)$

= 45 km

When, the speed is increased by 25%

Then, speed $= 54 \times \frac{5}{4} = \frac{27 \times 5}{2}$ km/h

Required time $= \frac{\frac{45 \times 3}{4}}{\frac{27 \times 5}{2}} = \frac{1}{2}$ hr = 30 minutes

81. (d) Speed = 190 km/h
Time = 7 hrs
Distance = 190 × 7 = 1330 km

Speed $= \frac{1330}{19} \times 4 = 280$ km/hr

82. (b) Let the length of each train is 'l' meters
Speed of first rain = 44 km/h.
Speed of second train = 32 km/hr.
Relative speed = 44 – 32 = 12 km/hr

$\Rightarrow 12 \times \frac{5}{18} = \frac{10}{3}$ m/sec.

Time taken to Pass the train = 72 sec.
Distance = Speed × Time

$\Rightarrow l + l = \frac{10}{3} \times 72 \quad \Rightarrow 2l = 240 \quad \Rightarrow l = 120$ m

So, Length of each train is 120 m.

83. (b) $\frac{40}{A} - \frac{40}{B} = \frac{5}{2}$ …(1)

$\frac{8}{A} - \frac{8}{B} = \frac{1}{2}$

$\frac{40}{B} - \frac{40}{2A} = 1$ …(2)

Equate (1) & (2)

$\frac{40}{A} - \frac{40}{2A} = \frac{7}{2}$

A $= \frac{40}{7}$ km/h

A $= \frac{40}{40} \times 7 = 7$ hrs

84. (c) $x + y = (74 + 52)\frac{5}{18} \times 12$

$x + y = 420$

$y = \frac{2}{3}x$

$x + \frac{2x}{3} = 420$

$\frac{5x}{3} = 420$

$x = 84 \times 3 = 252$ m

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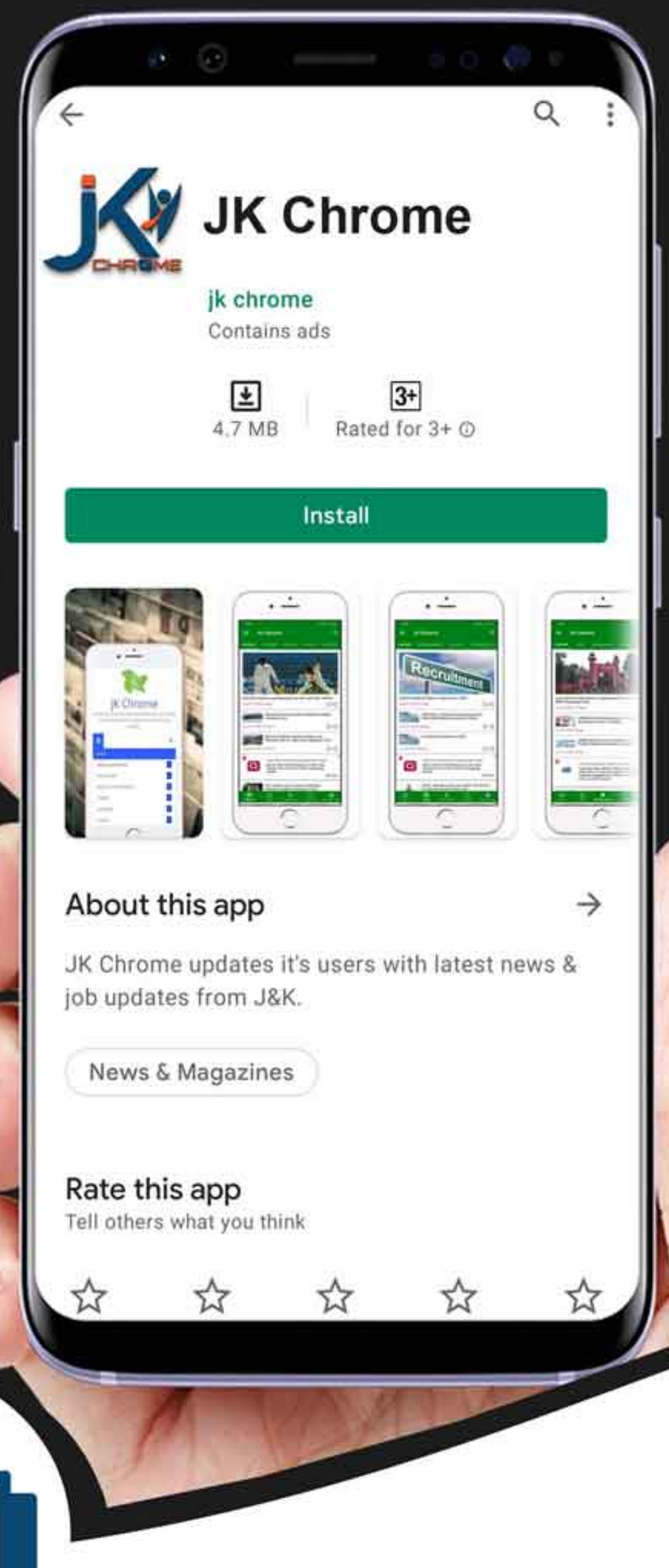

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