Describing Motion Around Us

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. A car travels 160 km in 4 hours. Its average speed is:
(a) 44 km/h **(b)** 640 km/h **(c)** 80 km/h **(d)** 40 km/h

2. A speed of 180 km/h in m/s is:
(a) 50 m/s **(b)** 648 m/s **(c)** 180 m/s **(d)** 55 m/s

3. A body's velocity changes from 7 m/s to 10 m/s in 3 s. Its acceleration is:
(a) 3 m/s^2 **(b)** 2 m/s^2 **(c)** 3.33 m/s^2 **(d)** 1 m/s^2

4. An athlete runs exactly one full round of a circular track of radius 56 m. The magnitude of the displacement is:
(a) 0 m **(b)** 352 m **(c)** 112 m **(d)** 56 m

5. The SI unit of speed is:
(a) m/s **(b)** m/s^2 **(c)** m **(d)** km/h

6. A car starts at 11 m/s and accelerates at 6 m/s^2 for 8 s. Its final velocity is:
(a) 94 m/s **(b)** 48 m/s **(c)** 17 m/s **(d)** 59 m/s

7. A body with initial velocity 2 m/s accelerates at 6 m/s^2 for 6 s. The distance covered is:
(a) 12 m **(b)** 228 m **(c)** 120 m **(d)** 126 m

8. Assertion (A): A car speeding up uniformly from 0 m/s to 42 m/s in 7 s has an acceleration of 8 m/s^2.
Reason (R): Acceleration = (final velocity − initial velocity) ÷ time taken.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

Section B — Short answer — 8 × 2 = 16 marks

9. A bus travels at 57 km/h for 4 h and then at 35 km/h for 4 h. Find its average speed. (Give the answer to 2 decimal places where needed.)

10. A car moving at 11 m/s is brought to rest in 8 s. Find its acceleration. (Give the answer to 2 decimal places where needed.)

11. A car moving at 24 m/s brakes with a retardation of 5 m/s^2. How far does it travel before stopping? (Give the answer to 2 decimal places where needed.)

12. A body reaches 55 m/s after accelerating at 4 m/s^2 for 10 s. Find its initial velocity.

13. An object covers 187 m in 17 s at a uniform speed. How long will it take to cover 1,122 m?

14. A body starts at 8 m/s and accelerates at 6 m/s^2 over a distance of 3 m. Find its final velocity.

15. The velocity of a scooter rises uniformly from 0 to 36 m/s in 19 s. Using the area under the velocity–time graph, find the distance covered. (Give the answer to 2 decimal places where needed.)

16. Kabir walks 26 m east and then 157 m west. Find the distance travelled and the displacement.

Section C — Word problems — 4 × 4 = 16 marks

17. A train starts from rest and accelerates uniformly at 2 m/s^2 for 6 s. Find its final speed and the distance it covers. (Give the answer to 2 decimal places where needed.)

18. A bus moving at 108 km/h is stopped in 7 s by applying brakes. Find the retardation and the distance it travels while stopping. (Give the answer to 2 decimal places where needed.)

19. Two cars cover a distance of 240 km, one at 40 km/h and the other at 90 km/h. How many minutes earlier does the faster car arrive? (Give the answer to 2 decimal places where needed.)

20. An athlete completes one round of a circular track of radius 28 m in 30 s. What distance has the athlete covered, and what is the displacement, after 135 s? (π = 22/7)

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Answer key

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Q	Answer	Working
1	**(d) 40 km/h**	160 ÷ 4 = 40
2	**(a) 50 m/s**	× 5/18: 180 × 5/18 = 50
3	**(d) 1 m/s^2**	(10 − 7) ÷ 3 = 1
4	**(a) 0 m**	back at the start: displacement is zero
5	**(a) m/s**	—
6	**(d) 59 m/s**	v = u + at = 11 + 6 × 8
7	**(c) 120 m**	s = ut + ½at^2 = 12 + 108
8	**(d) A is false, but R is true.**	A is false: (42 − 0) ÷ 7 = 6, not 8. R is true.
9	**46 km/h**	total distance 368 km ÷ total time 8 h
10	**−1.38 m/s^2**	a = (0 − 11) ÷ 8; the minus sign means it is slowing down
11	**57.6 m**	v^2 − u^2 = 2as: 0 − 576 = 2 × (−5) × s
12	**15 m/s**	u = v − at = 55 − 40
13	**102 s**	speed = 11 m/s; 1122 ÷ 11
14	**10 m/s**	v^2 = u^2 + 2as = 64 + 36 = 100
15	**342 m**	area of the triangle = ½ × 19 × 36
16	**distance 183 m; displacement 131 m west**	distance 26 + 157; displacement 157 − 26
17	**12 m/s; 36 m**	v = at = 12; s = ½at^2 = ½ × 2 × 36
18	**4.29 m/s^2; 105 m**	108 km/h = 30 m/s; a = 30 ÷ 7; s = ½ × 30 × 7
19	**200 minutes**	times 6 h and 2.67 h; difference × 60
20	**distance 792 m; displacement 56 m**	135 s = 4 ½ rounds; distance = 4 ½ × 2πr; displacement = diameter = 56 m

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