Rest and Motion: Motion is Relative

Are you moving right now? It depends on who is watching. Rest and motion are always measured from a reference point.

Name: Date: Score: ____ / 17

A. Fill in the blanks

1. An object is at rest if its position does not change with ____ relative to a reference point.

2. The fixed point used to describe position is called the ____ point.

3. A passenger in a moving bus is at ____ relative to the bus and in ____ relative to the road.

4. Nothing on the Earth is in ____ rest, because the Earth itself moves.

B. True or False

5. An object can be at rest and in motion at the same time. True / False

6. A parked car is at rest relative to the Sun. True / False

7. Two trains moving side by side at the same speed are at rest relative to each other. True / False

8. We can say whether something moves without choosing a reference point. True / False

C. Assertion and reason

9. Assertion (A): A person sleeping in a moving train is in motion.
Reason (R): Motion is described relative to a reference point.

(a) Both A and R are true, and R explains A
(b) Both A and R are true, but R does not explain A
(c) A is true, R is false
(d) A is false, R is true

Answer: _____

10. Assertion (A): A tree is always at rest.
Reason (R): A tree does not change its position relative to the ground.

(a) Both A and R are true, and R explains A
(b) Both A and R are true, but R does not explain A
(c) A is true, R is false
(d) A is false, R is true

Answer: _____

D. Choose the correct option

11. A girl sits in a moving car. Relative to the car she is:

(a) in motion
(b) at rest
(c) both
(d) neither

Answer: _____

12. A roadside tree appears to move backward to a bus passenger. This shows:

(a) the tree moves
(b) motion depends on the observer
(c) the bus is at rest
(d) the Earth is at rest

Answer: _____

13. Which is at rest relative to the Earth's surface?

(a) a flying bird
(b) a parked scooter
(c) the Moon
(d) a rolling ball

Answer: _____

14. To decide whether an object moves, first choose:

(a) its speed
(b) its mass
(c) a reference point
(d) its colour

Answer: _____

E. Short answer questions

15. Define rest and motion. Why must a reference point be named?

16. A ball is thrown up inside a train moving at constant speed. Describe its path for a passenger and for a person on the platform.

F. Match the columns

17. Match each item in Column A with the correct item in Column B.

Column A	Column B	Your answer
1. Passenger seen from inside the bus	(a) Reference point	1 → ____
2. Passenger seen from the road	(b) At rest	2 → ____
3. Fixed point for describing position	(c) Absolute rest	3 → ____
4. State no object on Earth has	(d) In motion	4 → ____

Detailed solutions

1. time

2. reference

3. rest; motion

4. absolute

5. True. Yes, for two different reference points.

6. False. The car moves with the Earth around the Sun.

7. True. The distance between them does not change.

8. False. Rest and motion have meaning only relative to a reference point.

9. (a) Relative to the ground the sleeper changes position, and the reason (reference point) is exactly why.

10. (d) A is false: relative to a moving bus or the Sun the tree moves. R is true.

11. (b) at rest. Her position inside the car does not change.

12. (b) motion depends on the observer. Relative to the bus the tree's position changes.

13. (b) a parked scooter. Its position on the ground does not change.

14. (c) a reference point. Motion is always relative to a reference point.

15. Rest: position unchanged with time relative to a reference point; motion: position changes. The same object can be at rest for one observer and moving for another, so the statement is incomplete without the reference point.

16. For the passenger it goes straight up and down. For the person on the platform it also moves forward with the train, so its path is a curve.

17. 1 → (b), 2 → (d), 3 → (a), 4 → (c). The passenger keeps the same place in the bus but changes place relative to the road; the Earth's own motion rules out absolute rest.