PHYSICS CLASS-7
CHAPTER- 2: MOTION
ANSWER KEY

A. 1. False
2. True
3. False
4. False
5. False
6. False
7. True
8. False

B. 1. (c) Rectilinear motion
2. (b) Oscillatory motion
3. (a) Car engine,
4. (b) body at rest
5. (a) Speed
6. (c) Throwing of a javelin
7. (b) Four types
8. (d)Two types

C. 1. motion
2. periodic
3. rotatory
4. vibratory
5. distance
6. zero
7. velocity
8. translatory and rotatory

D. 1. (b)
2. (c)
3. (h)
4. (a)
5. (d)
6. (g)
7. (f)
8. (e)

E. 1. Javelin thrown in the air.
It is because javelin thrown in the air is an example of curvilinear motion but the other three options are vibratory motions.

2. Rotatory motion.
It is because other options are linked with translatory motion.

F. 1. rest
2. motion
3. rectilinear
4. oscillatory
5. uniform
6. mass
7. periodic
8. weight

G. 1. Distance is the actual path followed by a body between the points between which it moves.

2. An object is said to be at motion, if it changes its position with respect to the stationary surroundings, with the passage of time.

3. Speed is the ratio of the distance travelled by a body to the time taken to do so.
Speed = $\frac{Distance}{Time}$

4. The rate of change of motion in a specified motion is called velocity

5. If an object covers equal distances in equal interval of time, it is said to be in uniform motion. Example: hour hand of a clock, motion of a fan, a ship steaming on a straight course at steady speed.

6. If an object covers unequal distances in equal intervals of time, it is said to be in non-uniform motion. Example: a horse racing in a race, a bouncing ball, a train coming to the terminal point, etc.

7. Mass is the amount of matter contained in a body. It is a constant quantity which does not change with respect to position or place.

8. Weight is the measure of the force of gravity on a body.

H. 1. An electric drill has both translatory and rotatory motion. The bit of the drill rotates as well as it moves forward into the wood or wall. Thus, a drilling machine shows a combination of motions.

2. If a body after travelling comes back to its starting point, the displacement is zero and distance travelled is not zero. Thus, displacement can be zero but displacement cannot be zero.

3. The Earth takes one year to complete one revolution around the Sun. So the motion of Earth around the Sun gets repeated after a fixed interval of time. Thus, revolution of Earth around the Sun is a periodic motion.

4. The kind of motion in which a body travels equal distances in equal intervals of time is called uniform motion.

For example, if a car is moving at a constant speed of 50 km/h covers a distance of 50 km every 1 hour, 25 km in every half an hour and 12.5 km in every 15 minutes, it is moving in uniform motion.

5. A translatory motion is a motion in which all the parts of a body move through the same distance in the same interval of time.

One example of translatory motion is a car moving on a straight road.

6.

OSCILLATORY MOTION	VIBRATORY MOTION
In this type of motion, the entire body moves back and forth about a mean position.	In this type of motion, a part of the body undergoes oscillatory motion and the remaining body stays at rest.
Example: motion of a pendulum, the motion of a swing, etc.	Example: motion of the strings of a guitar, violin, etc.

I. 1. An object can be at rest and also in motion at the same time. So, there is nothing like absolute rest. For example, all objects which are stationary on earth, are said to be at rest with respect to each other, but with respect to the sun, the objects are making revolutions at 30 km/h. Thus, an object at a given time can be in a state of motion with respect to one another, while it is in the state of rest with respect to another object. Hence, it can be stated that rest and motion are two relative terms.

2.

UNIFORM MOTION	NON-UNIFORM MOTION
The motion in which a body travels equal distances in equal intervals of time is called uniform motion.	The motion in which a body travels unequal distances in equal intervals of time is called non-uniform motion.
The speed of the object moving along a straight line remains constant with time.	The speed of the object moving along a straight line changes with time.
Example: A bike moving on a straight road with a constant speed of 40 km/h.	Example: A bike moving on a crowded road with variable speed.

3. In order to describe the motion of an object, three factors are needed to be kept in mind. They are as follows:
(i) the distance of the body from a reference point, which is origin of the motion of the body,
(ii) the direction of the motion,
(iii) the time of motion.

4. i) Rectilinear motion,
ii) Vibratory motion,
iii) Curvilinear motion,
iv) Oscillatory motion,
v) Rotatory motion,
vi) Oscillatory motion.

5.

MASS	**WEIGHT**
It is the amount of mass contained in a body.	It is a force equal to the gravitational pull exerted by a planet.
It is a constant quantity and does not change with respect to the position or place.	It is a variable quantity and changes with the change in acceleration due to gravity of a place.
Mass of a body can never be zero.	Weight of a body can be zero, during free fall or at the centre of the planet.
It is measured by using a physical balance.	It is measured by using a spring balance.
It is a scalar quantity.	It is a vector quantity.
It is measured in kilogram.	It is measured in newton.

6. An object is said to be at motion, if it changes its position with respect to the stationary surroundings, with the passage of time.

Motion is mainly classified into FOUR types. They are as follows:

(i) Translatory motion - A translatory motion is a motion in which all the parts of a body move through the same distance in the same interval of time. The translatory motion is further divided into two types:

(a) Rectilinear motion- Rectilinear motion is the motion of an object in straight line. Example: a car moving on a straight road.

(b) Curvilinear motion- Curvilinear motion is the motion of an object along a curved path. Example: a stone thrown into the air at an angle with the ground.

(ii) Rotatory motion- A motion is said to be rotatory if an object moves in a circular path around a fixed axis without changing its position. Example: motion of a potter's wheel.

(iii) Oscillatory motion- Oscillatory motion is the back and forth motion which takes place about a mean position. Example: motion of a swing.

(iv) Vibratory motion- Vibratory motion is a motion in which a part of a body undergoes oscillatory motion and remaining body stays at rest. Example: motion of the strings of a guitar.

7. Oscillatory motion means to and fro motion or back and forth motion about a mean position. For example: motion of a pendulum etc. In contrary, periodic motion is the motion that repeats itself after a fixed interval of time.

Now, oscillatory motion like for a pendulum, the motion of the bob always repeat after certain interval of time, thus it is periodic motion. But motion of planets around sun is periodic as because it repeats itself after sometime but can't be said to perform to and fro motion so they are not oscillatory motion. Hence, we can say that an oscillatory motion is always periodic, but a periodic motion is not always oscillatory.

8. Given,

Initial speed (S_1) = 40 km/h

Final speed (S_2) = 60 km/h

Initial time (t_1) = 15 min = $\frac{1}{4}$ h

Final time (t_2) = 15 min = $\frac{1}{4}$ h

Let D_1 be the initial distance covered by the car and D_2 be the final distance covered by the car.

According to the formula, Distance = Speed X Time

Thus,

Total distance (D) = $D_1 + D_2$

$= S_1 X\ t_1 + S_2 X\ t_2$

$= (40\ X \frac{1}{4} + 60\ X \frac{1}{4})$ km

= (10 + 15) km

= 25 km

Answer: The total distance covered by the car is 25 km.

9. The girl starts walking from the school at 3:00 pm or 15:00 h
The girl reaches her home from the school at 3:30 pm, or 15:30 h
Thus, the time taken = 30 min = $\frac{1}{2}$ h
Distance between her school and house = 12 km

According to the formula,

$$\text{Speed} = \frac{Distance\ travelled}{Time\ taken}$$

Thus, Average speed of the girl = $\frac{Total\ distance\ travelled}{Total\ Time\ taken}$

$= \frac{12}{1/2}$ km/h

= 24 km/h

Answer: The average speed of the girl is 24 km/h.
