

**BCM SCHOOL, BASANT AVENUE, DUGRI ROAD,  
LUDHIANA**

**ASSIGNMENT**

**ASSERTION REASON BASED MCQs**

**CLASS – XI**

**SUBJECT – PHYSICS**

**CHAPTER – GRAVITATION**

**DATE: 22 -11 – 2023**

## ASSERTION - REASON BASED QUESTIONS

### Direction for Q.No. 1 to Q.No. 12

The following questions from 1 to 12 consists of two statements each, labelled as Assertion (A) and the other labelled as Reason (R). While answering these questions, you are required to choose any of the following from options (a), (b), (c) & (d).

- (a) If both A & R are true and R is the correct explanation of A.
  - (b) If both A & R are true but R is not the correct explanation of A.
  - (c) If A is true but R is false.
  - (d) If A is false and R is also false.
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1. Assertion (A) : The time period of revolution of a satellite close to surface of earth is smaller than that revolving away from the surface of earth.  
Reason (R) : The square of time period of revolution of a satellite is directly proportional to cube of its orbital radius.
  2. Assertion (A) : We can not move even a finger without disturbing all the stars.  
Reason (R) : Every body in this universe attracts every other body with a force which is inversely proportional to the square of distance between them.
  3. Assertion (A) : Angular speed, linear speed and KE change with time but angular momentum remains constant for a planet orbiting the sun.  
Reason (R) : Angular momentum is constant as no torque acts on the planet.

4. Assertion (A) : An artificial satellite moving in a circular orbit around the earth has a total energy (i.e. sum of potential & kinetic energy) E. Its potential energy  $-E$ .  
Reason (R) : Potential energy of the body at a point in a gravitational field of earth is  $\frac{-GMm}{2R}$  .
5. Assertion (A) : The comets do not obey Kepler's Laws of planetary motion.  
Reason (R) : The comets do not have elliptical orbits.
6. Assertion (A) : The square of the period of revolution of a planet is proportional to the cube of its distance from the sun.  
Reason (R) : Sun's gravitational field is inversely proportional to the square of its distance from the planet.
7. Assertion (A) : The earth without its atmosphere would be inhospitably cold.  
Reason (R) : All heat would escape in the absence of atmosphere.
8. Assertion (A) : The difference in the value of acceleration due to gravity at pole and equator is proportional to square of angular velocity of earth.  
Reason (R) : The value of acceleration due to gravity is minimum at the equator and maximum at the pole.
9. Assertion (A) : At the centre of earth a body has centre of mass, but no centre of gravity.  
Reason (R) : This is because  $g = 0$  at the centre of the earth.
10. Assertion (A) : An astronaut in an orbiting space station above the earth experiences weightlessness.  
Reason (R) : An object moving around the earth under the influence of earth's gravitational force is in a state of free fall.
11. Assertion (A) : Linear momentum of a planet does not remain conserved.  
Reason (R) : Gravitational force acts on it.
12. Assertion (A) : Kepler's second law can be understood by conservation of angular momentum principle.  
Reason (R) : Kepler's second law is related with areal velocity which can further be proved to be based on conservation of angular momentum as  $\frac{dA}{dt} = \frac{1}{2}r^2\omega$  .