Answer on Question #40733, Physics, Mechanics | Kinematics | Dynamics

State against each observation below whether it is true or false. Give reasons for your answer.

i. The angular momentum of an artificial satellite rotating about the earth under its gravitation varies with time.

ii. An alpha particle scattered from an atomic nucleus moves in a plane.

iii. An artificial satellite moves at greater speed when it is nearer the earth.

Answer

i. The angular momentum of an artificial satellite rotating about the earth under its gravitation varies with time.

False: Gravitational force does not exert a torque on the masses orbiting the central body. Hence angular momentum is conserved, i.e. constant (doesn't depend on time).

ii. An alpha particle scattered from an atomic nucleus moves in a plane.

True: The trajectory of the scattered particle is lying in a plane through the scattering center because of the Coulomb force is a radial force.

iii. An artificial satellite moves at greater speed when it is nearer the earth.

True: The force of gravitation is greater as we move nearer the Earth's surface and the corresponding centripetal force acting on satellite as provided by gravity is greater. As such, orbital speed is greater.