Physics (New Book) - 9th Class Physics Chapter 5 Long Question Preparation

Q1. Q no(B) Define satellites. Find the orbital velocity of on artificial satellites.

Ans 1: Satellite:
An object that revolves around a planet is called satellite . The moon revolves around the earth as moon is a natural satellite of the earth.
Scientists have sent many objects into space Some of these objects revolve around the earth. These are called artificialsatalites.
Most of the artificial satallite orbiting around the Earth are usedfor communication purposes .Artificial satellites carry instruments or passengers to perform experiments in space.
Large number of artificial satellites have been launched in different orbits around the Earth.

Q2. What is the effect of the following on the gravitational acceleration

1. Mass of the freely falling body
2. Distance of the freely falling body from the center of the earth,(I>E> variation of "g" with altitude0 OR explain the variation in value of 'g' with altitude

Ans 1: We know that
$g= GM_e/R^2$
where Me is mass of earth. Hence this equation does not include the mass of the freely fallingbody. The value of g does not depend on the mass of the body. All bodies either lighter or heavier fall freely with the same gravitationalacceleration. Thus mass has no effect on g

---

Q3. How gravitation is discovered. what is the force of gravitation

Ans 1: The first man who came up with the idea of gravity was Isaac newton. It was an evening of 1665 when he was trying to solve the mystery why planets revolve around the sun. Suddenly an apple fell from the tree under which he was sitting. The idea of gravity flashed in his mind. he discovered not only the cause of falling apple but also the cause that makes the planet to revolve around the sun and the moon around the earth.
Force of gravitation: force due to which every body of the universe attracts every other body is called force of gravitation.

Q4. State and explain gravitational field

Ans 1: Gravitational pull of earth acting on the body whether the body is in contact with earth or not is called the field force and the are for this force around the earth is called gravitational field

Ans 2: For example: the velocity of a body, thrown up, goes on decreasing while on return its velocity goes on increasing. It is due to the gravitational pull earth acting on the body, which is a field force. It is assumed that a gravitational field exists all around the earth. This field is directed towards the center of the earth. The gravitational field becomes weaker and weaker as we go farther and farther away from the earth

Ans 3: Gravitational field strength: in the gravitational field of the earth, the gravitational force per unit mass is called the gravitational field strength of the earth. At any place its value is equal to the value of g at that point

---

Q5. Describe the motion of artificial satellite and derive the formula for the orbital speed of the artificial satellite

Ans 1: Artificial satellite: Artificial satellites are launched for space research and telecommunication. With their help, we are able to enjoy live coverage of cricket matches, Olympic games and many other programs directly on our television sets.
Artificial satellites keep on revolving around the earth in different geo stationary satellite orbits with uniform speed due to gravitational force

---

Q6. Q no: 5 (A) What ismeant by the force of gravitation? Also explain the law of gravitation.

Ans 1: everybody in the universeattracts every other body with a force which is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centres.

According to the law of gravitation the gravitationalforce of attraction F with which the two masses m1 and m2 separated by a distance `d' attract each other is given by:
F x m1m2
F x $1/d^2$
F x $m1m2/d^2$
F=G $m1m2/d^2$

Q7. Q no: (B) A polar satellite is launched at 850 km above earth. Find its orbital speed.

Ans 1: Solution:
Height= 850 km
= 850 x 1000m
850000m = 8.5×10^5m
orbital speed = v=?
$V=\sqrt{GMe/(R+h)}$
$=\sqrt{6.673 \times 10^{-11} \times 6 \times 10^{24}/(6.4 \times 10^6 + 8.5 \times 10^5)}$
= 743.13 ms^{-1}

Q8. Determine the mass of earth using Newtons law of gravitation

Ans 1: Mass of earth: the mass of earth can be calculated by using Newtons law of gravitationExplanation; consider a body of mass m is placed on the surface of the earth. The distance between the center of the body and the earth is R which is equal to radius of the earth. The mass of earth is Me.We know that the force with which the earth attracts a body on its surface towards its center is equal to the weight of the body

---

Q9. What do you mean by artificial satellite

Ans 1: Satellite: an object that revolves around a planet is called a satellite
Natural satellite: the moon revolves around the earth so moon is a natural satellite of the earth
Artificial; scientists have sent many objects into space. Some of these objects revolve around the earth. These are called artificial satellites.

Ans 2: Uses of artificial satellite: Most of the artificial satellites , orbiting around the earth are used for communication purpose. Artificial satellites carry instruments or passengers to preform experiments in space. Large number of artificial satellites have been launched in different orbits around the earth.
Dish antennas sending and receiving the signals from them have fixed direction depending upon their location on the earth.

Q10. How will you relate law of gravitation and Newtons third law of motion

Ans 1: in law of gravitation it is to be noted that mass m1 attracts m2 towards it with a force F while mass m2 attract m1 towards it

with a force of the same magnitude F but in opposite direction. If the force acting on m1 is considered as action then the force acting on m2 will be the reaction . We can say that the action and reaction due to force of gravitation are equal in magnitude but opposite in direction. This is in consistent with newtons third law of motion which states , to every action there is always an equal but opposite reaction