ASSIGNMENT
CLASS 11-PHYSICS
GRAVITATION

1. What is the direction of areal velocity of the earth around the sun?
2. If earth be at one half its present distance from the sun,then how many days will there be in a year?
3. The masses and coordinates of the three spheres are as follows; 20 kg, x = 0.50 m,y = 1.0 m ; 40 kg, x = -1.0 m, y = - 1.0 m ; 60 kg, x = 0 m ,y = -0.50 m .What is the magnitude of the gravitationl force on a 20 kg sphere located at the origin due to the other spheres ?
4. An object of mass m is raised from the surface of the earth to a height equal to the radius of the earth , that is ,taken from a distance R to 2R from the centre of the earth.What is the gain in its potential energy?
5. What will be the value of g at the bottom of sea 7 km deep?Diameter of the earth is 12800 km and g on the surface of the earth is 9.8 m/s^2 .
6. Two satellites are at different heights.Which would have greater velocity and Why?
7. How does the escape speed of a body from the earth depend on
   i) mass of the body
   ii) the location from where it is projected
   iii) the direction of projection
   iv) the height of the location from where the body is launched ?
8. Two satellites have their masses in the ratio of 3:1.The radii of their circular orbits are in the ratio of 1:4,What is the ratio of total mechanical energy of A and B ?
9. How much energy is required by a satellite to keep it in orbiting?Neglect air resistance.
10. The orbiting velocity of an earth satellite is 8 km/s. What will be the escape velocity?

WORK,ENERGY and POWER

1. An elevator can carry a maximum load of 1600kg (elevator + passengers) is moving up with a constant speed of 2m/s.The frictional force opposing the motion is 3320N .Determine the maximum power delivered by the motor to the elevator in watts and horsepower.
2. A bullet has a mass of 0.02kg and is moving with a speed of 10m/s.It can penetrate 10cm of a given target before coming to rest.If the same target were only 6 cm thick,what will be the speed and kinetic energy of the bullet , when it comes out ?
3. For what value of a, $\vec{A}$ = 2$\hat{\imath}$ + a$\hat{\jmath}$ + $\hat{k}$ is perpendicular to $\vec{B}$ = 4$\hat{\imath}$ - 2$\hat{\jmath}$ - 2$\hat{k}$?
4. State the Law of Conservation of energy.Show that the total mechanical energy of a body falling freely under the gravity.
5. How high must a body be lifted to gain an amount of potential energy equal to the kinetic energy it has,when moving at a speed 20m/s? (g = 9.8 m/s^2)
6. A ball dropped from rest at a height of 12 m.If it loses 25% of its kinetic energy on striking the ground,what is the height to which it bounces?How do you account for the loss in kinetic energy?

7. A man carrying a bucket of water walks on a horizontal road with uniform velocity.What is the workdone by him?

8. The momentum of body is doubled.By what percentage does its kinetic energy increases?

9. A vehicle of mass 30 quintals moving with a speed of 18 km/hr collides with another vehicle of mass 90 quintals moving with a spped of 14.4 km/hr in the opposite direction.What will be the velocity of each after the collision?

10. A light body and a heavy body have same momentum.Which is having more kinetic energy and why?

LAWS OF MOTION

1. The distance travelled by a moving body is directly proportional to time.Is any external force acting on it? Why.

2.A male astronaut 82 kg and a female astronaut 64 kg are floating side by side in space.
  i) Determine the acceleration of each astronaut if the woman pushes on man with a force of 16N.
  ii)How will your answer change if the man pushes with 16N(right) on woman instead?
  iii) How will your answer change if they both reach out and push on each others shoulders with a force of 16N?

3. The radius of curvature of a railway track at a place,where the train is moving at a speed of 72km/hr is 625m .The distance between the rails is 1.5m.Find the angle and the elevation of the out rail so that there may be no side pressure on the rails.(g=9.8m/s)

5. Carts with rubber tyres are easier to ply than those with iron types.Explain.

6. A body of mass 10kg is placed on an inclined plane of angle 30°.If the coefficient of ststic friction is $\frac{1}{\sqrt{3}}$ .Find the force required to just push the body up the inclined plane.

7. Derive an expression for acceleration of a body down a rough inclined plane.

8. Briefly explain static friction,limiting friction and kinetic friction.How do they vary with the applied force?

9. Forces of 16N and 12N are acting on a mass of 200kg in mutually perpendicular direction.Find the magnitude of acceleration produced.

10. For traffic moving at 60km/hr,if the radius of a curve is 0.1km,then what is the correct angl;e of banking of the road?(g = 10m/s^2)