Math:

1. The maximum vertical height of a projectile is 10 m. If the magnitude of the initial velocity is 28 m/s, what is the direction of the initial velocity? (g=9.8 m/s2 )
2. A person observes a bird on tree 39.6 m high and at a distance of 59.2m. With what velocity the person should shoot an arrow at an angle of 45° so that it may hit the bird?
3. How long will it take to reach the ground of a stone of mass 5kg thrown from the top of a building of 64m height?
4. An object moving at speed of 20ms-1 loses it speed by 3ms-2. How far does it travel before it stop?
5. A bullet after penetrating 3cm of a wall losses half of its speed. How far will the bullet penetrate the wall afterwards?
6. Prove that the time of flight T and the horizontal range R of a projectile are connected by the equation gT2 =2R tanθ, where θ is the angle of projection.
7. A block weighing 200N is pushed along a surface. If it takes 80N to get back the block to rest and 40N to keep the block moving at a constant velocity, what are the coefficients of static friction and kinetic friction?
8. How long would it take a force of 200N to reduce 1 1000 kg car’s momentum from 28000 kg-m/sec to 4000 kg-m/sec?
9. A riffle with a velocity of 1000ft/sec shoots a bullet at a small target 200 ft away. How high above the target must the gun aimed so that the bullet will hit the target?
10. Find the angle of projection at which the horizontal range and the maximum height of a projectile are equal.
11. A car of mass 1200kg is travelling along a straight horizontal road at a speed of 20m/sec. Friction brings the car to rest. If the coefficient of friction between the tires and road is 0.8. Calculate the deceleration and the distance travelled by the car before it comes to rest. (7.84/ 25.5m)
12. A thin metal ring of diameter 0.6 m and mass 1 kg starts from rest and rolls down an inclined plane. Its linear velocity is 5m/sec. Calculate the moment of inertia and kinetic energy of rotation.
13. A 1500 kg car is combined to another car of mass of 1000 kg by colliding with it at a velocity of 3 cm/sec. Find the velocity of the cars just after their collision.(1.8)
14. A railroadflatcar is located with crates having a coefficient of static friction 0.25 with the floor. If the train is moving at 30 miles/hr, in how short a distance can the train be stopped without letting the crates slide?(121)
15. A place kicker kicks a football with a velocity of 20.0 m/s and at an angle of 53degrees.(a) How long is the ball in the air?(b) How far away does it land?(c) How high does it travel?
16. A football kicked making an angle 300 with ground at the velocity 40ms-1. Find the magnitude of velocity of the football after 2s.
17. With what minimum velocity a man can throw a ball to a maximum range of 80m, and to what height does it reach in this condition?
18. A bomber is flying at a constant horizontal speed of 800 km/hr at an elevation of 1500 m from the ground. Find the sight angle to release the bomb to strike the target in the ground. (Ignore all types of friction and wind velocity).
19. An object is thrown at velocity 40m/s making an angle 600 with the horizontal plane. Find the maximum height and horizontal range.
20. A 40 kg box is taken from bottom to the top of an incline friction less plane of 12 m long and 8 m off the ground. Find the work done by a force parallel to the incline plane pushing up the box at constant speed.
21. A body of mass 5kg is moving towards north with a velocity of 4m/s. Another body of mass 3kg is moving towards south with a velocity 2m/s. at a particular time two bodies collided and became a single body. At what velocity and at which direction the combined body will move?
22. A book of mass 1kg is on a table If a force of 3N is applied tangentially along the plane of a table, the book tends to move. Calculate the coefficient of static friction between the table and book.
23. A box of mass 70 kg is pulled by a horizontal force of 500 N on the surface of the floor. When the box moves, the co-efficient of friction between the floor and the box is 0.50. Calculate the acceleration of the box.
24. The mass of metal sphere is 6g. it is rotated 4times per sec by fastening it at the end of a thread length 3m. What is its angular momentum?
25. A block weighing 8.0lb slides on a horizontal frictionless table with a speed of 4.0ft/sec. It is brought to rest in compressing a spring in its path. By how much is the spring compressed if it has the force constant 0.25lb/ft.
26. An inelastic collision occurs in one dimension, in which a 10 kg block traveling at 5 m/s collides with a 5 kg block traveling at 3 m/s in the same direction, and they stick together. What are the velocities of the blocks immediately after the collision?
27. A wheel weighing 5kg and radius of gyration about an axis is 0.2m. What is its moment of inertia? In order to produce angular acceleration of 2rad/s in the wheel. What magnitude of torque is to be applied?
28. A body of mass 6kg is at rest when a force of magnitude 30 N on the body. After 10s what will be kinetic energy?