

Delhi Public School, Jammu

Class 11th

Sub-Physics

Assignment (Half-Yearly Exams)

Section A (1 mark each)

- Q01. Why do we have different units for the same physical quantity?
- Q02. The average velocity of a particle is equal to its instantaneous velocity. Draw the position-time graph of its motion?
- Q03. A football is kicked into the air vertically upwards. What is its (a) acceleration, and (b) velocity at the highest point?
- Q04. A person driving a car suddenly applies the brakes on seeing a child on the road ahead. If he is not wearing seat belt, he falls forward and hits his head against the steering wheel. Why?
- Q05. A body is being raised to a height h from the surface of earth. What is the sign of work done by (a) applied force & (b) gravitational force ?

Section B (2Marks each)

- Q06. If the unit of force is 100 N, unit of length is 10 m and unit of time is 100 s, what is the unit of mass in this system of units??
- Q07. A man runs across the roof-top of a tall building and jumps horizontally with the hope of landing on the roof of the next building which is of a lower height than the first. If his speed is 9 m/s, the (horizontal) distance between the two buildings is 10 m and the height difference is 9 m, will he be able to land on the next building ? (take $g = 10 \text{ m/s}^2$)
- Q08. Show that in a closed loop, work done by the conservative forces is always zero.
- Q09. A block of mass M is held against a rough vertical wall by pressing it with a finger. If the coefficient of friction between the block and the wall is μ and the acceleration due to gravity is g , calculate the minimum force required to be applied by the finger to hold the block against the wall ?
- Q10. A boy travelling in an open car moving on a levelled road with constant speed tosses a ball vertically up in the air and catches it back. Sketch the motion of the ball as observed by a boy standing on the footpath. Give explanation to support your diagram.

Section C^(3 marks each)

- Q11. State Newton's Three laws of motion. Explain with examples.
- Q12. An engine is attached to a wagon through a shock absorber of length 1.5m. The system with a total mass of 50,000 kg is moving with a speed of 36 km h⁻¹ when the brakes are applied to bring it to rest. In the process of the system being brought to rest, the spring of the shock absorber gets compressed by 1.0 m. If 90% of energy of the wagon is lost due to friction, calculate the spring constant.
- Q13. What do you mean by resolution of vector. Resolve a vector in its components. Find its magnitude and hence represent it in co-ordinate form.
- Q14. Derive equations of motion.
- Q15. Show that Mechanical energy of a body falling from a given point to earth does not depend upon its position above ground and kinetic energy
- Q16. What do you mean by errors. Give its general type. If the cause of random errors is not known then how we can remove the random error.
- Q17. How we can define the work. Show that the work done in moving an object from one place to another place at same level of ground is zero.
- Q18. Prove that the center of mass also obeys Newton's 2nd law of motion.
- Q19. A rectangular board is measured with a scale having accuracy of 0.2cm. The length and breadth are measured as 35.4 cm and 18.4 cm respectively. Find the relative error and percentage error of the area calculated.
- Q20. What do you mean by impulse. Explain its 3 applications.
- Q21. State the law of conservation of linear momentum and derive it from Newton's second law of motion. Discuss one practical application of the law of conservation of momentum.
- Q22. Give the characteristics of Unit. Give the advantages of SI unit over other system of units.

Section D^(4 marks)

- Q23. Rajni was swinging on a swing in her society park. She wanted to increase the speed of the swing. She started pushing the ground backward harder with her feet, when her swing was at its lowest position during its oscillations. She enjoyed it but did not show the actual mechanism. Her elder brother Ajay told her the actual mechanism of gaining speed in a swing.
- What type of energy was possessed by Rajni while swinging on a swing? On what factors does it depend?
 - Why did the swing speed increase when Rajni pushed back the ground harder?
 - What conclusion do you draw about the characteristic quality of Rajni from the above?

Section E ^(5 marks each)

Q24. Find the velocities of bodies after they collide with each other in elastic collision. What will be the velocity of 1st body when it collides with 2nd body at rest which has mass very large than 1st body

OR

Prove that when two bodies stick with each other after the collision, then that collision is plastic collision in nature

Q25. Derive an expression for the Center of mass of two particle system.

OR

What do you mean by banking of road. Why it is done. Find the value of maximum velocity with which a vehicle can move on it without slipping.

Q26. Obtain the expression for trajectory, range, time of flight for oblique projectile.

OR

Show that Newton's third law is real law.

Differentiate between the accuracy and precision.