

DELHI PUBLIC SCHOOL JAMMU

ASSIGNMENT (2016-17)

CLASS XI

Sub: Physics

VERY SHORT ANSWER TYPE QUESTIONS (1 mark)

- Q1 Why do we say that velocity and acceleration of a body executing SHM?
- Q2 What is the pressure due to the water at the bottom of a 12m deep lake?
- Q3 Water rises in the capillary tube but mercury falls in the same tube. Why?
- Q4 Why does the small drop of liquid assume spherical shape?
- Q5 At what angle a stone should be thrown to achieve max height?

SHORT ANSWER TYPE QUESTIONS (2 marks)

- Q1 (a) What is the principle of superposition?
(b) Write down any two of the characteristics of standing waves.
- Q2 What is the value of acceleration due to gravity at a height of 3200 km above the surface of earth when its value at earth is 9.8m/s^2 ?
- Q3 Check the dimensional consistency of the following equation $v = \sqrt{Y/\rho}$
- Q4 A particle moves in a circle of radius 20cm at 120 revolutions per minute. Calculate the acceleration of the particle.
- Q5 (i) How torque and inertia are related to each other?
(ii) Give any one illustration of conservation of angular momentum.

SHORT ANSWER TYPE QUESTIONS (3 marks)

- Q1 (a) On what factor/factors the speed of a satellite depends?
(b) The escape velocity from earth for a piece of 1gm is 11.2 km/s. what would it be for a piece of 1000gm?
- Q2 Draw V-T graph for a body which accelerates uniformly from rest, then moves with uniform velocity and finally retarded uniformly?
Also draw acc- time graph for the above cases.
- Q3 State and explain reasons for the following:
 - (i) We prefer steel to copper in the manufacture of spring.
 - (ii) It is easier to spray water in which some soap is dissolved.
 - (iii) There is a danger of being pushed towards the train when a person stands on the edge of platform near the line when the train is passing by.
- Q4 What is the principle of hydraulic brakes? Explain its working with a suitable diagram.
- Q5 (i) A heat engine with 100% efficiency is only a theoretical possibility. Explain.

(ii) What are the limitations of first law of thermodynamics? How are these overcome in second law of thermodynamics?

- Q6 Assuming that the critical velocity v_c of a viscous fluid flowing through a tube depends upon its density ρ , radius r and the coefficient of viscosity η , derive a relation for the critical velocity by the method of dimensional analysis.
- Q7 What do you mean by degrees of freedom? Discuss the degrees of freedom of a monoatomic, a diatomic and a triatomic gas molecule.

OR

Calculate the root mean square speed of an air molecule at a temperature of 27°C . One mole of air has a mass of 29g. How does V_{rms} of air molecules compare to the speed of sound in air (340m/s)?

- Q8 A stone falls freely from rest and the total distance covered by it in last second of its motion equals the distance covered by it in the first 3s of its motion. How long the stone will remain in air?
- Q9 Show that the total mechanical energy of a body projected upwards is conserved.
- Q10 Two blocks of mass 1kg and 2kg are connected by an inextensible string which passes over a frictionless pulley. Calculate the acceleration of these blocks. Also draw free body diagrams for each block.
- Q11 A group of students went for a picnic to a nearby river bank. They spent the day enjoying scenery there and after lunch, they went for boating. Whole group hired boat for half an hour except one boy who was not well. They were enjoying the boating and reached the other side of the river. Suddenly Manoj from the group saw that his friend who was on the opposite side of the river became unconscious and fell on the ground. They had to reach to his friend as fast as they can. Manoj remembered that if they took their boat along the direction perpendicular to direction of river flow, they will cross the river in shortest time. This is what he followed and saved his friend.
- What values of Manoj helped him to save his friend?
 - Prove mathematically, the logic used by Manoj considering v_1 is velocity of boat and v_2 is the velocity of river.
 - When are the equations of relative velocity valid?

LONG ANSWER TYPE QUESTIONS (5 MARKS)

- Q1 What are standing waves? Discuss the various modes of vibration and formation of standing waves in a string fixed at both the ends.

OR

A wave travelling along a string is described by $y(x,t) = (0.005 \sin 80.0 x - 3.0 t)$ in which constants are in SI units. Calculate (a) amplitude (b) wavelength (c) period and frequency of wave at a distance $x = 30.0\text{cm}$ and time $t = 20\text{s}$.

- Q2 Define capillarity and angle of contact. Derive an expression for the ascent of a liquid in a capillary tube.

OR

State and prove Bernoulli's theorem and give its one practical application.

- Q3 Define centripetal acceleration. Derive an expression for centripetal acceleration of an object in uniform circular motion in a plane. What will be its direction at any instant?

OR

Discuss graphical method for the measurement of impulse in the following case:

- When constant force acts on the body
- When a variable force acts on the body