DELHI PUBLIC SCHOOL NEWTOWN
SESSION 2021-2022
HALF YEARLY EXAMINATION

CLASS IX **FULL MARKS: 50**

SUBJECT: PHYSICS (PAPER I) **TIME: 1 HOUR 30 MINS**

You will not be allowed to write during the first 10 minutes.
This time is to be spent in reading the question paper.
The time given at the head of this paper is the time allowed for writing the answers.
This paper consists of Section A and Section B.
Section A is compulsory. Attempt any four questions from Section B
The intended marks for questions or parts of questions are given in brackets [ ]
This paper consists of two printed pages

SECTION – A (10 Marks)

Question 1 **[2+2+2+2+2]**

a) **What is the usual weather prediction when there is a (i) gradual fall in barometric height and (ii) a sudden rise in the barometric height?**
b) **A body weighs 200 gf in air and 180 gf when completely immersed inside water. Find the volume of the body and the upthrust acting on it.**
[Density of water is $1gcm^{-3}$]
c) **Why is it that a boatman has to tie the boat to a pole on the shore while passengers are stepping out from it?**
d) **Two simple pendulums of effective length 1m and 4m are made to swing at a particular place. Which pendulum executes more oscillations in one minute? Justify your answer**
e) **Find the force of gravity and weight of a body of mass 10kg. ($g = 10\ m/s^2$).**

SECTION - B
(Answer any four questions)

Question 2 **[3+4+3=10]**

a) **The pitch of two screw gauge instruments are 0.01mm and 0.001mm respectively. Which screw gauge would you prefer and why? Mention one way of decreasing the least count of a screw gauge.**
b) **A pebble is dropped freely in a well from its top. It takes 20s to reach the water surface. Find the depth of the water surface and the time when the splash sound is heard after the pebble is dropped. (Speed of sound = 330m/s and $g=10m/s^2$)**
c) **Comment on the statement 'The sum of action and reaction forces on a body is zero'. Two spring balances joined at their free ends show same reading when pulled apart. Why is this so?**

Question 3 **[4+3+3=10]**

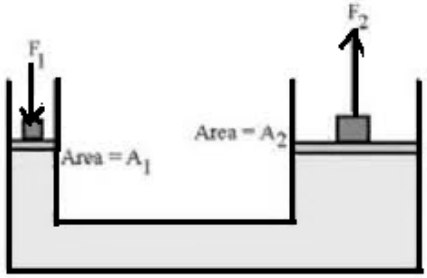
a) **A golfer hits a ball initially at rest, such that the contact between the ball and golf stick is for 0.1 s. If the golf ball covers a linear distance of 400 m in 2 s, find the magnitude of the force applied. The mass of the ball is 50g.**
b) **Prove the equation $v^2 = u^2 + 2as$ either graphically or by any alternative method.**
c) **Define acceleration due to gravity and hence find the relation between g and G.**

Question 4 **[3+3+4=10]**

a) **State two factors that don't affect time period of a pendulum. Two simple pendulums A and B have equal lengths, but their bobs weigh 50 gf and 75 gf respectively. What would be the ratio of their time periods?**
b) **A ball thrown vertically up reaches a maximum height 20m and returns to the ground. It does not rebound but comes to rest. Taking g = 10m/s^2, find the initial velocity of the ball and total time of journey of the ball.**
c) **Draw the (i) displacement – time (ii) velocity – time and (iii) acceleration – time graph for a freely falling body. How can you obtain g from the second graph?**

Question 5 **[3+4+3=10]**

a) **State any three laws of liquid pressure.**
b) **Deduce the mathematical proof that upthrust is equal to weight of displaced liquid. (Diagram to be drawn with necessary explanation).**
c) **In the following diagram A_1= 25 m^2 and A_2 = 100 m^2. How much force is required to be applied on the smaller piston to generate a force of 1500 N on the bigger piston? State the principle of hydraulic machines that you have used.**



Question 6 **[4+3+3=10]**

a) **State Archimedes' principle. A stone of density 3000 kgm^{-3} is completely submerged in brine solution of density 1500 kgm^{-3}. If the mass of the stone in air is 150 kg, calculate the force required to lift the stone. (Take g = 10m/s^2).**
b) **Write any three merits of an aneroid barometer.**
c) **Explain why water does not run out of a dropper unless rubber tube is pressed. Why is presence of vacuum needed in a simple barometer?**