DELHI PUBLIC SCHOOL NEWTOWN
SESSION:2020-2021
HALF-YEARLY EXAMINATION(ONLINE)

CLASS:IX **FULL MARKS:40**
SUBJECT:PHYSICS **TIME:1HR**

Instructions :

- **All questions are compulsory.**
- **This paper consists of two printed pages.**
- **All working including rough work must be clearly shown on the same sheet as the rest of the answers.**

Question 1

(a) State the condition for which the time period of a simple pendulum does not depend on extent of swing on either side. What is the numerical value of the frequency of oscillation of a second's pendulum?

(b) A train starts from rest and maintain uniform acceleration at the rate of $4m/s^2$ for 20s. It then maintains uniform speed for 240s. The train is uniformly retarded by applying brakes to stop it in 48s. Find (i) the maximum velocity reached, (ii) the retardation in the last 48s, and (iii) the total distance travelled.

(c) Write three characteristic properties of upthrust.

[3+4+3]

Question 2

(a) The motion of a freely falling body is an accelerated motion. State two factors on which the acceleration of a freely falling body does not depend.

(b) A stone is projected vertically upwards from the top of a tower 24.5m high with an initial velocity 19.6m/s. Taking g as $9.8m/s^2$, calculate the total height to which it rises before returning to the ground and the velocity with which it reaches the ground .

(c) Which is the usual procedure to be followed while taking out oil from a sealed oil can?

(d) Why does a thin sheet (lamina) gradually sink as it gets immersed in a liquid ?

[2+3+3+2]

Question 3

(a) State Archimedes' principle. A body of volume 100 cm^3 weighs 4kgf in air. Find its weight when completely inside a liquid of density $1600kg/m^3$ and the buoyant force exerted by the liquid. (express all your answers in kgf).

(b) Under what condition does Newton's second law of motion takes the form F=ma? How can one arrive at the first law from this relation?

(c) A horizontal spring has two identical wooden blocks fixed at its two ends. How are the restoring forces directed as (i) the spring gets compressed and (ii) when the spring gets stretched? Represent your answer by labelled diagrams.

[4+3+3]

Question 4

(a) Bring out the mathematical proof of the statement "Upthrust is equal to the weight of displaced fluid."

(b) Write the numerical value of Universal Gravitational constant. What is the only demerit of this constant?

(c) What is the effect produced on the swing as one stands up on it? Justify your answer.

(d) A mercury barometer initially reads 75cm. Due to a sudden error, 4cm^3 of air enter the tube making the reading as 63cm.The length of air column measured is 12cm. What is the cross-sectional area of the barometric tube?

[3+2+2+3]