



PON VIDYASHRAM GROUP OF CBSE SCHOOLS  
VACATION HOME TEST (2017-2018)

STD XI

PHYSICS

Total : 50 marks

1. Draw position-time graphs for two objects having zero relative velocity. 1
2. Is elastic limit a property of the material of the wire? 1
3. A man weighing 50 kg f supports a body of 25 kg f on his head. What is the work done when he moves a distance of 20 m up an incline of 1 in 10? Take  $g = 10 \text{ ms}^{-2}$ . 2
4. Define the term strain. Why it has not unit and dimensions. Mention different types of strain. 2
5. Find the terminal velocity of a steel ball 2 mm in diameter falling through glycerine. Relative velocity of steel = 8, relative density of glycerine = 1.3 and viscosity of glycerine = 8.3 poise. 3
6. Show that a pressure difference exists between the two sides of a curved liquid surface. 3
7. Prove the work-energy theorem for a variable force. 3
8. Define centripetal acceleration. Derive an expression for the centripetal of a particle moving with uniform speed  $v$  along a circular path of radius  $r$ . Discuss the direction of this acceleration. 3
9. Compare the weights of a body when it is (i) 100 km above the surface of the earth and (ii) 100 km below the surface of the earth. Radius of the earth is 6300 km. 3
10. Derive an expression for the excess pressure inside a soap bubble. 3
11. Define modulus of rigidity. Give its unit and dimensions. 3

12. Derive equation of continuity. 3
13. Define the term angle of contact. On what factor it depend? 3
14. What increase in pressure will be needed to decrease the volume of  $1.0 \text{ m}^3$  of water by  $10 \text{ c.c.}$ ? The bulk modulus of water is  $0.21 \times 10^{10} \text{ Nm}^{-2}$ . 3
15. Savita was surprised to see oil spreading on to the surface of water and asked her mother to explain why oil spreads on to the surface of water. Her mother explained her daughter the reason behind it. By going through the explanation she thought of learning more about the other scientific phenomenon also. What qualities do you can find in Savita? 4
- Oil spreads over the surface of water whereas water does not spread over the surface of oil. Why?
16. State and prove Bernoulli's principle for the flow of non-viscous fluids. Give its limitations. 5
- (or)**
- i. Define surface energy. Prove that it is numerically equal to the surface tension.
- ii. A wire ring of  $3 \text{ cm}$  radius is rested on the surface of a liquid and then raised. The pull required is  $3.03 \text{ g}$  more before the film breaks than it is afterwards. Find the surface tension of the liquid.
17. Define orbital velocity of a satellite. Derive expressions for the orbital velocity of a satellite. 5
- ii. A satellite revolves in an orbit close to the surface of a planet of mean density  $5.51 \times 10^3 \text{ kgm}^{-3}$ . Calculate the time period of the satellite.
- (or)**

What is meant by gravitational potential energy of a body? What is the zero level of potential energy?

Derive an expression for the gravitational potential energy of a body of  $m$  located at distance  $r$  from the centre of the earth.

\*\*\*\*\*