



**INDIAN SCHOOL SOHAR**  
**UNIT TEST- 2015**  
**PHYSICS – THEORY**

**CLASS: XI**  
**DATE: 17/05/2015**

**MARKS: 50**  
**TIME: 2Hrs**

General Instructions

1. *All questions are compulsory.*
2. *There are 18 questions in all .Questions 1 to 3 carry one mark each, questions 4 to 7 carry two marks each, questions 8 to 15 carry three marks each and questions 16 and 18 carry five marks each.*
3. *There is no overall choice. However, internal choice has been provided in one question of two marks, one question of three marks and one question of five marks each. You have to attempt only one of the given choices in such questions*
4. *Use of calculator is not permitted.*

1. Define a parsec and write its value in meters. (1)
2. Mention the domains of physics with the help of examples. (1)
3. Draw position time graph of a body with zero acceleration. Justify the graph. (1)
4. Name the principle related to the following technologies:  
 (a) Lasers (b) Electric generator (c) Steam engine (d) Radio and television (2)
5. How does the position-time graph for motion of a body give a geometrical way of calculating the instantaneous velocity and direction at a given time  $t$ ? (2)
6. Derive the dimensional formula of coefficient of viscosity and power.

**OR**

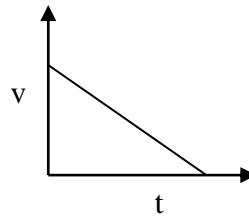
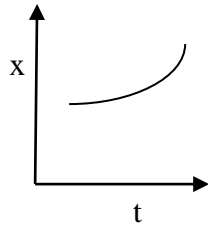
- Derive the dimensional formula of impulse and momentum. (2)
7. The displacement of a particle at any instant is given by  $x = 8t^2 - 3t^3$  .Calculate the  
 (i) The velocity of the particle at  $t=0s$  and  $t=3s$ . (ii) the average velocity between  $t=3s$  and  $t=6s$ . (2)
  8. The velocity  $v$  of a particle at a time  $t$  is given by  $v = at + \frac{b}{t+c}$  where  $a, b, c$  are constants. Find the dimensions of  $a, b, c$ . (3)
  9. Briefly explain how will you estimate the molar diameter of oleic acid. Hence derive its mathematical formula. (3)
  10. (a) Mention any two rules for combination of errors with the mathematical formula.  
 (b)The length ,breadth and thickness of a block of metal were measured with the help of vernier callipers. The measurements are:  $l = (5.250 \pm 0.001)$  cm,  $b = (3.450 \pm 0.001)$ cm  $t = (1.740 \pm 0.001)$  cm. Find the percentage error in volume of the block.(3)

11. What are systematic errors. Mention the sources and causes of such errors. How can you minimize them.

**OR**

What are random errors. Mention the sources and causes of each error. How can you minimize these errors. (3)

12. (a) Define solid angle with the help of diagram. Mention its formula and units.  
 (b) The parallax of a heavenly body measured from two points diametrically opposite on the earth's equator is 60 second. If the radius of the earth is  $6.4 \times 10^6$  m, determine the distance of the heavenly body from the centre of earth. (3)
13. Define absolute error, mean absolute error, relative error. Also write their mathematical expression. (3)
14. Identify the motion of the body in the following graphs. Justify the graph with suitable examples.



15. Check the accuracy of the relation  $v = \frac{1}{2l} \frac{F}{m}$  where  $m$  is the mass per unit length,  $F$  force,  $l$  the length and  $v$  the frequency of the vibrating string. (3)

16.(a) The velocity  $v$  of water waves depends upon their wavelength  $\lambda$ , the density of water  $\rho$  and the acceleration due to gravity  $g$ . Find the relation between these objects by the method of dimensions.

(b) Define plane angle with the help of diagram. Mention its formula and unit.

**OR**

16.(a) In the gas equation  $(P + \frac{a}{V^2})(V-b) = RT$ , where  $T$  is absolute temperature,  $P$  the pressure,  $V$  the volume. What are the dimensions of the constants  $a$  and  $b$ ? (5)

(b) What is parallax. How can this method be used to find the distance between far away objects.

17.(a) Define instantaneous acceleration and average acceleration with correct mathematical formula. (b) Two resistances  $(6 \pm 0.2)$  ohm and  $(8 \pm 0.6)$  ohm are connected in parallel. Find (i) total resistance of the combination (ii) maximum percentage error. (5)

18.(a) Define instantaneous velocity and average velocity with its mathematical formula.

(b) Explain the four fundamental forces available in nature. Write them in increasing order of their strength. (5)