

# Periodic Test –I, 2017-2018

## Class-XI

### Subject: Physics

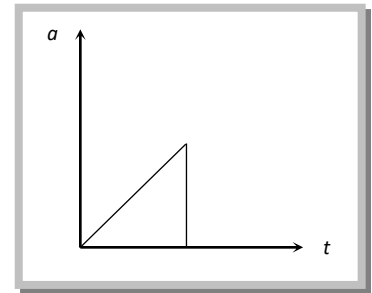
Time: 90 Min.

MM: 50

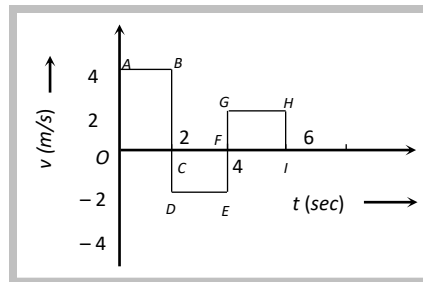
**Note:** All questions are compulsory. Q.N. 1 to 4 carry 1 marks, 5 to 9 carry 2 marks, 10 to 16 carry 3 marks and 17 to 19 carry 5 marks each.

Use of calculators is not permitted.

1. Name the physical quantities whose dimensional formula is  $[ML^2T^{-3}]$ .
2. Write expanded form of LASER & it's one use.
3. Name the field particle and range of electromagnetic force.
4. Define unit of length parsec and express it in metre?
5. The acceleration-time graph of a body is shown below, Draw velocity-time graph for the same motion.



6. A new system of units is proposed in which unit of mass is  $\alpha$  kg, unit of length is  $\beta$  m and the unit of time is  $\gamma$  s. How much will the 52 J measure in this new unit system?
7. The velocity time graph of a body moving in a straight line is shown in the figure. Find the displacement and distance travelled by the body in 6 sec ?



8. The mass of a box measured by a grocer's balance is 2.300 kg .Two gold pieces of masses 20.15 g and 20.173 g are added to the box. What is (a) the total mass of the box, (b) the difference in the masses of the pieces to correct significant figures?
9. Frequency  $\nu$  of vibration of stretched string depends upon the length  $l$  of the string, mass per unit length  $m$  and the tension  $T$  in the string. Obtain dimensionally an expression for the frequency  $\nu$  of vibration of stretched string.
10. Derive an expression for centripetal acceleration for uniform circular motion.
11. An object is thrown at an angle  $60^\circ$  from horizontal with initial velocity 20 m/s. Calculate Maximum height and horizontal range.

12. A physical quantity  $P$  is related to four observables  $a$ ,  $b$ ,  $c$  and  $d$  as  $P = \frac{a^3 b^2}{\sqrt{cd}}$ . The percentage errors in  $a$ ,  $b$ ,  $c$  and  $d$  are 1%, 3%, 4% and 2% respectively. What is the percentage in calculating quantity  $P$ ?
13. Find the magnitude of angular velocity and centripetal acceleration of a particle on the tip of a fan blade of length 30 cm rotating at 1200 rpm (rotation per minute).
14. A particle starts from origin at  $t=0$  with a velocity  $5.0\mathbf{i}$   $\text{ms}^{-1}$  and moves in  $x$ - $y$  plane with a constant acceleration of  $\{3.0\mathbf{i}+2.0\mathbf{j}\}$   $\text{ms}^{-2}$ . What is the  $y$ -coordinate of the particle at the instant its  $x$ -coordinate is 84m? What is the speed of the particle at this instant?
15. Two bodies are thrown with the same initial velocity  $u$  making angles  $\alpha$  and  $(90-\alpha)$  with the horizontal. What will be the ratio of (a) maximum heights attained by them and (b) their horizontal ranges?
16. Two parallel rail tracks run north-south. Train A moves north with a speed of 54  $\text{km h}^{-1}$ , and train B moves south with a speed of 90  $\text{km h}^{-1}$ . What is the (a) velocity of B with respect to A? (b) velocity of ground with respect to B? (c) velocity of a monkey running on the roof of the train A against its motion (with a velocity of 18  $\text{km h}^{-1}$  with respect to the train A) as observed by a man standing on the ground?
17. Using calculus derive first three equations of motion for uniformly accelerated rectilinear motion.
18. What is a projectile? Derive an expression for (a) trajectory (b) maximum height (c) horizontal range of a projectile projected with initial velocity  $u$  making an angle  $\theta$  with respect to the horizontal.
19. Using parallelogram law of vector addition, obtain the expression for the magnitude and direction of the resultant of two vectors  $\mathbf{P}$  and  $\mathbf{Q}$  inclined at an angle  $\theta$  ( $\theta < 90^\circ$ ). On a rainy day, rain was falling vertically with a speed of 35  $\text{ms}^{-1}$ . A wind starts blowing after some time with a speed of 12  $\text{ms}^{-1}$  in East to West direction. In which direction should a boy waiting at a bus stop hold his umbrella?