

Periodic Test –I

Class-XI

Subject: Physics

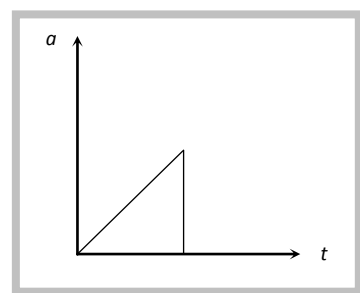
Time: 90 Min.

MM: 50

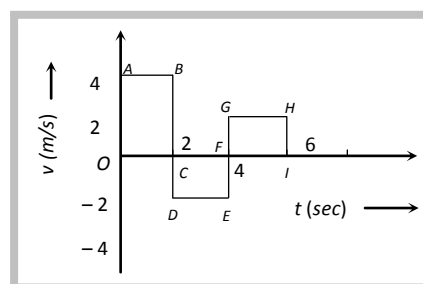
Note: All questions are compulsory. Q.N. **1 to 4** carry **1** marks, **5 to 9** carry **2** marks, **10 to 16** carry **3** marks and **17 to 19** carry **5** marks each.

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 α kg, unit of length is β m and the unit of time is γ 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 ν 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 ν 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° 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 $5.0\hat{i} \text{ ms}^{-1}$ and moves in x - y plane with a constant acceleration of $\{3.0\hat{i}+2.0\hat{j}\} \text{ ms}^{-2}$. What is the y -coordinates 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 α 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 km h^{-1} , and train B moves south with a speed of 90 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 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 θ 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 θ ($\theta < 90^\circ$). On a rainy day, rain was falling vertically with a speed of 35 ms^{-1} . A wind starts blowing after some time with a speed of 12 ms^{-1} in East to West direction. In which direction should a boy waiting at a bus stop hold his umbrella?