P H Y S I C S

**(DAILY PRACTICE PAPER)**   **[CLASS -11]**

CLASS – XI

1. Which of the following physical quantity has the dimension of $[ML^2T^{-2}]$
   (a) Force
   (b) Power
   (c) Energy
   (d) Linear momentum

2. If the unit of force and length are doubled then the unit of energy will be
   (a) ½ times
   (b) 4 times
   (c) 2 times
   (d) ½ times

3. The figure shows a v-t graph of a particle moving along a straight line. At which of the following time the particle is not at rest?
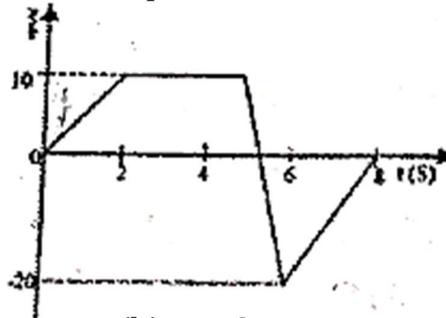
   (a) t = 0 sec
   (b) t = 8 sec
   (c) t = 5 sec
   (d) none of these

4. A ball is thrown vertically upward. Ignoring the air resistance, which one of the following plots represents the velocity-time plot for the period ball remains in air?
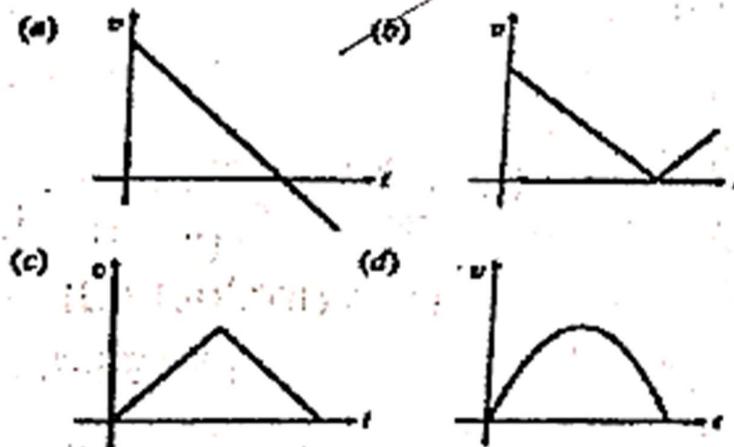
5. A ball is projected from the top of a tower at an angle of 60° with the vertical What happens to the vertical component of its velocity?
   (a) Increases continuously
   (b) Decreases continuously
   (c) Remains unchanged
   (d) First decreases and then increases.

6. **Assertion (A)** - A body can be at rest instantaneously and still have acceleration.

   Reason (R) - If a body moves with constant velocity, it's speed must be constant..

7. **Assertion (A)** - The range of projectile depends on the magnitude of velocity with which it is thrown.

   Reason (R) - The range of projectile depends on the angle of projection.

CASE STUDY- In physics, we can classify quantities as scalars or vectors. Basically, the difference is that a direction is associated with a vector but not with a scalar. A scalar quantity is a quantity with magnitude only. It is specified completely by a single number, along with the proper unit. Examples are: the distance between two points, mass of an object, the temperature of a body and the time at which a certain event happened. The rules for combining scalars are the rules of ordinary algebra. Scalars can be added, subtracted, multiplied and divided just as the ordinary numbers. A vector quantity is a quantity that has both a magnitude and adirection and obeys the triangle law of addition or equivalently the parallelogram law of addition. So, a vector is specified by giving its magnitude by a number and its direction. Some physical quantities that are represented by vectors are displacement, velocity, acceleration and force.

Answer the following multiple choice questions 8 and 9-

8. Force is example of
    (a) Scaler   (b) Vector
    (c) Tensor   (d) None of these

9. If two forces equal to 7N and 9N, inclined at an angle of 60° act simultaneously upon a particle. The magnitude of the resultant is
    (a) 12.9 N   (b) 13.9 N
    (c) 14.9 N   (d) 15.9 N

10. A force is inclined at 60° to the horizontal. If the horizontal component of the force be 40 N. Calculate the vertical component.

11. The motion of a particle along a straight line is described by the equation $x = 6 + 4t^2$ where x is in metres (m) and t is positive time in seconds. Find the acceleration at t=2 second?

12. Find the angle between two vectors if resultant of both is $\sqrt{3}$ times of either.

13. a=2î-j+2 k   and   b=-i+j+3k.
    Find the dot product and cross product of the given vectors.

14. Galileo's law of odd numbers: " The distances traversed during equal intervals of time, by a body falling from rest, stand to one another in the same ratio as the odd numbers beginning with unity (namely 1:3:5:7.........)." Prove it.

15. What is the dimension of:
    (a) time in acceleration due to gravity.
    (b) length in weight.

<center>OR</center>

    Write the dimensional formulae of:
    (a) Frequency
    (b) Mass per unit length

16. Find the dimensions of a x b in the relation:
    $$P = b - x^2/at$$
    where P is Power, x is time and t is time.

17. A stone is dropped from the top of a tower. One second later another stone is thrown downwards with a velocity of 20 m/s. How far below the top will the second stone overtake the first?

18. A body is in uniformly accelerated motion. The body later on slows down. Show the above statement graphically, when
    (a) Both v and a are positive.
    (b) $v = -ve$ and $a = +ve$
    (c) Both v and a are negative.

19. State the law of parallelogram of vector addition. Find an expression for the magnitude of the resultant vector R of two non-zero vectors A and B acting at angle θ.

20. The frequency 'v' of vibration of a stretched string depends upon:
    (a) it's length 'I'
    (b) it's mass per unit length 'm' and
    (c) the tension T in the string
    Obtain dimensionally an expression for frequency 'v'.

21. Derive second equation of motion with graphical method.
    Which physical quantity is obtained?
    (a) Slope of velocity time graph.
    (b) Area under the velocity time graph.

22. A projectile of mass m is fired with velocity u making angle of projection θ with the horizontal. Show that its trajectory is a parabolic. Also find the:
    (a) Time of flight
    (b) The horizontal range
    (a) The maximum height

<center>OR</center>

What is centripetal acceleration? Derive expression for the centripetal acceleration and hence for centripetal force of a body moving in uniform circular motion with velocity 'v' and radius 'r'. Also obtain the relation between linear and angular velocity.

In a uniform circular motion, which physical quantities:
   (a) remain constant
   (b) vary with position

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