

NEW STANDARD ACADEMY

Marks: 60

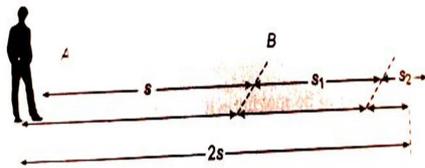
Date : 19-05-25

CLASS : 11TH JEE

Time: 3 hours.

PHYSICS

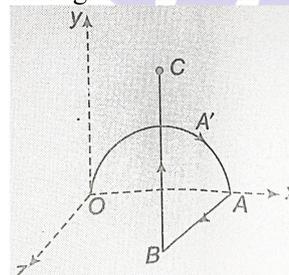
1. A train travels from A city to B city with constant speed of 10 ms^{-1} and returns to the A city at the speed of 20 ms^{-1} . Calculate the average speed during its entire journey.
2. A man traversed half the distance with a velocity V_0 . The remaining part of the distance was covered with velocity V_1 for half the time, and with velocity V_2 for the other half of the time. Find the average speed of the man average over the whole time of motion.



3. An electron starting from rest has a velocity that increases linearly with the time that is $v = kt$, where $k = 2 \text{ m/sec}^2$. Find the distance travelled in the first 3 seconds.
4. A railway track runs parallel to a road until a turn brings the road to railway crossing. A cyclist rides along the road every day at a constant speed 20 km/hr . He normally meets a train that travels in same direction at the crossing. One day he was late by 25 minutes and met the train 10 km before the railway crossing. Find the speed of the train.
5. A bullet moving with a velocity of 200 cm/s penetrates a wooden block and comes to rest after traversing 4 cm inside it. What

velocity is needed for travelling distance of 9 cm in same block?

6. The displacement – time graph for two particles A and b are straight lines inclined at angles of 30° and 60° with the time axis .The ratio of velocities of $V_A:V_B$ is?
7. A particle moves in a semicircular path of radius R from O to A . Then it moves parallel to z -axis covering a distance R up to B . Finally it moves along BC parallel to y -axis through a distance $2R$. Find the ratio of D/s .



8. A particle starts from rest from origin and is moving in xy - plane whose velocity is $v = by\hat{i} + v_0\hat{j}$. Find the trajectory of particle.
9. A particle starts from rest with a constant acceleration $a = 1 \text{ m/s}^2$. If the particle were initially moving with a velocity of 5 m/s , then find the distance travelled in the third second.
10. The displacement of the particle varies with time according to the relation $x = \frac{k}{b} [1 - e^{-bt}]$ Then the velocity of the particle is ?

CHEMISTRY

1. Why the term average atomic mass is used?
2. When does the law of constant proportions fail?
3. Which is more concentrated $1 \text{ M H}_2\text{SO}_4$ or $1 \text{ N H}_2\text{SO}_4$?
4. If density of water is 1 g/mL , then calculate its density in S.I. units.
5. What is meant by one gram atom of iron?
6. What is the mass of one mole electron , one mole proton and one mole neutron?
7. Give one example of each of the following:
(i) isotope of ${}_1\text{H}^1$ and ${}_8\text{H}^{16}$
(ii) isobar of ${}_{20}\text{Ca}^{40}$
(iii) isotone of ${}_{15}\text{P}^{31}$

8. What are isoelectronic species ? Give the examples.
9. What is the mole fraction of the solute in 2.5 m aqueous solution?
10. In an organic compound, C = 40%, H = 6.6 % and O=53.4% .If the V.D of the organic compound is 30 what is its molecular formula?

MATH

1. If the ordered pairs (a,-1) and (5,b) belong to $\{(x,y):y = 2x-3\}$ find the values of a and b.
2. If $A \times B = \{(x,1)(y,2),(x,3)(y,3)(y,1)(x,2)\}$, then find $B \times A$.
3. If $A = \{a,b,c\}$ and some elements of $A \times B$ are $(a,p)(b,q)(c,p)$ write the set B and find the remaining ordered pairs of $A \times B$ such that $n(A \times B) = 6$.
4. If $R = \{(x,y):x,y \in \mathbb{W}, x^2+y^2=100\}$ then find the domain and the range of R. Also write R in roster form.
5. Express the following function as a set of ordered pairs and find its range:
 $f: X \rightarrow R$ defined by $f(x) = x^3 + 1$, where $X = \{-1, 0, 3, 9, 7\}$
6. If a function f from R to R is defined by $f = \{(x, 3x-5): x \in R\}$ find the values of a and b given that $(a, 4)$ and $(1, b)$ belong to f .
7. Find the domain the functions
(i) $f(x) = \frac{x^2+2x+1}{x^2-8x+12}$ (ii) $f(x) = \frac{3}{2-x^2}$
(iii) $y = \sqrt{x-4} + \sqrt{6-x}$
8. If the domain of the function $F(x) = \log_7(1 - \log_4(x^2 - 9x + 18))$ is $(\alpha, \beta) \cup (\gamma, \delta)$, then $\alpha + \beta + \gamma + \delta$ is equal to
9. Let the domain of the function $f(x) = \cos^{-1}\left(\frac{4x+5}{3x-7}\right)$ be $[\alpha, \beta]$ and the domain of $g(x) = \log_2(2 - 6\log_7(2x+5))$ be (γ, δ) . Then $|7(\alpha + \beta) + 4(\gamma + \delta)|$ is equal to ____
10. If the domain of the function $f(x) = \log_e(4x^2 + 11x + 6) + \sin^{-1}(4x+3) + \cos^{-1}\left(\frac{10x+6}{3}\right)$ is $(\alpha, \beta]$, then $36|\alpha + \beta|$ is equal to: