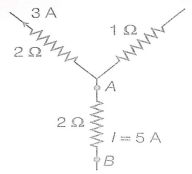
NEW STANDARD ACADEMY

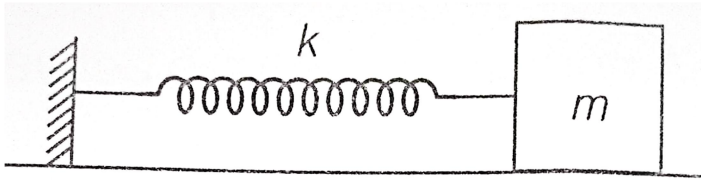
Semri Kothi Super Market, Raebareli
CLASS 12 (Academy) 19-05-2025

PHYSICS

1. In the junction shown below, consider an electron moving with a drift velocity of Va = 1.3×10^{-4} m/s approaching the juction from B to A.



   If momentum of electron considered is p = 1.18×10^{-34} kg-m/s (at B) and its momentum at A is Np, then find N.
2. A positive ion with a kinetic energy of 5.4×10^{-17} J is accelerated through a potential difference of 5 V. It is found that its final kinetic energy is 8.6×10^{-17} J. If ion has 10 N electrons less than protons on it, then find the value of N.
3. A mass m is connected to a very light (hypothetical) spring having spring constant k$\left(\frac{No}{m}\right)$ as shown in below figure.



   One end of spring is connected to a rigid support. An electric field pointing towards right hand side with magnitude of $k\left(\frac{V}{m}\right)$ ***exists in the region. When block is given some charge, spring is found to that spring extends by 8 Fm, number of electrons removed from block is*** $N \times 10^4$***, then find N.***
   In a hydrogen discharge tube, the number of hydrogen ions (protons) drifting across a cross-section per second is 1.0×10^{18} ***while the number of electrons drifting in the opposite direction across another cross-section is*** 2.7×10^{18}***.***
4. Find the current flowing in the tube.
5. If the voltage applied across the tube is 230 V, then find the effective resistance of the tube.

CHEMISTRY

1. How are average and instantaneous rate expressed mathematically ? How is instantaneous rate determined from the curve drawn between concentration against time?
2. Temperature of a reaction is increased by 10 K. Generally, how many folds does the rate constant increase?
3. For a reaction, rate = k$[A]^1$ $[B]^{1.5}[C]^0$. What is the overall order of reaction?
4. Write the unit of rate constant k for a zero, first and second order reaction?
5. Rate = k$[NO_3^-]$ $[I^-]$ $[H^+]^2$. What would be the effect on rate if the concentration of $[NO_3^-]$ and $[I^-]$ is made half and that of $[H^+]$ is doubled?

BIOLOGY

1. Which mendels law of enheritance is universally acceptable and without any exception? State the law.
2. How are alleles of a particular gene different? Explain the significance.
3. In a typical monohybrid cross the F_2 papulation radio is written as 3 : 1 for phenotype but expressed as 1: 2 : 1 for genotype explain with the help of an example.
4. Work out a cross to find the genotype of tall pea plant. Name the type of cross
5. What are the characteristic features of a tree breeding line?
6. What is birthday of mend
7. What is tilile name of mendal Experian paper.
8. What is scientific name of pea plant which is selected by mendal
9. How many type of gametes are possible from a diploid organism having genotype A ass cc?
10. What is full form in F_1 generatic.

MATH

1. Show that $f(x) = \begin{cases} \frac{|x-a|}{x-a} & x \neq a \\ 1, & x = a \end{cases}$ is discontinuous at x = a
2. Examine $f(x) = \begin{cases} \frac{\sin x}{x} & if\ x < 0 \\ x + 1 & if\ x \geq 0 \end{cases}$ $for\ continuity\ at\ x = 0.$
3. If f(x) $\begin{cases} \frac{cos^2x - sin^2x - 1}{\sqrt{x^2+1}-1}, & x \neq 0 \\ k & x = 0 \end{cases}$ is continuous at x=0, find the value of k.
4. Find the value of p and q, for which f(x) $\begin{cases} \frac{1-sin^3x}{3cos^2x}, & x < \frac{\pi}{2} \\ p, & x = \frac{\pi}{2} \\ \frac{q(1-sinx)}{(\pi-2x)^2}, & x > \frac{\pi}{2} \end{cases}$
5. Discuss the continuity of the function f defined by $f(x) = |x-1|+|x-2|$ *at x=1 and x=2.*
6. Is the function *f* defined by $f(x) = \tan x$ continuous at $x = \frac{\pi}{2}$?
7. If f(x) = $\begin{cases} kx^2 + 5 & x \leq 1 \\ 2 & x > 1 \end{cases}$ find k so that *f* may be continuous at x=1.
8. Is the function *f* defined by $f(x) = x - |x|$ continuity at x=0?
9. Examine the functions for continuity:
   F(x) $\begin{cases} \frac{x}{|x|}, & x \neq 0 \\ 0 & x = 0 \end{cases}$ at x=0
10. Examine the functions f(x) = $\begin{cases} x\ sin\frac{1}{x}, & x \neq 0 \\ 0 & x = 0 \end{cases}$ for continuity at x = 0.