

NEW STANDARD ACADEMY

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PHYSICS

- How a dielectric increases the maximum operating voltage without changing the physical size of a capacitor?
- Why water molecule is permanently polarised? What type of molecules has no permanent polarisation?
- If a dielectric filled in a capacitor's plates is heated, how will its capacitance change?
- A parallel plate capacitor of plate area 40 cm^2 and plate separation 1 mm is charged using a 12 V battery.
 - If plate separation is made 2 mm while the battery remains connected, find the work done by the external source.
 - Find the charge transferred to battery in above process.
- A parallel plate capacitor with circular plates of 8.2 cm radii and 1.3 mm separation is connected to a 120 V DC supply.
 - Find the capacitance of a capacitor.
 - When capacitor is fully charged, what value of charge appears on each plate? If capacitor is disconnected from the battery and its plates are moved apart so that plate separation is doubled.
 - What will be the new value of potential difference between plates?

CHEMISTRY

- On electrolysis of CuSO_4 solution using Pt electrodes blue colour disappears. If Copper electrodes are used, Blue colour does not disappear.
- What are the products obtained when dil. NaNO_3 solution is electrolysed?
- Which will allow greater conduction of electricity and why?
 - Copper wire at 25°C or at 50°C ,
 - MgCl_2 Solution at 25°C or at 50°C
- What is the decreasing order of equivalent conductivity of aqueous solutions and Why?
 - NaCl , HCl , and CH_3COOH
 - LiCl , NaCl , KCl
- What is the relation between molar conductivity and equivalent conductivity of:
 - NaCl Solution
 - BaCl_2 Solution

BIOLOGY

- Gregor Mendel, conducted hybridisation experiments on garden pea during which year.
- Why Mendel successful in his experiment of garden pea?
- What is main steps of artificial hybridization.

- What is the cross known as when the progeny of F_1 and a homozygous recessive plant is crossed? state the advantage.
- What are the criteria for selecting organisms to perform crosses to study the inheritance of a few traits.
- Test cross is back cross? Explain it
- How are the alleles of a gene different from each other? what is its importance?
- What is incomplete dominance give the example?
- What is codominance give the example?
- Give the difference between codominance and incomplete dominance?

MATH

- Examine the functions for continuity:

$$f(x) = \begin{cases} \frac{x^2-4}{x-2}, & x \neq 2 \\ 4, & x = 2 \end{cases} \text{ at } x = 2$$

- Prove that the function $f(x) = x^n$ is continuous at $x = c$ (any real number), where n is a positive integer.
- If the function f defined by $f(x) = \begin{cases} \frac{2^{x+2}-16}{4^{x-16}}, & x \neq 2 \\ k, & x = 2 \end{cases}$ is continuous at $x = 2$ then find the value of k .
- Show that the function $f(x) = 2x - |x|$ is continuous at $x = 0$.
- Show that $f(x) = \begin{cases} \frac{|x-a|}{x-a}, & x \neq a \\ 1, & x = a \end{cases}$ is discontinuous at $x = a$.
- Let $f(x) = \begin{cases} \frac{\sin x}{x} + \cos x, & \text{when } x \neq 0 \\ 2, & \text{when } x = 0 \end{cases}$ Show that f is continuous at $x = 0$.
- Examine $f(x) = \begin{cases} \frac{\sin x}{x}, & \text{if } x < 0 \\ x + 1, & \text{if } x \geq 0 \end{cases}$ for continuity at $x = 0$
- Find the values of a so that the function f defined by $f(x) = \begin{cases} \frac{1-\cos ax}{x^2}, & x \neq 0 \\ 8, & x = 0 \end{cases}$ may be continuous at $x = 0$.
- For what value of k is the following function continuous at $x = -\frac{\pi}{6}$?
$$f(x) = \begin{cases} \frac{\sqrt{3} \sin x + \cos x}{x + \frac{\pi}{6}}, & x \neq -\frac{\pi}{6} \\ k, & x = -\frac{\pi}{6} \end{cases}$$
- Let f' be the function defined by $f(x) = \frac{2x}{\sqrt{a+x} - \sqrt{a-x}}, x \neq 0$.

What choice, If any of $f(0)$ will make it continuous at $x = 0$?