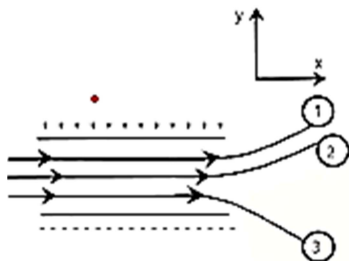


NEW STANDARD ACADEMY

Semri Kothi Super Market, Raebareli
CLASS 12 DPP (Academy) 07-07-2025

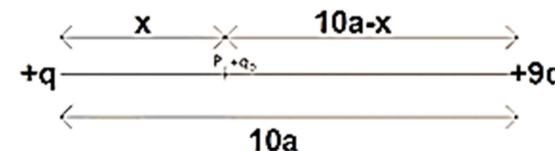
PHYSICS

- Why can one ignore the quantization of electric charge when dealing with macroscopic i.e., large scale charge?
- An electric field line is a continuous curve. That is, a field line cannot have sudden breaks. Why not?
- Explain why two field lines never cross each other at any point?
- An electric dipole with dipole moment $4 \times 10^{-9} \text{ Cm}$ is aligned at 30° with direction of a uniform electric field of magnitude $5 \times 10^4 \text{ NC}^{-1}$. Calculate the magnitude of the torque acting on the dipole.
- Figure below shows tracks of three charged particles in a uniform electrostatic field. Give the signs of the three charges. Which particle has the highest charge to mass ratio?



- What is the net flux of the uniform electric field of exercise 1.15 through a cube of side 20cm oriented so that its faces are parallel to the coordinate planes?
- Careful measurement of the electric field at the surface of a black box indicate that the net outward flux through the surface of the box is $\times 3.28.0 \text{ 10Nm/C}$.
 - What is the net charge inside the box?
 - If the net outward flux through the surface of the box were zero, could you conclude that there were no charges inside the box? Why or why not?
- A particle of mass m and charge q is released from rest in a uniform electric field of intensity E . Calculate the kinetic energy attained by this particle after moving a distance between the plates.

- Two charges $+q$ and $+9q$ are separated by a distance of $10a$. Find the point on the line joining the two charges where electric field is zero.



- Define the term dipole moment P of an electric dipole indicating its direction and also give its S.I. unit.

CHEMISTRY

- Actinoid contraction is greater from element to element than lanthanoid contraction. why?
- Name the oxometal anions of the first series of the transition metals in which the metal exhibits the oxidation state equal to its group number.
- What is lanthanoid contraction? What are the consequences of lanthanoid contraction?
- What are the different oxidation states exhibited by the lanthanoids?
- Describe the oxidising action of potassium dichromate and write the ionic equations for its reaction with : (i) iodide (ii) iron (II) solution and (iii) H_2S .
- Describe the preparation of potassium permanganate. How does the acidified permanganate solution react with (i) iron (II) ion (ii) SO_2 and (iii) oxalic acid.
Write the ionic equation for the reactions.
- Give example and suggest reasons for the following features of the transition metal chemistry:
 - The lowest oxide of transition metal is basic, the highest is amphoteric/acidic.
 - A transition metal exhibits highest oxidation state in oxides and fluorides.
 - The highest oxidation state is exhibited in oxoanions of a metal.
- Indicate the steps in the preparation of : (i) $\text{K}_2\text{Cr}_2\text{O}_7$ From chromite ore. (ii) KMnO_4 from pyrolusite ore.
- What are inner transition elements? Decide which of the following atomic numbers are the atomic numbers of the inner transition elements: 29, 59, 74, 95, 102, 104.

10. What can be inferred from the magnetic moment values of the following complex species?

Example	Magnetic Moment (BM)
$K_4[Mn(CN)_6]$	2.2
$[Fe(H_2O)_6]^{2+}$	5.3
$K_2[MnCl_4]$	5.9

BIOLOGY

1. Mention the type of evolution that has brought the similarity as seen in Potato tuber and Sweet Potato.
2. According to Hardy-Weinberg principle the allele frequency of a population remains constant ($p^2 + 2pq + q^2 = 1$). How do you interpret the change of frequency of alleles in a population?
3. Are flippers of penguin and dolphin homologous or analogous? What type of evolution has brought such a similarity in them?
4. Name the scientist who disproved spontaneous generation theory.
5. Mention how is mutation theory of Hugo de Vries different from Darwin's theory of natural selection.
6. State the significance of biochemical similarities amongst diverse organisms in evolution.
7. State the significance of biochemical similarities amongst diverse organisms in evolution.
8. What is chemosynthesis? Name a chemosynthetic organism.
9. How does Darwin's finches illustrate adaptive radiation?
10. (a) How does Hardy Weinberg expression ($P^2 + 2pq + q^2 = 1$) explain that genetic equilibrium maintained in a population?
(b) List any two factors that can disturb the genetic equilibrium.

MATHS

Evaluate the following Integrals:

1. $\int \frac{1-\cot x}{1+\cot x} dx$
2. $\int \frac{\tan x}{a+b \tan^2 x} dx$
3. $\int \frac{e^{2x}-e^{-2x}}{e^{2x}+e^{-2x}} dx$
4. $\int \frac{1+\tan x}{x+\log \sec x} dx$

5. $\int \cos^3(ax+b) \sin(ax+b) dx.$

6. $\int \frac{\cot x}{\sqrt{\sin x}} dx$

7. $\int \frac{\sqrt{3+\log x}}{x} dx$

8. $\int \sin^3(2x+1) dx$

9. If $\frac{d}{dx}[F(x)] \frac{\sec^4 x}{\operatorname{cosec}^4 x}$ and $F\left(\frac{\pi}{4}\right) = \frac{\pi}{4}$, then find $F(x)$.

10. If $\int x^{-3} \cdot 5^{1/x^2} dx = k \cdot 5^{1/x^2} + C$, then find the value of k