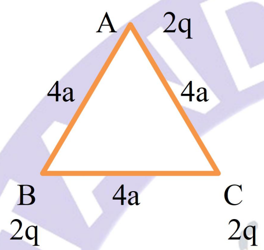
NEW STANDARD ACADEMY

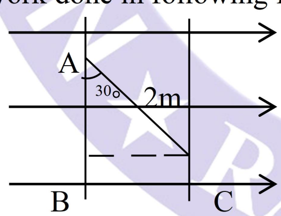
Date : 29-04-24 **CLASS : 12TH** **Marks: 60**
Time: 3 hrs.

PHYSICS

1. Calculate the work required to decrease the side of triangle to a in following figure



2. The electric field in a region is given by $\vec{E} = \left(\frac{A}{x^4}\right)\hat{J}$. What is the potential in the region?
3. Determine the electric field strength Vector if the the potential of this field depends upon x,y coordinates as V=axy.
4. By using Gauss law, Find electric field just outside the cube having 3 dipoles placed inside it of dipole moment $4\mu cm\ each$ & seperated with 4mm form charges.
5. Find work done in following figure



Given that AC=2m, ∠A=30°
$\vec{E}$= $4\hat{\imath}$ N/C
$q_0 = 2\mu c$ is moved from A to c

6. Electric dipole momemt of dipole is $9\mu c$m, if the separation between charge is 4mm .What is the charge on any one of the corner.

7. Given that $\vec{E}$=$4x^2\hat{\imath} - y^2\hat{\jmath} + Z\hat{k}$ & $\vec{A} = 20\hat{\imath} - \hat{\jmath}$ calculate electric flux

8. Two point charge $100\mu C$ and 5 μC are placed at point A and B respectively with AB =40 cm. The work done by external Force in displacing the charge 5 μC from B to C, where Bc =30 cm, angle ABC=$\frac{\pi}{2}$ and $\frac{1}{4\pi\varepsilon_0}$ =9× $10^9 Nm^2/C^2$

9. There is an electric field E in x- direction. If the work done in moving a charge $0.2\mu C$ through a distance of 2 metres along a line making an angle 60° with the x- axis is 4J, what is the value of E?

10. An electric charge of $20\mu C$ is situated at the origin of X-Y co-ordinate system. The potential difference between the points (5a,0) and (-3a,4a) will be

CHEMISTRY

1. Write the cell reaction for the following equation also write half cell reactions
$Cd_{(s)} + Nio(OH)_{(s)} + H_2O \rightarrow$
$NI(OH)_{2(s)} + Cd(OH)_{2(s)}$
2. Write Ohm's law
3. Define the following terms
1) Resistivity 2) Specific conductance
4. Write Kohlrausch law of electrolysis for weak electrolytes
5. What do you mean by standard electrode potential
6. The Conductivity of 0.001028 mol L^{-1} acetic acid is 4.95× $10^{-5} Scm^{-1}$calculate its dissociation constant if $\triangle°m$for acetic acid is 390.5Scm^2mol^{-1}
7. Calculate the limiting molar conductivity of acetic acid at 298K.given that at that temperature the limiting molar conductivities at infinite dilution of hydrochloric acid, Sodium chloride and sodium acetate are 426, 126 and 91 $Scm^2\ mol^{-1}$

8. The following cell has a potential of 0.55v at 25°C
Pt$_{(s)}$ $|H_2(1bar)|H^+(aq)(?\,M)||Cl^-(1M)|Hg_2Cl_{2(S)}\,|Hg(1)$
What is the pH of the solution in the Anode Compartment?
(Given E°=0.28V for calomel electrode)
9. The resistance of 0.01M solution of an electrolyte was found to be 210 Ohm at 25°C. Calculate the molar conductance of the solution of 25°C. , if the cell constant is 0.88 cm^{-1}
10. The electrical resistance of a column of 0.05 mol L^{-1}.NaOH solution of diameter 1cm and length 50cm is 5.55×10^3 ohm. Calculate its resistivity, conductivity and molar conductivity.

BIOLOGY

1. How many kinds of phenotype and genotype would you expect is F$_2$ generation in a monohybrid cross, give the example.
2. What are the characteristic features of true-breeding line?
3. With the help of a punnett square, find the % of heterozygous individual in a F^2 population in a cross involving a true breeding pea plant with green pods and yellow pods respectively.
4. Mention the advantages of selecting pea plant for experiment by Mendel.
5. Define and design a test cross with an example.
6. a) Explain the phenomena of dominance and Co-dominance, taking ABO blood group as an example.
b) What is the phenotype of the following?
7. A di-hybrid, plant on self-pollination (TtRr $\times\, TtRr$) produced 400 phenotype with 9 type of genotype.How many seeds will have genotype TtRr?
8. Define
i) Allele
ii) Heterozygous
iii) Hemizygous
iv) Homologous
9. What is law of segregation. Explain with example.
10 What is exception of mendelian law give the two examples

MATHS

1. If (x)=$\sin^{-1}\left\{\frac{\sqrt{3}}{2}x-\frac{1}{2}\sqrt{1-x^2}\right\}, -\frac{1}{2}\le x\le 1,$ then f(x) is equal to
a) $\sin^{-1}\left(\frac{1}{2}\right)-\sin^{-1}x$
b) $\sin^{-1}x-\frac{\pi}{6}$
c) $\sin^{-1}x+\frac{\pi}{6}$
d) None of these
2. The greatest and least values of $(\sin^{-1}x)^3+(\cos^{-1}x)^3$ are
a) $\frac{-\pi}{2},\frac{\pi}{2}$
b) $-\frac{-\pi^3}{8},\frac{\pi^3}{8}$
c) $\frac{\pi^3}{32},\frac{7\pi^3}{8}$
d) None of these
3. Find the maximum value of $(\sec^{-1}x)(cosec^{-1}x), x\ge 1$

Let A=$\begin{bmatrix}-5 & -8 & -7\\ 3 & 5 & 4\\ 2 & 3 & 3\end{bmatrix}$ $and\ B=\begin{bmatrix}x\\ y\\ 3\end{bmatrix}$.

If AB is a Scalar multiple ($\lambda\neq$0) of B then the point (x,y) lies on the whose

a) X-intercept is -1
b) Slope is-1
c) y -intercept is 1
d) distance from origin is 2
4. If A is a Square matrix of order 2, then -tr(A^2) + (tr(A))^2 is equal to
a) 0
b) det.(A)
c) 2det.(A)
d) –det.(A)
5. If A=$\begin{bmatrix}1 & -1\\ 2 & 1\end{bmatrix}, B=\begin{bmatrix}a & 1\\ b & -1\end{bmatrix}$and (A+B)^2=A^2+B^2+2AB then
a) a=-1
b) a=1
c) b=2
d) b=-2

6. If A=k$\begin{bmatrix} -1 & 2 & 2 \\ 2 & -1 & 2 \\ 2 & 2 & -1 \end{bmatrix}$ is a matrix such that $AA^T = I$, then k is equal to

a) *1*

b) ½

c) 1/3

d) -1/3

7. Let A be a 2×3matrix whereas B be a 3×2 matrix. If det.(AB)=4, then the value of of det.(BA) is

a) -4

b) 2

c) -2

d) 0

8. For what value of x:

$$[1\ 2\ 1]\begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 1 & 0 & 2 \end{bmatrix}\begin{bmatrix} 0 \\ 2 \\ x \end{bmatrix} = 0?$$