NEW STANDARD ACADEMY

Marks: 60

Date : 27-05-24 **CLASS : 12TH JEE** **Time: 3 HRS**

PHYSICS

1. Calculate the resistivity of the materal of wire 1.0m long, 0.4 mm diameter and having resistance of 2.0Ω ?
2. A wire of length 2.0 m diameter 1.0 mm has 50mΩ resistance, calculate resistivity of the material of wire.
3. An electric dipole of moment P is placed in an electric field of intensity 'E' the dipole acquires a position such that the axis of the dipole makes an angle θ with the direction of field. Assuming that the potential energy of the dipole to be zero when $\theta = 90^0$ the torque and the potential energy of the dipole will respectively be
4. A wire of 10Ω resistance is stretched to thrice its original length. What will be its new resistivity:
5. A conductor of capacitance o.5μF has been charged to 100 volts. It is now connected to uncharged conductor of capacitance 0.2 μF. The loss in potential energy is nearly?
6. If potential (in volts) in a region is expressed as V (*x,y,z*) = *6xy+y+2yz*, the electric field (in N/C) at point (1,1,0) is ?
7. A Capacitor is charged by a battery. The battery is removed and another identical uncharged capacitor is connected in parallel. What is the effect on total electrostatic energy of system.
8. Twenty seven drops of same size are charged at220V each. They coalesce to form a bigger drop. Then potential of bigger drop is ?
9. The resistance of a wire is 5 ohm at 50 ℃ and 6 ohm at 100 ℃. The resistance of the wire at 0 ℃ will be:
10. The resistance of a wire of length 300m and cross-section area 1.0 mm^2 made of material of resistivity 1.0 × 10^{-7}Ωm is?

CHEMISTRY

1. The initial rates of reaction for the equation $2A+B \longrightarrow$ Products.
   Products were determined under various initial concentrations of reactants.

$[A]_0$	$[B]_0$	-d[B]/dt
0.10 M	0.10M	0.25 Ms^{-1}
0.20M	0.10M	0.50 Ms^{-1}
0.10M	0.20M	0.25 Ms^{-1}

   Thus rate law is equal to
2. For a given reaction,
   $A \longrightarrow$ Product,
   Rate= $1\times 10^{-4} Ms^{-1}$ at [A] = 0.01 M and rate =$1.41\times 10^{-4} Ms^{-1}$ at [A] = 0.02M Hence,rate law is
3. What is the value of the rate constant ,predicted by the Arrhenius's equation if $T \longrightarrow \infty$? Is this value physically reasonable?
4. At 407 K the rate constant of a chemical reaction is $9.5\times 10^{-5} s^{-1}$ and at 420 K ,the rate constant is $1.9\times 10^{-4} s^{-1}$. Calculate the Arrhenius parameter of the reaction.
5. For the reaction $2SO_2+O_2 \rightarrow 2SO_3$, the rate of disappearance of $O_2$is 2.0×10^{-4} $molL^{-1}S^{-1}$. The rate of appearance of SO_3 is
6. The reaction $2N_2O_5 \longrightarrow 4NO_2 + O_2$ Shows an increase in concentration of NO_2 by 20×10^{-3} $molL^{-1}$ in 5s calculate the rate of appearance of NO_2
7. The standard EMF of the cell reaction $Cu(s)+Cl2(g) \rightarrow Cu^{2+}+Cl^-$ Is 1.02 V. The value of $\Delta G°$ will be
8. The half life period of a reaction, becomes 16 times when reactant concentration is halved. The order of reaction is____
9. Compounds A and B react with a common reagent with first order kinetics in both cases .If 99% of A must react before 1%

of B has reacted. The minimum ratio for their respective rate constants is___

(Given $\frac{2}{2-log99}$ = 458)

10. The rate of a reaction triples when temperature change form 20° to 50°C. Calculate energy of activation

MATHS

1. Area of triangle having vertices (a,a^2),(b,b^2) and (c,c^2) is 1/2 .Area of another triangle whose vertices are (p,p^2), (q,q^2) and (r,r^2) is 4. The value of $\begin{vmatrix}(1+ap)^2 & (1+bp)^2 & (1+cp)^2\\(1+aq)^2 & (1+bq)^2 & (1+cq)^2\\(1+ar)^2 & (1+br)^2 & (1+cr)^2\end{vmatrix}$ *is*
2. If $l_r^2+m_r^2+n_r^2=1; r=1,2,3$ *and* $l_rl_s+m_rm_s+n_rn_s=0$, $r\neq s, r=1,2,3$; s=1,2,3 then the value of $\begin{vmatrix}l_1 & m_1 & n_1\\l_2 & m_2 & n_2\\l_3 & m_3 & n_3\end{vmatrix}$
3. Sovle the Eqution $\begin{vmatrix}1+x & 1 & 1\\1 & 1+x & 1\\1 & 1 & 1+x\end{vmatrix}$ =0
4. If $2^a1, 2^a2, 2^a3\ldots\ldots\ldots 2^an$ are in G.P then $\begin{vmatrix}a_1 & a_2 & a_3\\a_{n+1} & a_{n+2} & a_{n+3}\\a_{2n+1} & a_{2n+2} & a_{2n+3}\end{vmatrix}$ is
5. If a-2b+c=1, then the value of $\begin{vmatrix}x+1 & x+2 & x+a\\x+2 & x+3 & x+b\\x+3 & x+4 & x+c\end{vmatrix}$ *is*
6. In a triangle ABC, if a, b and c are the sided opposite to angles A,B and C respectively, then the value of $\begin{vmatrix}bcosC & a & c\,cosB\\c\,cosA & b & a\cos C\\a\cos B & c & b\cos A\end{vmatrix}$
7. If f(x) = $\begin{vmatrix}sinx & \cos x & tanx\\x^3 & x^2 & x\\2x & 1 & x\end{vmatrix}$ then

   X→0 $\frac{f(x)}{x^2}$ =
8. If s is the set of distinct values of 'b' for which the following system of linear equations

   x+y+z =1

   x+ay+z =1

   ax+by+z = 0

   has no solution then S is
9. Let ω be a complex number such that $2\omega+1=z$ where $z=\sqrt{-3}$.

   If $\begin{vmatrix}1 & 1 & 1\\1 & -\omega^2-1 & \omega^2\\1 & \omega^2 & \omega^7\end{vmatrix}$= 3k then k is equal to
10. If $\begin{vmatrix}6i & -3i & 1\\4 & 3i & -1\\20 & 3 & i\end{vmatrix}$= $x+iy$, then find the value of x & y