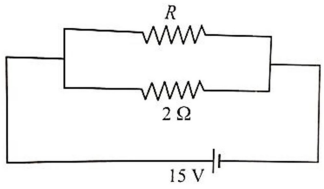
NEW STANDARD ACADEMY

Marks: 60

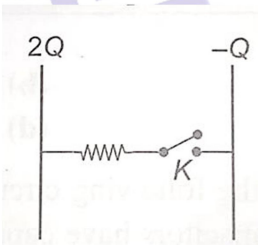
Date : 01-07-24 **CLASS : 12TH JEE** **Time: 3 HRS**

PHYSICS

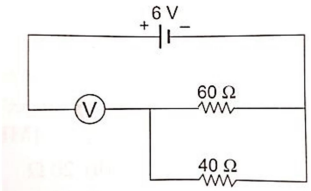
1. If in the circuit, the power dissipation is 150 W, then R is equal to?



2. A 220 V, 1000 W bulb is connected across a 110 V main supply. The power consumed will be?
3. A heater coil is cut into two parts of equal length and one of them is used in the heater . the ratio of the heat produced by this half coil to that by the original coil is?
4. Two electric bulbs marked 25W-220V and 100W -220 V are connected in series to a 440V supply. Which of the bulbs will fuse?
5. The capacitance of the system is C; if the key is closed, the total energy loss is equal to?



6. The resistance a galvanometer is 10Ω. It gives full –scale deflection when 1 mA current is passed. The resistance connected in series for converting it into a voltmeter of 2.5 volts will be?
7. The measurement of voltmeter in the following circuit is?



8. A 36Ωgalvanometer is shunted by resistance of 4Ω. The percentage of the total current, which passed through the galvanometer is?
9. Two electric bulbs whose resistances are in the ratio of 1:2 are connected in series. The powers dissipated in them have the ratio
10. What is Potential gradient?

CHEMISTRY

1. Write chemical equations involved in the preparation of $KMnO_4$ from MnO_2. .
2. How will you convert pot. Permanganate to Manganese dioxide?
3. What happen when dil. NaOH solution is added to a solution of $K_2Cr_2O_7$ in water ?
4. Complete the following equations:
   (a) $2MnO_4^- + 5SO_3^{2-} + 6H^+ \rightarrow$
   (b) $Cr_2O_7^{2-} + 6Fe^{2+} + 14H^+ \rightarrow$
5. Give relationship between the equivalent weight and molecular weight of $KMnO_4$.
   a) Acidic medium.
   b) Neutral medium
   c) Alkaline medium
6. What are lanthanides and actinides? Why are these called inner transition or *f*-block elements?
7. What is lanthanide contraction? What is its cause and what are its consequences?
8. The elements of 3d transition series are given:
   Sc Ti V Cr Mn Fe Co Ni Cu Zn
   . Answer the following
   (i) Write the element which shows maximum number of oxidation states. Give reason.

   (ii) Which element has the highest m.p?

   (iii) Which element shows only + 3 oxidation state?

(iv) Which element is a strong oxidizing agent in +3 oxidation state and why?

9. MnO_2 is fused with KOH in the presence of KNO_3 as an oxidizing agent, it gives a dark green compound (A) Compound (A) disproportionate in acidic solution to give a purple compound (B). An alkaline solution of compound (B) oxidises Kl to (C) whereas an acidified solution of compound (B) oxidises Kl to (D). Identify (A), (B), (C) and (D).
10. How would you account for the following? (i) Cr^{2+} is reducing in nature while with the same d-orbital configuration (d^4) Mn^{3+} is an oxidising agent.

MATHS

1. If $f(x)\begin{cases}\frac{\sin[x]}{[x]+1}, & \text{for } x>0\\ \frac{\cos\frac{\pi}{2}[x]}{[x]}, & \text{for } x<0\\ k, & \text{for } x=0\end{cases}$; where [x] denotes the greatest integer less than or equal to x, then in order that f be continuous at x = 0 , the value of k is
2. If $f: R\to R$ is defined by $F(x) = \begin{cases}\frac{2\sin x-\sin 2x}{2x\cos x}, & if\ x\neq 0\\ a, & if\ x=0\end{cases}$, then the value of a so that f is continuous at x= 0 is
3. The value of $f(0)$ so that $f(x) = \frac{(4^x-1)^3}{\sin\left(\frac{x}{4}\right)\log\left(1+\frac{x^2}{3}\right)}$ is continuous everywhere is
4. Let $f(x) = \frac{\sqrt{1+\sin x}-\sqrt{1-\sin x}}{x}$. then the value which should be assigned to f at x=0 so that it is continuous everywhere is.
5. Let $f(x) = \begin{cases}\frac{x^3+x^2-16x+20}{(x-2)^2}, & If\ x\neq 2\\ k, & If\ x=2\end{cases}$. If $f(x)$ is continuous for all x , then k =
6. The points at which the function $f(x) = \frac{x+1}{x^2+x-12}$ is discontinuous , are
7. If $f(x) = \begin{cases}\frac{\sin 5x}{x^2+2x}, & x\neq 0\\ k+\frac{1}{2}, & x=0\end{cases}$ is continuous at x =0, then the value of k is
8. If $f(x)=\begin{cases}\frac{1-\sin^3 x}{3\cos^2 x}, & x<\frac{\pi}{2}\\ a, & x=\frac{\pi}{2}\\ \frac{b(1-\sin x}{(\pi-2x)^2}, & x<\frac{\pi}{2}\end{cases}$ is continuous at $x=\frac{\pi}{2}$, then the value of $\left(\frac{b}{a}\right)^{5/3}$ is
9. If $f(x)=\begin{cases}e^{x^2}+x, & x>0\\ ax+b, & x\leq 0\end{cases}$ $is\ differentiable\ at\ x=0\ then$ find the value of a and b
10. If the derivative of the function $f(x)=\begin{cases}bx^2+ax+4; & x\geq -1\\ ax^2+b; & x<-1\end{cases}$ $is\ everywhere\ continuous\ then$