DPP
DAILY PRACTICE PROBLEMS

CLASS : XIITH
DATE :

Solutions

SUBJECT : PHYSICS
DPP NO. : 2

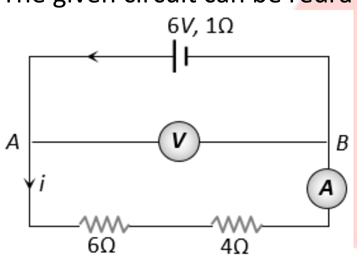
Topic :- Current Electricity

1 **(a)**
Ammeter is always connected in series and voltmeter in parallel.

2 **(a)**
$$S=\frac{G}{\frac{i}{i_g}-1}=\frac{25}{\frac{5}{50\times10^{-6}}-1}=\frac{25}{10^5-1}=\frac{25}{10^5}=2.5\times10^{-4}\Omega$$

3 **(a)**
Potential gradient $=\frac{V}{L}=\frac{iR}{L}=\frac{i\rho L}{AL}=\frac{i\rho}{A}$
$$=\frac{0.2\times40\times10^{-8}}{8\times10^{-6}}=10^{-2}V/m$$

4 **(c)**
The given circuit can be redrawn as follows



Current $i=\frac{6}{6+4+1}=\frac{6}{11}A$
P.D. between A and $B, V=\frac{6}{11}\times10=\frac{60}{11}V$

5 **(b)**
1 division $=1\mu A$
Current for 1°C $=\frac{40\mu V}{10}=4\mu A$
$1\mu A=\frac{1}{4}$ °C $=0.25$°C

6 **(a)**
Two resistances of each side of triangle are connected in parallel. Therefore, the effective resistance of each arm of the triangle would be $=\frac{r\times r}{r+r}=\frac{r}{2}$. The two arms AB and AC are in series and they together are in parallel with third one.
$\therefore\ R'(r/2)+(r/2)=r$
Total resistance
$$\frac{1}{R}=\frac{1}{r}+\frac{2}{r}=\frac{3}{r}$$
$R=r/3$

7 **(d)**
$I=neAv_d$

or $v_d = \frac{1}{neA}$

or $v_d \propto \frac{I}{A}$

$\therefore \frac{v'd}{vd} = \frac{I'/A'}{I/A} = \frac{2I/2A}{I/A} = 1$

or $v'd = v_d = v$

8 **(d)**

Let the resistance of the wire be R, then we know that resistance is proportional to the length of the wire. So each of the four wires will have $R/4$ resistance and they are connected in parallel. So the effective resistance will be

$\frac{1}{R_1} = \left(\frac{4}{R}\right)4 \Rightarrow R_1 = \frac{R}{16}$

9 **(b)**

By Faraday's law, $m \propto it$

$\therefore \frac{m_1}{m_2} = \frac{i_1 t_1}{i_2 t_2} \Rightarrow \frac{m}{m_2} = \frac{4 \times 120}{6 \times 40} \Rightarrow m_2 = \frac{m}{2}$

10 **(d)**

$1 \text{ coulomb } \times 1\text{volt} = 1 \text{ joule}$

Hence, option (d) is incorrect.

11 **(a)**

$\frac{i}{i_g} = 1 + \frac{G}{S} \Rightarrow \frac{i.G}{V_g} = 1 + \frac{G}{S} \Rightarrow \frac{100 \times 10^{-3} \times 40}{800 \times 10^{-3}} = 1 + \frac{40}{S}$

$\Rightarrow S = 10\Omega$

12 **(a)**

This is a balanced Wheatstone bridge. Therefore no current will flow from the diagonal resistance 10Ω

$\therefore$ Equivalent resistance $= \frac{(10+10)\times(10+10)}{(10+10)+(10+10)} = 10\Omega$

13 **(a)**

$E = at + \frac{1}{2}bt^2$ ... (i)

Differentiating Eq. (i), w.r.t., t

We have

$\frac{dE}{dt} = a + bt$

When $t = t_n, ie,$ neural temperature, then

$\frac{dE}{dt} = 0$

$\therefore 0 = a + bt_n$ or $t_n = -\frac{a}{b}$

The temperature of inversion

$t_i = 2t_n = t_0$

$= 2t_n - 0 = -\frac{2a}{b}$

Thermoelectric power

$P = \frac{dE}{dt} = a + bt$

14 **(c)**

Since, charge (q)=current (i) × times (t)

Therefore, charge is equal to area under the curve.

$\therefore$ Ist rectangle =*q*=*lb*=2

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IIIrd triangle $= q = \frac{1}{2} lb = 2$
Hence, ratio is 1:1:1.

15 **(b)**
The internal resistance of battery is given by
$$r = \left(\frac{E}{V} - 1\right) R = \left(\frac{40}{30} - 1\right) \times 9 = \frac{9 \times 10}{30} = 3\Omega$$

16 **(a)**
Conductivity $\sigma = \frac{1}{\rho}$ ...(i)
and conductance $G = \frac{1}{R}$
$\Rightarrow GR = 1$ ....(ii)
From equation (i) and (ii) $\sigma = \frac{GR}{\rho}$

18 **(d)**
Let the current in 12Ω resistance is i
Applying loop theorem in closed mesh $AEFCA$
$12i = -E + E = 0$
$\therefore i = 0$

19 **(b)**
$$P \propto V^2 \Rightarrow \frac{P}{P_0} = \left(\frac{V}{V_0}\right)^2 \Rightarrow P = \left(\frac{V}{V_0}\right)^2 P_0$$

20 **(a)**
$$P = \frac{V^2}{R} \Rightarrow \frac{P_P}{P_S} = \frac{R_S}{R_P} = \frac{(R_1 + R_2)}{R_1 R_2/(R_1 + R_2)} = \frac{(R_1 + R_2)^2}{R_1 R_2}$$
$$\Rightarrow \frac{100}{25} = \frac{(R_1 + R_2)^2}{R_1 R_2} \Rightarrow \frac{R_1}{R_2} = \frac{1}{1}$$

SMARTLEARN COACHING

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	A	A	A	C	B	A	D	D	B	D
Q.	11	12	13	14	15	16	17	18	19	20
A.	A	A	A	C	B	A	A	D	B	A

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