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)**

$$S = \frac{G}{\frac{i}{i_g} - 1} = \frac{25}{\frac{5}{50 \times 10^{-6}} - 1} = \frac{25}{10^5 - 1} = \frac{25}{10^5} = 2.5 \times 10^{-4}\Omega$$

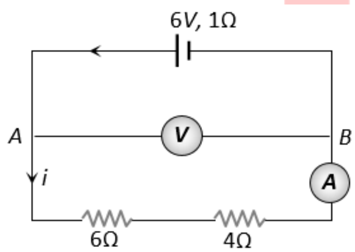
3 **(a)**

Potential gradient $= \frac{V}{L} = \frac{iR}{L} = \frac{i\rho L}{AL} = \frac{i\rho}{A}$

$$= \frac{0.2 \times 40 \times 10^{-8}}{8 \times 10^{-6}} = 10^{-2} V/m$$

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, $V = \frac{6}{11} \times 10 = \frac{60}{11} V$

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, $m\propto it$

$$\therefore\frac{m_1}{m_2}=\frac{i_1t_1}{i_2t_2}\Rightarrow\frac{m}{m_2}=\frac{4\times120}{6\times40}\Rightarrow m_2=\frac{m}{2}$$

10 **(d)**

1 coulomb $\times$ 1volt = 1 joule

Hence, option (d) is incorrect.

11 **(a)**

$$\frac{i}{i_g}=1+\frac{G}{S}\Rightarrow\frac{i.G}{V_g}=1+\frac{G}{S}\Rightarrow\frac{100\times10^{-3}\times40}{800\times10^{-3}}=1+\frac{40}{S}$$

$\Rightarrow S=10\Omega$

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 $= \text{q} = \frac{1}{2}\text{lb} = 2$

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)**

$$P = \frac{V^2}{R} \Rightarrow \frac{P_P}{P_S} = \frac{R_S}{R_P} = \frac{(R_1 + R_2)}{R_1 R_2/(R_1 + R_2)} = \frac{(R_1 + R_2)^2}{R_1 R_2}$$

$$\Rightarrow \frac{100}{25} = \frac{(R_1 + R_2)^2}{R_1 R_2} \Rightarrow \frac{R_1}{R_2} = \frac{1}{1}$$

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