DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth
DATE :

Solutions

SUBJECT : PHYSICS
DPP NO. : 6

Topic :- Current Electricity

1 **(a)**

Maximum current flows through bulb (1) Therefore, it will lights brightly.

2 **(d)**

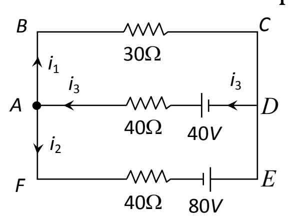
$S = \frac{i_g G}{(i - i_g)} \Rightarrow \frac{G}{S} = \frac{i = i_g}{i_g} = \frac{10-1}{1} = \frac{9}{1}$

4 **(d)**

Potentiometer works on null deflection method. In balance condition no current flows in secondary circuit.

6 **(b)**

The circuit can be simplified as follows



Applying KCL at junction A

$i_3 = i_1 + i_2$ ...(i)

Applying Kirchhoff's voltage law for the loop $ABCDA$

$-30i_1 - 40i_3 + 40 = 0$

$\Rightarrow -30i_1 - 40(i_1 + i_2) + 40 = 0$

$\Rightarrow 7i_1 + 4i_2 = 4$ ...(ii)

Applying Kirchhoff's voltage law for the loop $ADEFA$

$-40i_2 - 40i_3 + 80 + 40 = 0$

$\Rightarrow -40i_2 - 40(i_1 + i_2) = -120$

$\Rightarrow i_1 + 2i_2 = 3$ ...(iii)

On solving equation (ii) and (iii) $i_1 = -0.4A$

7 **(c)**

From Faraday's law, $m/E =$ constant

where $m =$ mass of substance deposited, $E =$ chemical equivalent

$\therefore \frac{m_2}{m_1} = \frac{E_2}{E_1} \Rightarrow m_2 = \frac{108}{32} \times 1.6 = 5.4g$

8 **(b)**

Based on Peltier effect

9 **(b)**

The current through the voltameter is same as drawn from the battery outside it

10 **(a)**

Slope of graph

$= \frac{I}{V} = \frac{1}{R}$

If experiment is performed at higher temperature then resistance increase and hence slope decrease, choice (a) is wrong.

Similarly in choice (b) and (c) resistance increase.

But for choice (d) resistance R increases, so slope decreases

11 **(d)**

Heat produced, $H = \frac{V^2 t}{R}$. When voltage is halved, the heat produced becomes one-fourth.

Hence time taken to heat the water becomes four time.

12 **(c)**

$H = \frac{V^2}{R} t \Rightarrow \frac{H_1}{H_2} = \frac{R_2}{R_1} = \frac{4}{2} = \frac{2}{1}$

13 **(c)**

Given that

emf $E_N = 1.5 r_N$

Where r_N is the internal resistance of nth cell.

Total emf $E = E_1 + E_2 + E_3 + \dots + E_n$

$= 1.5[r_1 + r_2 + r_3 + \dots + r_n]$

Total internal resistance

$r = r_1 + r_2 + r_3 + \dots + r_n$

$\therefore$ Current $i = \frac{E_{\text{total}}}{r_{\text{total}}}$

$i = \frac{1.5[r_1 + r_2 + r_3 + \dots + r_n]}{[r_1 + r_2 + r_3 + \dots + r_n]}$

Hence, $i = 1.5A$

14 **(b)**

The given network is a balanced Wheatstone bridge. It's equivalent resistance will be $R = \frac{18}{5}\Omega$

So current from the battery $i = \frac{V}{R} = \frac{V}{18/5} = \frac{5V}{18}$

15 **(d)**

The resistance of 40 W bulb will be more and 60 W bulb will be less

16 **(c)**

$E = aT + bT^2$

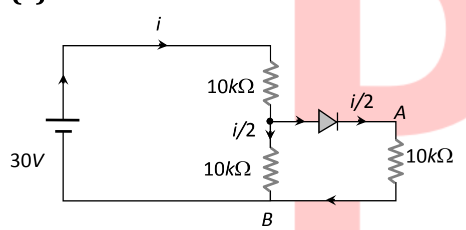
At temperature of inversion, $E = 0$,

$\therefore aT_i + bT_i^2 = 0$

$\Rightarrow T_i = -\frac{a}{b}$

$\Rightarrow T_i = -\frac{10 \times 10^{-6}}{(0.02 \times 10^{-6})} = 500°C$

17 **(c)**



Equivalent resistance $R = 10 + \frac{10}{2} = 15\ k\Omega$

Current $i = \frac{30}{15} = 2 \times 10^{-3} A$

Hence, potential difference between A and B

$V = \left(\frac{2 \times 10^{-3}}{2}\right) \times 10 \times 10^3 = 10\ Volt$

18 **(b)**

Let the potential difference across battery is V and internal resistance of the cell is r, then

$E = V + ir$ ....(i)

$V = iR$ ....(ii)

Now, from Eqs. (i) and (ii) we have

$E = iR + ir = i(R + r)$ .....(iii)

Now, dividing Eq. (iii) by Eq. (ii), we get

$\frac{E}{V} = \frac{R + r}{R} = 1 + \frac{r}{R}$

$\frac{E}{V} - 1 = \frac{r}{R}$

or $\left(\frac{E - V}{V}\right)R = r$

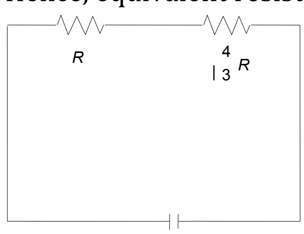
Hence, internal resistance

$r = \left(\frac{E - V}{V}\right)R$

20 **(b)**

In the given circuit, resistors $4R$ and $2R$ are connected in parallel while resistance R is connected in series to it.

Hence, equivalent resistance is



$$\frac{1}{R'} = \frac{1}{4R} + \frac{1}{2R}$$

$$= \frac{6R}{8R^2}$$

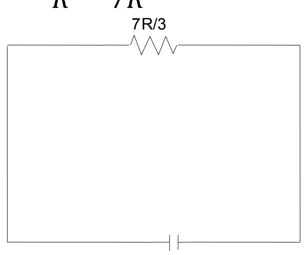
$$R' = \frac{8}{6}R$$

$$= \frac{4}{3}R$$

$$\Longrightarrow R'' = R + \frac{4}{3}R = \frac{7R}{3}$$

Given, emf is E volts, therefore

$$i = \frac{E}{R} = \frac{3E}{7R}$$



Potential difference across R is

$$V = ir = \frac{3R}{7R} \times R = \frac{3E}{7}$$

Potential difference across 2R is

$$V' = E - \frac{3E}{7} = \frac{4E}{7}$$

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