DPP

DAILY PRACTICE PRACTICE PROBLEMS

CLASS : XIIth
DATE :

Solutions

SUBJECT : PHYSICS
DPP NO. : 1

Topic :- Current Electricity

1 **(d)**

$$\text{Current} = \frac{\text{net emf}}{\text{net resistance}}$$

or $I = \frac{2+2+2}{1+1+1+2} = \frac{6}{5} = 1.2A$

2 **(b)**

The bridge will be balanced when the shunted resistance of value 2Ω $ie, 2 = \frac{3\times S}{3+S}$. On solving $S = 6\ \Omega$

4 **(a)**

Using Wheatstone principle $\frac{P}{Q} = \frac{R}{S} = \frac{R}{100-l}$

$$= \frac{35}{100-35} = \frac{35}{65} = \frac{7}{13}$$

5 **(a)**

If resistances of bulbs are R_1 and R_2 respectively then in parallel

$$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2} \Rightarrow \frac{1}{\left(\frac{V^2}{P_p}\right)} = \frac{1}{\left(\frac{V^2}{P_1}\right)} + \frac{1}{\left(\frac{V^2}{P_2}\right)}$$

$$\Rightarrow P_P = P_1 + P_2$$

6 **(c)**

Ist case

$$\frac{30}{P+Q} = \frac{l}{(100-l)}$$

$$\frac{30}{P+Q} = \frac{37.5}{(100-37.5)}$$

$$\frac{30}{P+Q} = \frac{37.5}{62.5}$$

$$P+Q = \frac{30\times 62.5}{37.5}$$

$P+Q = 50$ ...(i)

IInd case

$$\frac{30}{\frac{PQ}{P+Q}} = \frac{l}{(100-l)}$$

$$\frac{30(P+Q)}{PQ} = \frac{71.4}{(100-71.4)}$$

$$\frac{30\times 50}{PQ} = \frac{71.4}{28.6}$$

$$PQ = \frac{30\times 50\times 28.6}{71.4}$$

$P \approx 600$ ....(ii)

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So, from Eqs. (i) and (ii)
$P = 30\Omega$ and $Q = 20\Omega$

7 **(b)**

$r = \left(\frac{l_1 - l_2}{l_2}\right) \times R' = \left(\frac{l_1 - 2}{2}\right) \times 5$ ...(i)

and $r = \left(\frac{l_1 - 3}{3}\right) \times 10$ ...(ii)

on solving (i) and (ii), $r = 10\ \Omega$

8 **(b)**

No. of ions liberated $(n) = \frac{I \times t}{e \times \text{Valency}(p)}$

$ie, n \propto \frac{1}{P}$

$\therefore \frac{n_{\text{Ag}}}{\text{n}_{\text{Al}}} = \frac{P_{\text{Al}}}{P_{\text{Ag}}} = \frac{3}{1}$

9 **(b)**

Heat produced $= \frac{V^2 t}{4.2\ R} = mL$

or $m = \frac{V^2}{4.2\ R\ L} = \frac{(210)^2 \times 1}{4.2 \times 50 \times 80} = 2.62$ g

10 **(c)**

$$S = \frac{i_g G}{(i - i_g)} = \frac{1 \times 0.018}{10 - 1} = \frac{0.018}{9} = 0.002\Omega$$

11 **(b)**

Order of drift velocity $= 10^{-4} m/sec = 10^{-2} cm/sec$

12 **(c)**

Ammeter is always connected in series with circuit

13 **(d)**

Let (ρ_A, l_A, r_A, A_A) and $(\rho_B, l_B, r_B, A_B)$are specific resistances, lengths, radii and areas of wires *A* and *B* respectively.

Resistance of
$$A = R_A = \frac{\rho_A l_A}{A_A} = \frac{\rho_A l_A}{\pi R_A^2}$$
Resistance of
$$B = R_B = \frac{\rho_B l_B}{A_B} = \frac{\rho_B l_B}{\pi r_B^2}$$
For given information
$\rho_B = 2\rho_A$
$r_B = 2r_A$
And $R_A = R_B$

$$\therefore \frac{\rho_A l_A}{\pi r_A^2} = \frac{\rho_B l_B}{\pi r_B^2}$$

$$\Rightarrow \frac{\rho_A l_A}{\pi r_A^2} = \frac{2\rho_A \times l_B}{\pi (2r_A)^2}$$

$$\Rightarrow \frac{l_B}{l_A} = \frac{2}{1} = 2:1$$

14 **(b)**

$$P = \frac{V^2}{R} \Rightarrow \frac{P_1}{P_2} = \frac{R_2}{R_1} \Rightarrow \frac{6}{P_2} = \frac{4}{6} = \frac{2}{3} \Rightarrow P_2 = 9\ W$$

15 **(a)**

An ideal cell has zero resistance

16 **(c)**

$i = q/t = ne/t$

or $n = it/e = \frac{2\times1}{1.6\times10^{-19}} = 1.25 \times 10^{19}$

17 **(b)**

In parallel $P_{consumed} \propto$ Brightness $\propto \frac{1}{R}$

$P_A > P_B$ [Given] $\therefore R_A < R_B$

18 **(d)**

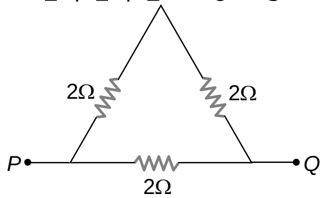
$I = \frac{P}{V} = \frac{10^5}{200} = 500$ A

and $W = zIt = 0.367 \times 10^{-3} \times 500 \times 1 = 0.1835$ g

19 **(a)**

Equivalent resistance of the combination

$$= \frac{(2+2)\times 2}{2+2+2} = \frac{8}{6} = \frac{4}{3}\Omega$$



20 **(d)**

Resistance of a conductor varies linearly with temperature as

$R_t = R_0(1+\alpha t)$

For the first conductor

$T_{t_1} = R_0(1+\alpha_1 t_1)$

$$or \quad \alpha_1 = \frac{Rt_1 - R_0}{t} \quad \ldots.(i)$$

Similarly, for second conductor

$$\alpha_2 = \frac{Rt_2 - R_0}{t_2} \quad \ldots\ldots.(ii)$$

From Eq. (i) and Eq. (ii), we get

$$\frac{\alpha_1}{\alpha_2} = \frac{t_2}{t_1}$$

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

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