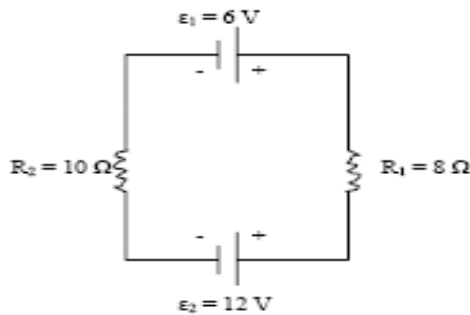


## Old Exam Questions Chapter 27

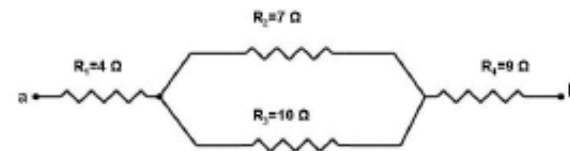
### T071

Q13. A single loop circuit contains two external resistors and two emf sources as shown in the figure 1. Assume the emf sources are ideal, what is the power dissipation across resistor R1. (Ans: 0.9 W)



Q14. A capacitor of capacitance  $5.0 \times 10^{-6}$  F is discharging through a  $4.0 \text{ M}\Omega$  resistor. At what time will the energy stored in the capacitor be half of its initial value? (Ans: 7 s)

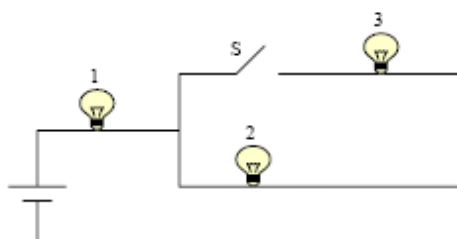
Q15. Four resistors are connected as shown in the figure 2. What is the current through R1, when a potential difference of 30.0 Volts is applied between points a and b? (Ans: 1.75 A)



Q16. If  $V_a - V_b = 3.2 \text{ V}$ , what is  $V_d - V_c$  shown in Figure 3 ? (Ans: -9.6 V)



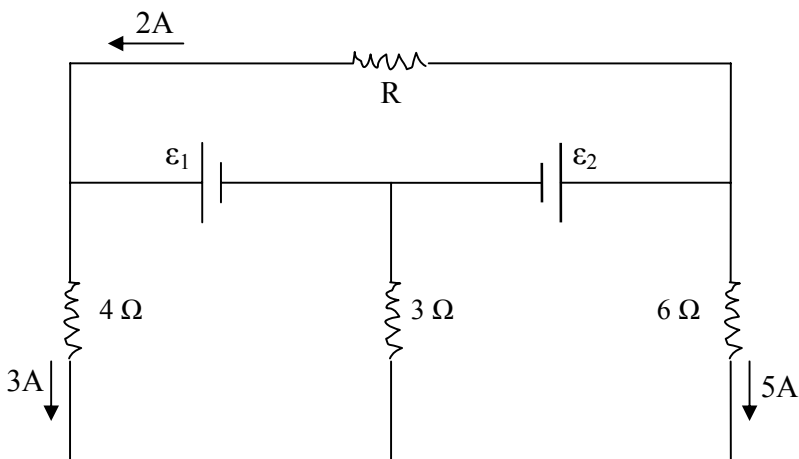
Q17. The figure below shows 3 identical light bulbs connected to a battery. What happens to the power of light bulb 1 when the switch S is closed in Figure 4? (Ans: The power increases)



**T062**

Q13. A 6-V battery supplies a total of 48 W to three identical light bulbs connected in parallel. The resistance of each bulb is: (Ans: 2.25  $\Omega$ )

Q14. In the following figure 1, find the current in 3  $\Omega$  resistor and the resistance R for the given currents. (Ans: 8 A, 9  $\Omega$ )



Q15. Two resistors  $r$  and  $R$  are connected in series across 100 V line. If  $r = 30 \text{ k}\Omega$  and the voltage across it is found to be 60 V, find the resistance of  $R$ . (Ans: 20  $\text{k}\Omega$ )

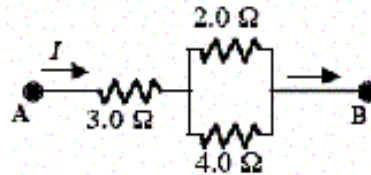
Q16. A 30.0  $\text{k}\Omega$  resistor and a capacitor are connected in series and a 15.0 V potential difference is suddenly applied across them. The potential difference across the capacitor rises to 5.00 V in 1.50  $\mu\text{s}$ . Find the capacitance of capacitor (Ans: 123 pF)

Q17. Four resistors, each of 20- $\Omega$ , are connected in parallel and the combination is connected to a 20 V emf device. The current in any one of the resistors is: (Ans: 1.0 A)

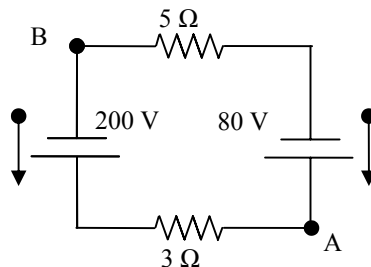
**T061**

Q12. Find the potential difference across 30  $\Omega$  resistor, when it is connected across a battery of emf 6 V and internal resistance of 0.5  $\Omega$ . (Ans: 5.9 V)

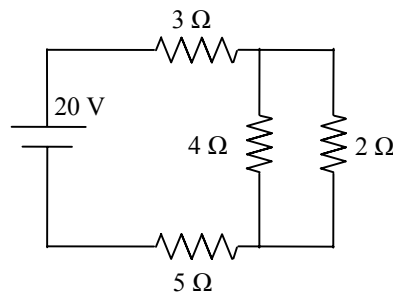
**Q13.** Three resistors are connected as shown in the following figure 1. The potential difference between points A and B is 30 V. How much current flows through the 4-Ohm resistor? (Ans: 2.3 A)



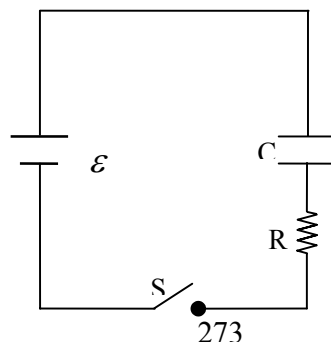
**Q14.** Two ideal emf sources along with two resistors are connected as shown in the figure 2. If the potential at A is 150 V, what would be the potential at point B? (Ans: - 5 V)



**Q15.** What is the total power dissipation in the circuit shown in the following figure 3. (Ans: 43 W)



**Q16.** Consider a series RC circuit as shown in the following figure 4, where  $R = 1.0 \times 10^6 \Omega$ ,  $C = 5.0 \mu\text{F}$  and  $\varepsilon = 30 \text{ V}$ . If the switch is closed at  $t = 0$ , what is the current in resistance R at time 10 s after the switch is closed? (Ans:  $4.1 \times 10^{-6} \text{ A}$ )



**T052**

Q#2. Calculate the equivalent resistance between a and b for the circuit shown in Figure 3. (Ans: 2.4  $\Omega$ .)

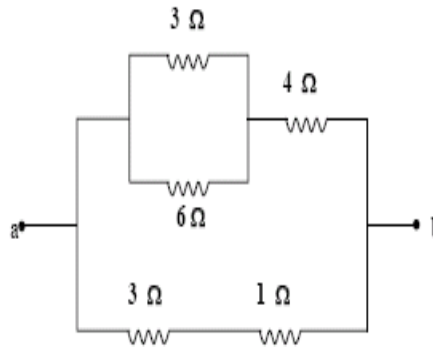


Figure 3

Q#4. The potential at point P shown in figure 1 is 20 V. What is the potential at point Q. (Ans: -18 V.)

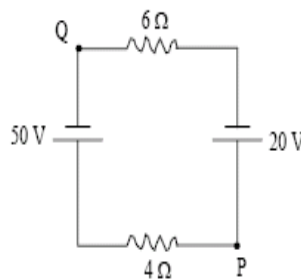


Figure 1

Q#12. A 12 V battery supplies 100 watts power to two identical bulbs connected in series. The resistance of each bulb is: (Ans: 0.7  $\Omega$  )

Q#22. In Figure 2,  $R_1 = R_2 = R_3 = 5 \Omega$ . What is the value of the emf of the second battery  $\epsilon_2$ . (Ans: 5 V.)

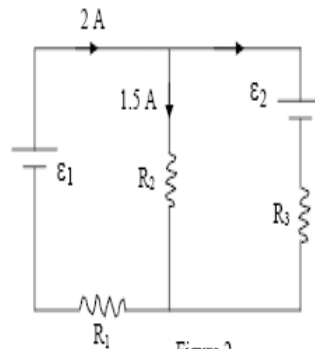
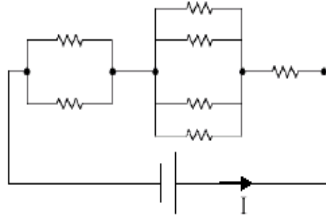


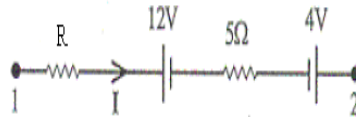
Figure 2

**T051:**

**Q#6.** In the figure 1 shown, each resistance is  $1 \Omega$ . Calculate the emf of the battery if the current  $I$  is  $4 \text{ A}$ . [Ans:  $7\text{V}$  ]



**Q#7.** In the figure 2 shown, the potential difference between point 1 and 2,  $(V_2 - V_1)$ , is  $-40 \text{ V}$ , and the current is equal to  $4.0 \text{ A}$ , then, the value of the resistance  $R$  is [ Ans:  $3 \Omega$  ]



**Q#20.** A  $2.0 \text{ volt}$  battery has an internal resistance  $r = 0.2 \Omega$  is used to operate a lamp of resistance  $R = 2.3 \Omega$ . What is the percentage of the power delivered to the lamp relative to that of the battery? [ Ans:  $92 \%$  ].

**Q#24.** An uncharged capacitor is connected as in the circuit shown in Fig. 3. When the switch is closed, the charge on the capacitor reaches half its maximum value in  $20 \text{ ms}$ . If  $R = 500 \Omega$  and the voltage of the battery is  $10 \text{ V}$  then the capacitance of the capacitor is: [Ans:  $58 \text{ micro-F}$  ]

