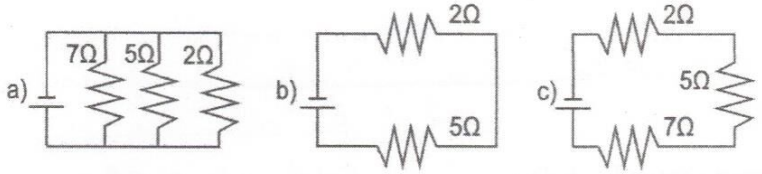
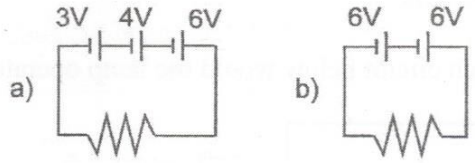
GURPREET SINGH

CIRCUITS WORKSHEET

1. Determine the equivalent (total) resistance for each of the following circuits below.

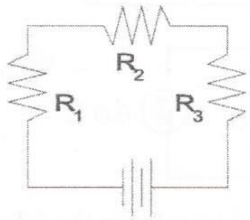


2. Determine the total voltage (electric potential) for each of the following circuits below.



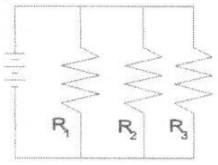
3. Fill out the table for the circuit diagramed at the right.

Circuit Position	Voltage (V)	Current (A)	Resistance (Ω)
1	1 V	0.1 A	10.0
2	2 V	0.1 A	20.0
3	3 V	0.1 A	30.0
Total	6.00	0.1 A	60Ω



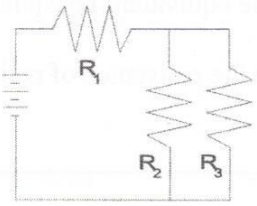
4. Fill out the table for the circuit diagramed at the right.

Circuit Position	Voltage (V)	Current (A)	Resistance (Ω)
1	6 V	0.6 A	10.0
2	6 V	0.3 A	20.0
3	6 V	0.2A	30.0
Total	6.00	1.1A	5.45Ω

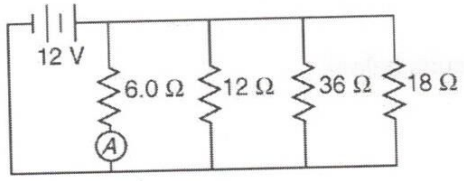


5. Fill out the table for the circuit diagramed at the right.

Circuit Position	Voltage (V)	Current (A)	Resistance (Ω)
1	2.7 V	0.27 A	10.0
2	3.3 V	0.165A	20.0
3	3.3 V	0.11 A	30.0
Total	6.00	6.27 A	22Ω



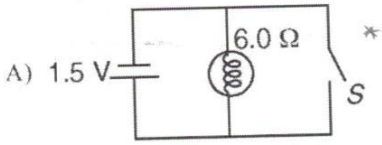
Questions 6 and 7 refer to the following:
The diagram to the right represents an electric circuit consisting of four resistors and a 12-volt battery.



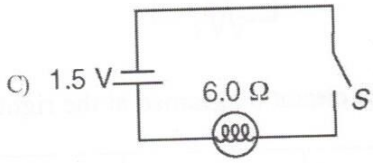
6) What is the equivalent resistance of the circuit shown? 3Ω

7) What is the current measured by ammeter *A* shown in the diagram? 2A

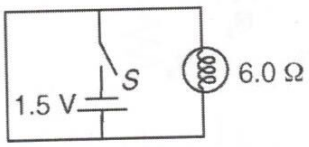
8) A 6.0-ohm lamp requires 0.25 ampere of current to operate. In which circuit below would the lamp operate correctly when switch *S* is closed?

A) 

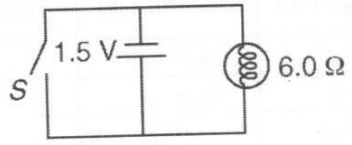
* short circuit

C) 

→ works

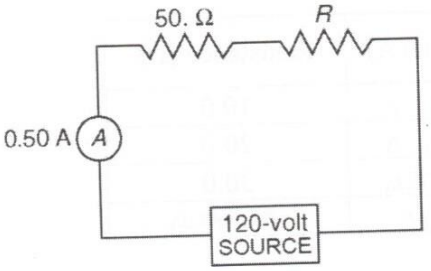
B) 

* short circuit

D) 

* short circuit.

Questions 9 and 10 refer to the following:
A 50.-ohm resistor, an unknown resistor *R*, a 120-volt source, and an ammeter are connected in a complete circuit. The ammeter reads 0.50 ampere.



9) Calculate the equivalent resistance of the circuit shown. 240Ω

10) Determine the resistance of resistor *R* shown in the diagram. 190Ω

Answers:

1a) 1.2 Ω	1b) 7 Ω	1c) 14 Ω
2a) 13 V	2b) 12 V	**6)** 3.0 Ω
7) 2.0 A	8) C	9) 240 Ω
10) 190 Ω		

Circuit Worksheet

1) a) $R_0 = \frac{1}{\frac{1}{7} + \frac{1}{5} + \frac{1}{2}}$

$R_0 = 1.1864\ \Omega$

b) $R_0 = 2 + 5$
$= 7\ \Omega$

c) $R_0 = 7 + 5 + 2$
$= 14\ \Omega$

2) $V_0 = 3 + 4 + 6$
$= 13V$

b) $R_0 = 6 + 6$
$= 12V$

3) $V_0 = 6V$ $I_0 = 0.1$ $R_0 = 30 + 20 + 10$ $V_3 = (0.1)(30)$
$V_1 = 1V$ $I_1 = 0.1$ $= 60\Omega$ $= 3V$
$V_2 = 2V$ $I_2 = 0.1$ $I_0 = \frac{6}{60}$ $V_2 = (0.1)(20)$
$V_3 = 3V$ $I_3 = (0.1)$ $= 2V$
$R_0 = 60\Omega$ $= 0.1A$ $V_1 = (0.1)(10)$
$= 1V$

4) $V_0 = 6V$ $I_0 = 1.1A$ $R_0 = \frac{1}{\frac{1}{10} + \frac{1}{20} + \frac{1}{30}}$ $I_0 = \frac{6}{5.4545}$ $I_1 = \frac{6}{10}$
$V_1 = 6V$ $I_1 = 0.6A$ $= 5.4545\Omega$ $= 1.1A$ $= 0.6$
$V_2 = 6V$ $I_2 = 0.3A$ $I_2 = \frac{6}{20}$ $I_3 = \frac{6}{30}$
$V_3 = 6V$ $I_3 = 0.2A$ $= 0.3A$ $= 0.2A$
$R_0 = 5.4545\Omega$

5) $V_0 = 6V$ $I_0 = 0.27A$ $R_0 = \frac{1}{\frac{1}{20} + \frac{1}{30}}$ $I_0 = \frac{6}{22}$ $V_1 = (0.27)(10)$
$V_1 = 2.7V$ $I_1 = 0.27A$ $= 12\Omega$ $= 0.27A$ $= 2.7$
$V_2 = 3.3V$ $I_2 = 0.165A$ $R_0 = 12 + 10$ $V_2 = 6 - 2.7$ $V_3 = 6 - 2.7$
$V_3 = 3.3V$ $I_4 = 0.11A$ $= 22\Omega$ $= 3.3V$ $= 3.3V$
$R_0 = 22\Omega$ $I_2 = \frac{3.3}{20}$ $I_3 = \frac{3.3}{30}$
$= 0.165A$ $= 0.11A$

Hilroy

6) $R_D = \frac{1}{\frac{1}{6} + \frac{1}{12} + \frac{1}{36} + \frac{1}{18}}$

$= 3\Omega$

7) $I_A = \frac{12}{6}$

$= 2A$

8) A) No B) No C) Yes D) No

9) $R_S = \frac{120}{0.50}$

$= 240\Omega$

10) $R_D = 240 - 50$

$= 190\Omega$