EXPERIMENT # 1

Introduction & Usage of Tools

Objectives:

1. Introduction and use of Electrical tools, Electrical materials.
2. Series and parallel connections

Apparatus:

Basic electric and workshop tools

Theory:

1.1: Tools

PLIER:
Generally three types of pliers are used in the electrical workshop. They are:-

1. FLAT NOSE PLIER: Used for holding jobs or holding wires. It has got only two slotted jaws, which are tapered. Thus it is used for tightening or loosening small nuts.
2. SIDE CUTTING PLIER: Used for cutting of thin wires and removing insulations from them. It has got cutting edge on its one of its sides.
3. ROUND NOSE PLIER: Used only to hold or cut the wires. It has no gripping jaws. Its cutting edge is long and rounded on the top.

SCREW DRIVER:
It is used to loosen or tighten or to keep screws in position. It has a wooden or plastic handle and a blade of high carbon steel.

CHISEL:

1. FIRMER CHISEL: Generally used for carpentry works and can be used by hand pressure or with the help of mallet. It has flat blade, which varies from 12mm to 15mm.
2. COLD CHISEL: Used for cutting iron pieces (cold). It has cutting angle from 30° to 45°and is made of high carbon steel.

HAMMER:

Most commonly used in the workshop. The head is made of cast iron or forged; the claw is hardened and tampered. The striking place is slightly convex. The head is fitted with a wooden handle of various lengths.

HACKSAW:

Used to cut metal such as iron strips, core pipes etc. it has a blade made of high steel or tungsten.

1.2: Electrical Tools

TUMBLER SWITCH:

(6 A for light), this switch was used 3-4 decade ago. It is made of Bakelite.

MCB BOX:

Known as the Miniature Circuit Breaker Box.

BATTEN LAMP HOLDER:

Mainly used to hold electric bulbs and lamps.

SWITCH BOARD WITH SWITCHES:
It contains the following:

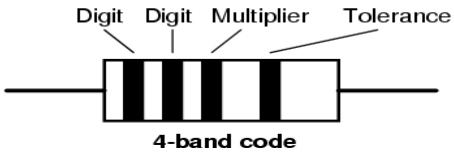
1. SOCKET OUTLETS: it is a type of electrical material through which electric current flows from wires to various electrical appliances. It is of 6A.
2. TWO WAY SWITCH: it is mainly used in staircase wiring to either on or off the light. It is of 6A.
3. ONE-WAY SWITCH: it is a device used to switch on lights of 6A.

RESISTANCE COLOUR CODING

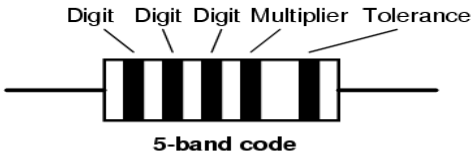
This is list of codes.

Color	Digit	Multiplier
Black	0	10^0 (1)
Brown	1	10^1
Red	2	10^2
Orange	3	10^3
Yellow	4	10^4
Green	5	10^5
Blue	6	10^6
Violet	7	10^7
Grey	8	10^8
White	9	10^9
Gold		10^{-1}
Silver		10^{-2}
(none)		

Color	Digit	Multiplier	Tolerance (%)
Gold		10^{-1}	5
Silver		10^{-2}	10
(none)			20



4-band code

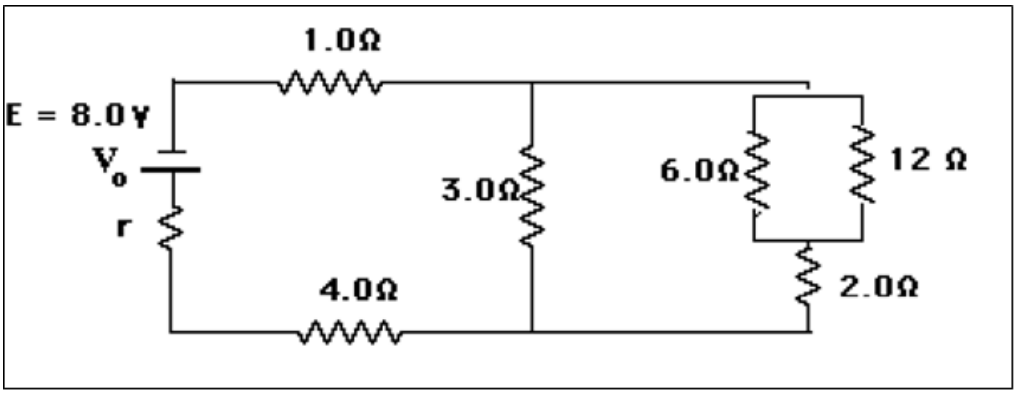


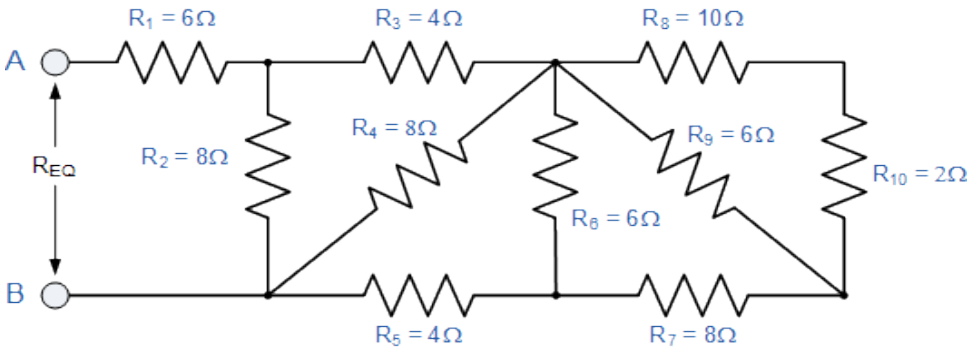
5-band code

Resistance calculation through colour coding

There may be three four or sometimes even five rings. These rings have values as shown in table 1. The first two indicate the significant figures in the value. The second is a multiplier and shows the power of ten to which the significant figures must be multiplied. As an example if a resistor had the rings yellow, purple, red these would correspond to the values 4, 7, 2, indicating a resistance of 47 x 10^2 or 4700 ohms. It can be seen from this that the third ring corresponds to the number of zeros after the significant figures.

EQUIVALENT RESISTANCE(SERIES AND PARALLEL)




A
B
R_{EQ}
$R_1 = 6\Omega$
$R_2 = 8\Omega$
$R_3 = 4\Omega$
$R_4 = 8\Omega$
$R_5 = 4\Omega$
$R_6 = 6\Omega$
$R_7 = 8\Omega$
$R_8 = 10\Omega$
$R_9 = 6\Omega$
$R_{10} = 2\Omega$

CONCLUSION