1001 Electronics EXCERCISES

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Contents

Chapter 1

W39B

Content of this section:

Quick-Check Exercises

KEYWORDS:Resistors

Ex. 1 — Which of the following are examples of resistor types:
(A) Variable resistors (B) Fixed resistors
(C) Digital adjustable resistors (D) Photo resistors
(E) All above

Ex. 2 — Resistors are used to perform the following function:
(A) Limit current flow (B) Set voltage level
(C) Only (A) (D) (A) and (B)

Ex. 3 — 3.3-kΩ equals to:
(A) 33000Ω (B) 3300Ω

Ex. 4 — Which of the following factors alter the power rating of a resistor?
(A) Ambient temperature (B) Enclosures
(C) Resistors grouping (D) Pulsed operation
(E) Additional air cooling (F) All above

Ex. 5 — If a 100Ω resistor is connected in parallel with 100Ω resistor, what is the total resistance?
(A) 50Ω (B) 200Ω (C) 250Ω (D) 400Ω
(E) Non of above

Ex. 6 — Voltage drop across each resistor in a "*Voltage divider circui*t" is proportional to the resistance.
(A) True (B) False

Ex. 7 — Which of the following statements is/are true:
(A) A resistor is a power sink (B) A battery is a power source
(C) Only (a) (D) Only (b)
(E) (a) and (b)

Ex. 8 — The color band in resistors indicate:
(A) Allowed operation voltage (B) Max current
(C) Resistance value (D) Non of above

Ex. 9 — How to read color bands on resistors?
(A) Left to right (B) Right to left
(C) From both sides (D) Non of above

Ex. 10 — A silver band on resistor means:
(A) 1% tolerance (B) 5% tolerance (C) 10% tolerance (D) Non of above

Ex. 11 — Which digit is represented by brown band on a resistor?
(A) 1 (B) 5 (C) 9 (D) Non of above

Ex. 12 — What color is 24K with 5% tolerance ?
(A) Red,Yellow,Orange,Green (B) Yellow,Orange,Green,Red
(C) Orange,Green,Red,Yellow, (D) Non of above

Theory Exercises

KEYWORDS:

Ex. 13 — Convert the following to Volts[V], Ampers[A] and Watts[W] respectively:
(a)2mV, (b) 400mA, (c) 66mW

Ex. 14 — For a particular application the resistor in Figure 3.49 p301 must be replaced such that the current in the circuit is doubled. (a) Calculate the new resistor value. (b) What is the power loss due to heating in the new resistor?

Ex. 15 — Calculate the current through R1 and R2 in the circuit shown in Figure 3.50 if R1 = 220Ω and R2= 470Ω and V= 5V. (b) Calculate the power dissipated by R1 and R2

(Hint):
- Find the equivalent resistance in the circuit
- Calculate the input current - Calculate the current through R1 AND R2 using Ohms law.

Ex. 16 — How much power is dissipated by R1 and R2 in the circuit shown in Figure 3.51, p303 if R1 and R2 are replaced by 220Ω and 470Ω respectively. (b) Calculate the voltage drop across R1 and R2.

Exploratory Exercises

KEYWORDS: LED current Limiting,Resistor color code

Ex. 17 — Explore the following resistor values using online calculator[1]
237Ω, 249Ω, 261Ω, 274 Ω, 287Ω, 301 Ω with 10% tolerance.

Ex. 18 — Build the circuit shown in Figure 3.48(a) in p300. Observe the changes in brightness of the LED, by turning the potentiometer clockwise/anticlockwise. Record your observation.

Ex. 19 — Build the circuit shown in Figure 3.48(a) in p300 and apply KVL in the circuit.

Ex. 20 — Build the circuit shown in Figure 2.46, p58 on your breadboard with the following change:
Power supply =5V. R1=82Ω, R220=Ω, R3=1KΩ Potentiometer
(a) Measure voltage drop across R2 if the potentiometer value is decreased by half. (b) Measure the Current in the circuit when the potentiometer is decreased by 1/3 of its original resistance.

Ex. 21 — Build the circuit shown in Figure 3.48(b) in p300. Use your DMM to read the voltage instead of BS2 IC. R1 is the Photoresistor that you can find from your Kit. Hold your hand just above the R1 (Photoresistor) and slowly move your hand away form the detector (R1) Observe how voltage changes as you control move your hand away from R1. Record your observation.

Simulation Exercises

KEYWORDS:

[1] https://www.electronics2000.co.uk/

Ex. 22 — Simulate the circuit shown in Figure 3.50, p302 using Falstad online simulation tool. Note your observation with regards to current through each resistors.

LAB Exercises

KEYWORDS:

Ex. 23 — Build the circuit shown in Figure 3.48 in p300 on your breadboard and measure the voltage across each resistors and the LED.

Ex. 24 — Build the circuit shown in Figure 3.50 on your breadboard with the following change:
Power supply =5V, R1=22050Ω , R2=1K50Ω (a) Measure the current through R1 and R2.(b) Measure voltage across R1 and R2. (c) By applying KCL show that the current entering the top junction of the resistors in parallel equals the sum of the current entering the resistors.

Ex. 25 — Build the circuit shown in Figure 2.46, p58 on your breadboard with the following change:
Power supply =5V. R1=82Ω, R220=Ω, R3=1KΩ
(a) Measure the current through R1, R2 and R3.(b) Measure voltage across R1, R2 and R3.