

1. How can you find assistance when using the library website?
 - a) Find Your Librarian link (on library homepage)
 - b) Chat
 - c) Quick search
 - d) Inquisifind
 - e) a) and b)
 - f) a) and c)
2. What kind of materials can you find when you do a Library Quick Search?
 - a) Articles
 - b) Library Cards
 - c) Books/Ebooks
 - d) Kitchen Utensils
 - e) a) and c)
 - f) a) and b)
3. Why is it important to use peer-reviewed items in academic research? Because it is:
 - a) important to the author and librarians
 - b) trustworthy, and supported by other experts in the field
 - c) it's fake news.
 - d) cataloged in the library.
4. What's the easiest way to find peer-reviewed articles?
 - a) Open the article and ready it.
 - b) Ask you mother.
 - c) Limit your search to "Peer Reviewed" in the library QuickSearch
 - d) Google
5. What link appears in the google scholar results page after you add the UTSA library link.
 - a) "Come and Get It"
 - b) "Available Now @ UTSA"
 - c) "You Found IT"
 - d) "Found @ a Library Near You"
6. What are the subgroups of ACM?
 - a) ACMW
 - b) RowdyHacks
 - c) ICPC
 - d) Rowdy Creators
 - e) All of the above

- f) None of the above
7. Is ACMW ONLY catered to women and is an exclusive group?
- a) Yes
 - b) No
8. Could you apply to be an ACMW junior officer any time during the year?
- a) Yes
 - b) No
9. Do you need computer experience to join ACM or any of its subgroups?
- a) No
 - b) Yes
10. How much does being a member cost per semester?
- a) \$15
 - b) \$20
 - c) It's free
 - d) \$25
11. Can you be a junior officer your first year with no prior experience?
- a) Yes
 - b) No
12. What is Rowdy Creators?
- a) An annual Hackathon
 - b) A group that builds projects
13. Will this year's Rowdy Hacks still happen even if we are online?
- a) Yes
 - b) No
14. When did ICPC at UTSA start?
- a) 2015
 - b) 2016
 - c) 2017
 - d) 2014
15. What does MATLAB stand for?
- g) Math Laboratory
 - h) Matrix Laboratory
 - i) Math Works
 - j) Matrix Laboratory Base
 - k) a) and b)
 - l) a) and c)
16. Which of the following arrange the numbers 1,34,5,32,55,33,54 in a cell array?
- g) [1,34,5,32,55,33,54]
 - h) (1,34,5,32,55,33,54)
 - i) {1,34,5,32,55,33,54}
 - j) [(1,34,5,32,55,33,54)]
 - k) [[1,34,5,32,55,33,54]]
 - l) a) and c)

- m) None of the above
17. Which of the following is not a pre-defined variable in MATLAB?
- e) i
 - f) gravity
 - g) j
 - h) pi
18. What is the value of 'a' at the end of 4th loop in the following for loop code?
- ```
a=2.3;
for i=1:2:14
 a=round((a*1.5*i)-2.2)
end
```
- a) 134
  - b) 243
  - c) 256.3
  - d) inf
  - e) a) and b)
19. Which of these being not an aspect of a for/while loop:
- e) update
  - f) runner
  - g) initialization
  - h) condition
  - i) None of the above
20. To print a newline in a fprintf statement, you must use the following escape character:
- a) \t
  - b) \nl
  - c) \nxt
  - d) \n
  - e) All of the above
21. Which of the following is proper *if statement* operator in MATLAB?
- a) &&
  - b) ==
  - c) >=
  - d) <=
  - e) All of the above
22. Which of these is the way to access the first element in a vector named V (assuming there is at least one element in the vector)?
- a) V(1)
  - b) V(0)
  - c) V(:)
  - d) V(:==)
  - e) None of the above
23. What is the ans on the command window for the following while loop:
- ```
b=0;
while b<10
```

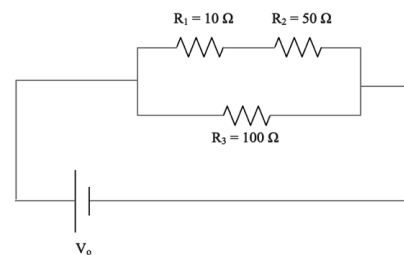
```
b=b+1;  
end  
c=(b*4*pi);  
disp(b)
```

- a) 8.8
 - b) 10**
 - c) 32
 - d) 10.5
 - e) 4.1
24. In MATLAB, given a vector V, the function size(V)= [row# column#]. Given V=[1,3,4,5:6,7,8,9]. What is the value of b and be if this code is entered into MATLAB>> [a b] = size(vector)?
- a) 4**
 - b) 7
 - c) 2
 - d) 5
 - e) b) and c)
25. What is the ans that is printed on the command window when the following code is run:
reverse('UTSAECE')?
- a) 'ECEASTU'**
 - b) 'ECEUTSA'
 - c) 'ECEUSTA'
 - d) 'USATCEE'
 - e) None of the above
26. To display 'Question 2' in the command window, the correct command is?
- a) Dis('Question 2')
 - b) disp('Question 2')**
 - c) disp(='Question 2')
 - d) display([Question 2])
 - e) c)
27. The clc command is used to clear:
- a) Command window**
 - b) Everything in a .m files
 - c) Workspace
 - d) Directory
 - e) a) and b)
28. What of the following is used to see if two variables are equal in MATLAB?
- a) !=
 - b) ==**
 - c) --
 - d) +==!
 - e) is equal to

29. What is the equivalent of *else* in an *if statement* for a *switch case statement*?

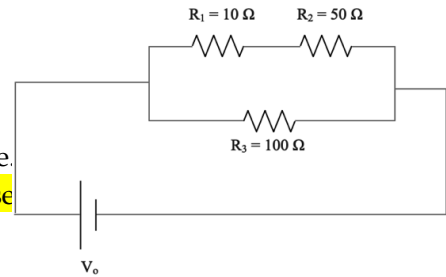
- a) case
 - b) case 2
 - c) case repeat
 - d) else
 - e) otherwise
30. When voltage is applied across a resistor, what happens?
- a) A short circuit occurs.
 - b) An open circuit occurs.
 - c) A current begins to flow.
 - d) Both a and c.
31. When current flows through a resistor, what happens?
- a) The intensity of the flow is reduced.
 - b) The resistor shrinks a small amount.
 - c) A short circuit occurs.
 - d) Both a and c.
32. When resistors are connected in parallel in a circuit:
- a) The same current always runs through each resistor.
 - b) The potential drop is always the same across each resistor.
 - c) The largest resistance has the largest current through it.
 - d) The power generated in each resistor is the same.
33. If four resistors are connected in parallel, the total resistance of the combination is:
- a) The average of the individual resistance values.
 - b) Less than any of the individual resistance values.
 - c) Greater than any of the individual resistance values.
 - d) All the above.
34. If four resistors are connected in series, the total resistance of the combination is:
- a) The average of the individual resistance values.
 - b) Less than any of the individual resistance values.
 - c) Greater than any of the individual resistance values.
 - d) All the above.
35. From the circuit diagram, compared to the potential dropped across R_1 , the potential dropped across R_3 is: [Hint: Ohm's Law]

- a) The same.
- b) More.
- c) Less.
- d) There is not enough info to determine



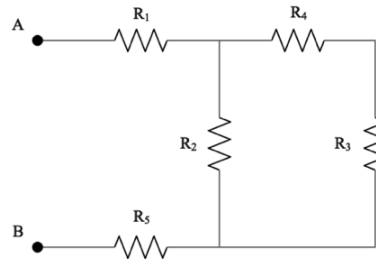
36. From the circuit diagram, If the resistance of R_3 is set to 0Ω , which of the following statements is true?

- a) No current will flow through the circuit.
- b) The total current leaving the battery will remain the same.
- c) The total current leaving the battery will increase.
- d) The total current leaving the battery will decrease but still be greater than zero.



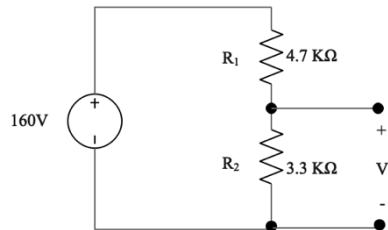
37. For the circuit shown below, what is the equivalent resistance between terminals A and B when $R_1 = 6\Omega$, $R_2 = 10\Omega$, $R_3 = 2.8\Omega$, $R_4 = 1\Omega$, $R_5 = 1\Omega$ [Hint1: $R_{eq} = R_1 + R_2 + \dots + R_N$] [Hint2: $R_{eq} = \frac{R_1 R_2}{R_1 + R_2}$]

- a) $52.25\ \Omega$
- b) $28.52\ \Omega$
- c) $35.15\ \Omega$
- d) $25.25\ \Omega$



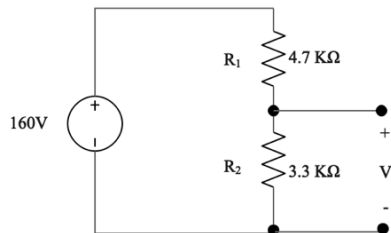
38. Calculate the power dissipated in R_1 , [Hint: $V = IR$, $P = I^2 R$]

- a) $18.8\ \text{W}$
- b) $1.88\ \text{W}$
- c) $17.88\ \text{W}$
- d) $1.788\ \text{W}$



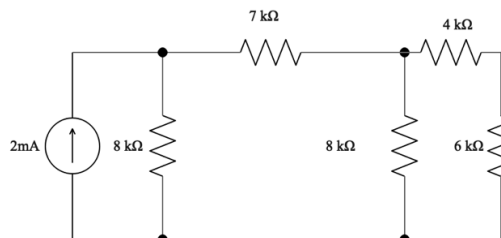
39. Calculate the power dissipated in R_2 , [Hint: $V = IR$, $P = I^2 R$]

- a) $1.9\ \text{W}$
- b) $2.32\ \text{W}$
- c) $5.88\ \text{W}$
- d) $1.32\ \text{W}$



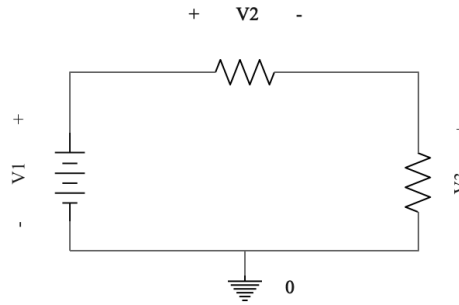
40. Look the circuit below, use current division to find the current flowing from top to bottom in the $8\ \text{k}\Omega$ resistor. [Hint: Ohm's L

- a) $13.6\ \text{mA}$
- b) $1.17\ \text{mA}$
- c) $16.3\ \text{mA}$
- d) $1.73\ \text{mA}$



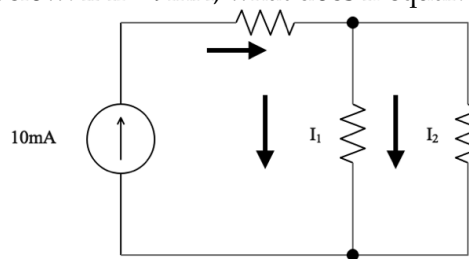
41. Consider the circuit illustrated below. If $V_1 = +18\text{V}$ and $V_2 = +14\text{V}$, what does V_3 equal?
[Hint: Use Kirchhoff's Voltage Law]

- a) 7 V
- b) 3 V
- c) 9 V
- d) 4 V



42. Consider the circuit illustrated below. If $I_2 = 9\text{mA}$, what does I_1 equal?
[Hint: Use KCL]

- a) 2 mA
- b) 1 mA
- c) 3 mA
- d) 4 mA



43. When current flows through a resistor, what happens?

- a) The intensity of the flow is reduced.
- b) The resistor shrinks a small amount.
- c) The resistor heats up.
- d) Both a and c.

44. Express 0.93 mA in units of amps (A).

- a) 0.00093 A
- b) 0.93×10^{-3} A
- c) 9.3×10^{-4} A
- d) All the above.

45. A circuit has a total resistance of $20\text{ k}\Omega$ and a total voltage of 60V. What is the total current in milliamps? Using the result, what is the power in the circuit in milliWatts?

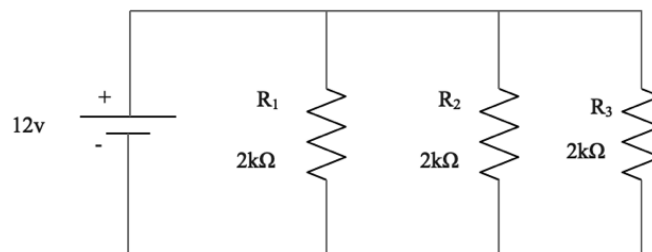
[Hint: $V = I \cdot R$, $P = I \cdot V$]

- a) 7 mA, 200mW
- b) 3 mA, 180mW
- c) 4 mA, 160mW
- d) 4 mA, 175mW

46. Determine the equivalent resistance R_{eq} of the circuit below.

[Hint: $R_{eq} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_N}}$]

- a) $\frac{3}{2}\text{ k}\Omega$
- b) $\frac{2}{3}\text{ k}\Omega$
- c) $\frac{5}{2}\text{ k}\Omega$
- d) $\frac{1}{2}\text{ k}\Omega$



47. Compute the determinants of matrix A

$$A = \begin{pmatrix} -5 & 6 \\ 7 & -8 \end{pmatrix}$$

- a) 2
- b) -2
- c) 26
- d) -26

48. Find the inverse of the following matrix X.

$$X = \begin{pmatrix} \frac{1}{4} & \frac{-1}{2} \\ \frac{1}{2} & \frac{1}{4} \end{pmatrix}$$

- a) $\begin{pmatrix} \frac{4}{5} & \frac{-8}{5} \\ \frac{8}{5} & \frac{4}{5} \end{pmatrix}$
- b) $\begin{pmatrix} \frac{8}{5} & \frac{-4}{5} \\ \frac{1}{2} & \frac{1}{4} \end{pmatrix}$
- c) $\begin{pmatrix} \frac{-1}{2} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{2} \end{pmatrix}$
- d) $\begin{pmatrix} \frac{4}{5} & \frac{8}{5} \\ \frac{-8}{5} & \frac{4}{5} \end{pmatrix}$

49. Divide the complex numbers and express the result in the standard form, a+bi, where a and b are fractions in lowest terms.

$$\frac{6 + 7i}{5 + 3i}$$

- a) $\frac{3}{2} + i\frac{1}{2}$
- b) $\frac{3}{2} + \frac{1}{2}$
- c) $\frac{2}{3} + i\frac{1}{2}$
- d) $\frac{6}{5} + i\frac{1}{2}$

50. Compute the determinants of matrix B

$$B = \begin{pmatrix} -5 & 6 \\ 7 & -8 \end{pmatrix}$$

- a) $\frac{-1}{4}$
- b) $\frac{-3}{4}$
- c) $\frac{-9}{4}$

d) $\frac{1}{4}$

51. Calculate the derivative of the function directly from the definition.

$$f(x) = \frac{x^2 + 1}{5x - 3}$$

a) $\frac{5x^2 - 6x - 5}{(5x - 3)^2}$

b) $\frac{5x^2 - 6x - 5}{5x - 3}$

c) $\frac{5x - 3}{5x^2 - 5}$

d) $\frac{(5x - 3)^2}{5x^2 - x - 5}$

52. Calculate the derivative of the function directly from the definition.

$$f(x) = 5x^3 - x + 2$$

a) $5x^2 + 2$

b) $5x^2 - 1$

c) $15x^2 + 2$

d) $15x^2 - 1$

53. Calculate the following limit:

$$\lim_{x \rightarrow 0} \left(\frac{4.5 \sin(x)}{x} \right)$$

a) ∞

b) 4.5

c) 1

d) $-\infty$

54. Calculate the following limit:

$$\lim_{x \rightarrow 4} \left(\frac{5.6x^2 + 3x - 1}{x} \right)$$

a) ∞

b) 25.15

c) 15.3

d) -1

55. Write the complex number in polar form with argument θ between 0 and 2π .

$$3 - 4i\sqrt{3}$$

a) $r = 7.55; \theta = 66.59^\circ$

b) $r = 9.93; \theta = 66.59^\circ$

c) $r = 9.93; \theta = -66.59^\circ$

d) $r = 7.55; \theta = -66.59^\circ$

56. Find the inverse of the following matrix X.

$$X = \begin{pmatrix} 1 & \frac{-1}{\sqrt{3}} \\ \frac{1}{\sqrt{3}} & -1 \end{pmatrix}$$

$$\text{a) } \begin{pmatrix} -1 & \frac{1}{\sqrt{3}} \\ \frac{-1}{\sqrt{3}} & 1 \end{pmatrix}$$

$$\text{b) } \begin{pmatrix} \frac{3}{2} & \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{3}} & \frac{3}{2} \end{pmatrix}$$

$$\text{c) } \begin{pmatrix} \frac{3}{2} & \frac{-\sqrt{3}}{2} \\ \frac{\sqrt{3}}{2} & \frac{-3}{2} \end{pmatrix}$$

$$\text{d) } \begin{pmatrix} \frac{3}{2} & \frac{\sqrt{3}}{2} \\ \frac{\sqrt{3}}{2} & \frac{3}{2} \end{pmatrix}$$