AMC **TEST**

ME 4543: Mechatornics

Department of Mechanical Engineering

Mock Exam

Useful information:

(1) There are 4 questions.

(2) Each question has only 1 correct answer. Each question is worth 1 point and there is no negative marking.

(3) Cellphones, laptops, tablets and other electronics except calculators should be shut down. Only calculators are allowed.

(4) Darken the appropriate box next to the options entirely. Your answers will be graded by a computer so it is important that you darken the bubble entirely and do not write anything near the bubbles or options.

NOTE: The actual exam will have 20 questions worth 20 points.

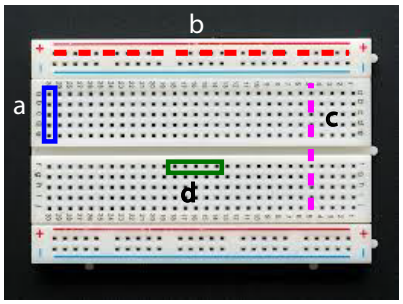
Firstname and Lastname:

.....

Part 1

Question 1 Consider the breadboard below. Indicate the true statement

- ☐ Holes shown by the blue vertical box denoted by a are all connected
- ☐ Three options are true
- ☐ Holes shown by the pink vertical line denoted by c are all connected
- ☐ Holes shown by the red dashed line denoted by b are all connected
- ☐ Two options are true



Question 2 For the waveform $y(t) = 10\sin(\pi) + 5\cos(\pi)$, the DC offset is

- ☐ 15
- ☐ 12
- ☐ -5
- ☐ 0
- ☐ 11

Question 3 A voltage source $V = 10$ V, resistors R_1 and $R_2 = 20\ \Omega$ are in all series. If the voltage drop across the R_1 resistor is 2.5 V then R_1 in Ω is

☐ 10 ☐ 5 ☐ 7.5 ☐ 3.33 ☐ 6.67

Question 4 A voltage source V_s is connected in series with two resistors $R_1 = 1\ \Omega$ and $R_2 = 2\ \Omega$. If voltage drop across R_1 is 1 V then V_s in V is

- ☐ 1.2
- ☐ 8
- ☐ 12
- ☐ 3
- ☐ 0

Question 5 Consider two resistances, $R_1 = 5\ \Omega$ and $R_2 = 10\ \Omega$. The two resistors when connected in series, have an effective resistance R_{series} and when connected in parallel, have an effective resistance $R_{parallel}$. Indicate all true statements.

- ☐ $R_{series} > R_1$
- ☐ $R_2 > R_{parallel}$
- ☐ $R_{parallel} > R_{series}$
- ☐ Two options are true
- ☐ Three options are true

Question 6 A resistor has a value of 50 M Ω. The second band is black. The third band will be

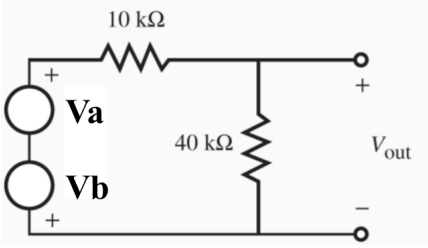
- ☐ Red
- ☐ Blue
- ☐ Orange
- ☐ Voilet

Question 7 Two capacitors of values $2\mu F$ each as connected in series. The equivalent capacitance in μF is

- ☐ 1
- ☐ 0.5
- ☐ 2
- ☐ 4
- ☐ 8

Question 8 In the circuit shown if $Va = 10$ V and $Vb = 5$ V then V_{out} in V equals

- ☐ Three options are true
- ☐ Two options are true
- ☐ $R_2 > R_{parallel}$
- ☐ $R_{series} > R_1$
- ☐ $R_{parallel} > R_{series}$



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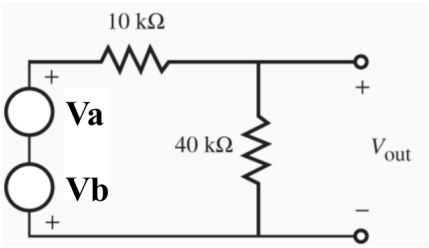
Part 1

Question 1 In the circuit shown if $Va = 10$ V and $Vb = 5$ V then V_{out} in V equals

- ☐ $R_{parallel} > R_{series}$
- ☐ Three options are true
- ☐ $R_{series} > R_1$
- ☐ $R_2 > R_{parallel}$
- ☐ Two options are true



Question 2 Two capacitors of values $2\mu F$ each as connected in series. The equivalent capacitance in μF is

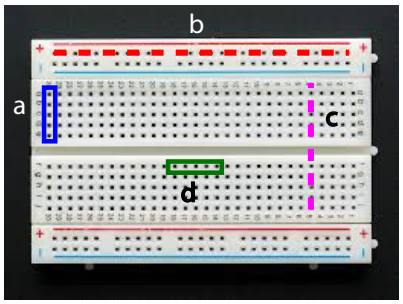
- ☐ 1
- ☐ 8
- ☐ 2
- ☐ 4
- ☐ 0.5

Question 3 Consider two resistances, $R_1 = 5\ \Omega$ and $R_2 = 10\ \Omega$. The two resistors when connected in series, have an effective resistance R_{series} and when connected in parallel, have an effective resistance $R_{parallel}$. Indicate all true statements.

- ☐ Three options are true
- ☐ $R_{parallel} > R_{series}$
- ☐ $R_2 > R_{parallel}$
- ☐ $R_{series} > R_1$
- ☐ Two options are true

Question 4 Consider the breadboard below. Indicate the true statement

- ☐ Holes shown by the pink vertical line denoted by c are all connected
- ☐ Two options are true
- ☐ Three options are true
- ☐ Holes shown by the red dashed line denoted by b are all connected
- ☐ Holes shown by the blue vertical box denoted by a are all connected



Question 5 A voltage source V_s is connected in series with two resistors $R_1 = 1\ \Omega$ and $R_2 = 2\ \Omega$. If voltage drop across R_1 is 1 V then V_s in V is

- ☐ 0
- ☐ 12
- ☐ 1.2
- ☐ 8
- ☐ 3

Question 6 For the waveform $y(t) = 10\sin(\pi) + 5\cos(\pi)$, the DC offset is

- ☐ 15
- ☐ 0
- ☐ 12
- ☐ 11
- ☐ -5

Question 7 A voltage source $V = 10$ V, resistors R_1 and $R_2 = 20\ \Omega$ are in all series. If the voltage drop across the R_1 resistor is 2.5 V then R_1 in Ω is

☐ 5 ☐ 3.33 ☐ 7.5 ☐ 6.67 ☐ 10

Question 8 A resistor has a value of 50 M Ω. The second band is black. The third band will be

- ☐ Orange
- ☐ Voilet
- ☐ Red
- ☐ Blue

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Part 1

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- ☐ 1.2
- ☐ 3
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- ☐ 8
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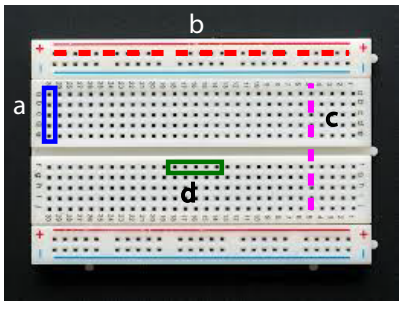

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☐ 3.33 ☐ 10 ☐ 7.5 ☐ 6.67 ☐ 5

Question 4 Two capacitors of values $2\mu F$ each as connected in series. The equivalent capacitance in μF is

- ☐ 8
- ☐ 0.5
- ☐ 2
- ☐ 4
- ☐ 1

Question 5 In the circuit shown if $Va = 10$ V and $Vb = 5$ V then V_{out} in V equals

- ☐ Two options are true
- ☐ $R_{parallel} > R_{series}$
- ☐ $R_2 > R_{parallel}$
- ☐ $R_{series} > R_1$
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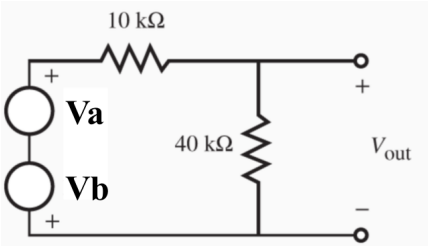

Question 6 A resistor has a value of 50 M Ω. The second band is black. The third band will be

- ☐ Orange
- ☐ Blue
- ☐ Red
- ☐ Voilet

Question 7 For the waveform $y(t) = 10\sin(\pi) + 5\cos(\pi)$, the DC offset is

- ☐ 11
- ☐ -5
- ☐ 0
- ☐ 12
- ☐ 15

Question 8 Consider two resistances, $R_1 = 5\ \Omega$ and $R_2 = 10\ \Omega$. The two resistors when connected in series, have an effective resistance R_{series} and when connected in parallel, have an effective resistance $R_{parallel}$. Indicate all true statements.

- ☐ $R_{parallel} > R_{series}$
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☐ 5 ☐ 3.33 ☐ 6.67 ☐ 10 ☐ 7.5

Question 2 Consider two resistances, $R_1 = 5\ \Omega$ and $R_2 = 10\ \Omega$. The two resistors when connected in series, have an effective resistance R_{series} and when connected in parallel, have an effective resistance $R_{parallel}$. Indicate all true statements.

☐ $R_{parallel} > R_{series}$
☐ $R_{series} > R_1$
☐ Two options are true
☐ Three options are true
☐ $R_2 > R_{parallel}$

Question 3 Two capacitors of values $2\mu F$ each as connected in series. The equivalent capacitance in μF is

☐ 8
☐ 4
☐ 0.5
☐ 2
☐ 1

Question 4 A voltage source V_s is connected in series with two resistors $R_1 = 1\ \Omega$ and $R_2 = 2\ \Omega$. If voltage drop across R_1 is 1 V then V_s in V is

- [ ] 1.2
- [ ] 0
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Question 5 In the circuit shown if $Va = 10$ V and $Vb = 5$ V then V_{out} in V equals

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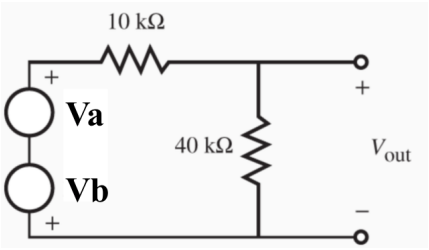

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- [ ] Orange
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- [ ] Blue
- [ ] Red

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- [ ] Holes shown by the pink vertical line denoted by c are all connected
- [ ] Holes shown by the red dashed line denoted by b are all connected
- [ ] Two options are true
- [ ] Three options are true
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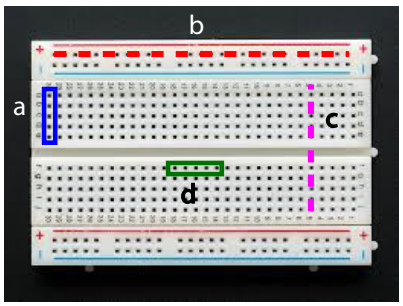

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- [ ] 12
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+5/1/48+

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Question 2 Two capacitors of values $2\mu F$ each as connected in series. The equivalent capacitance in μF is

- ☐ 4
- ☐ 1
- ☐ 8
- ☐ 0.5
- ☐ 2

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- ☐ 12
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- ☐ 1.2

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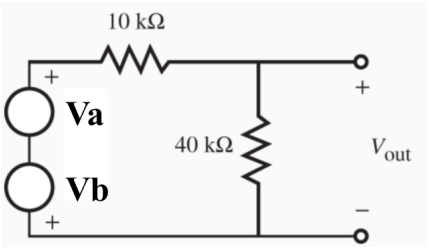

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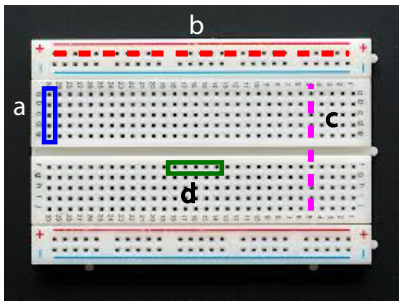
- [ ] Two options are true
- [ ] Holes shown by the blue vertical box denoted by a are all connected
- [ ] Holes shown by the pink vertical line denoted by c are all connected



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