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## Unit 5 - Week 4

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## Assignment 4

The due date for submitting this assignment has passed. **Due on 2018-02-21, 23:59 IST**  
As per our records you have not submitted this assignment.

1) A full-wave rectifier circuit is driven by a sinusoidal input voltage with  $V_{rms} = 15V$  and frequency  $50Hz$ . If the load resistance is  $100\Omega$ , what is the ripple voltage with a filter capacitance of  $1.5mF$ ? (Assume the diodes to be ideal, with  $V_{on} = 0V$ .) 1 point

- 
- $0.8V$
- $2.1V$
- $1.4V$
- $2.7V$

**No, the answer is incorrect.**  
**Score: 0**

**Accepted Answers:**  
 $1.4V$

2) For the conditions given in Q-1, what is the average diode current? 1 point

- 
- $106mA$
- $150mA$
- $300mA$
- $75mA$

**No, the answer is incorrect.**  
**Score: 0**

**Accepted Answers:**  
 $106mA$

3) For the conditions given in Q-1, what is the peak diode current? 1 point

- 
- $1.2A$
- $2.5A$
- $3.8A$
-

Week 7

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Week 12

4.5A

**No, the answer is incorrect.****Score: 0****Accepted Answers:**

3.8A

4) For the conditions given in Q-1, what is the maximum instantaneous reverse voltage (approximately) across each diode?

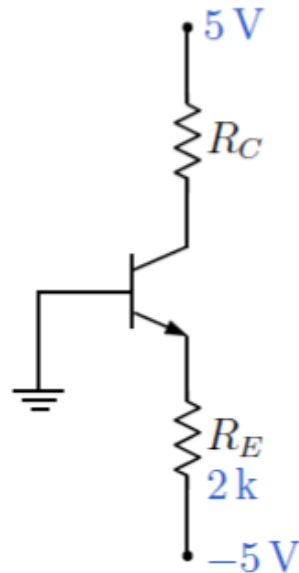
**1 point**

- 15V
- 42V
- 30V
- 21V

**No, the answer is incorrect.****Score: 0****Accepted Answers:**

21V

5) For the circuit shown in the figure, assume that the BJT has a large  $\beta$ . Suppose  $R_C$  is selected to ensure BJT operation in the active region. What is the collector current  $I_C$ ?

**1 point**

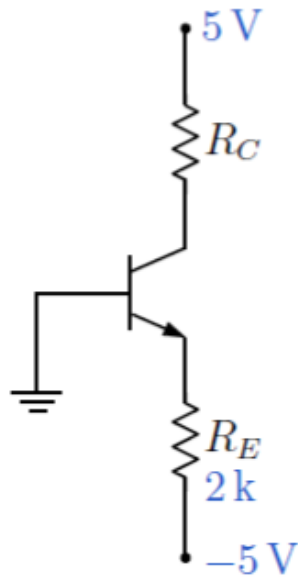
- 2.15mA
- 2.5mA
- 0.35mA
- 1.65mA

**No, the answer is incorrect.****Score: 0****Accepted Answers:**

2.15mA



6) For the circuit of Q-5, what is the condition on  $R_C$  which ensures that the BJT operates in the active region? **1 point**



- $R_C > 3.2k\Omega$
- $R_C < 2.6k\Omega$
- $R_C < 4.2k\Omega$
- $R_C > 1.8k\Omega$

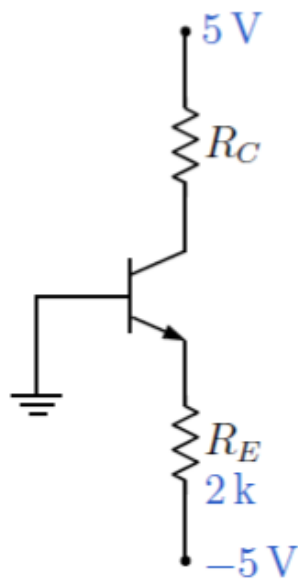
**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$R_C < 2.6k\Omega$

7) For the circuit of Q-5, what value of  $R_C$  is required for a reverse bias of 2.5V across the B-C junction? **0 points**



- $3.1k\Omega$
- $580\Omega$
- $1.4k\Omega$



2.4kΩ

No, the answer is incorrect.

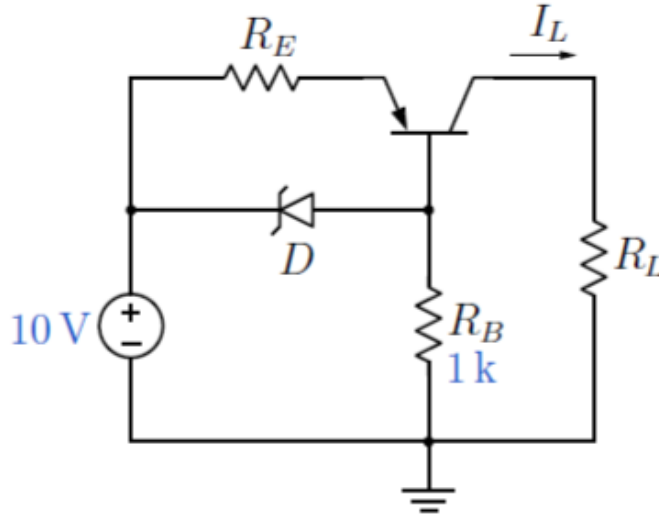
Score: 0

Accepted Answers:

1.4kΩ

8) A current source circuit is shown in the figure. It provides a constant current to the load  $R_L$  (i.e.,  $I_L$  independent of  $R_L$ ) as long as  $R_L < R_L^{max}$ . Assume that the Zener diode, with  $V_Z = 5.1V$ , operates in reverse breakdown. For  $I_L = 2mA$ , what value of  $R_E$  is required?

1 point



- 820Ω
- 1.6kΩ
- 3.4kΩ
- 2.2kΩ

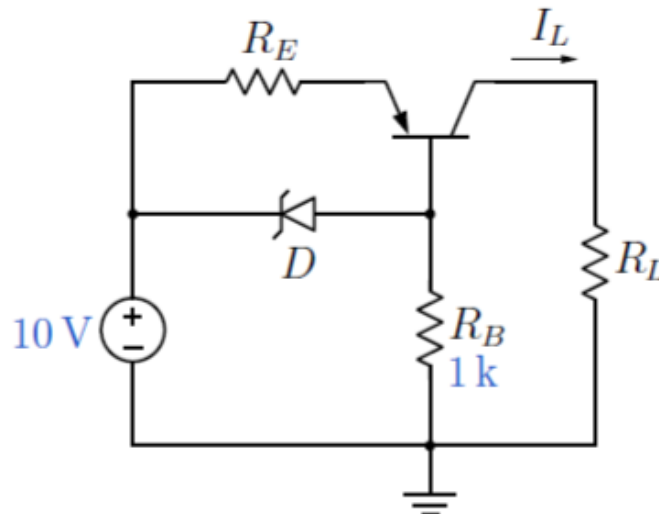
No, the answer is incorrect.

Score: 0

Accepted Answers:

2.2kΩ

9) For the current source circuit of Q-8 with  $R_L = 1kΩ$ , and  $R_E$  selected to get  $I_L = 2mA$ , what is the reverse bias across the B-C junction?



1.8V

- 
- 2.9V
- 
- 3.4V
- 
- 2.3V

No, the answer is incorrect.

Score: 0

Accepted Answers:

2.9V

10) For the current source circuit of Q-8 with  $R_E$  selected to get  $I_L = 2mA$ , what is  $R_L^{max}$ ? 1 point

- 
- 2.7k $\Omega$
- 
- 1.9k $\Omega$
- 
- 3.3k $\Omega$
- 
- 3.8k $\Omega$

No, the answer is incorrect.

Score: 0

Accepted Answers:

2.7k $\Omega$

11) Consider an *npn* transistor operating in the linear region at 300K with  $I_C = 1.2mA$ . By what amount should the B-E voltage  $V_{BE}$  be reduced in order to reduce the current to 1mA? 1 point

- 
- 8.3mV
- 
- 4.7mV
- 
- 1.9mV
- 
- 5.4mV

No, the answer is incorrect.

Score: 0

Accepted Answers:

4.7mV

12) Consider an *npn* transistor operating in the linear region at 45<sup>0</sup>C. If  $V_{BE}$  is increased by 15mV, by what factor will the collector current increase? 1 point

- 
- 1.2
- 
- 2.4
- 
- 3.5
- 
- 1.7

No, the answer is incorrect.

Score: 0

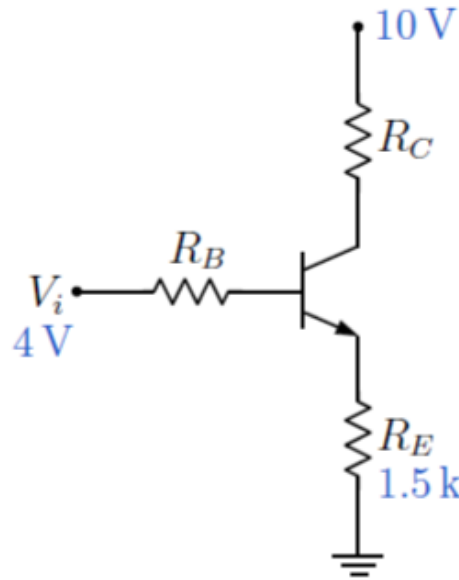
Accepted Answers:

1.7

13) In the BJT circuit shown in the figure, assume that  $R_B$  and  $R_C$  are selected to ensure BJT operation in the active mode. The transistor has  $\beta = 100$ . For a collector current of 1.2mA, what value 1 point



of  $R_B$  is required?



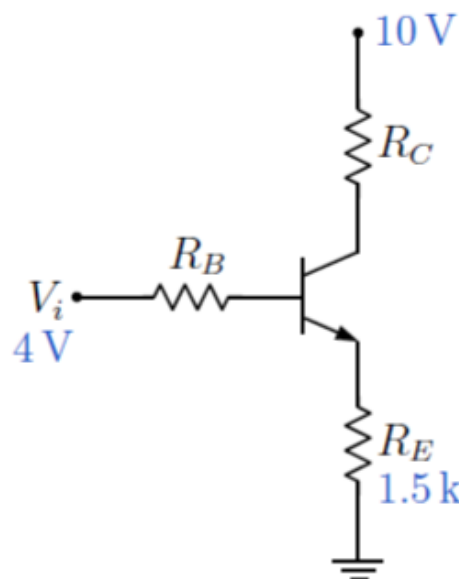
- 76kΩ
- 210kΩ
- 123kΩ
- 186kΩ

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
123kΩ

14 For the BJT circuit of Q-13, with  $R_B$  selected for  $I_C = 1.2mA$ , what value of  $R_C$  is required to obtain  $V_{CE} = 4V$ ?

1 point



3.5k $\Omega$



1.8k $\Omega$



2.7k $\Omega$



4.2k $\Omega$

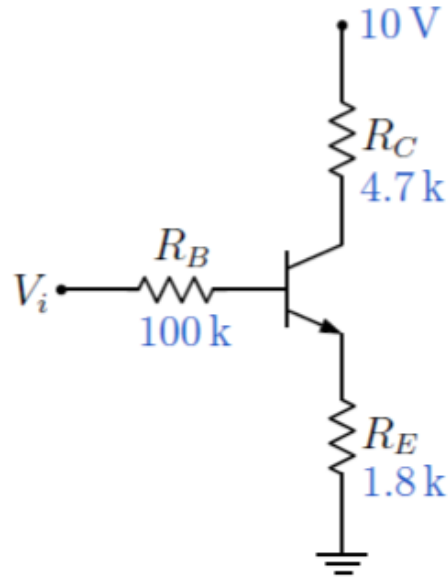
**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

3.5k $\Omega$

15) In the BJT circuit shown in the figure, assume that the transistor has  $\beta = 100$ . What is the minimum value of  $V_i$  required for the BJT to operate in saturation? 1 pt



4.2V



4.9V



3.6V



5.5V

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

4.9V



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