Unit 10 - Week 8

Course outline

How does an NPTEL online course work?

Practice Assignment

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

- Module 1: Zener Effect, Rectifiers
- Module 2: Rectifiers
- Module 3: Clamper, Peak Rectifier, Super diodes
- Module 4: BJT DC Circuits
- Module 5: Current Mirror
- Download Videos
- Weekly Feedback
- Quiz : Assignment 8
- Week 8 Assignment 8 solution

Assignment 8

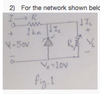
The due date for submitting this assignment has passed. Due on 2020-03-25, 23:59 IST.
As per our records you have not submitted this assignment.

1) A zener diode with nominal voltage of 16 V at 12 mA has an incremental resistance of 50 Ω. Find the value of V_{in} in the zener diode model. What voltages can be expected if the diode current is halved and doubled? *1 point*

- 15.2 V, 15.5 V, 16.3 V
- 15.4 V, 15.7 V, 16.6 V
- 15.7 V, 15.9 V, 16.2 V
- 15.1 V, 15.7 V, 16.4 V

No, the answer is incorrect.
Score: 0
Accepted Answers:
15.4 V, 15.7 V, 16.6 V

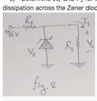
2) For the network shown below, determine the range of R_L and I_L that will maintain V_L at 10 V. Maximum zener current is 32 mA. *1 point*



- $I_{L,max} = 40mA, I_{L,min} = 8mA, R_{L,max} = 1.25k\Omega, R_{L,min} = 250\Omega$
- $I_{L,max} = 60mA, I_{L,min} = 12mA, R_{L,max} = 1.0k\Omega, R_{L,min} = 100\Omega$
- $I_{L,max} = 80mA, I_{L,min} = 16mA, R_{L,max} = 1.50k\Omega, R_{L,min} = 500\Omega$
- $I_{L,max} = 20mA, I_{L,min} = 4mA, R_{L,max} = 0.75k\Omega, R_{L,min} = 50\Omega$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$I_{L,max} = 40mA, I_{L,min} = 8mA, R_{L,max} = 1.25k\Omega, R_{L,min} = 250\Omega$

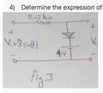
3) Determine R_s and V_z for the given network that will maintain V_L at 12 V. The load current varies from 0 to 200 mA. What will be the maximum power dissipation across the Zener diode? *1 point*



- $R_s = 140\Omega, V_z = 12V, P_{z,max} = 2.60W$
- $R_s = 40\Omega, V_z = 10V, P_{z,max} = 2.00W$
- $R_s = 70\Omega, V_z = 8V, P_{z,max} = 1.60W$
- $R_s = 20\Omega, V_z = 12V, P_{z,max} = 2.40W$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$R_s = 20\Omega, V_z = 12V, P_{z,max} = 2.40W$

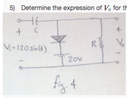
4) Determine the expression of V_o for the given network. *Assume: turn on voltage of diode as 0.7 V.* *1 point*



- $V_o = \begin{cases} 4.0, & 8.0 \geq V_i > 4.0 \\ V_i, & 4.0 \geq V_i \geq -8.0 \end{cases}$
- $V_o = \begin{cases} 4.7, & 8.0 \geq V_i > 4.7 \\ V_i, & 4.7 \geq V_i \geq -8.0 \end{cases}$
- $V_o = \begin{cases} 3.3, & 8.0 \geq V_i > 3.3 \\ V_i, & 3.3 \geq V_i \geq -8.0 \end{cases}$
- $V_o = \begin{cases} 4.3, & 8.0 \geq V_i > 4.3 \\ V_i, & 4.3 \geq V_i \geq -8.0 \end{cases}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$V_o = \begin{cases} 4.7, & 8.0 \geq V_i > 4.7 \\ V_i, & 4.7 \geq V_i \geq -8.0 \end{cases}$

5) Determine the expression of V_o for the given network. *Assume: turn on voltage of diode as 0.7 V.* *1 point*



- $V_o = \begin{cases} 20.3, & V_i = 60 \\ -100.7, & V_i = 0 \\ -220.3, & V_i = -60 \end{cases}$
- $V_o = \begin{cases} 19.3, & V_i = 120 \\ -99.3, & V_i = 0 \\ -220.7, & V_i = -120 \end{cases}$
- $V_o = \begin{cases} 20.7, & V_i = 120 \\ -99.3, & V_i = 0 \\ -219.3, & V_i = -120 \end{cases}$
- $V_o = \begin{cases} 19.3, & V_i = 60 \\ -99.3, & V_i = 0 \\ -219.3, & V_i = -60 \end{cases}$

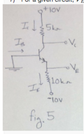
No, the answer is incorrect.
Score: 0
Accepted Answers:
$V_o = \begin{cases} 20.7, & V_i = 120 \\ -99.3, & V_i = 0 \\ -219.3, & V_i = -120 \end{cases}$

6) In a full wave rectifier (FWR) circuit and a bridge rectifier circuit. The peak inverse voltage rating of a diode in FWR and Bridge rectifier is *(in terms of supply voltage V and diode voltage V_{Dc})*: *1 point*

- $(2V - V_{Dc})$ *and* $(V - V_{Dc})$ *respectively.*
- $(V - V_{Dc})$ *and* $(2V - V_{Dc})$ *respectively.*
- $(V - V_{Dc})$ *and* $(V - V_{Dc})$ *respectively.*
- $(2V - V_{Dc})$ *and* $(2V - V_{Dc})$ *respectively.*

No, the answer is incorrect.
Score: 0
Accepted Answers:
$(2V - V_{Dc})$ *and* $(V - V_{Dc})$ *respectively.*

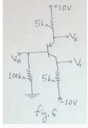
7) For a given circuit, $V_E = -0.7V$, $\beta = 92$. Find I_E, I_B, I_C and V_C. *1 point*



- $I_E = 0.95mA, I_B = 18\mu A, I_C = 0.93mA, V_C = 5.45V$
- $I_E = 0.93mA, I_B = 16\mu A, I_C = 0.91mA, V_C = 5.48V$
- $I_E = 0.95mA, I_B = 10\mu A, I_C = 0.94mA, V_C = 5.42V$
- $I_E = 0.93mA, I_B = 10\mu A, I_C = 0.92mA, V_C = 5.40V$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$I_E = 0.93mA, I_B = 10\mu A, I_C = 0.92mA, V_C = 5.40V$

8) For a given circuit, $V_E = 1.7\,V$, $V_B = 1.0\,V$. Find I_E, I_B, I_C and V_C. *1 point*



- $I_E = 1.52mA, I_B = 20\mu A, I_C = 1.50mA, V_C = 1.75V$
- $I_E = 1.75mA, I_B = 30\mu A, I_C = 1.72mA, V_C = 1.45V$
- $I_E = 1.66mA, I_B = 10\mu A, I_C = 1.65mA, V_C = -1.75V$
- $I_E = 1.33mA, I_B = 45\mu A, I_C = 1.28mA, V_C = -1.45V$

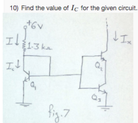
No, the answer is incorrect.
Score: 0
Accepted Answers:
$I_E = 1.66mA, I_B = 10\mu A, I_C = 1.65mA, V_C = -1.75V$

9) A BJT having β = 100 at a DC collector current of I_C = 1.5 mA. Find the values of g_m, r_π, r_e at the bias point. *1 point*

- $g_m = 40mA/V,\ r_\pi = 25.0\Omega,\ r_e = 2.5k\Omega$
- $g_m = 60mA/V,\ r_\pi = 16.5\Omega,\ r_e = 1.66k\Omega$
- $g_m = 80mA/V,\ r_\pi = 12.5\Omega,\ r_e = 1.27k\Omega$
- $g_m = 35mA/V,\ r_\pi = 28.3\Omega,\ r_e = 2.85k\Omega$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$g_m = 60mA/V,\ r_\pi = 16.5\Omega,\ r_e = 1.66k\Omega$

10) Find the value of I_C for the given circuit. *Assume all transistors to be identical with* β = 100 and V_{BE} = 0.7 V. *1 point*



- 1.96 mA
- 2.96 mA
- 3.96 mA
- 4.96 mA

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