

Unit 10 - WEEK 8

Week 8 Assignment 8

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-25, 23:59 IST.

Common data for Q 8.1 to Q 8.6:

The circuit shown in Fig 8.1 is a cascode amplifier.

The values of device parameters for both transistors are given as: $K \frac{W}{L} = 0.5 \text{ mA/V}^2$, $V_{th} = 1 \text{ V}$, $\lambda = 0.01 \text{ V}^{-1}$.

The values of the components in the amplifier are given as: $R_1 = 30 \text{ k}\Omega$, $R_2 = 10 \text{ k}\Omega$, $R_3 = R_4 = 10 \text{ k}\Omega$, $C_1 = C_2 = 10 \text{ }\mu\text{F}$, $C_L = 100 \text{ pF}$ and $R_5 = 10 \text{ M}\Omega$.

The values of parasitic capacitance of both transistors are given as: $C_{p1} = 10 \text{ pF}$ and $C_{p2} = 5 \text{ pF}$.

The supply voltage for the amplifier is given as, $V_{dd} = 12 \text{ V}$ and $I_{BIAS} = 1 \text{ mA}$.

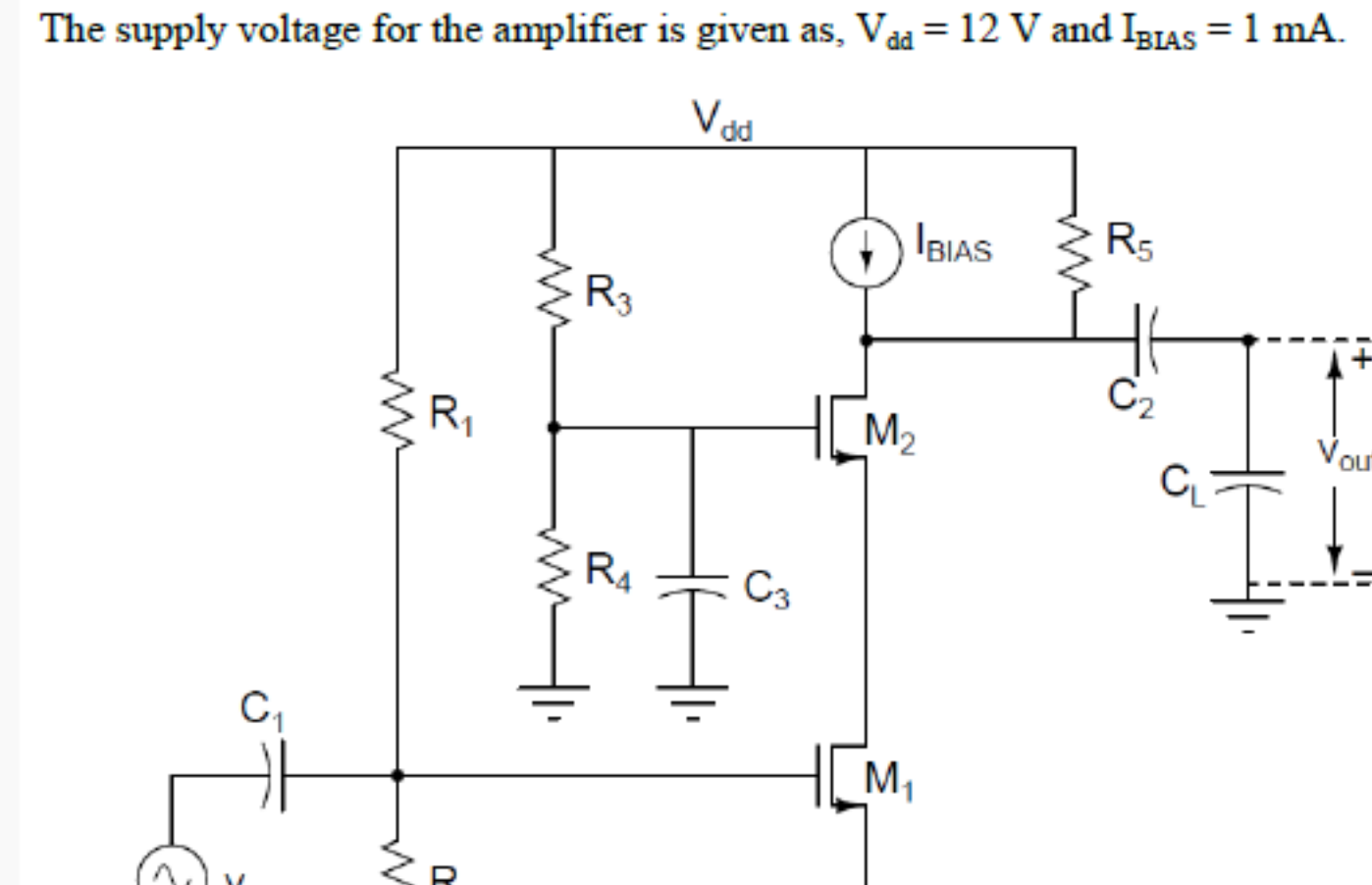


Fig 8.1

- 1) Find the small signal output resistance of the amplifier circuit as shown in Fig 8.1. Select the closest option from the following:

a) 10 M Ω b) 20 M Ω c) 6 k Ω d) 5 M Ω e) 100 k Ω

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
d)

- 2) Find the DC voltage (V_{out}) between drain of M_2 and ground terminals for the amplifier circuit as shown in Fig 8.1. Select the closest option from the following:

a) 12 V b) 6 V c) 5 V d) 7 V e) 4 V

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
b)

- 3) Find the voltage gain, $\frac{v_{out}}{v_{in}}$ in mid frequency range of the amplifier circuit as shown in Fig 8.1. Select the closest option from the following:

a) 50 b) 10^4 c) 100 d) 5000 e) 200

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
d)

- 4) Find the input capacitance of the amplifier circuit as shown in Fig 8.1. Select the closest option from the following:

a) 515 pF b) 15 pF c) 265 pF d) 2 nF e) 135 pF

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
c)

- 5) Find the upper cut off frequency of the amplifier circuit as shown in Fig 8.1. Select the closest option from the following:

a) 318 Hz b) 159 Hz c) 15.9 kHz d) 7.9 kHz e) 31.8 kHz

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
a)

- 6) Refer to the circuit in Fig 8.1, find the maximum output voltage swing (without having significant distortion) of the amplifier circuit for a sinusoidal input signal (v_{in}). Select the closest option from the following:

a) 1 V_{p,p} b) 5 V_{p,p} c) 8 V_{p,p} d) 6 V_{p,p} e) 2 V_{p,p}

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
e)

Common data for Q 8.7 to Q 8.12:

The circuit shown in Fig 8.2 is a CE amplifier with active load.

The values of device parameters of the transistors are: $V_{BE(ON1)} = V_{EB(ON2)} = 0.6 \text{ V}$, $V_{CE(ON1)} = V_{EC(ON2)} = 0.3 \text{ V}$, $\beta_1 = \beta_2 = 100$, and the power supply $V_{CC} = 10 \text{ V}$. Assume early voltages of both transistors are, $V_{A1} = V_{A2} = 100$.

The values of the components of the amplifier are given as: $R_1 = 940 \text{ k}\Omega$, $R_2 = 440 \text{ k}\Omega$, $C_1 = C_2 = C_3 = 10 \text{ }\mu\text{F}$, $C_L = 100 \text{ pF}$.

The values of parasitic capacitances for both transistors are given as: $C_{p1} = 10 \text{ pF}$ and $C_{p2} = 5 \text{ pF}$.

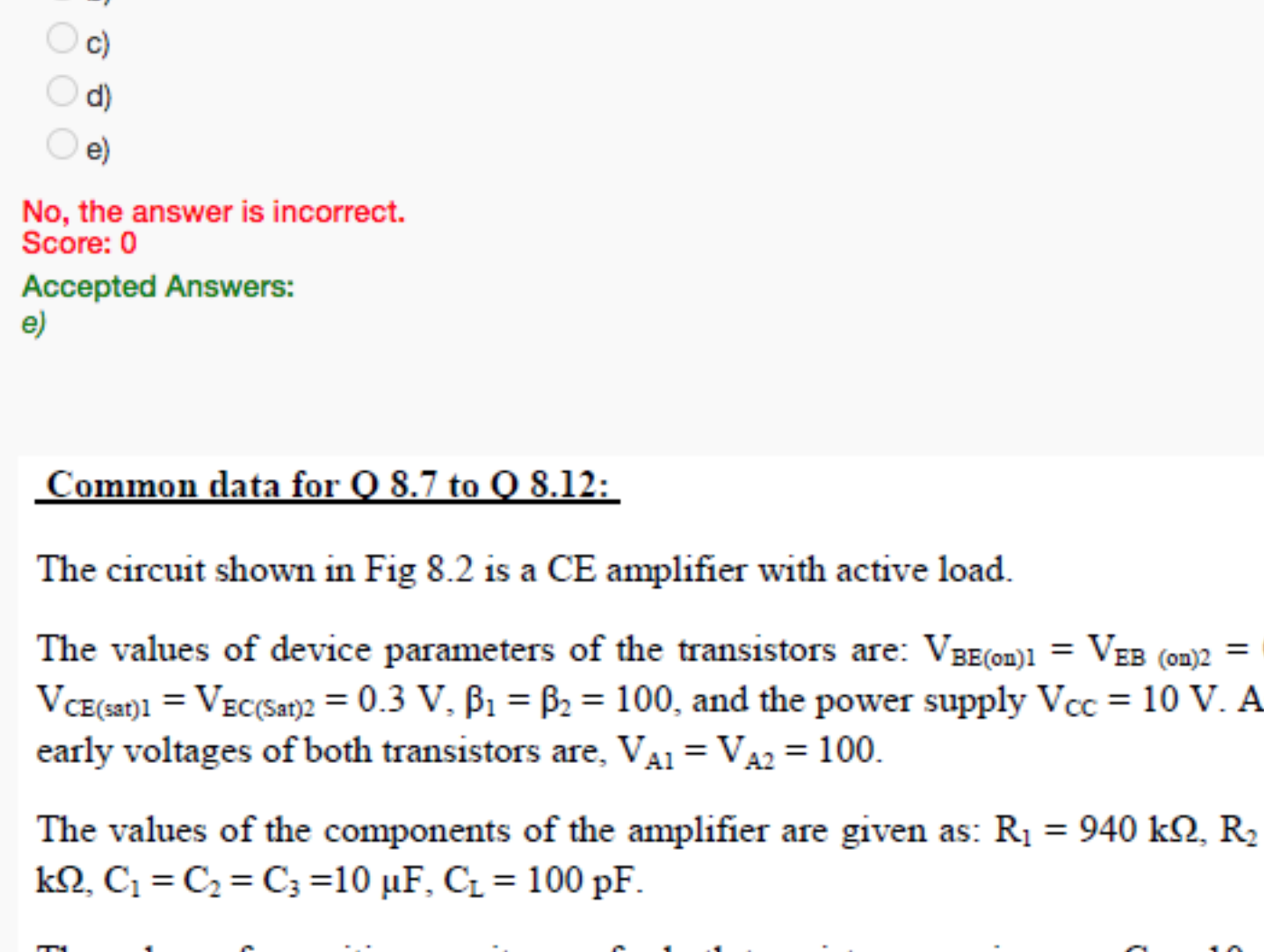


Fig 8.2

- 7) Find the DC voltage between the collector and emitter (V_{CE1}) terminals of the transistor Q_1 as shown in Fig 8.2. Select the closest option from the following:

a) 6.6 V b) 5.8 V c) 4.1 V d) 5 V e) 6 V

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
d)

- 8) Refer to the circuit in Fig 8.2, find the DC voltage between the collector and emitter (V_{CE1}) terminals of the transistor Q_1 if the early voltage (V_{A2}) of transistor Q_2 changes from 100 to 80. Select the closest option from the following:

a) 6.1 V b) 4 V c) 3.2 V d) 6.9 V e) 5.1 V

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
e)

- 9) Find the voltage gain, $\frac{v_o}{v_{in}}$ in mid frequency range of the amplifier circuit as shown in Fig 8.2. Select the closest option from the following:

a) 5 b) 3454 c) 863 d) 1727 e) 17

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
d)

- 10) Find the small signal output resistance of the amplifier circuit as shown in Fig 8.2. Select the closest option from the following:

a) 45 k Ω b) 60 k Ω c) 26 Ω d) 200 k Ω e) 100 k Ω

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
a)

- 11) Find the input capacitance of the amplifier circuit as shown in Fig 8.2. Select the closest option from the following:

a) 17.2 nF b) 15 pF c) 4.3 nF d) 8.65 nF e) 100 pF

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
d)

- 12) Refer to the circuit in Fig 8.2, find the maximum output voltage swing (without having significant distortion) of the amplifier circuit for a sinusoidal input signal (v_{in}). Select the closest option from the following:

a) 0.6 V_{p,p} b) 9.4 V_{p,p} c) 5.3 V_{p,p} d) 4.7 V_{p,p} e) 2 V_{p,p}

- a)
 b)
 c)
 d)
 e)

No, the answer is incorrect.
Score: 0

Accepted Answers:
b)

Course outline

How does an NPTEL online course work?

Week 0 Assignment 0

WEEK 1

WEEK 2

WEEK 3

WEEK 4

WEEK 5

WEEK 6

WEEK 7

WEEK 8

● Lecture 63 : Multi-Transistor Amplifiers: Cascode Amplifier (Contd.) – Numerical Examples (Part A)

○ Lecture 64 : Multi-Transistor Amplifiers: Cascode Amplifier (Contd.) – Numerical Examples (Part B)

○ Lecture 65 : Multi-Transistor Amplifiers: Cascode Amplifier (Contd.) – Numerical Examples (Part C)

● Lecture 66 : Multi-Transistor Amplifiers: Amplifier With Active Load (Part A)

○ Lecture 67 : Multi-Transistor Amplifiers: Amplifier With Active Load (Part B)

○ Lecture 68 : Multi-Transistor Amplifiers: Amplifier With Active Load (Contd.) – Numerical Examples (Part A)

○ Lecture 69 : Multi-Transistor Amplifiers: Amplifier With Active Load (Contd.) – Numerical Examples (Part B)

● Week 8 Lecture material

○ Quiz : Week 8 Assignment 8

○ Week 8 Feedback Form

WEEK 9

WEEK 10

WEEK 11

WEEK 12

Supplementary material

Download Videos

Detail solution

Live Interactive Session

Text Transcripts