Unit 14 - WEEK 12

Week 12 Assignment 12

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

Due on 2020-04-22, 23:59 IST.

Common data for Q 12.1 to Q 12.6:

The circuit shown in Fig 12.1 is a voltage-shunt (shunt-shunt) feedback amplifier.

The values of device parameters for the transistors are given as:
$V_{BE(on)} = 0.6$ V, $\beta = 200$, $V_A = +120$ V.

The values of the components in the amplifier are given as:
$R_B = 1.9$ MΩ, $R_C = 3.3$ kΩ, $R_F = 60$ kΩ, $C_1 = C_2 = C_3 = 10$ μF.

The supply voltage, $V_{CC} = 12$ V.

Consider, thermal equivalent voltage $V_T = 26$ mV and R_C is a part of the forward amplifier.

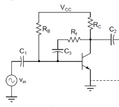

Fig 12.1

1) Find the suitable range of R_F for the voltage-shunt feedback amplifier circuit as shown in Fig 12.1. Select the closest option from the following: 2 points

a) 660 kΩ >> R_F >> 3.3 kΩ
b) 660 kΩ >> R_F >> 4.3 kΩ
c) 866 kΩ >> R_F >> 3.3 kΩ
d) 866 kΩ >> R_F >> 4.3 kΩ
e) 100 kΩ >> R_F >> 3.3 kΩ
f) 100 kΩ >> R_F >> 4.3 kΩ

a)
b)
c)
d)
e)
f)

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

2) Find the overall transimpedance of the voltage-shunt feedback amplifier circuit as shown in Fig 12.1. Select the closest option from the following: 2 points

a) 358 Ω b) 275 Ω c) 7.9 kΩ d) 55 kΩ e) 12 kΩ

a)
b)
c)
d)
e)

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

3) Find the value of input resistance for amplifier circuit due to feedback as shown in Fig 12.1. Select the closest option from the following: 1 point

a) 275 Ω b) 4.3 kΩ c) 55 kΩ d) 720 Ω e) 360 Ω

a)
b)
c)
d)
e)

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

4) Find the value of output resistance for amplifier circuit due to feedback as shown in Fig 12.1. Select the closest option from the following: 1 point

a) 275 Ω b) 3.3 kΩ c) 115 Ω d) 360 Ω e) 55 kΩ

a)
b)
c)
d)
e)

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

5) Find the small signal voltage gain, $|A_v| = \left|\frac{V_o}{V_{in}}\right|$ in mid frequency range of the amplifier circuit due to feedback as shown in Fig 12.1. Assume, the coupling capacitors are shorted in mid frequency range of the amplifier. Select the closest option from the following: 2 points

a) 1824 b) 12.6 c) 304 d) 76 e) 152

a)
b)
c)
d)
e)

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

6) Find the overall transconductance of the voltage-shunt feedback amplifier circuit as shown in Fig 12.1. Select the closest option from the following: 2 points

a) 3.8 mΩ b) 554 mΩ c) 46 mΩ d) 92 mΩ e) 272 mΩ

a)
b)
c)
d)
e)

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

7) To obtain very high input impedance and high output impedance in a feedback amplifier, which topology is mostly used? Select the correct option from the following: 1 point

a) Voltage series
b) Current series
c) Voltage shunt
d) Current shunt

a)
b)
c)
d)

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

8) As compared to the basic amplifier, in a shunt-shunt negative feedback amplifier select the correct option from the following: 1 point

a) Both, input and output impedances decreases

b) Input impedance decreases and output impedance increases

c) Input impedance increases and output impedance decreases

d) Both, input and output impedances increases

a)
b)
c)
d)

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

9) An amplifier has an open loop gain of 100, an input impedance of 1 kΩ and an output impedance of 100 Ω. A feedback network with a feedback factor of 0.99 is connected to the amplifier in a voltage-series feedback mode. The new input and output impedances respectively are from the following: 2 points

a) 10 Ω and 1 Ω

b) 10 Ω and 10 kΩ

c) 100 kΩ and 1 Ω

d) 100 kΩ and 1 kΩ

a)
b)
c)
d)

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

10) An amplifier without feedback has a voltage gain of 50, input resistance of 1 kΩ and output resistance of 2.5 kΩ. Find the input resistance of the current-shunt negative feedback amplifier using the above amplifier with a feedback factor of 0.2. Select the correct option from the following: 2 points

a) $\frac{1}{11}$ kΩ b) $\frac{1}{5}$ kΩ c) 5 kΩ d) 11 kΩ

a)
b)
c)
d)

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

11) As compared to the basic amplifier, in a voltage-series amplifier select the proper option from the following: 1 point

a) Both, input and output impedances decreases

b) Input impedance decreases and output impedance increases

c) Input impedance increases and output impedance decreases

d) Both, input and output impedances increases

a)
b)
c)
d)

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

12) The input impedance (Z_i) and output impedance (Z_o) of an ideal Transconductance (voltage controlled current source) amplifier are from the following: 1 point

a) $Z_i = 0\ \Omega$, $Z_o = 0\ \Omega$

b) $Z_i = 0\ \Omega$, $Z_o = \infty\ \Omega$

c) $Z_i = \infty\ \Omega$, $Z_o = 0\ \Omega$

d) $Z_i = \infty\ \Omega$, $Z_o = \infty\ \Omega$

a)
b)
c)
d)

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

13) Identify the feedback topology in the amplifier circuit (for simplicity base bias is not given) as shown in Fig 12.2 from the following topology: 1 point

a)Voltage – shunt feedback

b) Current – series feedback

c) Current – shunt feedback

d) Voltage – shunt feedback

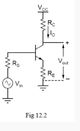

Fig 12.2

a)
b)
c)
d)

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

14) The input impedance ($Z_{in,fb}$) and output impedance ($Z_{out,fb}$) of an ideal feedback networkfor a current – series amplifier are from the following: 1 point

a) $Z_{in,fb} = 0\ \Omega$, $Z_{out,fb} = 0\ \Omega$

b) $Z_{in,fb} = 0\ \Omega$, $Z_{out,fb} = \infty\ \Omega$

c) $Z_{in,fb} = \infty\ \Omega$, $Z_{out,fb} = 0\ \Omega$

d) $Z_{in,fb} = \infty\ \Omega$, $Z_{out,fb} = \infty\ \Omega$

a)
b)
c)
d)

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