Unit 6 - WEEK 4

Week 4 Assignment 4

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

Due on 2020-03-01, 23:59 IST.

Common data for Q 4.1 to Q 4.5:

For the circuit shown in Fig 4.1, consider the values of CE amplifier $R_B = 470k\Omega$, $R_C = 3k\Omega$, $\beta = 100$, $V_{EB(on)} \approx 0.6V$, $V_{EC(sat)} \approx 0.2V$, thermal equivalent voltage $V_T = 26$ mV and early voltage is very high.

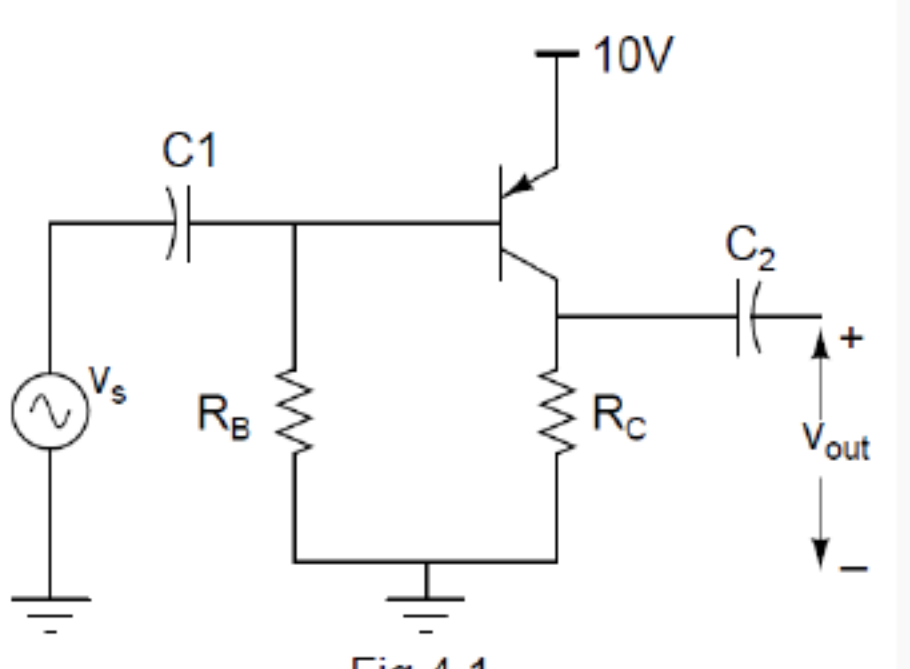

Fig 4.1

1) For the circuit shown in Fig 4.1 find the magnitude of small signal voltage gain (in dB). Assume the signal coupling capacitors are shorted while doing the small signal analysis. Select the closest option from the following: *2 points*

a) 230.7 b) 47.2 c) 10 d) 23.6 e) 23

a) b) c) d) e)

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

2) Find the small signal input resistance for the circuit shown in Fig 4.1. Select the closest option from the following: *1 point*

a) 470 kΩ b) 3 kΩ c) 13 Ω d) 1.3 kΩ e) 2.6 kΩ

a) b) c) d) e)

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

3) Find the value of signal coupling capacitor C_1 such that the lower cut off frequency of the amplifier shown in Fig 4.1 is 100 rad/sec. Select the closest option from the following: *2 points*

a) 1.22 µF b) 8.1 µF c) 10 µF d) 21.27 nF e)7.69 µF

a) b) c) d) e)

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

4) Find the maximum output signal swing without "significant distortion" for a sinusoidal input as shown in the Fig 4.1. Select the correct option from the following: *2 points*

a) 12 V_{P-P} b) 9.8 V_{P-P} c) 6 V_{P-P} d) 7.6 V_{P-P} e) 10 V_{P-P}

a) b) c) d) e)

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

5) Find the maximum input signal swing for the circuit shown in the Fig 4.1. Select the closest option from the following: *2 points*

a) 52 mV_{P-P} b) 26 mV_{P-P} c) 32.94 mV_{P-P} d) 16.47 mV_{P-P} e) 161 mV_{P-P}

a) b) c) d) e)

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

Common data for Q 4.6 to Q 4.9

For the circuit shown in Fig 4.2, consider $R_1 = 40$ kΩ, $R_2 = 80$ kΩ, $R_C = 3.3$ kΩ, $R_E = 3.4$ kΩ, $V_{CC} = 12V$, $V_{EB(on)} \approx 0.6V$, $V_{EC(sat)} \approx 0.2V$, $\beta = 100$, thermal equivalent voltage $V_T = 26mV$ and early voltage is very high.

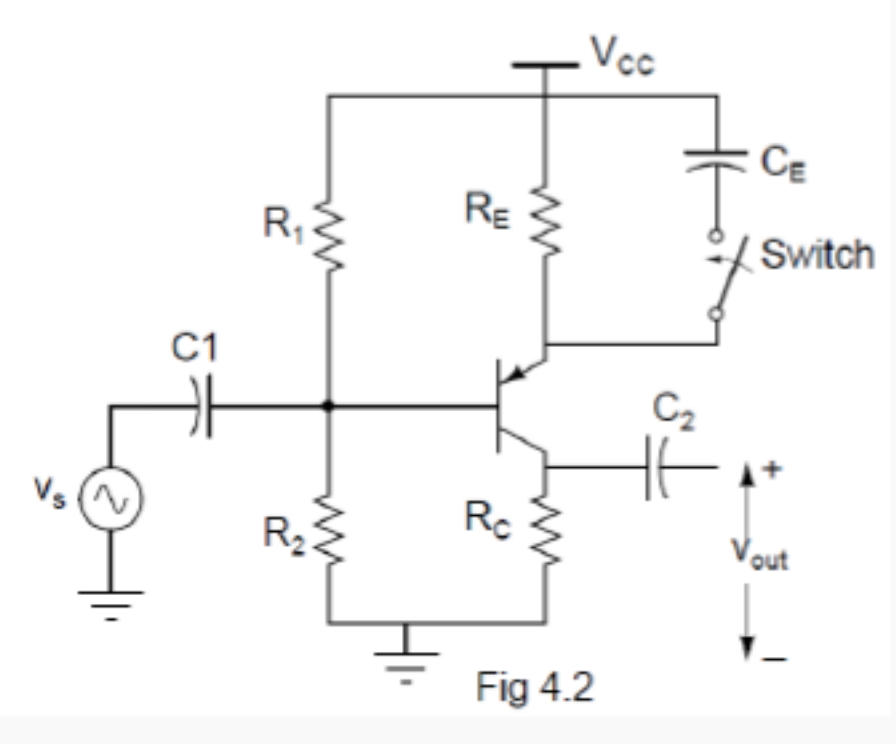

Fig 4.2

6) Find the DC voltage across the emitter and collector terminals (V_{EC}) of the BJT for the circuit shown in Fig 4.2. Select the closest option from the following: *1 point*

a) 5.33 V b) 8.6 V c) 3.26 V d) 10.66 V e) 0.2 V

a) b) c) d) e)

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

7) By considering the $\beta = 200$ find the DC voltage across the emitter and collector terminals (V_{EC}) of the BJT for the circuit shown in Fig 4.2. Select the closest option from the following: *1 point*

a) 5.31 V b) 8.6 V c) 3.28 V d) 10.62 V e) 0.2 V

a) b) c) d) e)

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

8) Find the ratio of small signal voltage gains of the amplifier with and without bypass capacitor (C_E) for the circuit shown in Fig 4.2. Select the closest option from the following: *0 points*

a) 48.13 b) 125.66 c) 255.1 d) 41.98 e) 131.76

a) b) c) d) e)

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

9) Find the input resistance (in kΩ) for the circuit shown in Fig 4.2 by assuming the bypass capacitor is not present (i.e., the switch is opened). Select the closest option from the following: *1 point*

a) 26.66 b) 2.62 c) 24.75 d) 122.62 e) 13.33

a) b) c) d) e)

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

Common data for Q 4.10 to Q 4.15

For the circuit shown in Fig 4.3, the values of device parameters of the MOSFET are given by, $K\frac{W}{L} = 1$ mA/V^2, $V_{thn} = 1$ V, $\lambda \approx 0$ V^{-1}. The values of components are given by $R_1 = 35$ kΩ, $R_2 = 15$ kΩ, $R_D = 3$ kΩ, and $V_{dd} = 10$ V.

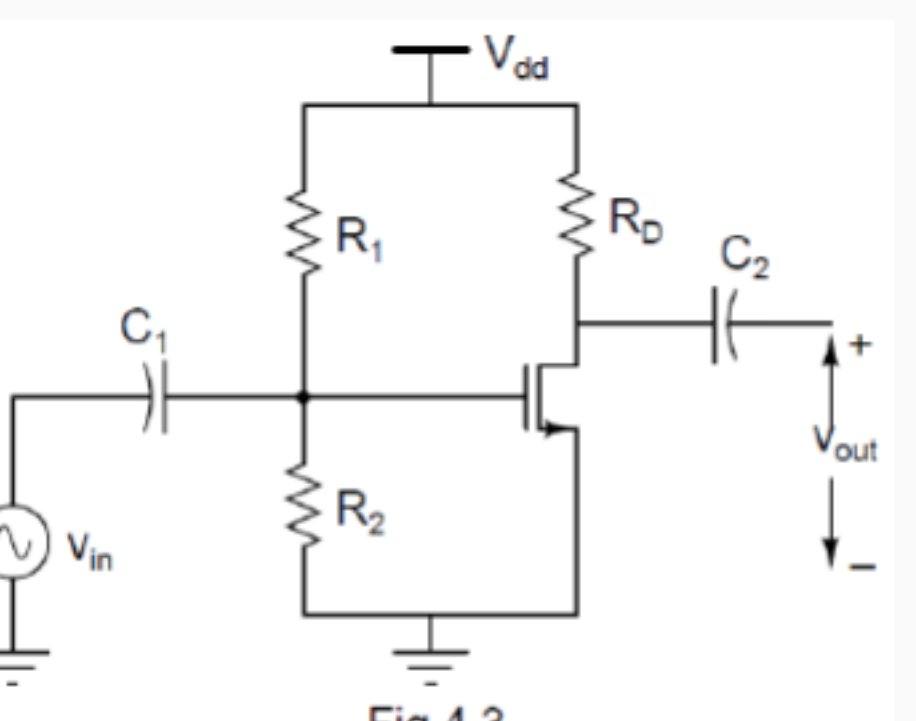

Fig 4.3

10) Calculate the small signal voltage gain, $|A_v| = \left|\frac{v_{out}}{v_{in}}\right|$ for the circuit shown in Fig 4.3. Assume, signal coupling capacitors are shorted for the input signal. Select the correct option from the following: *1 point*

a) 1.33 b) 2 c) 3 d) 6 e) 0.85

a) b) c) d) e)

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

11) Find the input resistance for the circuit shown in Fig 4.3. Assume, signal coupling capacitors are shorted while doing the small signal analysis. Select the correct option from the following: *1 point*

a) 35 kΩ b) 10.5 kΩ c) 15 kΩ d) 50 kΩ e) 3 kΩ

a) b) c) d) e)

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

12) Find the output resistance for the circuit shown in Fig 4.3. Assume, signal coupling capacitors are shorted while doing the small signal analysis. Select the correct option from the following: *1 point*

a) 2.33 kΩ b) 10.5 kΩ c) 15 kΩ d) 13.5 kΩ e) 3 kΩ

a) b) c) d) e)

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

13) Find the value of signal coupling capacitor C_1 such that the lower cut off frequency of the amplifier shown in Fig 4.3 is 15 Hz. Select the closest option from the following: *1 point*

a) 6.3 µF b) 1 µF c) 1.33 µF d) 212.7 nF e) 22.2 µF

a) b) c) d) e)

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

14) Find the power dissipation of the amplifier (including biasing circuit) as shown in Fig 4.3. Select the correct option from the following: *1 point*

a) 22 mW b) 2 mW c) 20 mW d) 12 mW e) 6 mW

a) b) c) d) e)

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

15) For the circuit shown in Fig 4.3, find the maximum output signal swing without "significant distortion" for a sinusoidal input. Select the closest option from the following: *1 point*

a) 10 V_{P-P} b) 4 V_{P-P} c) 2 V_{P-P} d) 8 V_{P-P} e) Not known

a) b) c) d) e)

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