

Reg. No.: 21BEC1857

Name :

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## Continuous Assessment Test I – January 2023

CH2022235002479

Programme	: B.Tech (ECE/ECM)	Semester	: WS 2022-23
Course	: Analog Circuits	Code	: BECE206L
Faculty	: Dr.Sangeetha R.G	Class Nbr	: CH2022231001110
Time	: 90 Minutes	Slot	: F1+TF1
		Max. Marks	: 50

Answer ALL the questions

Q.No.	Sub. Sec.	Questions	Marks
1.		<p>Design a bias-stable PNP transistor circuit to meet a set of specifications. The transistor (Figure 1) values are <math>V_{ECQ} = 7V</math>, <math>I_{CQ} = 0.5mA</math>, <math>\beta = 80</math> and <math>V_{BE(on)}</math>. Find the values of resistors.</p> <p>Figure 1</p>	15
2.		<p>Consider the circuit shown in Figure 2 and answer the following;</p> <p>Figure.2</p>	10



- (i) Draw the small signal high frequency equivalent model and derive the miller capacitance for the circuit (6)
- (ii) Derive the expression for lower and upper cut-off frequencies (4)

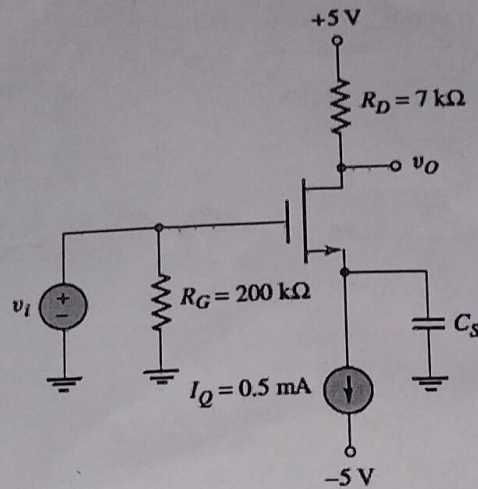


Figure 3.

- i. Draw the small signal equivalent circuit for the circuit shown in Figure 3. (2)
- ii. Derive the expression of voltage gain  $A_v$  (5)
- iii. Assume  $V_{gs} = V_i$ ,  $V_{TN} = 0.8V$ ,  $K_n = 1mA/V^2$  and  $\lambda = 0$ ,  $I_{DQ} = 0.5mA$
- (a) Find drain to source voltage (1)
- (b) Gate to source voltage (1)
- (c) small signal voltage Gain (1)

Analyze the characteristics of class A power amplifier as shown in Figure 4. Also, calculate the actual efficiency of a class A output stage. The circuit parameters are  $V_{DD} = 10V$  and  $R_D = 5k\Omega$  and the transistor parameters are:  $k_n = 1mA/V^2$ ,  $V_{TN} = 1V$  and  $\lambda = 0$ . Assume the output voltage swing is limited to the range between the transition points and  $v_{DS} = 9V$  to minimize nonlinear distortion.

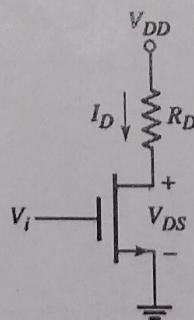


Figure 4

Total 50