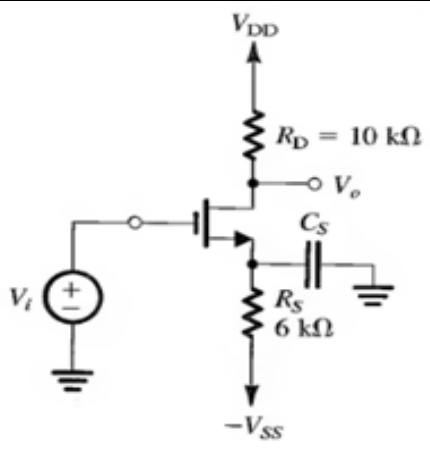


Test: CLAT- II  
Course Code & Title: 18ECC201J – Analog Electronic Circuits  
Year & Sem: II / IV

Date: 24-05-2022  
Duration: 2 Periods  
Max. Marks: 50

**Course Articulation Matrix:**

18ECC201J - Analog Electronic Circuits		Program Outcomes (POs)														
		Graduate Attributes												PSO		
COs	Course Outcomes (COs)	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO-1	Analyze bipolar amplifier circuits and their frequency response.	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO-2	Develop MOSFET amplifier circuits and their frequency response.	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO-3	Compile various negative feedback amplifier and oscillator circuits.	1	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO-4	Demonstrate the different classes of power amplifiers according to their performance characteristics.	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO-5	Construct the basic circuit building blocks that are used in the design of IC amplifiers, namely current mirrors and sources.	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO-6	Organize analog electronic circuits using discrete components to measure various analog circuits' performance.	-	-	3	-	-	-	-	-	2	-	-	-	3	1	-

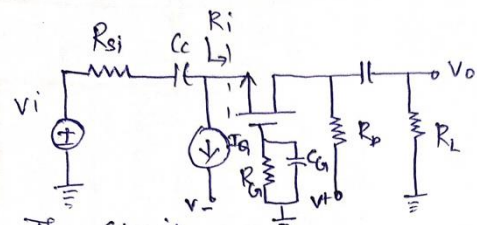
Q. No	Part-A (10*1=10 Marks)	Marks	BL	CO	PO
1	 <p>The amplifier in the figure shown is biased to operate at <math>I_D = 1\text{mA}</math> and <math>g_m = 1\text{mA/V}</math>. Find the midband gain.</p> <p>a. 0.43 V/V  b. 1.43 V/V  c. 2.43 V/V  d. 3.43 V/V</p>	1	2	2	2
2	<p>Thermal runaway is not possible in FET because as the temperature increases</p> <p>a. mobility decreases  b. transconductance increases  c. drain current increases  d. mobility increases</p>	1	1	2	1

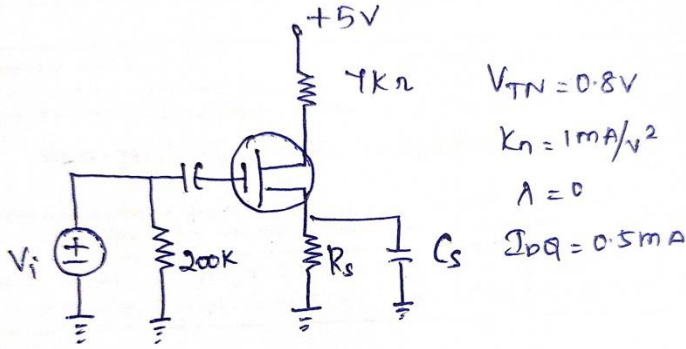
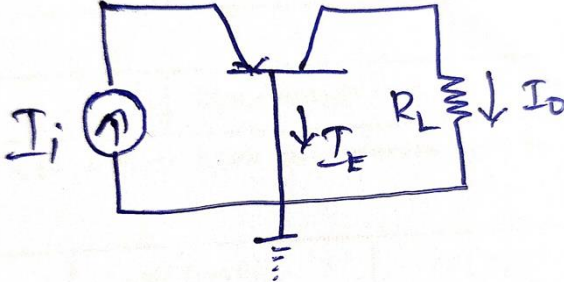
3	<p>Choose the voltage gain of Common Source (CS) amplifier.</p> <p>a. <math>g_m r_d</math></p> <p>b. <math>g_m r_s</math></p> <p>c. <math>-g_m R_D / (1+g_m R_s)</math></p> <p>d. <math>-g_m R_s / (1+g_m r_D)</math></p>	1	2	2	2
4	<p>Which MOSFET amplifier circuit has low input impedance?</p> <p>a. Common Substrate</p> <p>b. Common Drain</p> <p>c. Common Gate</p> <p>d. Common Source</p>	1	1	2	2
5	<p>The midband gain of an amplifier can be calculated by assuming</p> <p>a. Coupling capacitor short circuit and load capacitor open circuit</p> <p>b. Coupling capacitor open circuit and load capacitor short circuit</p> <p>c. Both Coupling capacitor and load capacitor short circuit</p> <p>d. Both Coupling capacitor and load capacitor open circuit</p>	1	2	2	1
6	<p>A signal which is amplified to produce output signal is called _____</p> <p>a. Feedback signal</p> <p>b. Error Signal</p> <p>c. Periodic signal</p> <p>d. Analog Signal</p>	1	2	3	2
7	<p>When the desensitivity factor increases, the stability of the amplifier _____</p> <p>a. decreases.</p> <p>b. increases.</p> <p>c. fixed.</p> <p>d. gradually increases and falls.</p>	1	2	3	1
8	<p>_____ is reduced in the negative feedback amplifier</p> <p>a. Distortion.</p> <p>b. Noise Sensitivity.</p>	1	2	3	1

	c. Bandwidth. d. Input Impedance				
9	The input and output resistances required for the transconductance amplifier are a. Low, Low b. High, Low c. High, High d. Low, High	1	2	3	1
10	_____ is a system consisting of active and passive circuit elements to produce a sinusoidal or other repetitive waveforms at the output without the application of an external input signal. a. Amplifier. b. Oscillator. c. Multivibrator. d. Voltage Regulator	1	2	3	1

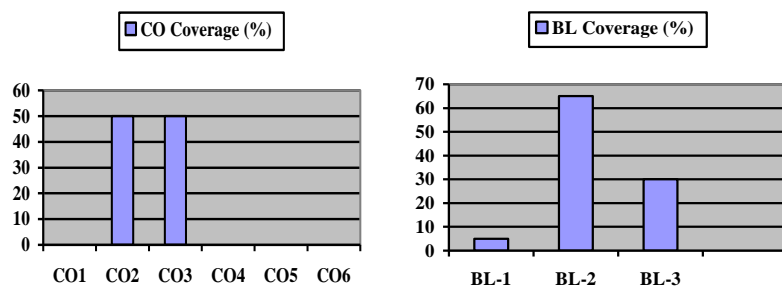
**Part – B**  
(4 x 10 = 40 Marks)

**SECTION B1**  
**Instructions: Answer ANY 2 Questions**

11.	For the common gate circuit, determine the output voltage for a given input current.   The Circuit parameters are: $I_Q = 1\text{mA}$ , $V^+ = +5\text{V}$ , $V^- = -5\text{V}$ , $R_g = 200\text{k}\Omega$ , $R_p = 5\text{k}\Omega$ , $R_L = 10\text{k}\Omega$ , The transistor parameters are $V_{TN} = 1\text{V}$ , $K_n = 1\text{mA/V}^2$ , and $\lambda = 0$ . Assume the input current is $100\sin\omega t \text{ mA}$ & $R_{si} = 50\text{k}\Omega$ .	10	3	2	2
12.	Draw the n-channel common drain amplifier circuit and derive the expression for the input resistance, output resistance and voltage gain.	10	3	2	2
13.	a. Explain the impact of bypass capacitor in frequency response of an amplifier with necessary diagram. b. Determine the small signal voltage gain of Common Source circuit with source bypass capacitor as shown below.	5  5	3  3	2  2	2  3

					
<b>SECTION B2</b>					
<b>Instructions: Answer ANY 2 Questions</b>					
14.	a. Draw the Series shunt feedback topology and derive the expression for the input resistance, output resistance and gain with feedback.	8	3	3	2
	b. Compare RC and LC oscillator.	2	2	3	2
15.	a. For a given circuit, identify the type of feedback topology and derive the expression for the gain, input resistance and output resistance with feedback.	7	3	3	3
		3	2	3	1
16.	a. Determine the operating frequency for Hartley Oscillator with $L_1=1000\mu\text{H}$ , $L_2=500\mu\text{H}$ , $C=50\text{pf}$ and $M=20\mu\text{H}$ .	4	3	3	3
	b. Explain the working of RC Phase Shift Oscillator with neat diagram, write the expression for frequency of oscillation and the condition for oscillation.	6	2	3	2

**Course Outcome (CO) and Bloom's level (BL) Coverage in Questions**



## Evaluation Sheet

Name of the Student:

Register No.:

Part- A (10 x 1= 10 Marks)					
Q. No	CO	PO	Maximum Marks	Marks Obtained	Total
1	CO2	2	1		
2	CO2	1	1		
3	CO2	2	1		
4	CO2	2	1		
5	CO2	1	1		
6	CO3	2	1		
7	CO3	1	1		
8	CO3	1	1		
9	CO3	1	1		
10	CO3	1	1		
Part- B (4 x 10= 40 Marks)					
11	CO2	2	10		
12	CO2	2	10		
13.a	CO2	2	5		
13.b	CO2	3	5		
14.a	CO3	2	8		
14.b	CO3	2	2		
15.a	CO3	3	7		
15.b	CO3	1	3		
16.a	CO3	3	4		
16.b	CO3	2	6		

Consolidated Marks:

CO	Maximum Marks	Marks Obtained
2		
3		
Total		

PO	Maximum Marks	Marks Obtained
1		
2		
3		
Total		

Signature of Course Teacher