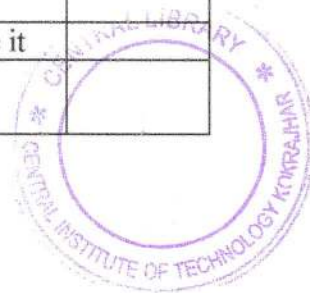


**END SEMESTER/RETEST EXAMINATION, 2020****Semester: 5<sup>th</sup>****Subject code: CAI-506****Subject: Electronic Circuits and Devices-II****Full Marks: =70 (Part A : 25 + Part B:45)****Duration: 3 hours****Instructions:**

1. Questions on Part A are compulsory
2. Answer any five questions from Part B

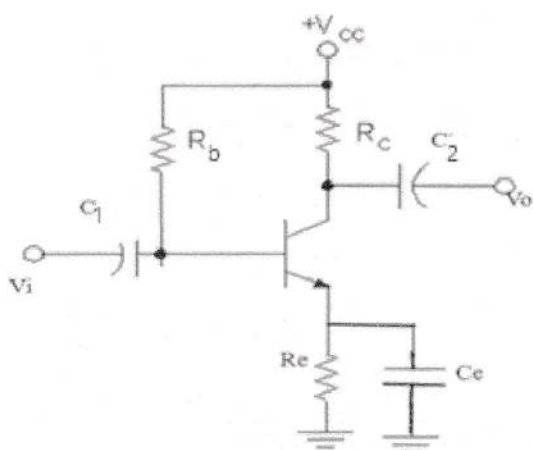
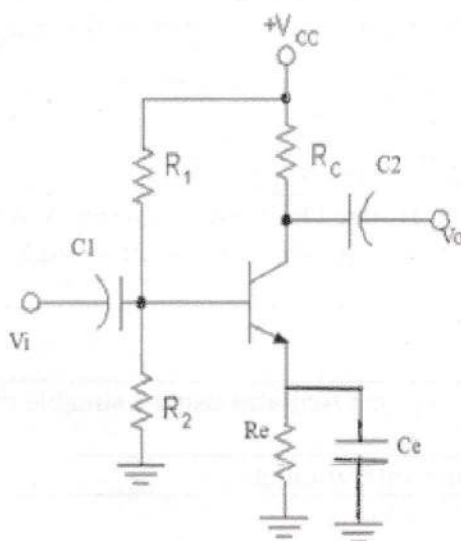
<b>PART-A</b>		
<b>MARK-25</b>		
<b>Question no.</b>	<b>Questions</b>	<b>marks</b>
Question 1	Match the following	1x9=9
	A. Diode	1. Voltage Regulator
	B. Voltage Follower	2. Quartz
	C. Crystal Oscillator	3. Unity Gain Amplifier
	D. Silicon	4. Oscillators
	E. Barkhausen criteria	5. Feedback Amplifier
	F. Transistor	6. Rectifier.
	G. Zener Diode current device.	7. Current controlled
	H. OPAMP Non Inverting Amplifier	8. OPAMP
	I. CMRR	9. Semiconductor
Question no.2	Write true or false:	1x9=9
2a	An ideal OPAMP has zero output impedance.	
2b	An ideal OPAMP has a fixed bandwidth.	
2c	The gain or amplification factor of a transistor is temperature independent.	
2d	Tank circuits are used in tuned amplifiers.	
2e	Bipolar Junction Transistor is a current amplifier.	
2f	The emitter of a transistor is doped moderately.	
2g	Schmitt Trigger is used to convert a square waveform to sinusoidal waveform.	
2h	In transistor DC analysis, capacitors are short circuited.	
2i	LM 317 IC is used for voltage amplification purpose.	
Question no. 3	Choose the correct answer	1x7=7
Q 3a	The emitter of a transistor is generally doped the heaviest because it	
i)	has to dissipate maximum power.	
ii)	has to supply the charge carriers.	



iii)	is the first region of the transistor.	
iv)	must possess low resistance	
3b	The voltage divider bias circuit is used in amplifiers quite often because it	
i)	limits the ac signal going to the base.	
ii)	makes the operating point almost independent of $\beta$	
iii)	reduces the dc base current.	
iv)	reduces the cost of the circuit.	
3c	What is the purpose of impedance matching between the output of previous stage and input of next stage in a cascaded amplifier?	
i)	To achieve high efficiency.	
ii)	To achieve maximum power transfer.	
iii)	To achieve reduced distortion.	
iv)	To achieve reduced noise.	
3d	Negative feedback in an amplifier leads to which one of the following?	
i)	Decrease in bandwidth.	
ii)	Increases in current gain.	
iii)	Increases in voltage gain.	
iv)	Decrease in voltage gain.	
3e	Voltage series feedback ( also called series-shunt feedback) results in	
i)	increases in both input and output impedances.	
ii)	decrease in both input and output impedances.	
iii)	increases in input impedance and decrease in output impedance.	
iv)	decrease in input impedance and increase in output impedance	
3f	The BJT amplifier which offers highest input impedance and least voltage gain is	
i)CE		
ii)CB		
iii)CC		
iv) Cascade Amplifier.		
3h	Oscillators use following feedback	
i)	Negative	
ii)	Positive	
iii)	Both negative and positive.	
iv)	None of the above .	

PART-B, MARK- 45		
Question no.	Questions	marks
Question no. 4		
Q4a	Determine the expressions for $I_c$ and $V_{CE}$ for the following biasing circuit (figure 1).	6



	 <p style="text-align: center;">Figure 1</p>	
Q4b	Draw the circuit for series shunt feedback amplifier and deduce the expression for voltage gain with feedback.	3
Question no.5		
Q5a	Deduce the expressions for input impedance, output impedance and voltage gain of the following circuit (figure 2) using $r_e$ model of the transistor .	7
	 <p style="text-align: center;">Figure 2</p>	
Q5b	A series shunt amplifier has an open loop gain of 50 and feedback gain 0.2, determine the loop gain of the feedback amplifier	2
Question no. 6		
Q6a	<p>In the network shown in figure 3, <math>R_b = 570\text{ k}\Omega</math>, <math>R_c = 4\text{ k}\Omega</math>, <math>+V_{cc} = 12\text{V}</math>, <math>h_{ie} = 1\text{ k}\Omega</math>, <math>h_{fe} = 100</math>, <math>h_{re} = 10</math>, <math>h_{oe} = 20\mu\text{A/V}</math>. Determine the following :</p> <p>(i) Input Impedance  (ii) Output impedance  (iii) Voltage Gain</p>	7





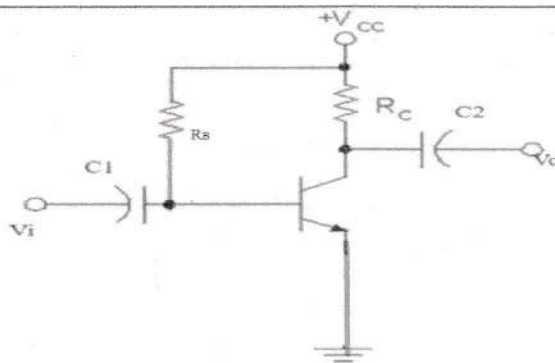


Figure 3

Q6b	Write two properties of feedback amplifiers.	2
Question no. 7		
Q7a	Explain the working of a series voltage regulator using a suitable diagram.	4
Q7b	Draw the diagram of +12V regulated power supply circuit and describe its operation in brief.	5
Question no. 8		
Q8a	Draw the characteristic curve of tuned amplifier and write the expression for resonant frequency and bandwidth of the amplifier.	4
Q8b	Describe the working of a double tuned amplifier using a suitable circuit diagram. What are its advantages as compared to single tuned amplifier?	5
Question no. 9		
Q9a	What are the properties of an oscillator?	2
Q9b	Draw the diagram of Wein Bridge Oscillator. Describe how the criteria for sustain oscillation is achieved in a Wein Bridge Oscillator circuit?	7
Question no. 10		
Q10a	Explain the working of Colpitts Oscillator using a suitable circuit diagram.	5
Q10b	Describe the operation of crystal oscillator.	4
Question no. 11		
Q11a	What is the significance of CMRR in OPAMP?	2
Q11b	Draw the diagram of OPAMP low pass filter and describe its operation. Also, determine the expression for gain.	7
Question no. 12		
Q12a	Describe the working of Stagger tuned amplifier using a circuit diagram.	6
Q12b	What are the features of an ideal OPAMP?	3

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