

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/ Backlog), November-December 2015

B. Tech in Electronics & Communication Engineering, Semester V

(Common to Electrical Engineering)

Roll No.....

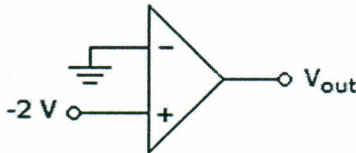
ECE501: LINEAR INTEGRATED CIRCUITS

Time: 3 hours

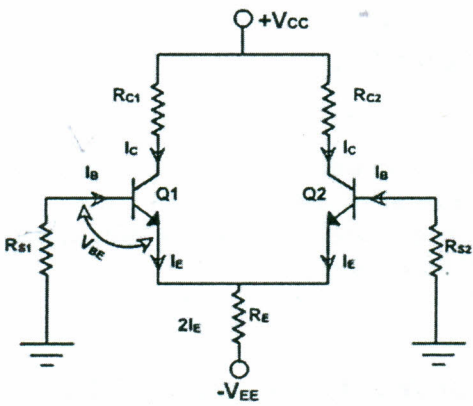
Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A	One word/one sentence answer type questions (10 questions @ 1 mark)	10
i.	Refer to the given figure. The output voltage is ($2V/-2V/V_{sat}/-V_{sat}$) 	
ii.	List out the two applications of Op-amp in open loop configuration.	
iii.	Define the Common Mode Rejection ratio.	
iv.	Define Slew Rate.	
v.	To obtain BPF, LPF and HPF must be connected in	
vi.	Give any limitation of using Op-amp as comparator.	
vii.	What does order of filter signifies?	
viii.	What is Barkhausen stability criterion of oscillation?	
ix.	Write the application of all pass filter?	
x.	Give pin configuration of Timer-555.	

Q.2	Short answer type questions (4 questions @ 2.5 marks)	10
i.	What is effect of negative feedback in a non-inverting amplifier on input impedance and bandwidth?	
ii.	Tabulate the differences between basic comparator & Schmitt trigger?	
iii.	In an inverting adder circuit the input voltages are 0.3V, 0.5V, 0.1V while $R_1=R_2=R_3=1\text{ K}\Omega$, $R_F=10\text{ K}\Omega$. Calculate the output voltage.	
iv.	For an Astable multivibrator using 555 Timer, $R_A=4.7\text{ K}\Omega$, $R_B=1\text{ K}\Omega$, and $C=0.1\mu\text{F}$, Determine the positive pulse width, negative pulse width and the free running frequency.	

Q.3A	Show that the output of the subtractor is proportional to the difference between the two input voltages i.e. $V_0 = k(V_1 - V_2)$ Where V_0 is output, k is gain and V_1 and V_2 are the two inputs.	05
Q.3B	The following specifications are given for the dual input, balanced-output differential amplifier as shown in figure below.  $R_{C1} = R_{C2} = 1 \text{ k}\Omega$, $R_E = 1 \text{ k}\Omega$, $R_{S1} = R_{S2} = 50 \Omega$, $+V_{CC} = 13 \text{ V}$, $-V_{EE} = -13 \text{ V}$, $\beta_{dc} = 100$, $I_B = 0 \text{ mA}$ and $V_{BE} = 0.6 \text{ V}$. Determine the operating points (I_{CQ} and V_{CEQ}) of the two identical transistors.	05

Q.4A	What are limitations in basic differentiator circuit using Op-amp? How these problems can be avoided?	05
Q.4B	Describe the operating principle of PLL. Define capture and locking range.	05

Q.5A	Write a short note on Peaking Amplifier.	05
Q.5B	Discuss the zero crossing detectors with its circuit diagram.	05

Q.6A	What is the difference between active and passive filters? Classify filters based on roll off factors, operating range, and frequency response.	05
Q.6B	Derive the following expression for Wien bridge oscillator. $f_{osc} = \frac{1}{2\pi RC}$ $R_F = 2R_1$ OR	05
Q.6B	Draw the circuit diagram of following circuits using op-amp: (a) phase shift oscillator (b) comparator (c) Voltage-to-Current converter	

Q.7	Draw and explain phase shift oscillator using op-amp. Mention the necessary condition for oscillation.	10
	OR	
Q.7	What is Op-Amp? Draw and Explain the block diagram representation of a typical Op-Amp.	
Q.8	Draw and explain the block diagram of IC 555 Timer. Design an astable multivibrator which will flash the bulb such a that its ON time will be 3 seconds and OFF time will be 1 second.	10
	OR	
Q.8	Explain the Monostable Multivibrator using IC 555 Timer.	
Q.9A	(a) Design first order low pass Butterworth filter at cut-off frequency of 1.59 KHz with pass band gain of 2. Draw circuit with component value. (b) Design a wide band-pass filter having high cut off frequency of 200 Hz and low cut off frequency of 1 KHz.	10
Q.9B	Explain Phase locked loop as a frequency multiplier and FSK demodulator.	10
	OR	
Q.9B	Explain <i>Any Two</i> application of Op-Amp as: (a) Peak Detector (b) Sample and Hold Circuit (c) Absolute-value Output Circuit (d) Square wave generator	