QUESTION PAPER CODE- 54017

University Institute of Engineering & Technology

(Recognised Under Section 2(f) and 12B of UGC)

Kurukshetra University, Kurukshetra

Roll No. -

THEORY EXAMINATION – MAY 2019	
B.TECH - ECE	SEMESTER - IV

TIME – 3 Hrs.

M.M. - 75

PAPER –ECE 208

SUBJECT – Analog Electronics

Note: All questions in Part-A and Part-B are compulsory. Attempt any four questions from Part-C selecting at least one from each unit.

PART-A (15 Marks)

Q. No. – 1 Answer the following questions. **15x1=15**

(i)	Define the Hysteresis Voltage of the Schmitt Trigger circuit.
(ii)	Explain the importance of using current mirror circuit in the differential amplifier.
(iii)	For a dual input balanced output Differential Amplifier, if R_C=10 KΩ, r_e=5 Ω, calculate differential gain.
(iv)	An amplifier has a voltage gain of 400 dB, if the input voltage is 3 V, calculate the output voltage.
(v)	Define the crossover distortion in class B amplifiers.
(vi)	For a Wien bridge oscillator to work at a frequency of 100 kHz, find R if C=0.1 μF.
(vii)	Explain the differences between class A,B,C,AB amplifier based on conduction angle.
(viii)	Describe the advantages of using negative feedback in amplifiers.
(ix)	Define the phase and gain margin for stability of feedback amplifiers.
(x)	Explain the barkhausen criterion of oscillators.
(xi)	Draw the pin diagram of the 555 Timer IC with function of each pin.
(xii)	If differential gain, A_d=10000, common mode gain, A_{cm}=0.1, calculate the CMRR in dB.
(xiii)	Design the Schmitt trigger circuit using Op-Amp, if hysteresis voltage is 14 V?
(xiv)	Classify various types of the differential amplifiers circuits and their differential gains.
(xv)	If r_e=26 Ω, find the value of the emitter current I_E.

PART-B (20 Marks)

	UNIT-I	
2	Explain the differences between voltage, current, transconductance and transresistance Amplifiers based on input and output resistances with the help of diagrams.	5
	UNIT-II	
3	Determine feedback factor β, if Voltage gain of an Amplifier before feedback is 120 dB, gain after 20 dB.	5
	UNIT-III	
4	Explain the working of the Wien bridge oscillator using Op-amp and derive its frequency of Oscillation.	5
	UNIT-IV	
5	What is the application of Schmitt trigger circuit? Explain the operation of Op-Amp based Schmitt Trigger with necessary diagram.	5

PART-C (40 Marks)

	UNIT-I	
6	Derive the input impedance, output impedance, voltage gain of the common emitter fixed Bias BJT amplifier using small signal r_e model.	10
7	Design a common emitter voltage divider bias amplifier for a Voltage Gain=150. Choose V_{CC}=10 V, $I_C(sat)$=5 mA, $I_C=I_C(sat)/2$, $V_{CE}=V_{CC}/2$.	10
	UNIT-II	
8	Derive the equation of the overall Bandwidth of n identical Amplifiers having same lower cut-off Frequency f_1 and same higher cut-off frequency f_2 when Cascaded in series. Compare the frequency response before and after cascading using diagram.	10
9	Derive the value of the maximum efficiency of the class A amplifier . Prove that it can not be greater than 25 %.	10
	UNIT-III	
10	Explain the working and operation of Phase shift oscillator using Op-amp and derive its frequency of Oscillation.	10
11	Explain the working and operation of Monostable multivibrator using 555 Timer and derive the expression of Time period of the output waveform.	10
	UNIT-IV	
12	Derive the Expression of the differential gain A_d and CMRR of a dual-input balanced-output Differential Amplifier.	10
13	Given a Dual-input Balanced output Differential Amplifier, Calculate the output Voltage for the following specifications: R_C = 47 KΩ, R_E= 43 KΩ V_{CC} = +10V V_{EE}= -10V V_{IN1} = 5mV V_{IN2} = 2mV	10