Question Paper

Exam Date & Time: 03-Dec-2018 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
IV SEMESTER B.S. ENGG. END SEMESTER EXAMINATION - NOV./ DEC. 2018
IC Systems [EC 243A]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.

1) A) Draw the circuit of an emitter coupled differential amplifier. Derive an expression for CMRR. (10)

B) Mention any four characteristics of ideal OP-AMP. Draw the internal block diagram of OP-AMP and explain each block. (10)

2) A) Draw the circuit diagram of OP-AMP based i) differential amplifier ii) four input summing amplifier. Derive the expression of the output voltage for both the circuits. (10)

B) Draw the schematic diagram of feedback amplifier and derive the expression for closed loop gain. What are the advantages of negative feedback? (10)

3) A) Draw an inverting amplifier circuit using OP-AMP. Derive the expression for the output voltage assuming ideal conditions. Design the circuit to obtain voltage gain of 10. Draw the output waveform for the input signal (i) $V_i = 0.5\sin(3140t)$ (ii) $V_i = 4\sin(3140t)$ Use supply voltage Â±11V. Assume gain of OP-AMP is 10. (10)

B) Draw the circuit diagram of OP-AMP based triangular wave generator. Explain its working principle with neat waveform and necessary derivations. (10)

4) A) Draw the circuit diagram of second order Butterworth active High pass filter and derive the expression for Transfer function. (10)

B) Draw the circuit diagram of precision full wave rectifier. Explain its working principle with neat waveform and necessary derivations. (10)

5)	A)	Draw the circuit diagrams of V to I converter with Floating and Grounded load using OP-AMP. Derive the expressions for load current.	(10)
	B)	Draw the circuit of an 8-bit successive approximation type ADC. Explain the conversion process with an example. List the names of other ADCs.	(10)
6)	A)	Draw the functional diagram of 555 timer and explain its operation. Explain the function of following pin numbers 4, 5, 6 and 7.	(10)
	B)	Draw the functional diagram of VCO (IC 566) and explain its operation. Derive the expression for frequency of oscillation.	(10)
7)	A)	What is PLL? Give the applications of PLL. Draw the block diagram of IC565 & explain the working of each block.	(10)
	B)	Draw the circuit diagram of series voltage regulator and adjustable regulator. Explain its operation and derive the output voltage expressions.	(10)
8)		Explain the following with circuit diagram, waveforms and expressions: i) Anti-Log amplifier ii) Precision Half wave rectifier iii) Inverting Schmitt trigger iv) Analog Divider	(20)

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