KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: APRIL /MAY 2024

(Regulation 2018)

Fourth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U18ECI4202: Analog Electronics and Integrated Circuits

COURSE OUTCOMES

CO1:   Design and verify feedback amplifiers, LC and RC oscillators.
CO2:   Describe the characteristics of operational amplifiers.
CO3:   Develop and analyze operational amplifier application circuits.
CO4:   Build data converters for the given specifications.
CO5:   Operate 555 timer circuit and generate waveforms.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

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1.	Compare and contrast positive and negative feedback in amplifier.	CO1	[K2]
2.	What are the conditions for sustained oscillation in an oscillator?	CO1	[K2]
3.	List the importance of current mirror circuit used in differential amplifier.	CO2	[K3]
4.	Draw the internal block diagram of an Op-amp	CO2	[K3]
5.	Illustrate the need for an instrumentation amplifier.	CO3	[K2]
6.	Summarize the applications of comparator.	CO3	[K2]
7.	Why VCO is also called as V to F converter?	CO5	[K2]
8.	An Astable multivibrator constructed using with 555 timer with R_A=6.8kΩ, R_B=3.3kΩ and C=0.1μF. Compute t_{HIGH} and t_{LOW}.	CO5	[K3]
9.	Evaluate the number of resistors required for an 8-bit weighted resistor D/A converter. Let the smallest resistance is R and obtain the largest resistance value.	CO4	[K4]
10.	Predict the number of comparators required for realizing a 4-bit flash ADC.	CO4	[K4]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Explain the working of an RC phase shift oscillator with neat circuit diagram and derive an expression for frequency of sustained oscillations.	8	CO1 [K2]

b)	Draw the current series feedback amplifier and derive the equation for the input impedance, output impedance and the voltage gain.	8	CO1	[K₂]

12. a) Construct the tank circuit of Hartley oscillator for the frequency of 120KHz, $L1=0.4mH$ and $C=0.004\mu F$. Neglect the mutual inductance.   6   CO2   [K₃]

    b) Illustrate the DC characteristics of operational amplifier. Also explain the compensation techniques used.   10   CO2   [K₂]

13. a) Describe the working of an integrator using Op-amp. Also draw the input and output waveform of practical integrator when the input is sine wave and square wave.   12   CO3   [K₂]

    b) Examine the output voltage of the following circuit. Given R1 =R2 = 10kΩ and Rf = 100   4   CO3   [K₄]
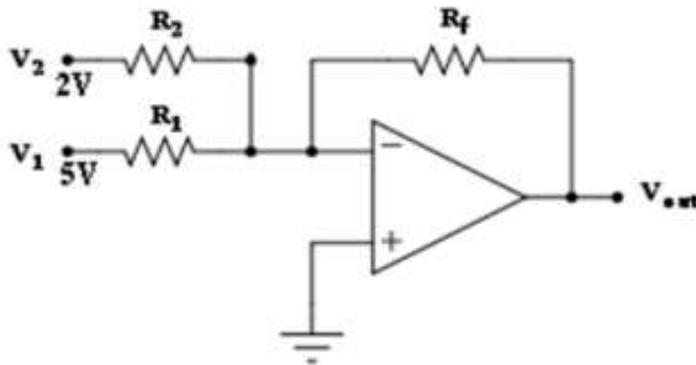
14. a) Explain Log and Antilog log amplifier circuit with necessary diagrams.   8   CO3   [K₂]

    b) Describe Schmitt Trigger circuit for $V_{UT}=3V$ and $V_{LT}= -IV$.   8   CO3   [K₄]

15. a) Discuss any two applications of PLL in detail.   6   CO5   [K₂]

    b) Explain the working of 555 timer as Monostable Multivibrator.   10   CO5   [K₂]

16. a) Examine the output voltage would be produced by a D/A converter for the output voltage range is 0 to 10V and its input binary number is,   8   CO4   [K₃]

       i.   10(for a 2-bit D/A converter)

       ii.   0110 (for a 4-bit D/A converter)

       iii.   10111100(for a 8-bit D/A converter)

    b) Explain the working of successive approximation type A/D converter.   8   CO4   [K₂]

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