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**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FOURTH SEMESTER B.TECH DEGREE EXAMINATION, JULY 2017**

**Course Code: EC204****Course Name: ANALOG INTEGRATED CIRCUITS (AE, EC)**

Max. Marks: 100

Duration: 3 Hours

**PART A***Question No.1 is compulsory. Answer question 2 or 3*

- 1 a) Draw the block diagram of an op-amp and explain the necessity and implementation of each block. (10)
- b) Design an op-amp based circuit to implement the function,  $V_o = 2V_a + 3V_b$ . (5)
- 2 a) With suitable diagram explain how the voltage series feedback is implemented in op-amp based circuits. (5)
- b) Derive the expressions for gain, input impedance, output impedance and frequency response of the above configuration. (10)

**OR**

- 3 a) Draw and explain the circuit diagram of an instrumentation amplifier and derive the output equation. (10)
- b) With suitable diagram and equation, explain how the average of signals can be achieved by using an op-amp circuit. (5)

**PART B***Question No.4 is compulsory. Answer question 5 or 6*

- 4 a) Design an op-amp based astable multi-vibrator for a duty cycle of 75% and draw the waveforms at different points. (8)
- b) Draw and explain the circuit diagram of a log amplifier and derive the output equation. (7)
- 5 a) Draw and explain the working of a practical differentiator circuit including frequency response analysis. (15)

**OR**

- 6 a) Design a Schmitt trigger circuit for different UTP and LTP magnitudes. (7)
- b) Draw and explain the circuit of a square/saw tooth wave generator using op-amps. (8)

**PART C***Question No.7 is compulsory. Answer question 8 or 9*

- 7 a) List the features of IC555 and design a monostable multi-vibrator for a pulse duration of 1ms using IC555. (10)
  - b) With suitable diagram explain the working of a flash convertor. (10)
  - 8 a) Draw and explain the working of a PLL and describe the importance of lock range and capture range. (10)
  - b) Explain the method of current boosting in voltage regulator IC's. (10)
- OR**
- 9 a) Draw and explain the working of a binary ladder type D/A convertor. (10)
  - b) List and explain at least five important specifications of D/A and A/D convertors. (10)

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