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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   (10)
      of each block.
   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   (5)
      op-amp based circuits.
   b) Derive the expressions for gain, input impedance, output impedance and frequency   (10)
      response of the above configuration.

**OR**

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

### 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   (8)
      waveforms at different points.
   b) Draw and explain the circuit diagram of a log amplifier and derive the output   (7)
      equation.
5  a) Draw and explain the working of a practical differentiator circuit including   (15)
      frequency response analysis.

**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   (10)
      duration of 1ms using IC555.
   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   (10)
      and capture range.
   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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