Time: 3Hours **Max. Marks: 80**
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NB:
1. Question No. 1 is compulsory and solve any THREE questions from remaining questions
2. Assume suitable data if necessary
3. Draw clean and neat diagrams

Q.1 Attempt any four Marks

   a. Define the following OPAMP parameters. **05**
      1) C.M.R.R 2) Slew rate 3) Input offset current 4) Input bias current
      5)Input resistance
   b. What are active filters? State its advantages over passive filters. **05**
   c. List important specifications of ADC 0808. **05**
   d. Draw functional block diagram of IC741 . **05**
   e. Explain the basic block diagram of Phase Locked Loop PLL. **05**

Q.2. a.Design first order high pass filter using OPAMP at $f0= 1KHZ$ and
     with gain at 2. **10**

    b. Design a differentiator to differentiate input signal that varies in frequency
      from 10 Hz to about 1 kHz. **10**

Q.3. a Explain with necessary diagrams and waveforms the principle of operation of a
    Monostable multivibrator using OP-AMP. **10**

    b. Design an IC 555 astable multivibrator for an output frequency 1 kHz and a
     duty cycle of 60%. **10**

Q.4. a. Design Voltage regulator using IC723 for $V_0 = 10V$ and $I_L = 200mA$. **10**

    b.With neat circuit explain R/2R ladder digital to analog converter. **10**

Q.5. a Explain triangular wave generator using OPAMP. **10**

    b. Explain internal diagram of power amplifier LM 380. **10**

Q.6Write notes on following (**Any four**)

    a) High frequency effect on operation of OPAMP **05**

    b) Sample and Hold circuit. **05**

    c) Voltage controlled Oscillator (VCO). **05**

    d) Instrumentation Amplifier **05**

    e) Peak detector circuit. **05**

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