Brahma Valley College of Technical Education, Anjaneri, Nashik
Prelim Exam

Course & Code: EJ4G **Date:** 10/03/2014
Subject: LIC(17445) **Time:** 9.30 am to 12.30 pm

Q1.A)Attempt any SIX **(12 Marks)**

a. Define:
   i)Input offset voltage
   ii)Slew Rate
b. Draw circuit diagram of basic differentiator using op-amp
c. List any four specification of IC LM 324
d. State the need of signal conditioning(any two points)
e. Define sample period and hold period with reference to sample and hold circuit
f. Define:
   i) Q factor of filter
   ii) Passband of filter
g. Draw circuit diagram of narrow band reject filter using op-amp
h. State functions of following pins of IC 555
   i)Threshold
   ii)Discharge

Q1.B) Attempt any TWO **(08 Marks)**

a. Describe the function of input stage and level shifting stage of op-amp with it's block diagram
b. State ideal values of following parameters of op-amp as well as state typical values of following parameters of op-amp IC741
c. Describe the term dual i/p balanced o/p differential amplifier and dual i/p unbalanced o/p differential amplifier and draw single i/p unbalanced o/p differential amplifier

Q2. Attempt any FOUR **(16 Marks)**

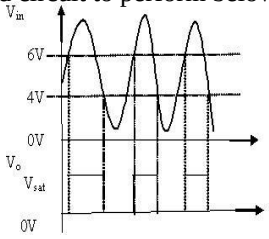
a. Compare open loop and closed loop configuration of op-amp on following basis
   a. Circuit Diagram
   b. Gain
   c. Bandwidth
   d. Application
b. Describe virtual ground and virtual short concept with reference to op-amp.
c. Draw closed loop Non-Inverting amplifier using op-amp and derive expression for it's gain.
d. Derive the expression for relation between i/p and o/p of basic integrator and draw basic integrator.
e. Design and draw the circuit for the following operation using op-amp
f. $Vo=2V_1+V_2-5V_3$
g. Suggest op-amp based circuit to convert squrewave to triangular wave and draw the circuit diagram with input and output waveform.

Q3. Attempt any FOUR **(16 Marks)**

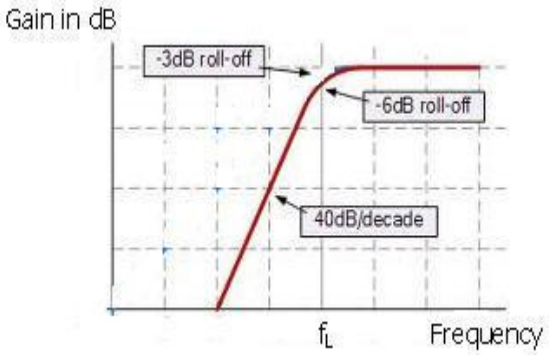
a. Describe the operation of instrumentation amplifier with transducer bridge with help of neat circuit diagram.
b. Draw circuit diagram of grounded load type V-I converter and derive expression for it's output.
c. State the needs of peak to peak detector and draw it's circuit diagram.
d. Draw and describe following op-amp based operation using log and antilog amplifier $Vo=V_1 \times V_2$
e. Draw circuit diagram and input output waveforms of inverting ZCD and non-inverting ZCD
f. Describe the operation of op-amp based Schmitt trigger for sine to square wave conversion with the help of it's circuit diagram

Q4. Attempt any FOUR **(16 Marks)**

a. Suggest an OPAMP based circuit to perform below operation



b. Design and draw low pass filter with cut off frequency 2 Khz and passband gain of 2.
c. Suggest and draw op-amp based circuit using Butterworth filter to fulfill following response



d. Describe the operation of wide bandpass filter with the help of circuit diagram
e. Draw the circuit diagram of op-amp based filter circuit which provides following response and describe it's operation.
f. Classify the op-amp filters on following basis:
   1.Components used
   2.Frequency range
   3. Frequency response
   4.Nature of passband and stopband

Q5. Attempt any FOUR **(16 Marks)**

a. Draw the block diagram of SE 555.State the function of both internal transistors in IC 555.
b. Draw and describe the operation of water level controller using IC 555.
c. Draw and describe the operation of frequency divider using IC 555.
d. Describe the operation of phase detector and role of VCO in PLL.
e. Define and state the expression for lock range and capture range of PLL.
f. Describe with the help of block diagram the operation of FM demodulator using PLL.

Q6. Attempt any FOUR **(16 Marks)**

a. Draw the block diagram of VCO using IC 555.Describe how output frequency varies with the variation in voltage applied to pin 5 of IC 555.
b. Draw the circuit diagram of square wave generator using IC 555. State the purpose of external diode used in the circuit and state expression of it's output frequency.
c. Design and draw monostable multivibrator using IC555 with Tp=1ms.
d. Design and draw op-amp based Wein Bridge oscillator for frequency 1KHz.
e. Draw and describe operation of Bistable multivibrator using op-amp.
f. How much is overall phase shift in op-amp based phase shift oscillator and how it is achieved. Draw it's circuit diagram.