MAHANT BACHITTAR SINGH COLLEGE OF ENGINEERING & TECHNOLOGY, JAMMU

Assignment-1 (Date of Submission 20/09/2016)

SEMESTER: 6TH **COURSE NAME: LIC** **COURSE CODE: ECE-504** **BRANCH: E&CE / AE&I**

Q2. (a) Draw the Op-amp symbol and explain various Op-amp terminals. List the ideal characteristics of on op-amp. (5)

(b) What is the difference between compensated and non compensated op-amps? Explain. (5)

Q3. (a) Derive an expression for output voltage in case of differential amplifier using two OP-Amps. (5)

(b) What is internally compensated op-amp? Draw the frequency response of op-amp and derive an expression for open loop voltage gain. (5)

Q4. (a) What is slew rate and its causes? Derive an expression for slew rate. (5)

(b) For an op-amp having a slew rate of 3 V / μsec. What is the maximum closed loop voltage gain that can be used when the input signal varies by 0.4 V in 12 μsec? (5)

(c) For a dual input balanced output, differential amplifier, V_{CC}=10V, V_{EE}=-10V, R_C=4.7kΩ, R_E=6.8kΩ and R_S=50Ω. Determine

(i) I_{CQ} and V_{CEQ}

(ii) The voltage gain

(iii) Input and output resistance.

Assume h_{fe}=500, h_{ie}=18kΩ and V_{BE}=0.712V. (5)

Q5. (a) For an op-amp used as an inverting amplifier, the values of R_f and R_I are 47k Ω and 470Ω respectively. The input offset voltage drift is 28 μ V/^{0}C while input offset current drift is 300 pA/^{0}C. The amplifier is nulled at 25^{0}C. If the input voltage is 12mV peak sine wave at 2 kHz, then calculate the error voltage and output at 55^{0}C. Also draw the output voltage waveform at 55^{0}C. (5)

(b) List the four negative feedback configurations. Which two configurations are most commonly used and why? (5)

Q6. (a) Non-compensated op-amp has a DC gain A=1,20,000 and the following break frequencies: f_{01}=5kHz, f_{02}=320kHz, f_{03}=1MHz, and f_{04}=2MHz. Write the open loop gain equation for the op-amp as a function of break frequencies and DC gain A. Also draw the frequency response and phase response curves. (5)

(b) What is the active load? Where it is used and why. (5)

(c) Discuss the various methods of realizing high input resistance for an op-amp. Highlight the relative merits and demerits of each. (5)

(d) Define the common-mode rejection ratio (CMRR) and explain the significance of a relatively large value of CMRR. (5)