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Fourth Semester B.E. Degree Examination, June/July 2014
Linear ICs and Applications

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. Define the following parameters and mention its practical values for op-Amp 741.
   (i) CMRR   (ii) Slew-rate   (iii) PSRR   (iv) Output offset voltage.   (08 Marks)
   b. Explain direct-coupled two I/P-Inverting summing amplifier with neat diagram and necessary design steps.   (06 Marks)
   c. A non-inverting amplifier is to amplify a 100 m.V signal to a level to 5 V. Using a 741 op-Amp, design a suitable circuit.   (06 Marks)

2 a. Sketch the circuit of a high Z_{in} - capacitor –coupled voltage follower and design its steps.   (06 Marks)
   b. A capacitor coupled non-inverting amplifier using 741 op-Amp has $A_v = 100$ & $V_o = 5$ V. The load resistance is 10 kΩ and the lower cut-off frequency is to be 100 Hz. Design a suitable circuit.   (08 Marks)
   c. Explain inverting A.C. Amplifier with neat diagram and mention its design steps using only single-supply op-Amp.   (06 Marks)

3 a. Explain phase lead and phase lag compensation methods along with frequency response.   (08 Marks)
   b. Consider a 741 op-Amp with slew rate of 0.6 V/µs is used as a voltage follower. Calculate (i) The slew rate limited cut-off frequency if the sine wave o/p is 6V. (ii) Calculate the maximum peak value of the sinusoidal o/p voltage, if the circuit operator with unity gain cut-off frequency of 800 kHz. (iii) Calculate the maximum peak value of the o/p voltage, if the upper cut-off frequency is 8 kHz.   (06 Marks)
   c. List the precautions that should be used for op-Amp circuit stability.   (06 Marks)

4 a. Draw the circuit of an instrumentation amplifier and explain how the voltage gain can be varied?   (10 Marks)
   b. Discuss the operation of precision full wave rectifier circuit using bipolar op-Amp.   (10 Marks)

PART – B

5 a. Explain the operation of op-Amp sample and hold circuit with signal, control and output waveforms.   (08 Marks)
   b. Draw a neat sketch and explain the working of wein bridge oscillator circuit.   (06 Marks)
   c. Explain frequency doubler technique using op-Amp.   (06 Marks)

6 a. Sketch the circuit of a second order low lass filter and explain its working.   (07 Marks)
   b. An INV Schmitt trigger circuit is to have UTP = 0 V and LTP = 2.5 V. Design a suitable circuit using a bipolar op-Amp with ± / 15 V supply.   (06 Marks)
   c. Sketch the circuit of an op-Amp astable multivibrator and show the voltage waveforms at various points and explain its operation.   (07 Marks)

7   a.   Explain the terms line, load regulation and ripple rejection for a dc voltage regulator.

                                                                                         (06 Marks)

       b.   Design a voltage regulator using IC723 to get a voltage o/p of 25 V.   **(08 Marks)**

       c.   Mention the salient features of a 723 regulator.   **(06 Marks)**

8   a.   Explain Mono-stable multi-vibrator using 555 Ic ?   **(06 Marks)**

       b.   With a neat sketch, explain the working of a R-2R ladder network.   **(08 Marks)**

       c.   With block diagram, explain successive approximation ADC.   **(06 Marks)**

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