Code No.: 10293

FACULTY OF ENGINEERING

B.E. III/IV Year (ECE) I Semester (Supplementary) Examination, May 2006

LINEAR INTEGRATED CIRCUITS AND APPLICATIONS

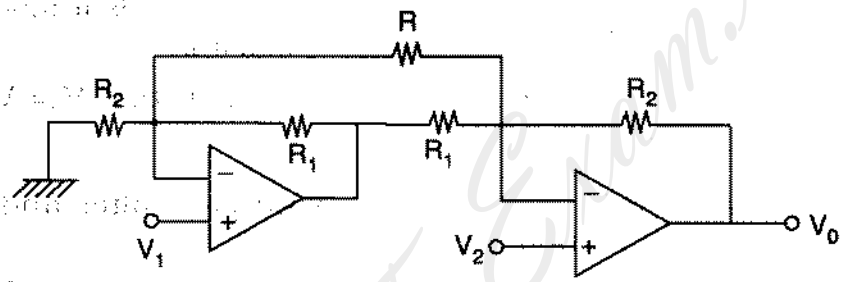
Time : 3 *Hours*] [*Max. Marks* : 75

Answer **all** *questions of* Part A.
Answer **five** *questions from* Part B.

Part A – (Marks : 25)

1. List the Op Amp parameters that are important for ac applications. What are their practical significance.

2. Obtain the output expression for the following circuit



3. What is all pass filter? Where and why is it needed?

4. What are the advantages of active filters over passive ones.

5. State the relationship between lock range and capture range through a mathematical expression and explain.

6. Calculate the frequency of oscillation of a IC 566 VCO for external components $R_T = 6.8K\Omega$, $C_T = 470$ pf. Assume other component values if necessary and draw the circuit.

7. Show the principle of operation of current sweep generator.

8. Draw the functional diagram of IC 8038 and mention its important features.

9. List the specifications of an IC voltage regulator and explain their importance.

10. For an 8-bit DAC with an output range 0–2.55V, define its resolution in at least two ways.

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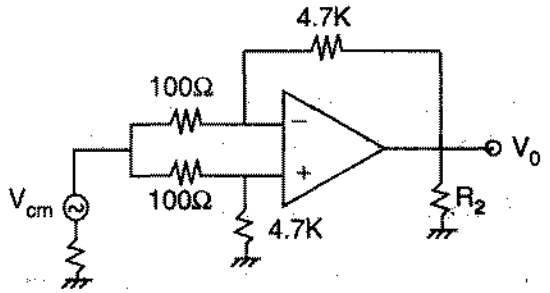
Part B – (Marks : 5 × 10 = 50)

11. (a) In the circuit shown below calculate the amplitude of common mode voltage V_{cm}. If the induced 60Hz noise at the output is 5V(rms).



(b) Define input offset and output offset voltage of an Op Amp. Draw the differential amplifier with offset voltage compensating network and explain its operation.

12. (a) Draw the frequency response curve of a differentiator. How is it modified when a small resistor is connected in series with the capacitor.

(b) Design a difference amplifier (using one Op Amp). Such that $V_0 = V_2 - 3V_1$ and $Ri_1 = Ri_2 = 100$ K.

13. (a) Draw the circuit of a second order narrow band-pass filter and derive an expression for its transfer function.

(b) Design a fourth order butterworth high pass active filter for a cutoff frequency of 2.5 kHz with a pass-band gain of '6'.

14. (a) Draw the circuit of a Schmitt trigger which is required to compare the input signal against the fixed reference of +2V. The output is to switch states whenever input goes below or above 2V by 0.5 mV. The input source is 50Ω. Current I_b = 0.5μV. Common mode input (max) is 5V. Assume offset is '0'.

(b) Draw the internal functional diagram of IC 555 and explain the functions of each P in.

15. (a) Design the circuit of IC 7805 voltage regulator for 5V at 1.5Amp load current. 4

(b) Draw the circuit of a IC 723 voltage regulator for 6V at 200ma. Explain the current fold back feature of this IC voltage regulator. 6

16. (a) Design an PLL circuit using IC 565 for a free running frequency of 400kHz and a capture range of ±10kHz with a supply voltages of ±6V.

(b) Explain at least three application of PLL in detail.

17. (a) Explain the working of R-2R ladder type DAC circuit.

(b) A dual slope ADC uses a 16-bit counter and 1MHz clock rate. The maximum input voltage is +10V. The maximum integrator output voltage should be –8V. When it counts 2n counts with C = 0.1μf find the value of the integrating resistor.