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FIFTH SEMESTER **B.Tech. [ECE]**

SUPPLEMENTARY EXAMINATION ***(FEB.-2019)***

EC-303 LINEAR INTEGRATED CIRCUITS

Time: 3 Hours ***Max. Marks: 40***

Note: Answer ***Any five*** questions.
All questions carry equal marks.
Assume suitable missing data, if any.

Q1. (a) Determine $\frac{V_0(s)}{V_{in}(s)}$ for the circuit show in Fig.1.

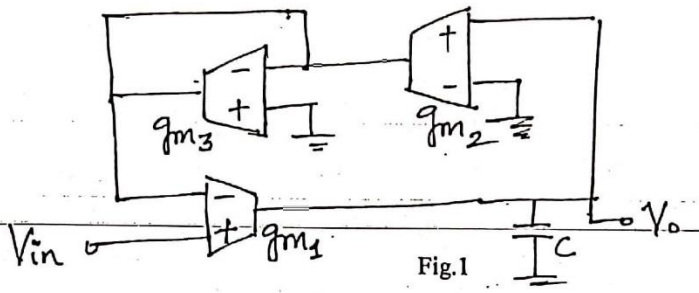

Fig.1

(b) Design a 2nd order band pass filter using OTA and hence find its cut-off frequency.

Q2. (a) Design an monostable multivibrator using OP-AMP to generate a pulse of pulsewidth 1ms. Use a capacitor of 100pF. Explain the circuit with waveforms.

(b) Explain with a circuit diagram, how IC 555 timer can be used as Voltage Controlled Oscillator (VCO). Also determine the frequency of oscillations.

Q3. (a) Describe with neat circuit diagram how analog multiplier can be used for:
(i) Amplitude modulation and demodulation
(ii) Measurement of phase angle.

(b) Design and discuss a precision full wave rectifier using OP-AMP.

Q4. (a) Describe and discuss the three modes of operation of an IC PLL.

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(b) Draw a neat circuit diagram of a four quadrant Gilbert multiplier cell and determine the conditions for which the cell can be used for analog signal processing.

Q5. (a) Assuming, $A_{v1}(s) = A_{v2}(s) \cong \frac{\omega_t}{s}; \omega_t = A_0\omega_p$, determine the output voltage of a passive compensated inverting amplifier using OP-AMP.

(b) (i) For the circuit shown in Fig.2, assume all the transistors to be identical with finite current gain ß. Find the I_{01} and I_{02} in terms of I_{ref}.

(ii) What is the actual value of the current I_{01} and I_{02} if I_{ref}=0.7mA and ß=30.

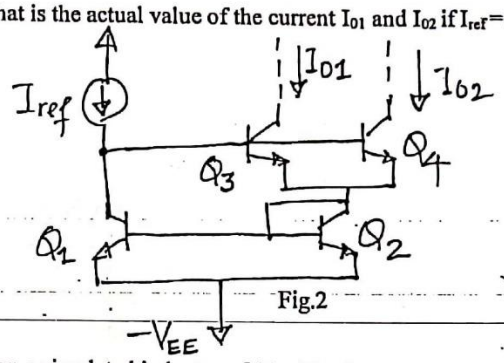

Fig.2

Q6. (a) Design a simulated inductor of 10 mH using General Impedance Converter (GIC).

(b) For the emitter- coupled differential amplifier as shown in Fig.3, draw its small signal equivalent and hence determine:

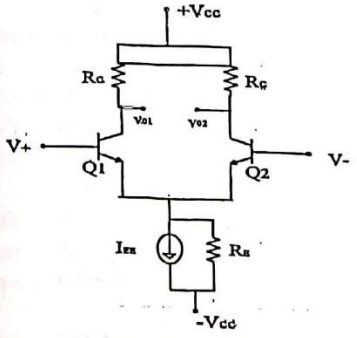

Fig.3

(i) Common mode voltage gain (A_{cm}), differential mode voltage gain (A_{dm}) and
(ii) Common mode rejection ratio (CMRR).

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