EL 213 ANALOG CIRCUITS

End -Semester Exam

2nd May 2015

Time: 2 Hours

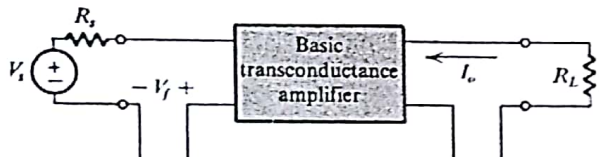
Maximum marks: 50 Marks

Note: 1. Write short but precise answers. 2. Any parameter not specified but assumed should be clearly mentioned. 3. Answer any 5 questions. 4. Use of calculator is allowed.

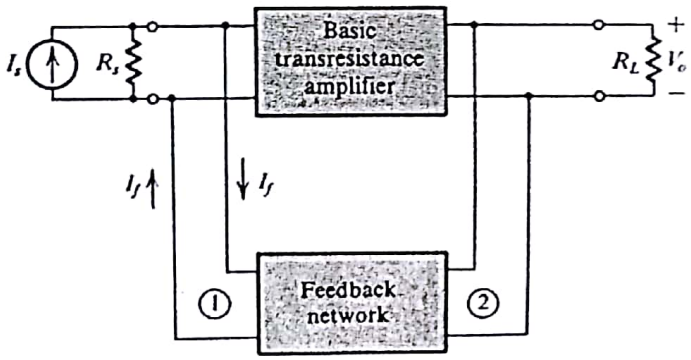
Q.1 Explain the general structure of a negative feedback amplifier. Mention some of its properties and detail on 2 of its properties by appropriate derivations. **10 Marks**

Q.2 Explain series-shunt feedback amplifier with ideal structure and equivalent circuit diagrams. Derive the equations for A, A_f, R_{if} and R_{of} (input and output resistances with feedback) and β. **10 Marks**

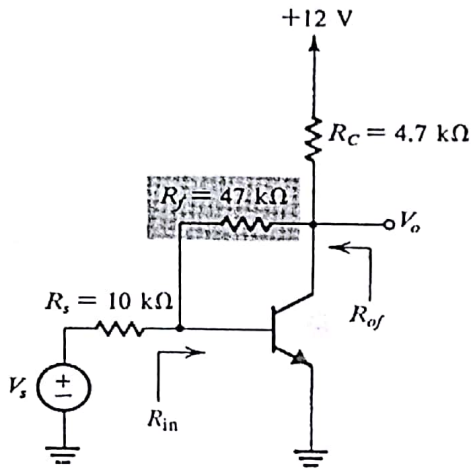
Q.3 (a) A series-series feedback circuit shown below uses an ideal transconductance amplifier and operates with $V_S = 100$ mV, $V_f = 95$ mV, and $I_o = 10$ mA. What are the corresponding values of A and β? Include the correct units for each. **5 Marks**



Q.3 (b) A shunt-shunt feedback circuit represented below uses an ideal transresistance amplifier and operates with $I_S = 100$ μA, $I_f = 95$ μA, and $V_o = 10$ V. What are the corresponding values of A and β? Include the correct units for each. **5 Marks**



Q. 4 Solve following voltage shunt feedback circuit by first calculating gain without feedback but with beta loading, and then calculate beta, loop gain, Desentitivity factor, input and output resistance with feedback and voltage gain Vo/Vs. **10 Marks**



Q.5 (a) Derive the expression of Common Mode Rejection Ratio CMRR for a differential amplifier. **3 Marks**

(b) Draw a basic BJT differential amplifier with emitter resistors and current source and explain its working. **2 Marks**

(c) Explain Monostable multivibrator with a circuit diagram. **5 Marks**

Q.6 (a) Explain under what conditions, a closed loop negative feedback amplifier becomes unstable? **2 Marks**

(b) Explain the terms Phase and Gain margin with diagram. **3 Marks**

(c) Draw Bode Plot for a 3-pole loop gain expression and explain how you will improve stability using Dominant pole compensation method. **5 Marks**