Fayoum University
Faculty of Engineering
Electrical Engineering Dep.

Electronics I, ECE201
Final-Term Exam
January 11, 2017

- **Answer all Questions**
- Maximum degree is **70.**
- Total time allowed is **3 hours.**
- The exam is **5 questions in 2 pages.**

Good Luck! Dr. Mohammed A. Hassan

Problem (1) [15 points]:

For the amplifier circuit shown in Fig. 1, [K_N=4mA/V^2. V_{TN}=1V, V_A=∞, C_{gs}=0.5pF, C_{gd}=0.1pF].

Part (a) low frequency analysis:

(i) Determine the DC biasing point and check SAT condition.
(ii) Plot the ac equivalent circuit for the amplifier, then determine the midband voltage gain.
(iii) Choose the capacitors C_1 and C_2 such that the corresponding break frequencies are f_1=1Hz and f_2=10Hz.
(iv) Draw the magnitude Bode plot on the logarithmic graph paper.

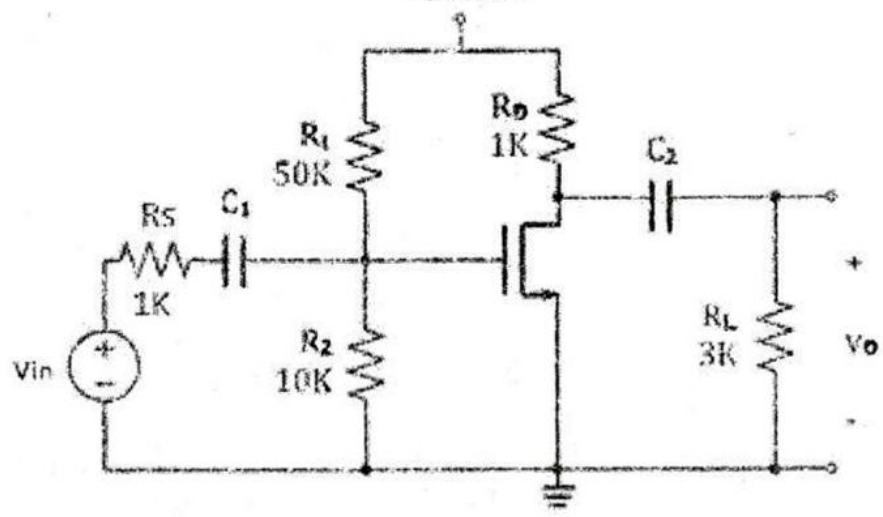

Fig. 1

Part (b) high frequency analysis:

(v) Determine the two high corner frequencies of the amplifier.
(vi) Draw the magnitude Bode plot of the high frequency behavior of the amplifier over the same logarithmic paper used in part (iv).

Problem (2) [15 points]:

For the following cascade amplifier shown in Fig. 2, [V_A=200V, β=200, V_T=25mV, $V_{BE,on}$=0.7V].

(a) Calculate the DC biasing point and the ac small-signal parameters (r_π, g_m, r_o) and plot the ac equivalent circuit for the overall amplifier.
(b) Calculate the no-load voltage gain and output voltage of the amplifier.
(c) Calculate input impedance of the first stage and output impedance of the second stage.
(d) Calculate the overall gain and output voltage if 10 kΩ load is applied to the second stage.

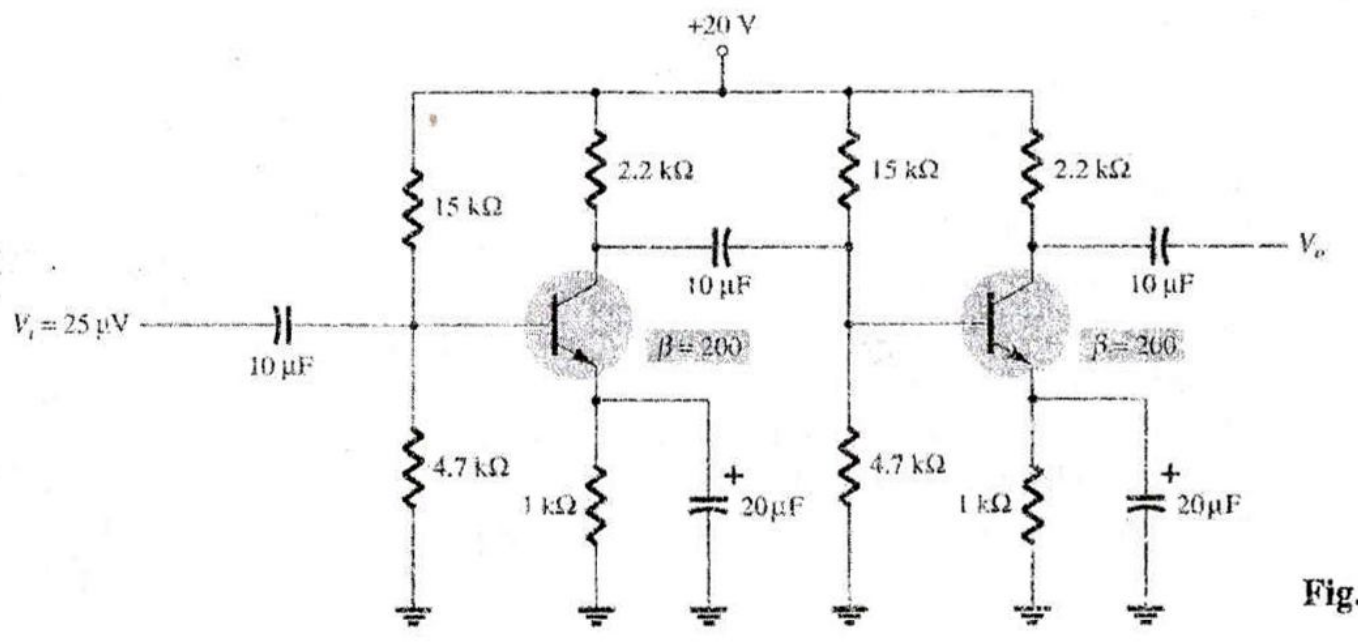

Fig. 2