Mansoura University Faculty of Engineering Biomedical Engineering (BME) Program - Level 200		Electronic Circuits (2) Course code: ECE264 Time : 120 minutes Full Mark : 50 degrees
Final Exam 2015-2016 – Second Semester		

Notes:

1- There are additional 5 degrees distributed among all questions.
2- Answer **only** five questions from the following six questions.
3- Clear Answers may be helpful for both of us
4- Time allowed is 120 minutes (24 minutes for each question of the required 5 questions)

1- With aid of characteristic curves, symbols, equations, and Models; briefly describe each of the following with one application for each: JFET, Depletion MOSFET, Enhanced MOSFET, BJT, Zener diode, Shockley diode, and Varactor [11 degrees]

2- For the Circuit Shown in Figure (1); (a) For the DC-analysis : find I_B , I_C , I_E , V_C , V_E , V_{CE} , and discuss the thermal stability (b) for the AC analysis; using Simplified h-model : find the voltage gain , current gain , input impedance , output impedance , and obtain if there is a phase shift between input and output. [11 degrees]

3- For the Darlington Pair circuit shown in Figure (2); find the voltage gain, current gain, input impedance, output impedance, and obtain if there is a phase shift between input and output. [11 degrees]

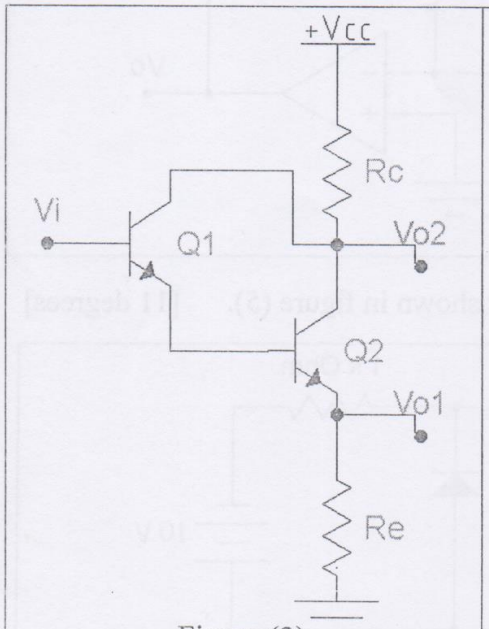

Figure (2)

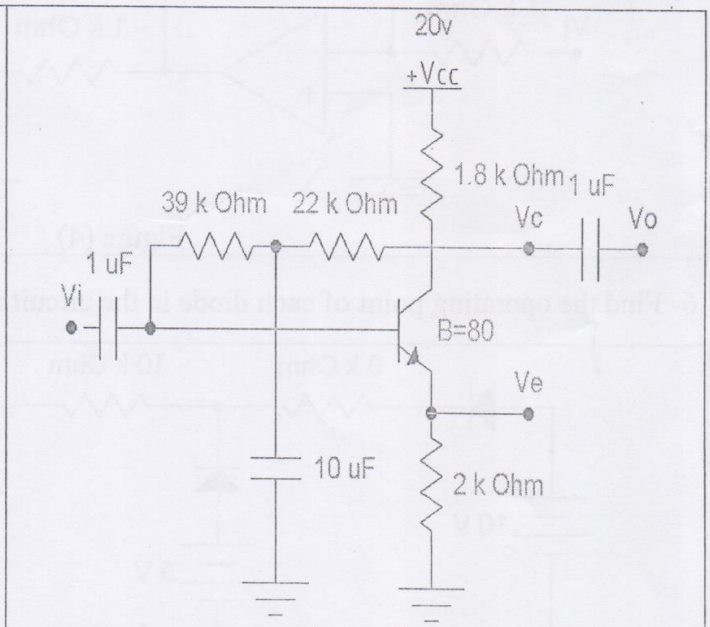

Figure (1)

4- For the Circuit shown in figure (3); Find: Voltage Gain (Av), Current Gain (AI), Input Impedance (Zi), Output Impedance (Zo), and obtain if there is a phase shift between input and output. h_{ie}=1, h_{fe}=30 , r_d=10kΩ, and μ=20 [11 degrees]

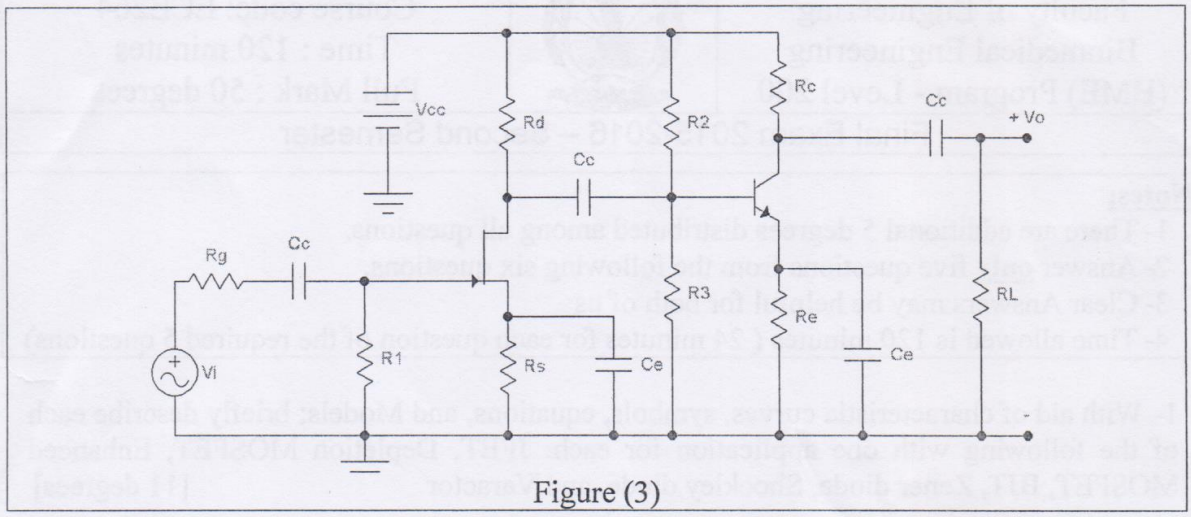

Figure (3)

5- For the Operational Amplifier circuit shown in Figure(4); (a) Find the mathematical expression which describe the relation between Vo and Vi (b) Describe the operation of this circuit (c) State the main characteristics of the Operational Amplifiers [11 degrees]

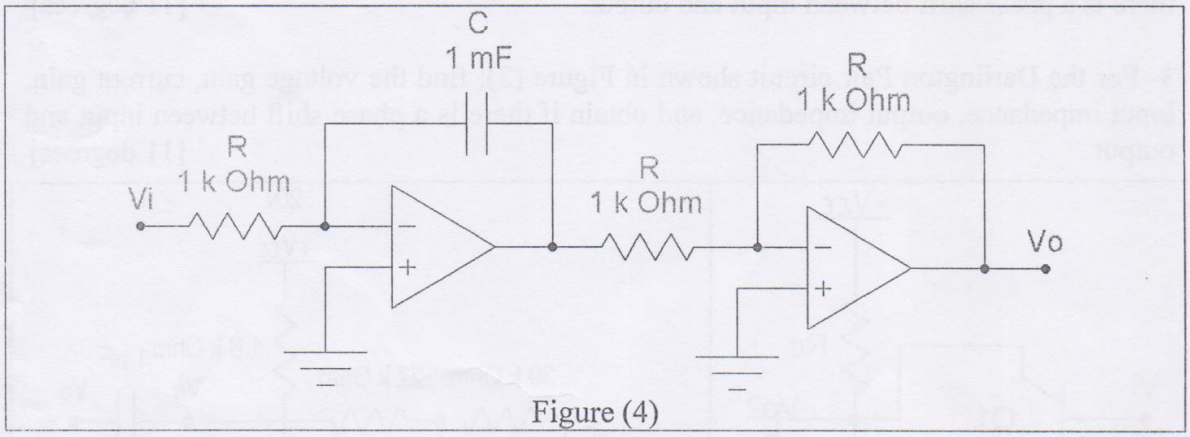

Figure (4)

6- Find the operating point of each diode in the circuit shown in figure (5). [11 degrees]

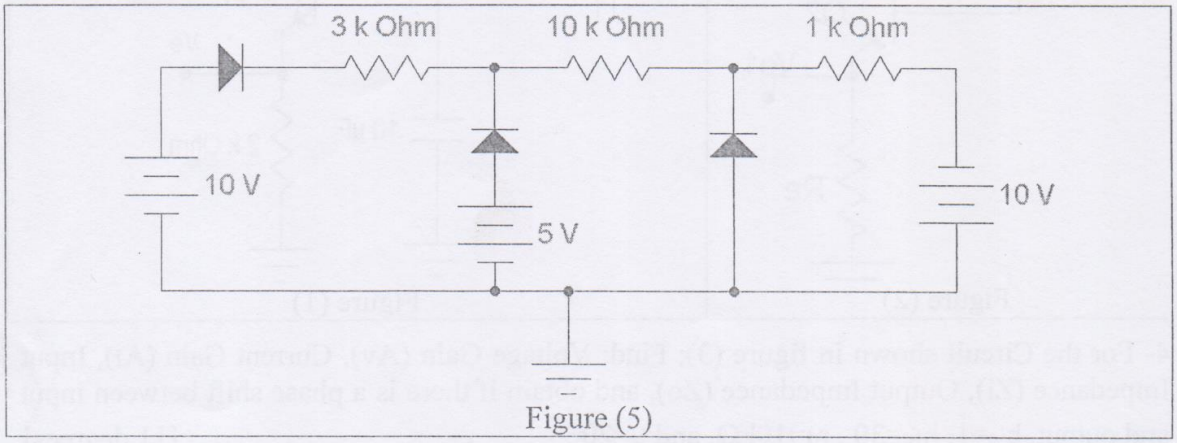

Figure (5)

With all of my best wishes
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Electronics 2
Final-Term Exam
Time allowed: 2 Hours

Answer the following questions; assuming any missing data.

1) a- Compare in a table between the common emitter, common base, and common collector BJT amplifiers.
   b- Investigate the effect of connecting a resistance to the emitter terminal in a CE BJT amplifier.
   c- Compare between the small signal, and power amplifiers.

(10 Degrees)

2) For the common base (CB) amplifier shown in Fig. 1, find the input impedance, voltage gain, overall voltage gain, current gain, short circuit current gain, and output impedance. With R_C =10 kΩ, R_L=10 kΩ, V_{CC}=10 V, and R_S=100 Ω, what is the value of I so that the input impedance at E is equal to that of the source (i.e. 100 Ω) assume β=100 .

(10 Degrees)

3) Use the circuit of Fig. 2 to design a common gate amplifier. Find R_{in}, R_{out}, A_{vo}, A_v, G_v, and *Gi* for R_L =15 kΩ and R_{sig} = 50 Ω. What will the overall voltage gain become for R_{sig} = 50 Ω? 10 kΩ? 100 kΩ?

(15 Degrees)

4) The circuit shown in Fig. 3 consists of two stages:
   Stage 1: CE amplifier with V_{cc} = 12 V, R_c = 1.0 kΩ and r_e=5Ω.
   Stage 2: Darlington emitter follower amplifier with voltage divider bias, given R_1 = 10 kΩ, R_2 = 22 kΩ, R_E = 22 Ω, R_L = 8 Ω, V_{cc} = 12 V and $\beta_1 = \beta_2$ = 100.

(15 Degrees)

a) Determine the voltage gain of the common-emitter amplifier.
b) Determine the voltage gain of the Darlington emitter-follower.
c) Determine the overall voltage gain.
d) If the circuit is without the Darlington pair, find the gain and compare with that obtained in C.

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b) Determine the voltage gain of the Darlington emitter-follower.
c) Determine the overall voltage gain.
d) If the circuit is without the Darlington pair, find the gain and compare with that obtained in C.