Jordan University of Science & Technology
Department of Electrical Engineering

Summer 2010 | EE 322 Midterm (Theoretical) | July 29, 2010

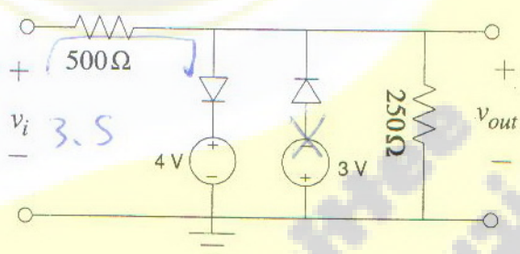
Student Name: _____ Student ID: _____

Q	1	2	3	4	5	6	7	8
A	B	C	A	D	D	F	E	E

Problem 1 multiple choice questions [8-points]: Read the following questions and then fill the above table with the symbol of the correct answer

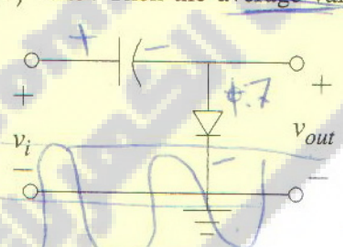
1. For the circuit shown below, if the input is 3.5 V. Assume the turn-on voltage of the diode is 0.7 V, then the value of the output voltage is

   a. 3.5 V
   b. 4.7 V
   c. 1.167 V
   d. 2.3 V
   e. 1.75 V
   f. None of the above



2. For the circuit shown below. If $v_i(t) = 10\cos(\omega t + \theta)$ volts. Then the average value of the output waveform is (assuming ideal diode)

   a. 10
   b. -5
   c. -10
   d. 5
   e. 0
   f. None of the above



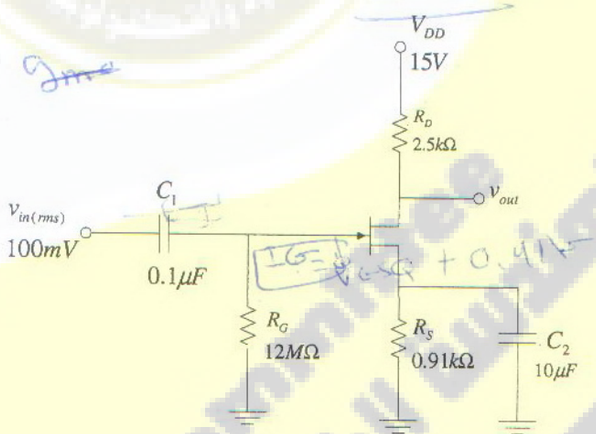
3. For a common emitter amplifier, if the voltage gain, at no load, is -10, and -8 when connected to a load of 10Kohms, then the value of the amplifier output impedance (in Kohms) is

   a. 2.5
   b. 12.5
   c. 10
   d. 8
   e. None of the above

4. The main function of the RC filter at the output of the half wave rectifier is to
   a. Increase the ripple frequency
   b. Cause the circuit to operates as a full wave rectifier
   c. Filter out the noise
   d. Increase the DC average
   e. Reduce the coupling effect

5. The frequency of the ripple voltage in a full wave rectifier is
   a. Same as the input frequency
   b. Half the input frequency
   c. Four times the input frequency
   d. Double the input frequency
   e. None of the above

6. For the circuit shown below, assume for this particular JFET that $I_{DSS} = 8mA$ and $V_{GS(off)} = -3V$. If the circuit is biased at the midpoint of load line, then the value of the Q-point is
   a. 4 mA, 1.36 V
   b. 8 mA, 2.25 V
   c. 4 mA, 2.25 V
   d. 4 mA, -2.25 V
   e. 8 mA, -1.36 V
   f. None of the above



7. For the circuit of Q6, the value of the forward transconductance is
   a. 10.67 mS
   b. 16 mS
   c. 2.67 mS
   d. 1.78 mS
   e. 5.33 mS
   f. None of the above

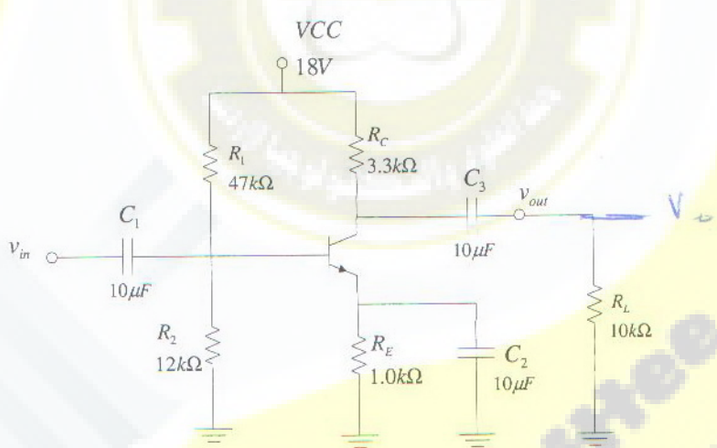
8. In a common emitter amplifier, the purpose of having a decoupling capacitor at the input circuit is
   a. To provide a varying bias
   b. To increase the voltage gain
   c. To have the Q-point in the mid range of the DC load line
   d. To couple the AC signal from the DC circuit
   e. To decouple the AC signal from the DC circuit

Problem 2 [4.5 points]

For the circuit shown below with $\beta_{DC} = 100$, and $\beta_{AC} = 120$

Determine

1. The Q-point and draw the DC load line
2. Maximum voltage swing
3. Determine the input impedance as seen from the source
4. Draw the AC equivalent circuit and determine the voltage gain



Good luck