

PURDUE UNIVERSITY NORTH CENTRAL

Electrical Engineering Technology Department

EET 257 (Prof. Smith)

Final Exam

Test-Out

NAME: _____

1. Refer to the characteristic curves below.

(a) For $V_{CC} = 32\text{ V}$ and $I_{C(\max)} = 8\text{ mA}$, draw the load line and a Q-point on the plot below.

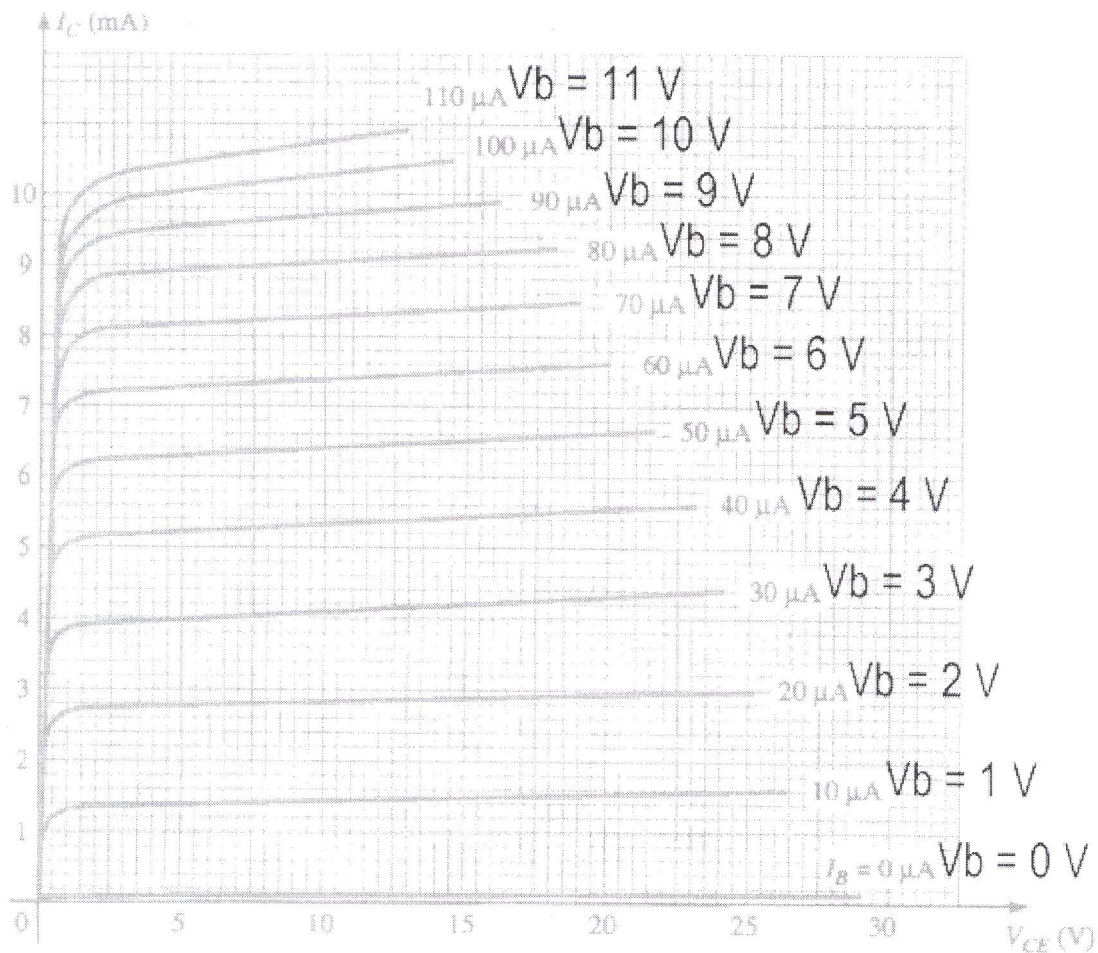
NOTE: Show your work and answers for Parts b, c and d on the top of Page 2.

(b) Draw the circuit of a common-emitter amplifier based on these curves. (Use the same circuit we examined in class.)

(c) Choose appropriate values for R_A , R_B , R_C and R_E to design a circuit that operates at your Q-point.

(d) Draw a rough sketch of the base and collector voltages (I.E., V_{in} and V_{out} .)

(10 points total)



NAME: _____

(Use top half of this page to show your work and answers for Problem 1, Parts b, c and d.)

2. Using one or more 741 op amps, design a circuit that has the following characteristics:

(a) Has two inputs, V_1 and V_2

(b) $V_{\text{out}} = 3V_1 + 5V_2$

(10 points total)

3. Fill in the following table for the six type of FETs we studied this semester. (20 points total)

		P-Channel		N-Channel	
JFET	SYMBOL	MICROSCOPIC VIEW	SYMBOL	MICROSCOPIC VIEW	
	CHARACTERISTIC CURVES		CHARACTERISTIC CURVES		
	BRIEF DESCRIPTION OF OPERATION		BRIEF DESCRIPTION OF OPERATION		
Enhancement Mode MOSFET	SYMBOL	MICROSCOPIC VIEW	SYMBOL	MICROSCOPIC VIEW	
	CHARACTERISTIC CURVES		CHARACTERISTIC CURVES		
	BRIEF DESCRIPTION OF OPERATION		BRIEF DESCRIPTION OF OPERATION		
Depletion Mode MOSFET	SYMBOL	MICROSCOPIC VIEW	SYMBOL	MICROSCOPIC VIEW	
	CHARACTERISTIC CURVES		CHARACTERISTIC CURVES		
	BRIEF DESCRIPTION OF OPERATION		BRIEF DESCRIPTION OF OPERATION		

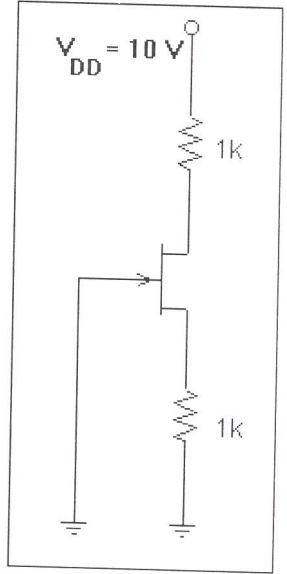
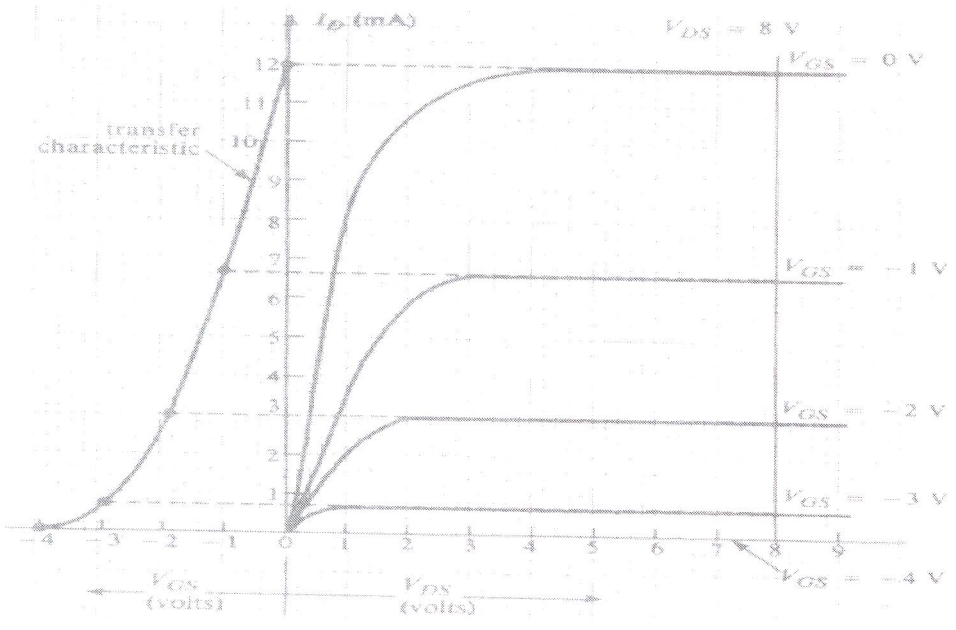
4. For the circuit shown, assume the device has the following parameters:

$$V_P = -4 \text{ V and } I_{D_{max}} = 12 \text{ mA}$$

The device's characteristics and transfer curve are shown below. Determine the following. (Show all work!)

- (a) I_{DQ} (b) V_{GSQ} (c) V_D (d) V_S

(10 points total)

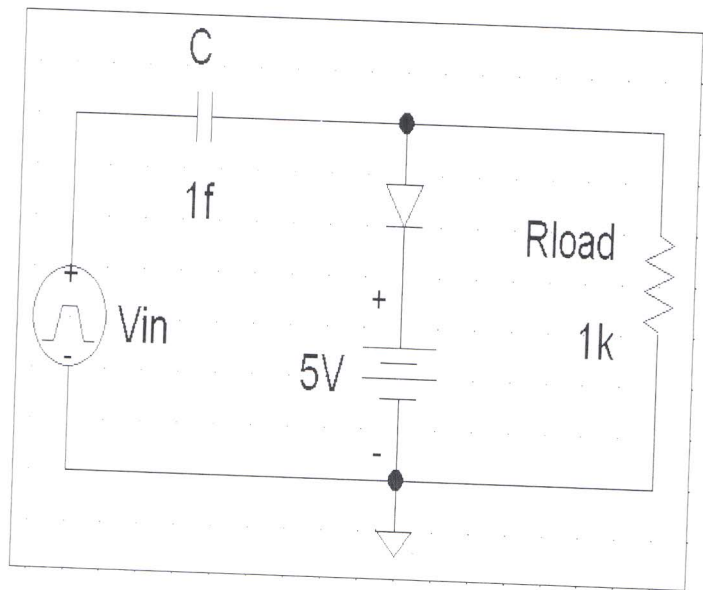
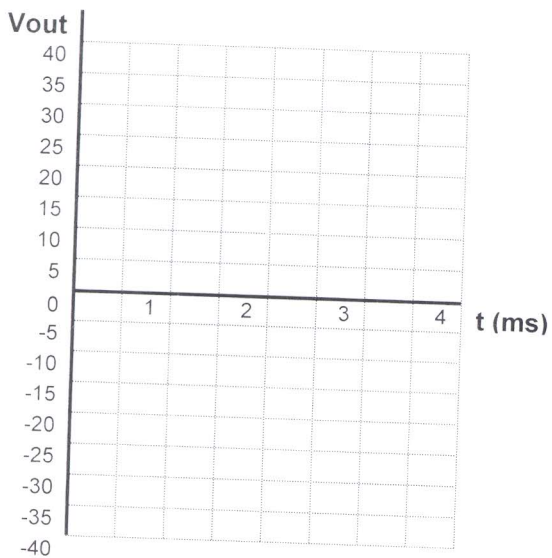


5. Fill in the table below.

MAKE THESE ASSUMPTIONS: The maximum signal each circuit can handle is $20 V_{P-P}$.
The input signal is a sine wave of amplitude $10 V_{PEAK}$. (15 points total)

AMPLIFIER TYPE	BIASING LEVEL	OPERATING CYCLE	EFFICIENCY	SKETCH OF OUTPUT
Class A				
Class B				
Class B+/B- (Push-Pull)				
Class AB				
Class C				
Class D				

6. Sketch the output of the following circuit, given that the input is a sine wave with amplitude $10V_{PK}$ and Period 4ms. Assume that the diode is ideal. Ignore any deviant behavior the circuit shows at start-up. (10 points total)



7. A power supply has 3.5% voltage regulation and an open-circuit AC output voltage of $110V_{p-p}$.
 (a) What is the full-load voltage of the supply in V_{p-p} ?
 (b) If a 1k-ohm resistor draws full-load current, what is the supply's output impedance?
 (15 points total)

8. For the circuit shown, assume the following: (a) The diode is ideal; (b) The SCR conducts when the gate voltage reaches +1V; and (c) The voltage drop across the conducting SCR is negligible. Sketch the voltage across the load.
 (10 points total)

