



Key 3000.11.

Seat No. : _____

King Mongkut's University of Technology Thonburi
Final Exam of Second Semester, Academic Year 2017

CPE 122 Basic Circuits and Electronics

CPE(Inter.) Students

Friday 18 May 2018

13.00-16.00

Instructions

1. This examination contains 6 problems, 10 pages (including this cover page),
The total score is 20 points.
2. The answers must be written in the space provided.
3. Students are allowed to use **calculator**.
4. **Books, notes, and dictionary** are **NOT** allowed.

Students must raise their hand to inform to the proctor upon their completion of the examination, to ask for permission to leave the examination room.

Students must not take the examination and the answers out of the examination room.

Students will be punished if they violate any examination rules. The highest punishment is dismissal.

This examination is prepared by

Asst. Prof. Sanan Srakaew
Tel. 0-2470-9083

This examination paper is approved by Computer Engineering Department.

(Assoc.Prof.Dr.Natasha Dejdumrong)

Student Name: _____ I.D.: _____

Problem	1	2	3	4	5	6	Total
Points	5	3	3	3	3	3	20
Earned Points							

1. In the circuit shown in Figure 1 ($R_1 = 1\text{k}\Omega$, $R_2 = 2\text{k}\Omega$, $C = 0.5\mu\text{F}$), determine:
- The behavior of the voltage frequency response at extremely low frequency
 - The behavior of the voltage frequency response at extremely high frequency
 - Compute and plot the frequency response
- (5 points)

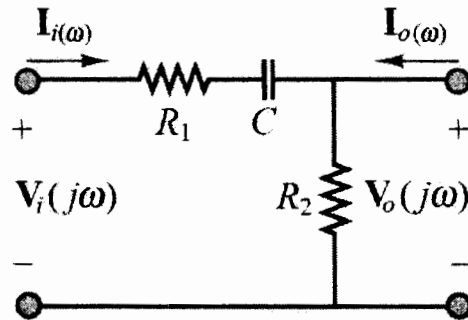
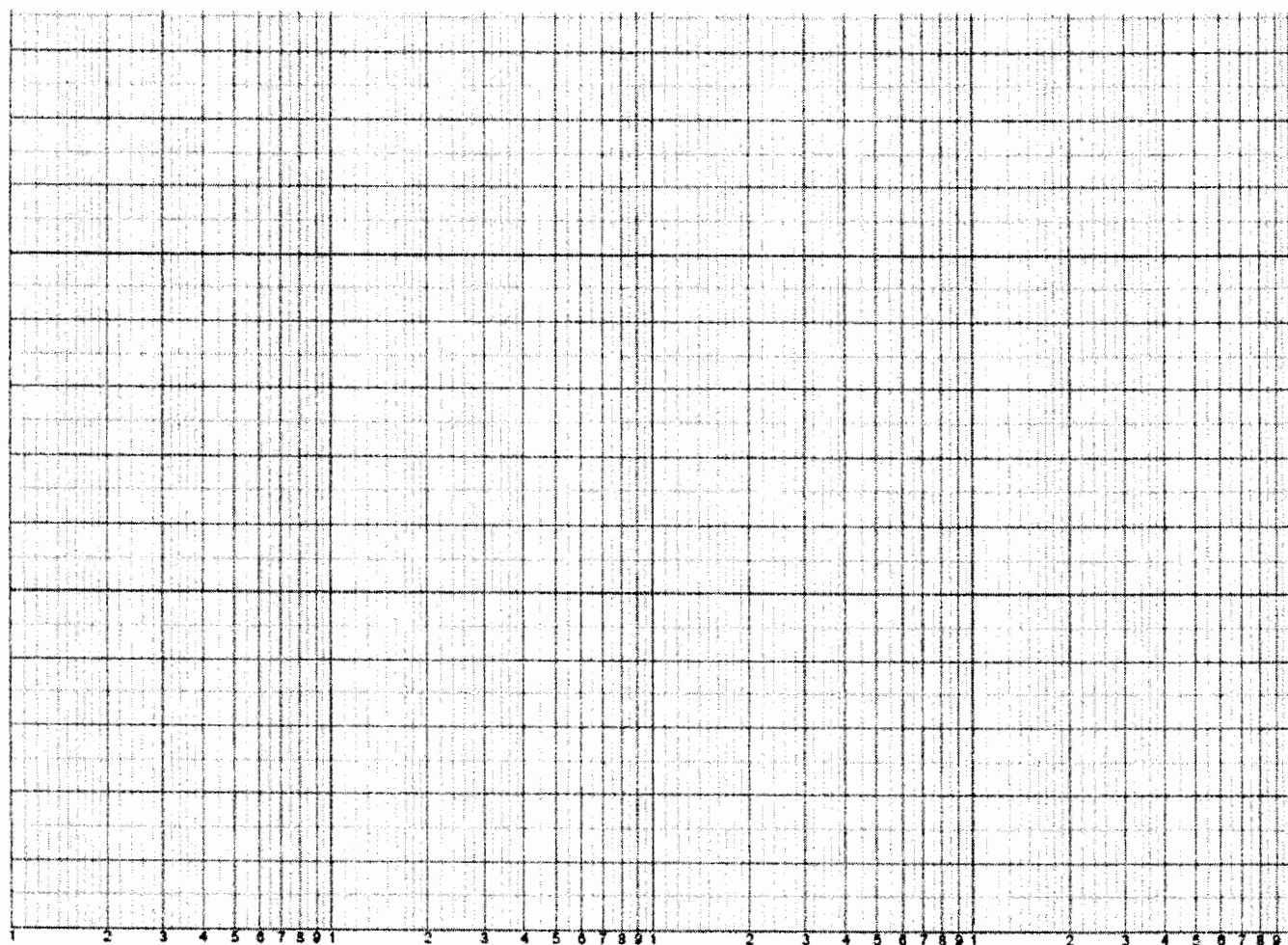


Figure 1

Frequency(Hz)	Gain(dB)	Phase(°)
10		
50		
100		
500		
1 k		
5 k		
10 k		
50 k		
100 k		



2. A load impedance, $Z_L = 15 + j5 \, \Omega$, is connected to a source and with transmission line resistance equal to $1 \, \Omega$, as shown in Figure 2. Determine the current and calculate the following values. Given $V_s = 220 \, \text{V}_{\text{rms}}$.
- a) The average power delivered to the load
 - b) The average power absorbed by the transmission line
 - c) The apparent power supplied by the source
 - d) The power factor of the load
 - e) The power factor of the line plus load
- (3 points)

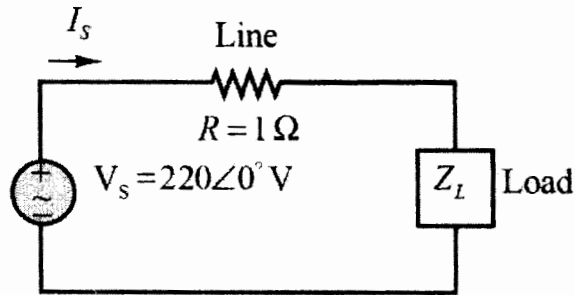


Figure 2

3. Calculate v_{out} as labeled in the circuit of Figure 3.

(3 points)

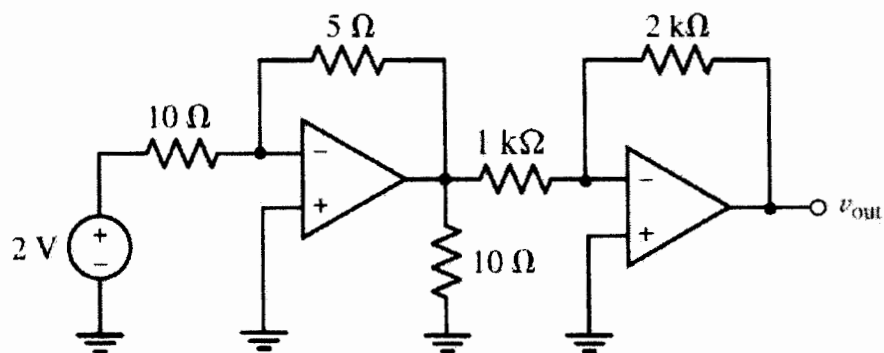


Figure 3

4. Determine whether the ideal diode of Figure 4 is conducting.

(3 points)

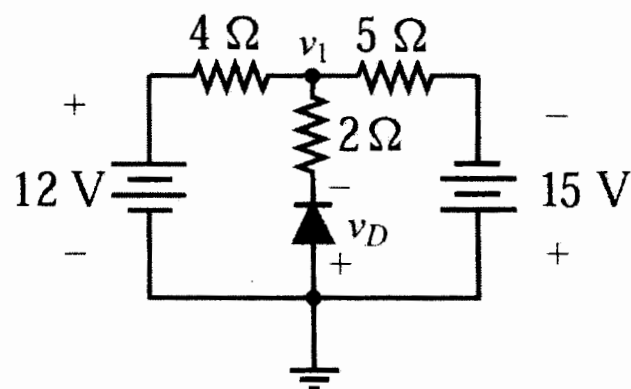
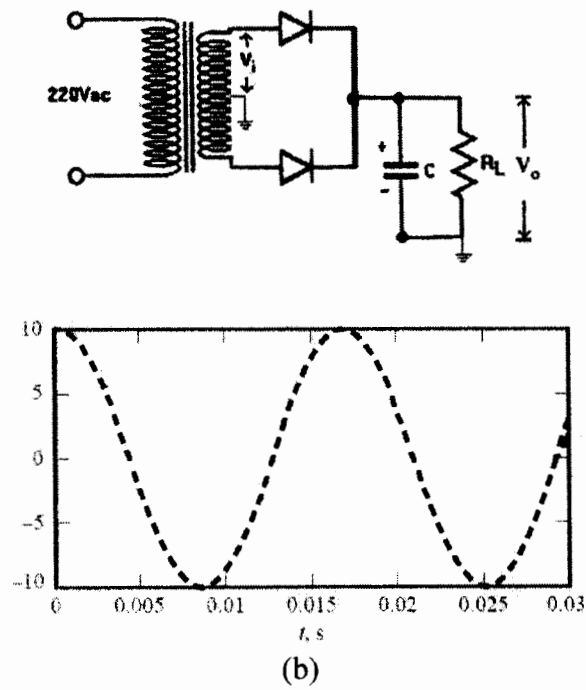
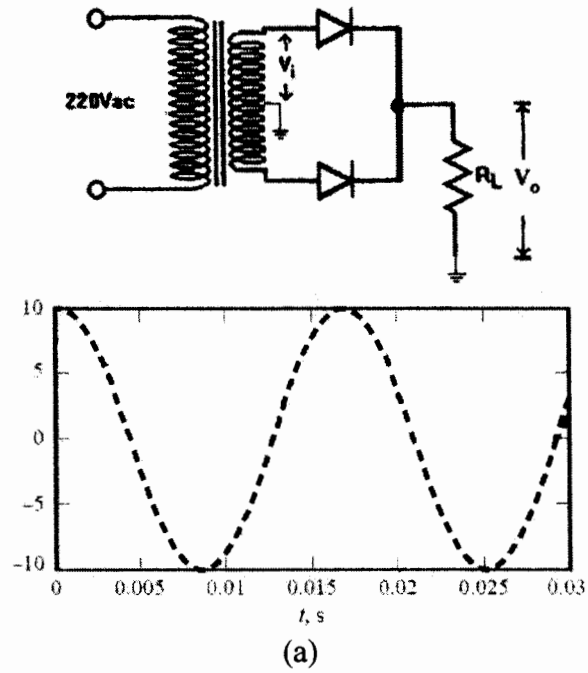
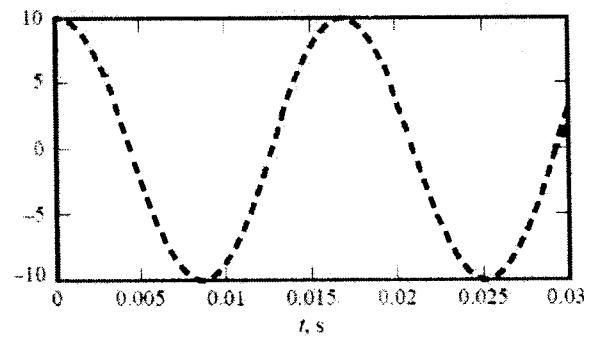
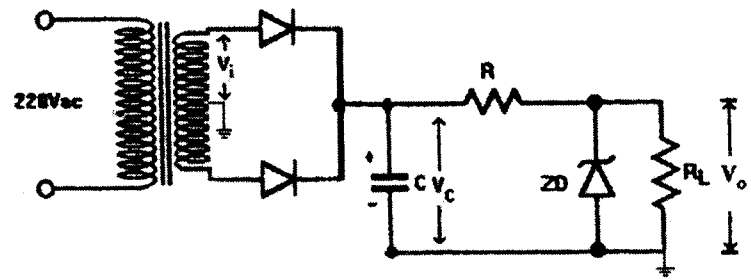


Figure 4

5. Given the V_i wave form, sketch the output voltage, V_o , of the following circuits on the same scale.
 Given: All diodes are 1N4001, $C = 100 \mu\text{F}$, $R = 100 \Omega$, $R_L = 500 \Omega$, $V_{ZD} = 5.2 \text{ V}$. (3 points)





(c)

6. Use the collector characteristics of the 2N3904 npn transistor shown in Figure 6(a) and (b) to determine the operating point (I_{CQ} , V_{CEQ}) of the transistor in Figure 6(c). What is the value of β at this point? (3 points)

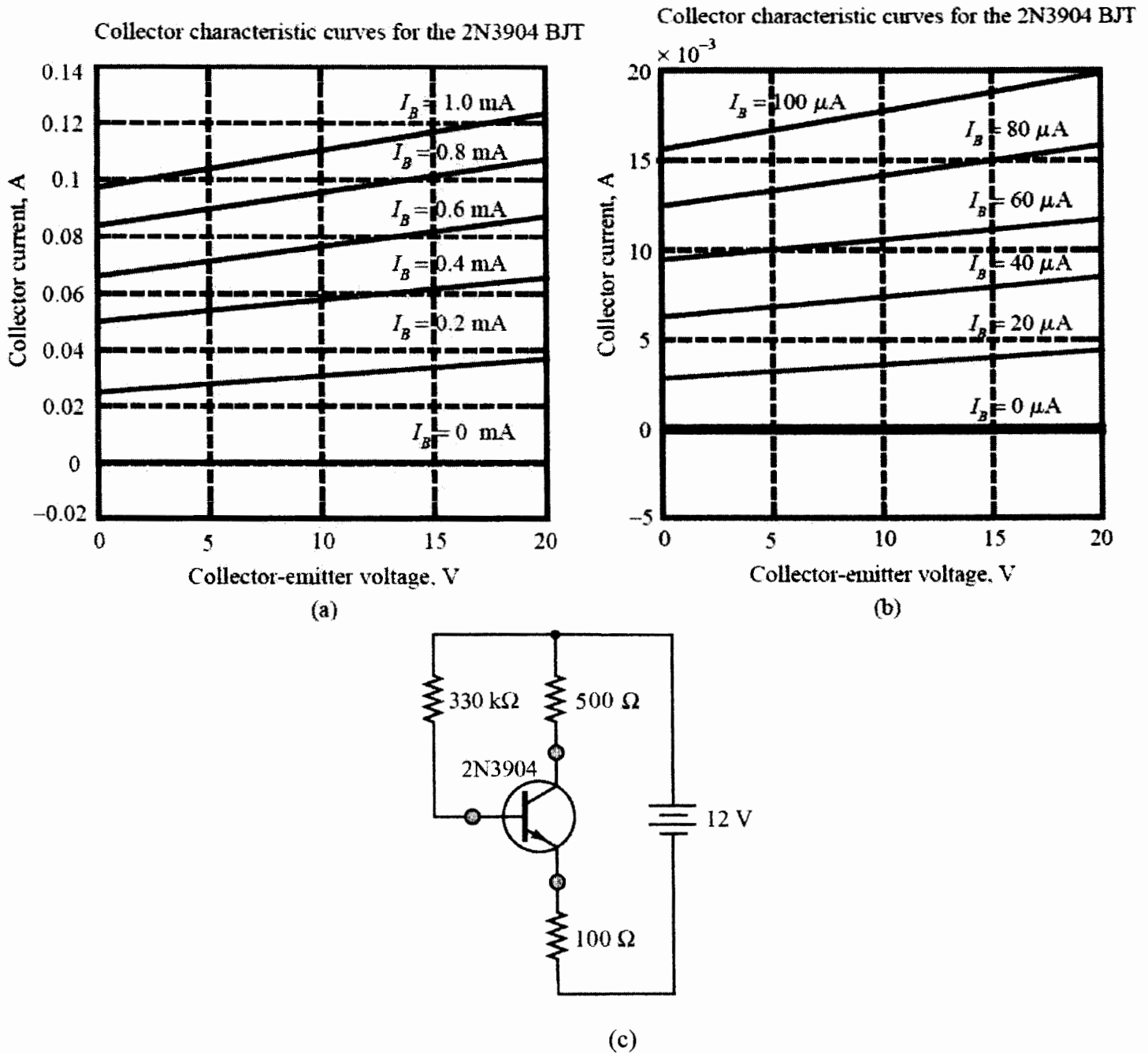


Figure 6

