Seat Number

King Mongkut's University of Technology Thonburi
Midterm **Examination**
Semester 1 – Academic Year 2014

Subject: EIE 210 Electronic Devices and Circuit Design I
For: Electrical Communication and Electronic Engineering, 2nd Yr (Inter. Program)
Exam Date: Thursday September 25, 2014 **Time:** 13.00-16.00

Instructions:-

1. This exam consists of 4 problems with a total of 6 pages, including the cover.
2. This exam is closed books.
3. You are **not** allowed to use any written A4 note for this exam.
4. Answer each problem on the exam itself.
5. A calculator compiling with the university rule is allowed.
6. A dictionary is **not** allowed.
7. **Do not** bring any exam papers and answer sheets outside the exam room.
8. Open Minds … No Cheating! GOOD LUCK!!!

Remarks:-

- **Raise your hand when you finish the exam to ask for a permission to leave the exam room.**
- **Students who fail to follow the exam instruction might eventually result in a failure of the class or may receive the highest punishment with university rules.**
- **Carefully read the entire exam before you start to solve problems. Before jumping into the mathematics, think about what the question is asking. Investing a few minutes of thought may allow you to avoid twenty minutes of needless calculation!**

Exam No.	1	2	3	4	5	6	7	8	TOTAL
Full Score	20	8	10	12					50
Graded Score									

Name _____ **Student ID** _____

This examination is designed by
Asst. Prof. Kamon Jirasereeamornkul. Ph.D.; Tel: 9067.

This examination has been approved by the committees of the ENE department.

R. Silapunt

(Assoc. Prof. Rardchawadee Silapunt, Ph.D.)
Head of Electronic and Telecommunication Engineering Department

1. Analyze and draw the output of clippers in Figure 1(a) and 1(b). Assume that the diodes are ideal diodes (20 marks)

1.1 Series clipper (10 marks)

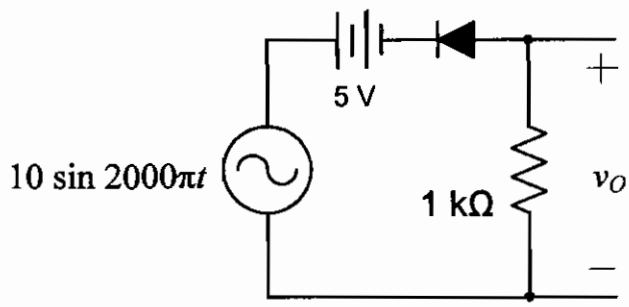

Fig. 1(a)

1.2 Parallel clipper (10 marks)

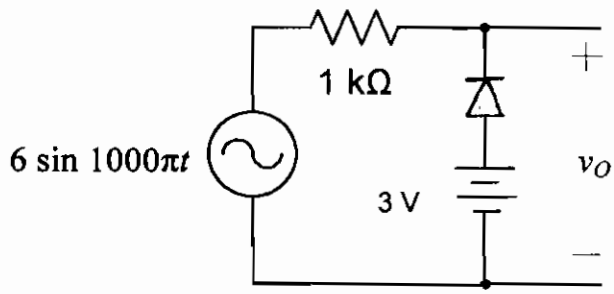

Fig. 1(b)

2. Consider the circuit in Figure 2. Sketch the waveform of output voltage v_O compare with secondary voltage v_s. Also, determine the average value of v_O. (8 marks)

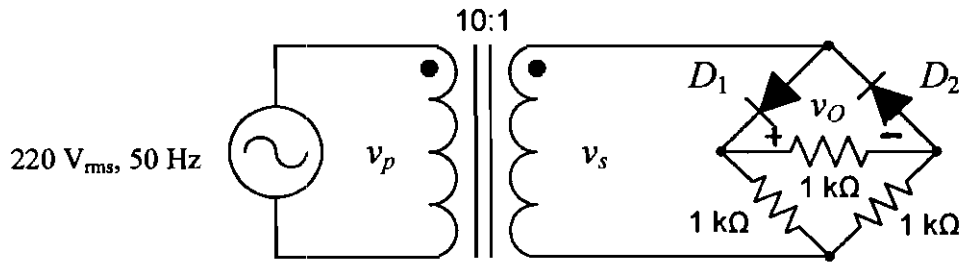

Fig. 2

3. From circuit in Figure 3 and datasheet, find V_{Z0}, R_{L_min}, and R_{L_max} (10 marks)

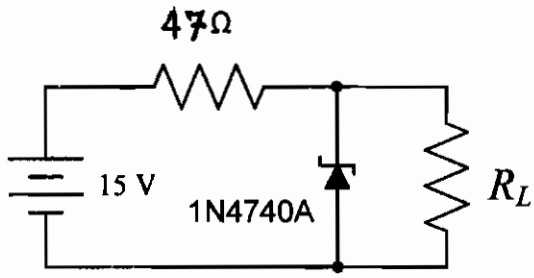

Fig. 3

ELECTRICAL CHARACTERISTICS

Rating at = 25 °C ambient temperature unless otherwise specified

TYPE	Nominal Zener Voltage		Maximum Zener Impedance			Maximum Reverse Leakage Current		Maximum DC Zener Current
	V_Z @ I_{ZT}	I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}	I_{ZK}	I_R @ V_R		I_{ZM}
	(V)	(mA)	(Ω)	(Ω)	(mA)	(µA)	(V)	(mA)
1N4728	3.3	76.0	10	400	1.0	100	1.0	276
1N4729	3.6	69.0	10	400	1.0	100	1.0	252
1N4730	3.9	64.0	9.0	400	1.0	50	1.0	234
1N4731	4.3	58.0	9.0	400	1.0	10	1.0	217
1N4732	4.7	53.0	8.0	500	1.0	10	1.0	193
1N4733	5.1	49.0	7.0	550	1.0	10	1.0	178
1N4734	5.6	45.0	5.0	600	1.0	10	2.0	162
1N4735	6.2	41.0	2.0	700	1.0	10	3.0	146
1N4736	6.8	37.0	3.5	700	1.0	50	4.0	133
1N4737	7.5	34.0	4.0	700	0.5	50	5.0	121
1N4738	8.2	31.0	4.5	700	0.5	50	6.0	110
1N4739	9.1	28.0	5.0	700	0.5	50	7.0	100
1N4740	10	25.0	7.0	700	0.25	50	7.6	91

4. Please explain how series regulator regulates the output voltage against the changing of input voltage and load current (12 marks)