



UNIVERSITI KUALA LUMPUR

Malaysia France Institute

FINAL EXAMINATION JANUARY 2011 SESSION

SUBJECT CODE : FLB 30203
SUBJECT TITLE : POWER ELECTRONICS & DRIVES
LEVEL : BACHELOR
DURATION : 9.00am – 12.00pm
(3 HOURS)
DATE / TIME : 14 MAY 2011

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. Please write your answers on the answer booklet provided.
4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
5. This question paper consists of TWO (2) sections. Section A and B. Answer all questions in Section A. For Section B, answer two (2) question only.
6. Answer all questions in English.

THERE ARE 6 PRINTED PAGES OF QUESTIONS EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)**INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**

(a) Give the definition of the following power converters and draw their general block diagrams.

- i. Rectifier
- ii. Chopper
- iii. Inverter

(6 marks)

(b) Explain the advantages of Schottky diode in terms of recovery time as compared to standard diode and fast recovery diode.

(6 marks)

(c) Draw a typical V-I characteristics of a thyristor and briefly explain the following parameters:

- i. Holding current
- ii. Latching current
- iii. The effects of gate current on forwards breakover voltage

(8 marks)

Question 2

- (a) A single-phase diode bridge rectifier shown in **Figure 1** has a purely resistive load of 15Ω . Given the source voltage is $V_S=300 \sin 314 t$, determine:
- i. The efficiency of rectification
 - ii. The form factor
 - iii. The ripple factor

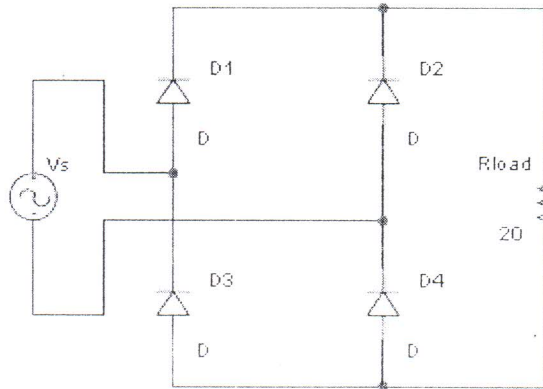


Figure 1

(6 marks)

- (b) A single-phase half-wave thyristor converter is supplied with source voltage of 240V 60Hz. Determine the power absorbed by the resistive load and the power factor given that the circuit produced an average voltage of 40V across a 100Ω load.

(8 marks)

- (c) Based on voltage and current flow diagram, explain the characteristics of the following converters.

- i. First Quadrant Converter
- ii. Second Quadrant Converter
- iii. Third and Fourth Quadrant Converter

(6 marks)

