



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
JANUARY 2011 SESSION**

SUBJECT CODE : FLD 10102
SUBJECT TITLE : ELECTRONIC DEVICES
LEVEL : DIPLOMA
TIME / DURATION : 9.00 am – 11.00 am
(2 HOURS)
DATE : 08 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) questions only.
6. Answer all questions in English.

THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 60 marks)

INSTRUCTION: Answer ALL questions.
Please use the answer booklet provided.

Question 1

- (a) Describe the difference between n-type and p-type semiconductor materials. (2 marks)
- (b) Name 2 types of bias for pn-junction. (2 marks)
- (c) Assuming both practical diodes of similar characteristics and based on silicon, determine V_{out} , I_1 and I_{D1} for diode circuit in **Figure 1** below: (6 marks)

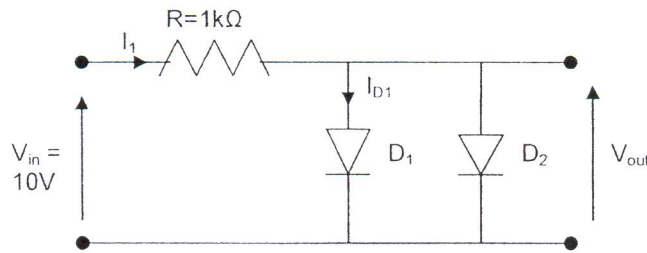


Figure 1

- (d) Assume that the forward voltage across a forward-biased silicon diode is 0.7V and that across a forward-biased germanium diode is 0.3V.
 - (i) If D_1 and D_2 are both silicon diodes in **Figure 2**, find the current I in the circuit. (5 marks)
 - (ii) Repeat if D_1 is silicon and D_2 is germanium. (5 marks)

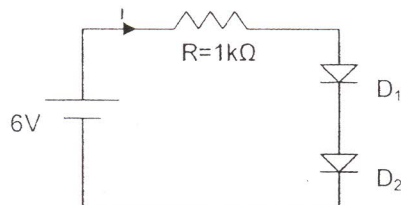


Figure 2

Question 2

(a) A basic dc power supply can be broken down into four (4) circuit groups. Name the circuits.

(4 marks)

(b) Refer to **Figure 3** and answer the following questions:

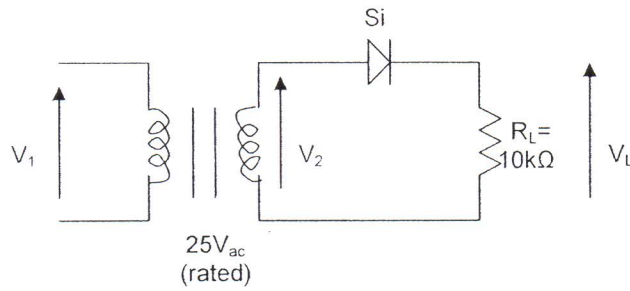


Figure 3

(i) Explain the operation of the above rectifier circuit.

(6 marks)

(ii) Sketch the waveform of V_2 and V_L .

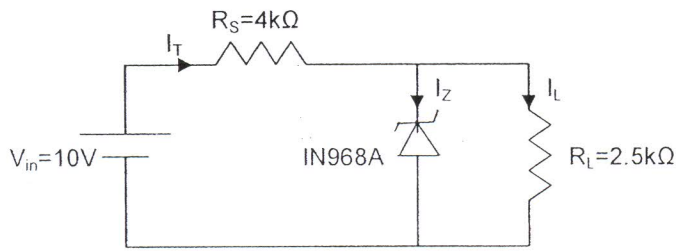
(4 marks)

(iii) Calculate average load voltage (V_{Lavg}).

(6 marks)

Question 3

- (a) By referring to the zener voltage regulator circuit shown in **Figure 4**, calculate I_Z .
 (Consider ideal zener diode). (16 marks)



IN968A Parameters:
 $V_Z = 2.7V$
 $I_{ZK} = 0.25mA$
 $I_{ZM} = 20mA$

Figure 4

- (b) Determine whether zener diode IN968A used in circuit in **Figure 4** can maintain its regulation. Give your reason for your answer. (4 marks)

SECTION B (Total: 40 marks)

INSTRUCTION: Answer TWO (2) questions only.

Question 4

Determine the minimum and the maximum input voltages that can be regulated by the zener diode in **Figure 5** (Consider ideal zener diode).

(20 marks)

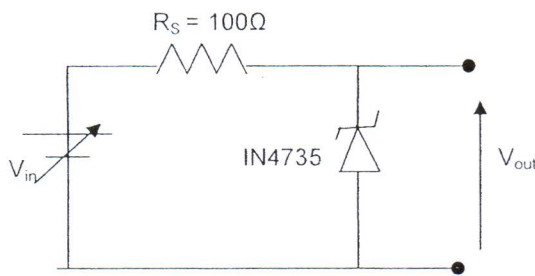


Figure 5

IN4735 Parameters:
 $V_Z = 6V$ at $I_{ZT} = 49mA$
 $I_{ZK} = 1mA$
 $Z_{ZT} = 6\Omega$ at I_{ZT}
 $P_D = 1W$ at $T_L = 50^\circ C$

Question 5

Determine I_B , I_C , I_E , V_{BE} , V_{CE} and V_{CB} in the circuit in **Figure 6**. This silicon based transistor has a rating of $\beta = 150$.

(20 marks)

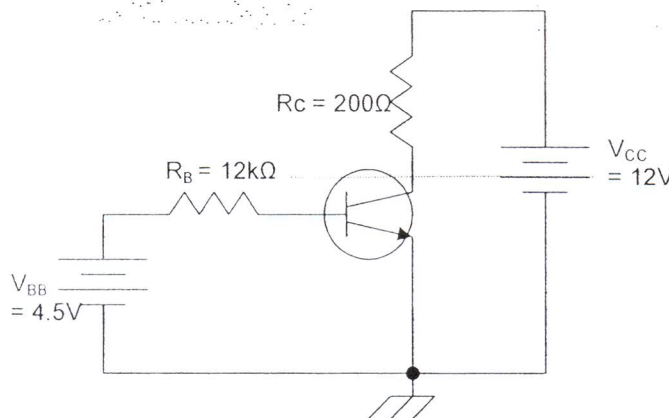


Figure 6

Question 6

The primary voltage on the transformer in **Figure 7** below is $120V_{RMS}$ and $N_1 : N_2 = 15 : 1$.
 Diode's forward voltage is $0.7V$.

- (i) Determine the value of R_L if the average current in R_L must be $0.5A$.

(15 marks)

- (ii) Calculate the power dissipated in R_L under the conditions of (i).

(5 marks)

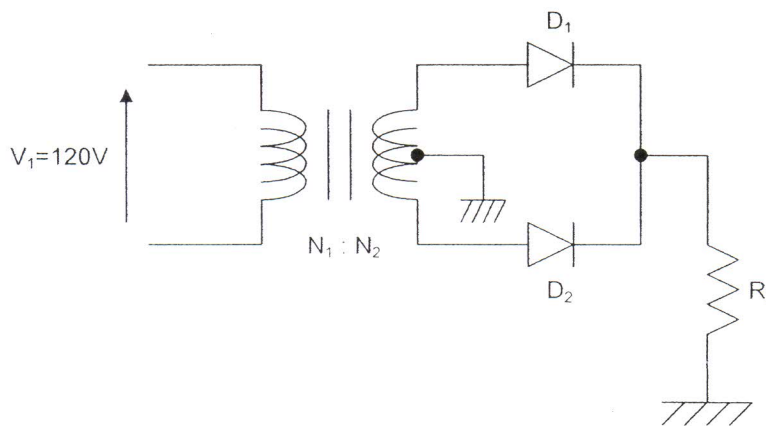


Figure 7

END OF QUESTION PAPER