UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION

JANUARY 2014 SESSION

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SUBJECT CODE	:	**FLB12013 / FLB12023 / FLB10102 / FLB20102**
SUBJECT TITLE	:	**ANALOG ELECTRONICS / ELECTRONIC DEVICES / OP-AMP AND NON-LINEAR CIRCUIT**
LEVEL	:	**BACHELOR**
TIME / DURATION	:	**2.5 HOURS**
DATE	:	

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.   **Answers 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 three (3) questions only.**

6.   **Answer all questions in English.**

7.   **Do not open the question paper until instructed to do so**

THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

INSTRUCTION: Answer ALL questions.

Please use the answer booklet provided.

Question 1

(a) Explain the two element types that are used for doping   (4 marks)

(b) Explain the formation of pn-junction   (6 marks)

Question 2

For the circuit in **Figure 1** below, determine:
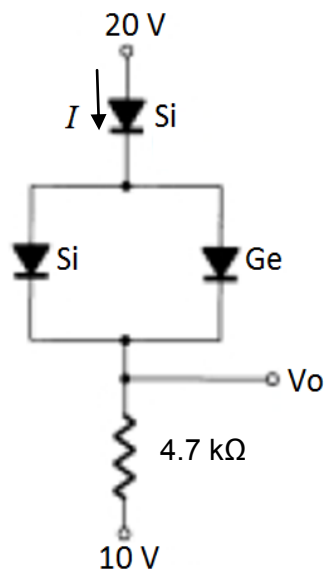
Figure 1

(a) The current, *I*   (6 marks)

(b) The output voltage, Vo   (4 marks)
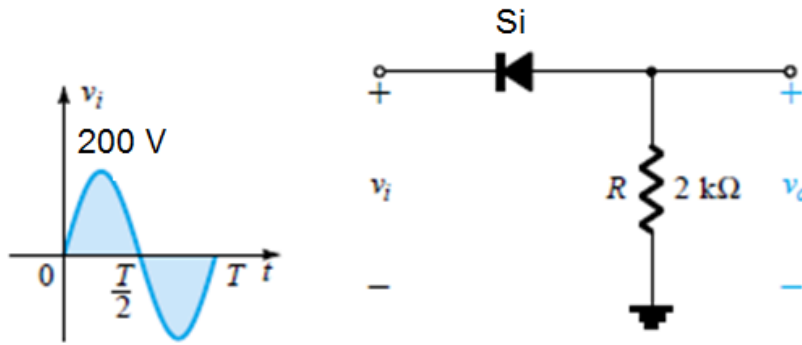
Question 3

For the network in **Figure 2** below,

Figure 2

(a) Determine v_o and sketch the output waveform   (6 marks)

(b) Calculate the output voltage dc level, Vdc   (3 marks)

Question 4

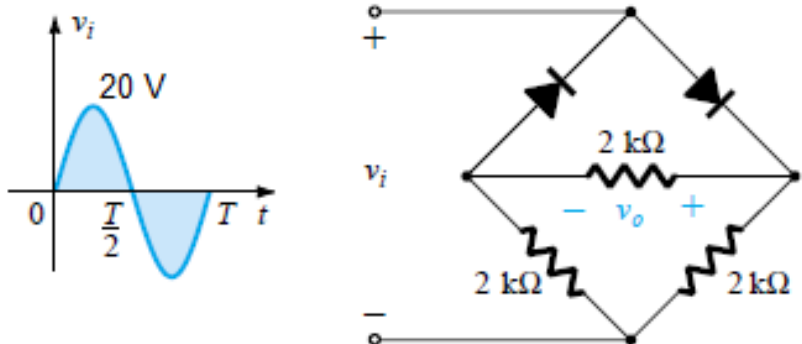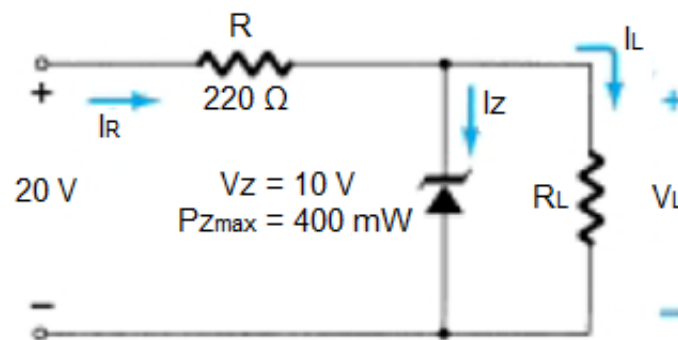For the full-wave rectifier with ideal diodes given in **Figure 3** below,

Figure 3

(a) Determine v_o and sketch the output waveform   (8 marks)

(b) Calculate the output voltage dc level, Vdc   (3 marks)

SECTION B (Total: 60 marks)

INSTRUCTION: Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 5

For the network of **Figure 4** below, determine:

Figure 4

(a) V_L, I_L, I_R and I_Z if $R_L = 470 \, \Omega$.   (10 marks)

(b) The value of R_L that will establish maximum power conditions for the

   Zener diode.   (6 marks)

(c) The minimum value of R_L to ensure that the Zener diode is in the "on" state.   (4 marks)

Question 6

(a) Define 'transistor'.   (2 marks)

(b) State TWO (2) application of transistor in communication system and digital

   electronic.   (4 marks)
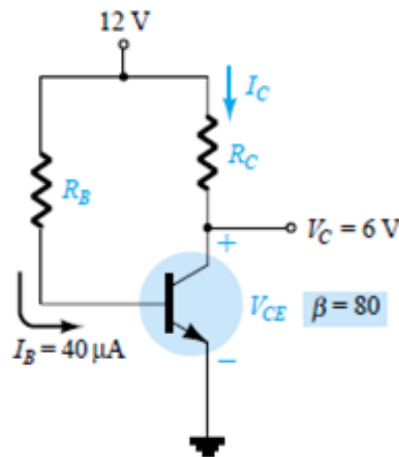
(c) For the network given in **Figure 5** below, determine:

Figure 5

    (i)   Ic   (3 marks)

    (ii) V_{CE} (3 marks)

    (iii) R_C (4 marks)

    (iv) R_B (4 marks)

Question 7

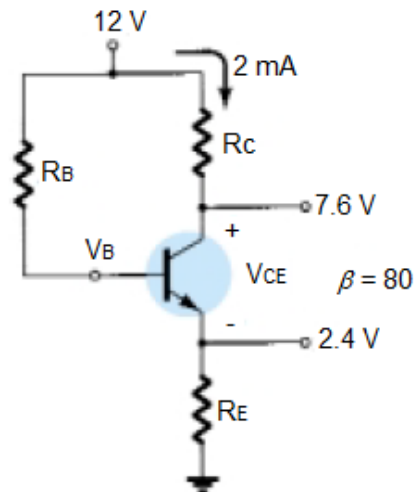Referring to the circuit provided in Figure 6 below, calculate:

Figure 6

    (i) V_{CE} (4 marks)

    (ii) R_E (4 marks)

    (iii) R_B (4 marks)

    (iv) R_C (4 marks)

    (v) V_B (4 marks)

Question 8

Show the connection of LM124 quad op-amp as a three-stage amplifier with gains of +10, -18 and -27. Use a 270 kΩ feedback resistor for all three circuits. Calculate the output voltage, *Vo* if the input voltage, *Vi* = 150 µV.   (20 marks)

END OF QUESTION PAPER