



UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF MARINE ENGINEERING TECHNOLOGY

FINAL EXAMINATION
SEPTEMBER 2016 SESSION

COURSE CODE : LEB10202
COURSE NAME : MARINE ELECTRONICS
PROGRAMME NAME : BACHELOR OF ENGINEERING TECHNOLOGY IN
NAVAL ARCHITECTURE & SHIPBUILDING
DATE : 20 JANUARY 2016
TIME : 03.00 PM – 05.30 PM
DURATION : 2 HOURS 30 MINUTES

INSTRUCTIONS TO CANDIDATES

1. Please **CAREFULLY** read the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of **TWO (2)** sections; Section A and Section B.
4. Answer **ALL** questions in Section A. For Section B, answer **THREE (3)** questions.
5. Please write your answers on the answer booklet provided.
6. Answer all questions in English language **ONLY**.

THERE ARE 7 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

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

Question 1

- (a) Define resistance, capacitance and inductance and its units **(CLO1)**
(6 marks)
- (b) A three color resistor has the color code red-green-orange. If it is placed across a 12V source, calculate the current flow in the circuit. **(CLO2)**
(4 marks)
- (c) Briefly explain the material below according to their ability to conduct electricity:
(CLO1)
- i. Conductors
 - ii. Insulators
 - iii. Semiconductors
- (10 marks)

Question 2

- (a) Classify the different between digital and analogue system. **(CLO1)**
(6 marks)
- (b) Briefly explain the operation and construct the truth table of an Exclusive OR (EXOR) logic gates. **(CLO1)**
(4 marks)
- (c) Define ideal integrator and ideal differentiators in operational amplifier and illustrate its symbols. **(CLO1)**
(10 Marks)

SECTION B (Total: 60 marks)

INSTRUCTION: Answer only THREE (3) questions.

Please use the answer booklet provided.

Question 3

(a) Referring to the Figure 1, analyze the circuit and calculate: (CLO2)

- i. Total resistance (3 marks)
- ii. Total current (3 marks)
- iii. Power absorbed by 90Ω resistor (3 marks)

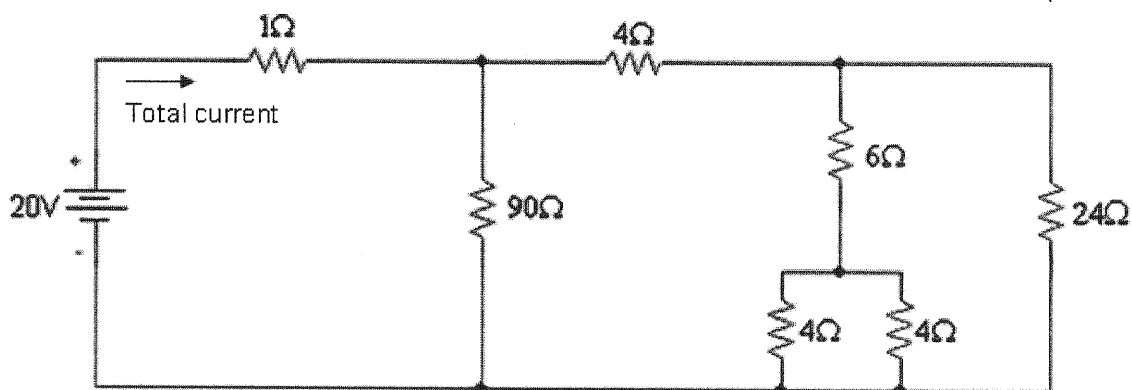


Figure 1

(b) Referring to the Figure 2, analyze the circuit and calculate $L_{EQUIVALENT}$. (CLO2)

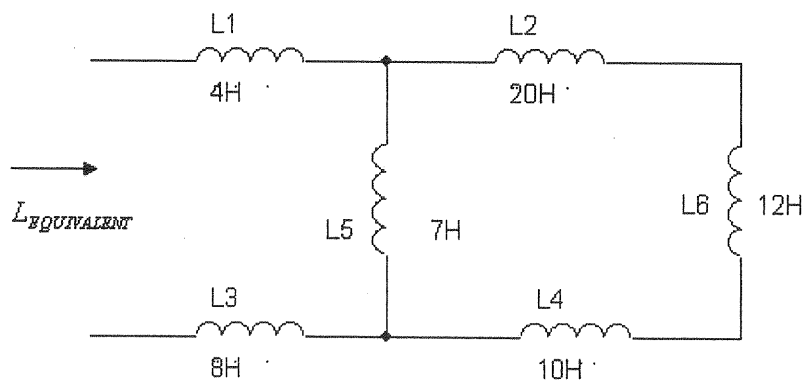


Figure 2

(6 marks)

- (c) Referring to the Figure 3, analyze the circuit and calculate $C_{EQUIVALENT}$. (CLO2)

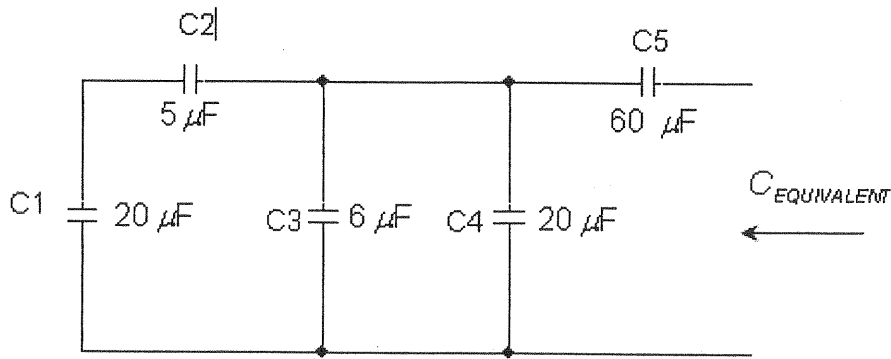


Figure 3

(5 marks)

Question 4

- (a) Referring to the Figure 4, analyze and calculate the Q-point in the following circuit. Assume $\beta_{DC} = 200$ (CLO2)

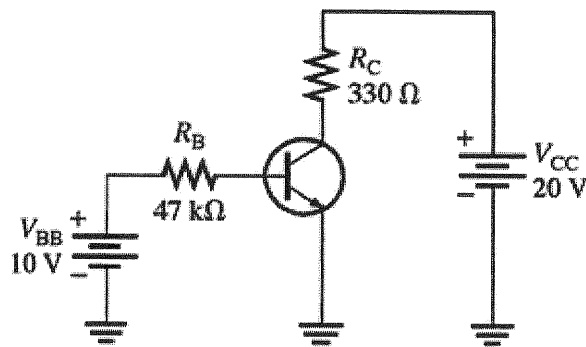


Figure 4

(10 marks)

- (b) Explain the characteristic of FETs and draw the basic structure (CLO1)

(10 marks)

Question 5

- (a) Given the input voltages for summing amplifier are +5.0V, -3.5V and +4.2V. Using the input given, illustrate a summing amplifier and determine V_{out} in below condition:

(CLO2)

- i. All resistor value is $10k\Omega$
- ii. $R_1 = R_2 = R_3 = 10k\Omega$ and $R_f = 3.3k\Omega$

(8 Marks)

- (b) Determine value of R_1 , R_2 and R_3 in Figure 5 if $R_f = 10k\Omega$. Input1 and Input2 requires a gain of -2 and Input3 requires a gain of -3. **(CLO2)**

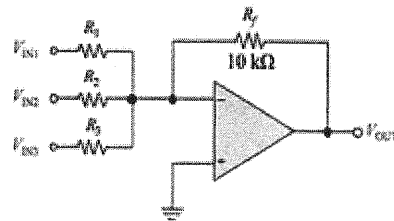


Figure 5

(4 Marks)

- (c) Explain condition of diode when in forward bias and reverse bias. **(CLO1)**

(8 Marks)

Question 6

- (a) Determine the peak voltage, average voltage and PIV in Figure 6. (CLO1)

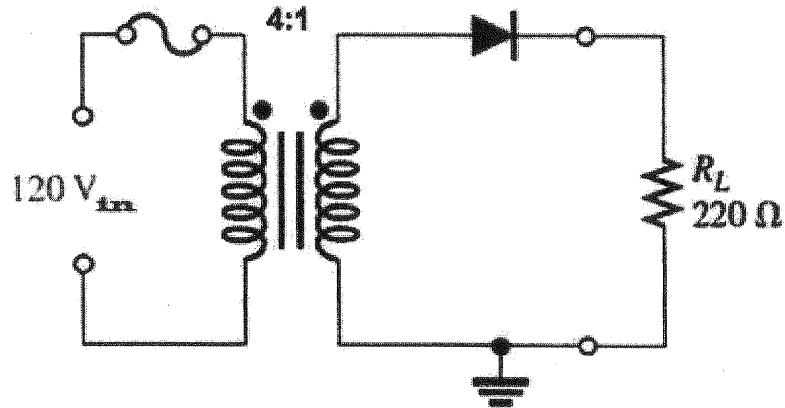


Figure 6

(6 marks)

- (b) Determine and sketch the output voltage, V_{OUT} waveform for the circuit in Figure 7. Assume $V_P = 30\text{ V}$, $R_1 = 2.2\text{ k}\Omega$ and diode is Silicone. (CLO2)

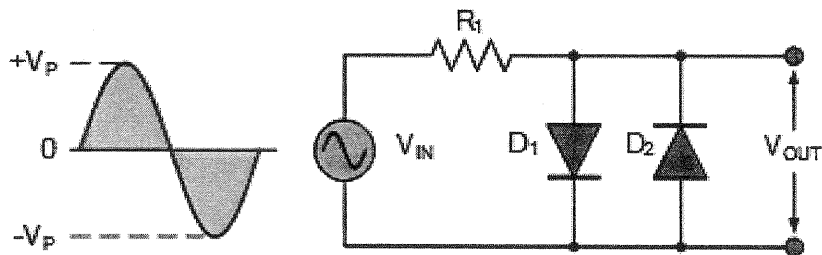


Figure 7

(4 marks)

- (c) Find the Boolean expression for the output $F(A,B,C,D)$ of logic circuit shown in Figure 8. (CLO2)

(5 marks)

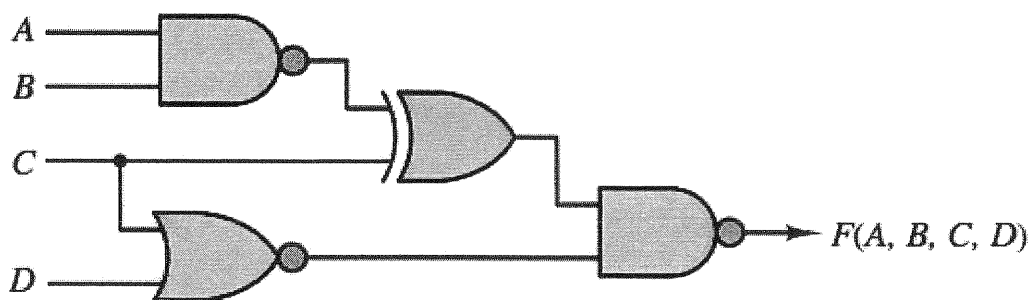


Figure 8

- (d) Solve the operations $135_{10} + 62_{10}$ in binary number. Present your answer in hexadecimal number. **(CLO2)**

(5 marks)

END OF EXAMINATION PAPER