Document No : UniKL MFI_SD_AC41
Revision No: 02
Effective Date: 01 December 2008

CONFIDENTIAL

SET A

UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION

SEPTEMBER 2013 SESSION

SUBJECT CODE	:	**FEB 10202**
SUBJECT TITLE	:	**ELECTRICAL PRINCIPLES**
LEVEL	:	**BACHELOR**
TIME / DURATION	:	**2 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 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

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

Question 1

(a) Define:

(i) Kirchoff's Voltage Law (2 marks)
(ii) Kirchoff's Current Law (2 marks)

(b) Determine the resistance and tolerance limits for each of the following resistor:

(i) Violet, yellow, blue, silver (2 marks)
(ii) Red, gray, silver, gold (2 marks)

(c) Determine the voltage across the resistor when a current of 8 A through it converts 2000 J of electrical energy into heat energy in 25 s. (3 marks)

Question 2

(a) A sinusoidal alternating voltage has a peak value of 250 V and a frequency of 50 Hz. Determine the angle and time when it first reaches the instantaneous voltage of 200 V (6 marks)

(b) Determine the rms voltage across R_3 (V_{3rms}) in **Figure 1** below:

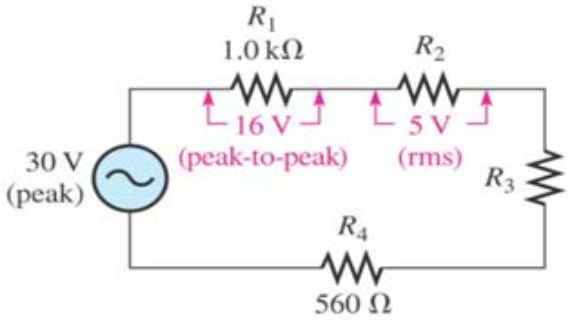

Figure 1 (7 marks)

Question 3

For the circuit in **Figure 2** below, determine:

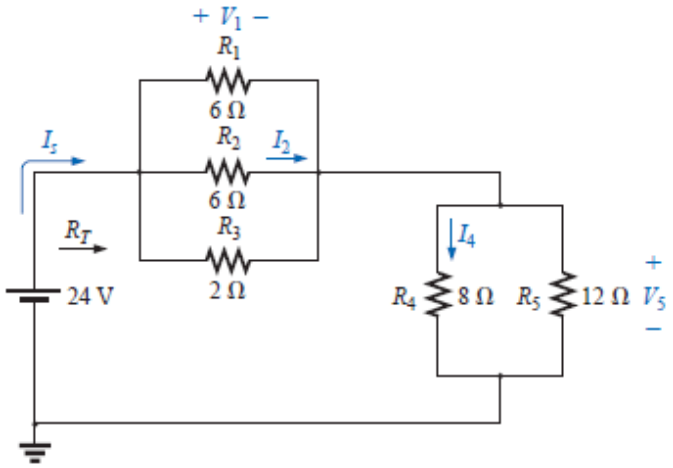

Figure 2

(i)	Total resistance, (**R_T**)	(4 marks)
(ii)	Total current, (**Is**)	(2 marks)
(iii)	Voltage drop across R_1 (**V_1**) and R_5 (**V_5**)	(4 marks)
(iv)	Current flow through R_2 (**I_2**) and R_4 (**I_4**)	(4 marks)
(v)	Power delivered by the source, (**Ps**)	(2 marks)

SECTION B (Total: 60 marks)

INSTRUCTION: Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 4

(a) For the network shown in **Figure 3** below, determine the:

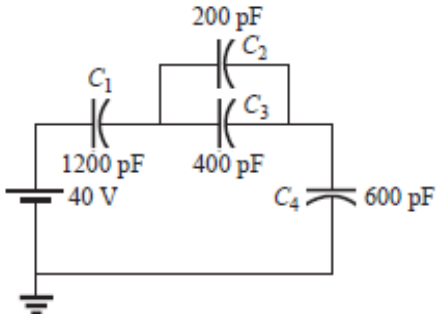

Figure 3

(i) Total capacitance (**C_T**) (4 marks)

(ii) Total charge (**Q_T**) (3 marks)

(iii) Voltage across capacitor C_2 (**V_2**) (4 marks)

(iv) Charge at capacitor C_3 (**Q_3**) (3 marks)

(b) For the circuit in **Figure 4** below, the capacitor is initially uncharged. Determine the:

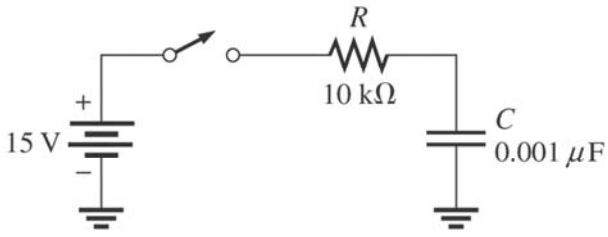

Figure 4

(i) Time constant (**τ**) (2 marks)

(ii) Time taken for the capacitor to charged to 8V. (4 marks)

Question 5

(a) Referring to **Figure 5** below, calculate the:

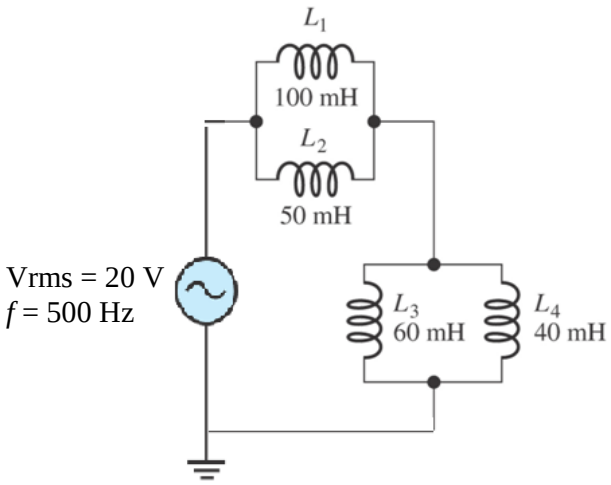

Figure 5

(i) Total reactance ($\mathbf{X_T}$) (6 marks)

(ii) Total rms current ($\mathbf{I_T}$) (2 marks)

(iii) Total reactive power ($\mathbf{P_r}$) (2 marks)

(b) For the ideal inductor in **Figure 6** below, calculate the:

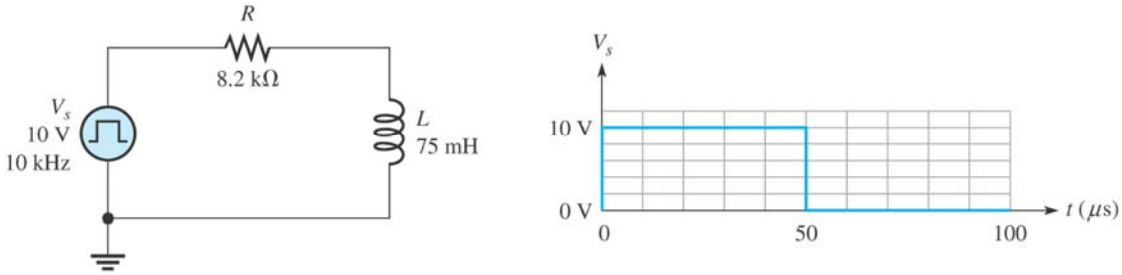

Figure 6

(i) Time constant (τ) (2 marks)

(ii) Final current ($\mathbf{I_F}$) (2 marks)

(iii) The current at t = 25 μs (3 marks)

(iv) The current at t = 80 μs (3 marks)

Question 6

Referring to **Figure 7** below, calculate the:

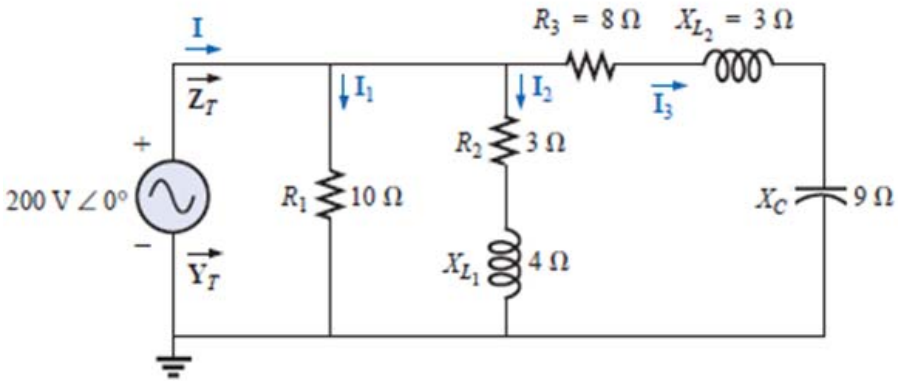

Figure 7

(a) Total admittance (**Y_T**) (4 marks)

(b) Total impedance (**Z_T**) (2 marks)

(c) Total current (**I**) (3 marks)

(d) Current (**I_1**), (**I_2**) and (**I_3**) (9 marks)

(e) Total power factor (**PF**) (2 marks)

Question 7

(a) Determine each voltage (**V_1**), (**V_2**), (**V_3**) and (**V_4**) as indicated in **Figure 8** below:

(8 marks)

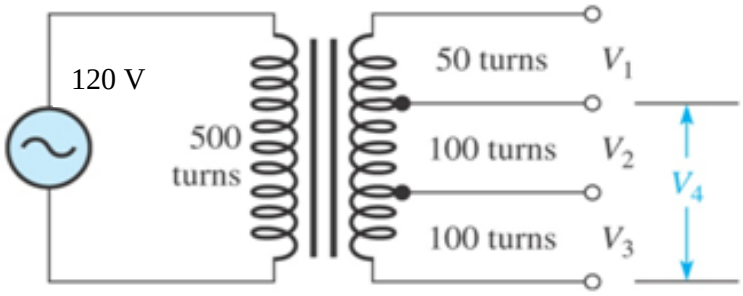

Figure 8

(b) For the network in **Figure 9** below, find the:

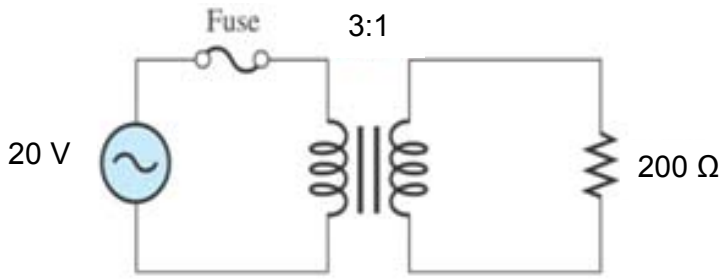

Figure 9

(i) Reflected resistance at primary winding ($\mathbf{R_p}$) (4 marks)

(ii) Primary current ($\mathbf{I_p}$) (2 marks)

(iii) Secondary current ($\mathbf{I_s}$) (2 marks)

(iv) Secondary voltage ($\mathbf{V_s}$) (2 marks)

(v) Power in the load ($\mathbf{P_L}$) (2 marks)

END OF QUESTION PAPER