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CONFIDENTIAL

SET B

UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2010 SESSION

SUBJECT CODE	: FED 10502
SUBJECT TITLE	: ELECTRICAL TECHNOLOGY
LEVEL	: DIPLOMA
TIME / DURATION	: 9.00am – 11.00am (2 HOURS)
DATE	: 29 APRIL 2010

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 answer on the answer booklet provided.
4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
5. This questions paper consists of TWO (2) sections. Sections A and B. Answer ALL questions in section A. For section B, answer ONE (1) questions only.
6. Answer all questions in English.

THERE ARE 7 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 75 marks)

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

Question 1

(a) Calculate a peak/maximum value of a sinusoidal alternating current of 4.78 RMS amperes.

(3 marks)

(b) Calculate the average value of sinusoidal alternating current of 31 A maximum value.

(3 marks)

(c) An alternating current has a periodic time of 0.03 second. Determine the frequency.

(2 marks)

(d) An alternating current represented by ***i(t) = 70.7 sin (520 t) A.*** Determine the value of current at ***t = 0.0015*** second.

(4 marks)

(e) In Figure 1, two similar capacitors are connected in series and a voltage with an instantaneous value of ***v = 200 sin 314t*** is applied across their terminals.
Calculate the capacitance of each capacitor if the effective current (RMS) taken by the series combination is 0.4 A.

(7 marks)

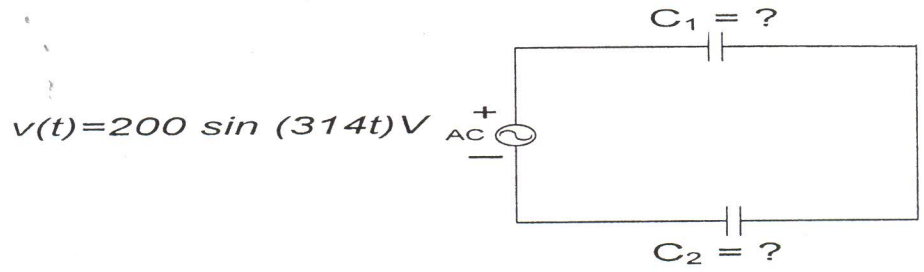

Figure 1

(f) Prove the formula of $Q_{factor} = \frac{1}{R}\sqrt{\frac{L}{C}}$

(6 marks)

Question 2

(a) Two coils A and B are connected in series across a 240 V, 50 Hz supply shows in Figure 2. The resistance of Coil A is 5 Ω and the inductance of Coil B is 0.015 H. If the input from the supply is 3 kW and 2 kVAR, calculate :

i. the inductance of A and the resistance of B.

(10 marks)

ii. the voltage across each coil.

(5 marks)

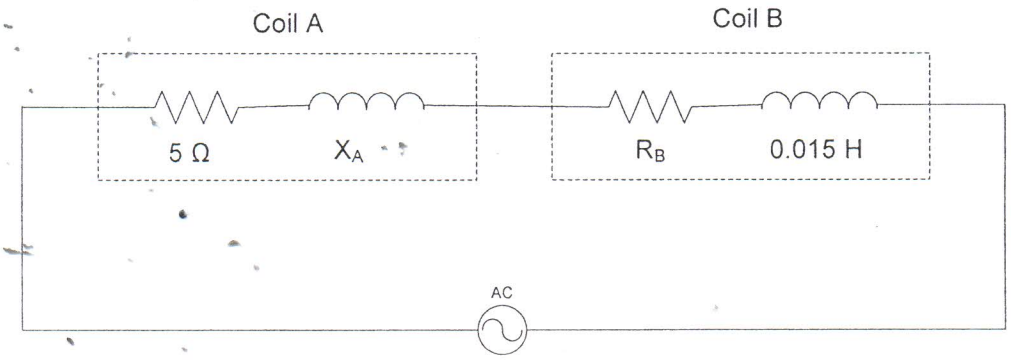

Figure 2

(b) For the network shown in Figure 3, determine;

i. the total network admittance

(4 marks)

ii. the total network impedance

(3 marks)

iii. the supply current I_s

(3 marks)

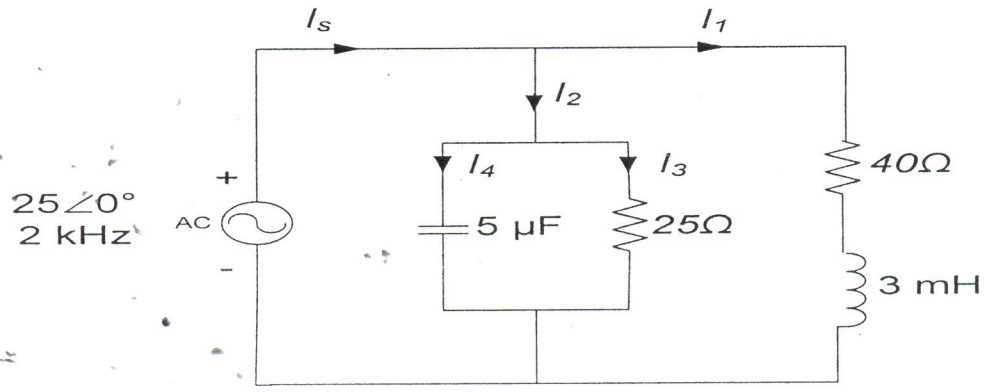

Figure 3

Question 3

(a) Refer to Figure 4 and calculate the current I_1 which is flows through R_1 and L_1 using the Superposition Theorem.

(25 marks)

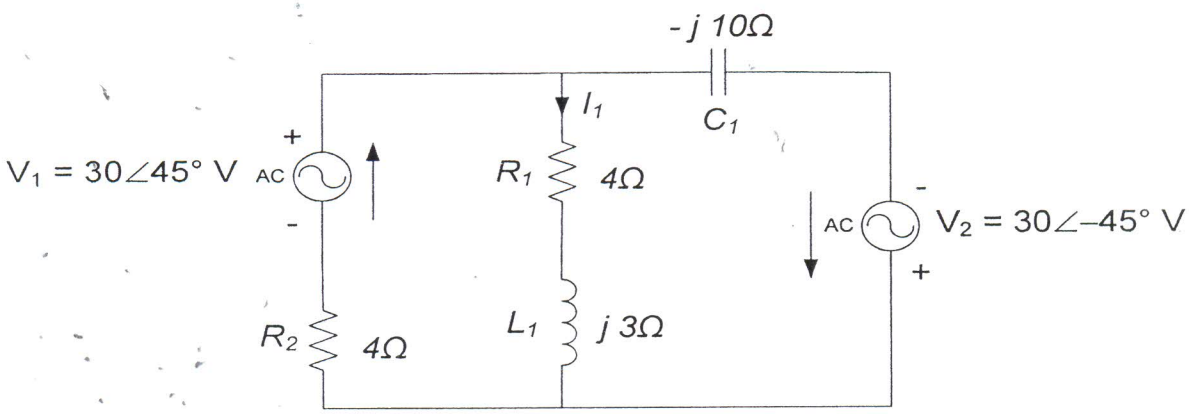

Figure 4

SECTION B (Total: 25 marks)

INSTRUCTION: Answer ONE question only.
Please use the answer booklet provided.

Question 4

(a) In the circuit delta–delta connection shown in Figure 5, determine the value of:

i. loads current I_{ZA} , I_{ZB} and I_{ZC}.

(6 marks)

ii. lines current I_{AL} , I_{BL} and I_{CL}.

(3 marks)

iii. the total average power

(2 marks)

iv. the total reactive power

(2 marks)

v. the total apparent power

(2 marks)

vi. the power factor

(2 marks)

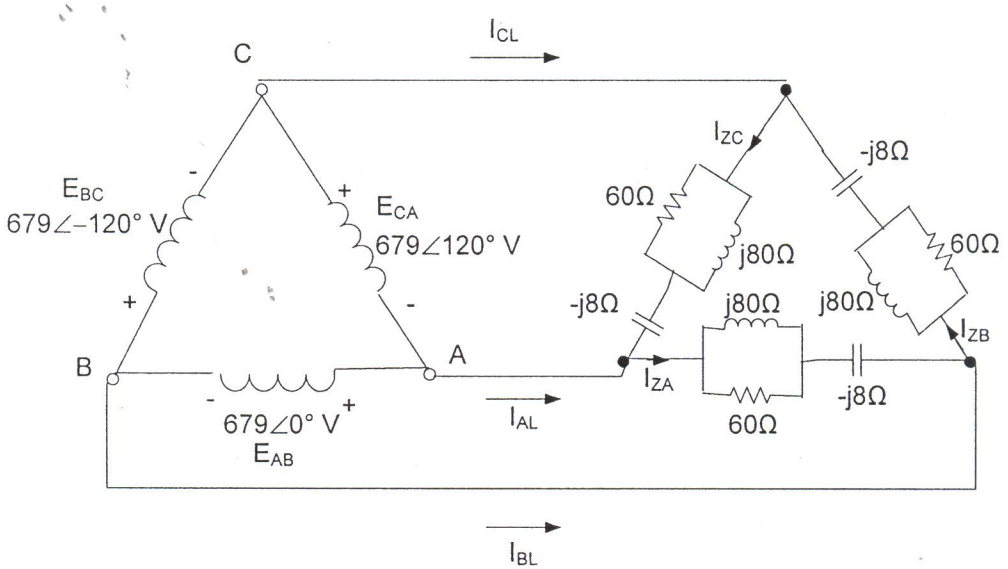

Figure 5

(b) From the figure shows in Figure 6, determine;

i. the current I_2.

(6 marks)

ii. the phase angle (θ), between I_2 and the source voltage.

(2 marks)

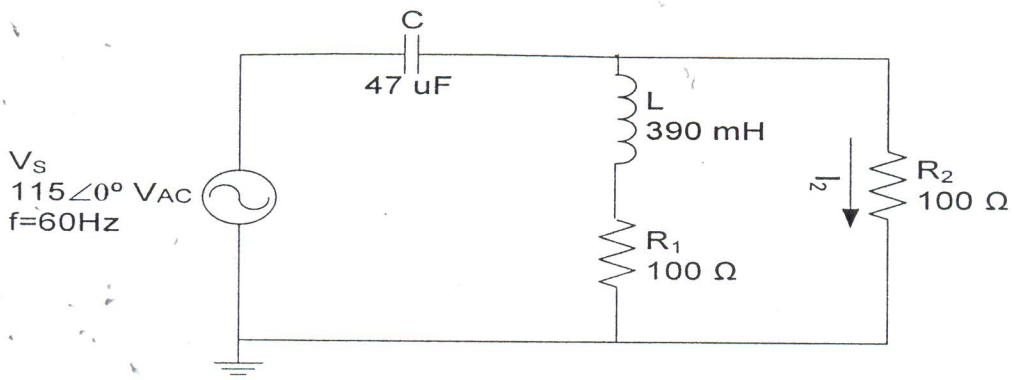

Figure 6

Question 5

(a) Refer to Figure 7, determine;

i. the Norton equivalent network at terminals A-B.

(13 marks)

ii. the power dissipated in a 5 Ω load resistor.

(2 marks)

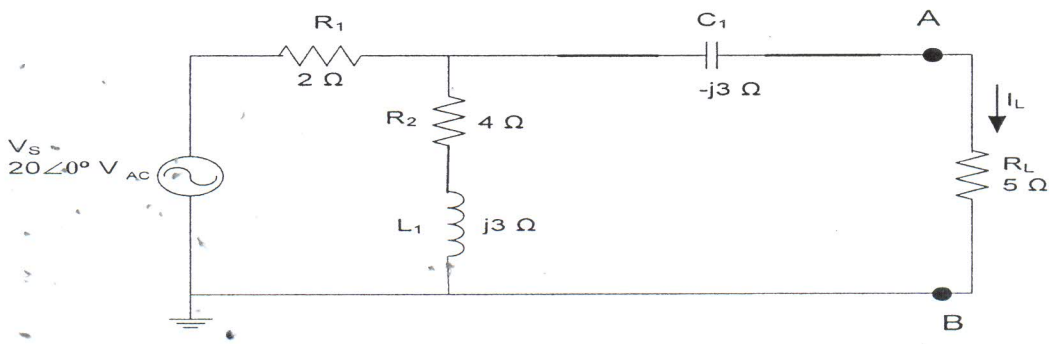

Figure 7

(b) For the power system shown in Figure 8, find:

i. the total apparent power and the power factor.

(5 marks)

ii. the total current i_T in polar form.

(5 marks)

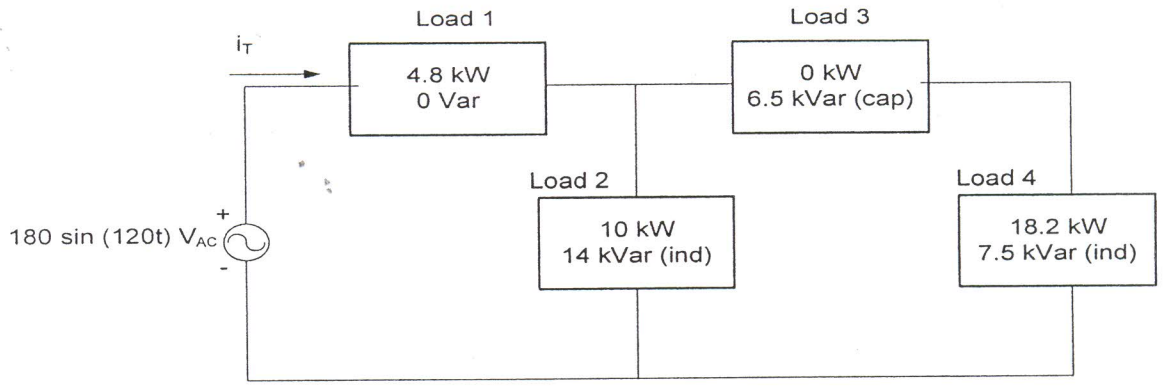

Figure 8

END OF QUESTION PAPER