



UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2010 SESSION

SUBJECT CODE	: FED 10202
SUBJECT TITLE	: ELECTRICAL PRINCIPLE
LEVEL	: DIPLOMA
TIME / DURATION	: 8.00pm – 10.00pm (2 HOURS)
DATE	: 30 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 **FIVE (5)** questions. Answer **FOUR (4)** questions only.
6. Answer all questions in English.

THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTION: Answer FOUR questions only.

Please use the answer booklet provided.

Question 1

The circuit diagram of an automotive lighting system is shown in Figure 1 below :

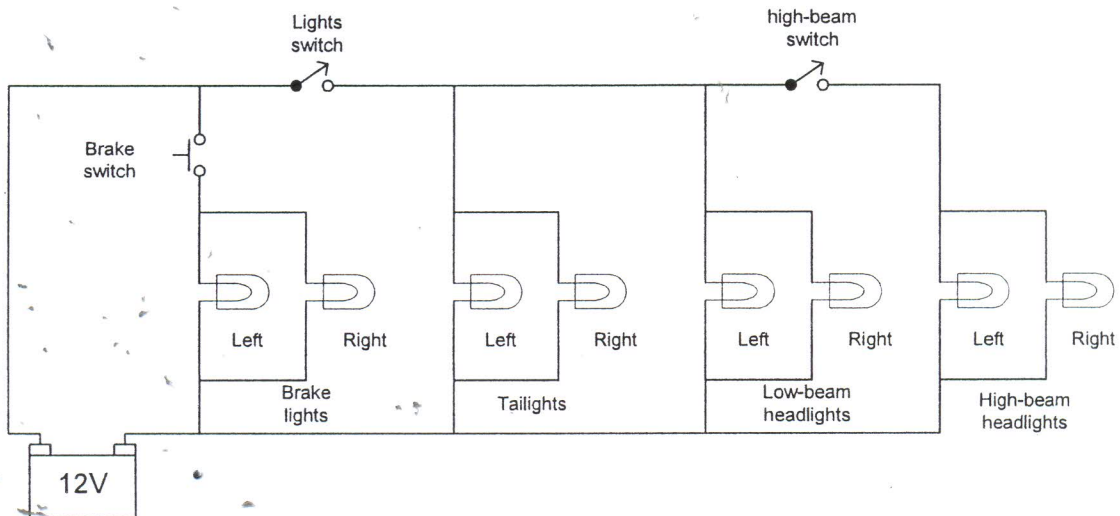


Figure 1

The complete circuit diagram, when only brake switch is pressed (lights switch and high-beam switch is not pressed) is as in Figure 1a :

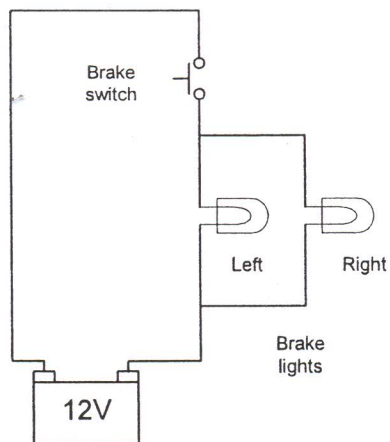


Figure 1a

- (a) From Figure 1a, If the all lights have equal resistance of $1\text{ k}\Omega$, calculate the total current for the above circuit, I_{T1} and the branch current, I_{brake} .

(5 marks)

- (b) From Figure 1, draw the circuit diagram, if lights switch is closed (tail light and low beam lights turned on) and calculate :

- current generated by battery, I_T .
- branch current for this circuit.

Assume all lamps has $1\text{ k}\Omega$ resistance. Find the branch current for this circuit.

(7.5 marks)

- (c) Repeat question 1 (b), if all switches are closed.

(12.5 marks)

Question 2

- (a) Given that $i(t) = 100 \sin(3840 t)$, Find :

- the angular velocity.
- the frequency.
- the period of the waveform.

(8 marks)

- (b) For the circuit shown in Figure 2. Find :

- the total impedance in polar form.
- total current, I_T in polar form.
- V_1 and V_2 in polar form
- total power dissipated by the resistors.

(17 marks)

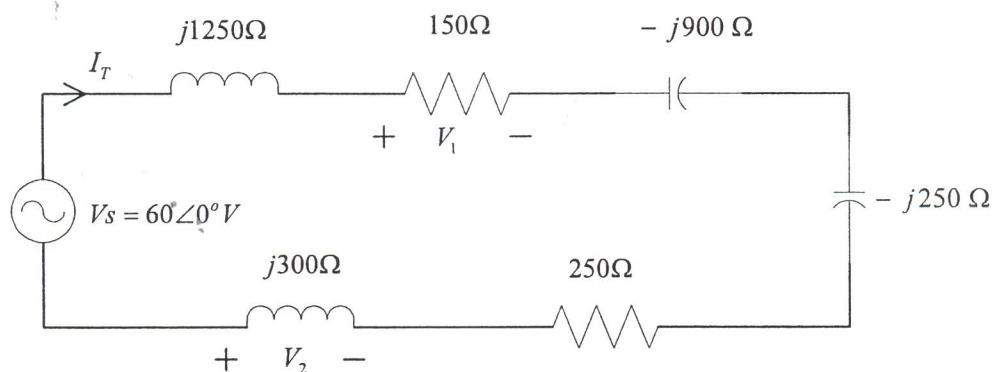


Figure 2

Question 3

- A 680 turns coil is wound on the central limb of the cast steel sheet frame as shown in Figure 3, where dimensions are in cm. A total flux of 1.6 mWb is required to be in the air gap. Find the current required in the magnetizing coil. Assume gap density is uniform and all lines pass straight across the air gap. Following data is given :

$B \text{ (Wb / m}^2\text{)}$	0.2	0.45	0.8	1.0	1.2
$H \text{ (AT / m)}$	300	500	700	900	1100

(25 marks)

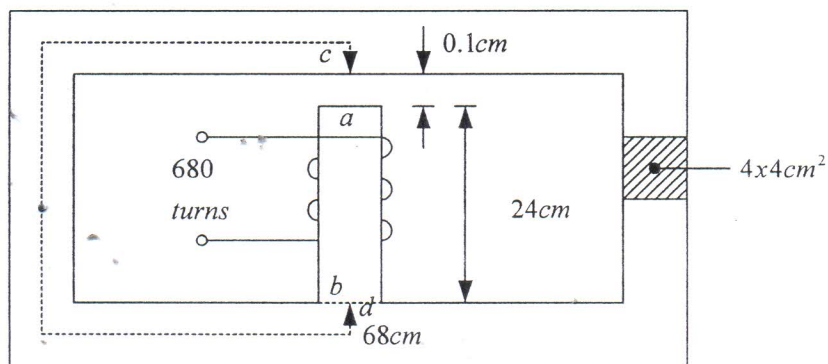


Figure 3

Question 4

- (a) Find the magnitudes of E_1 , E_2 and E_3 in the circuit shown in Figure 4.

(8 marks)

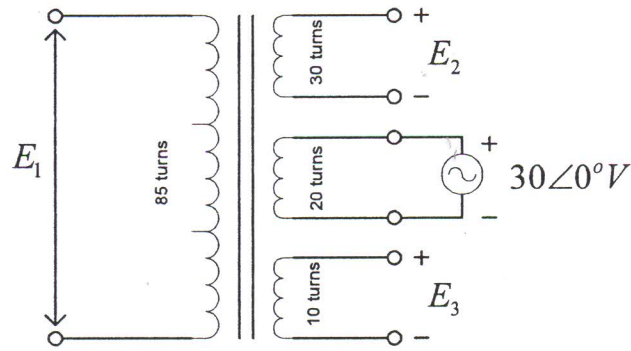


Figure 4

- (b) In the circuit containing the distribution transformer shown in Figure 5. Determine :

- transformer ratio for T_1 , T_2 and T_3 .
- magnitude of the current I_{s2} , I_{s3} , I_{p2} , I_{p3} , I_{s1} and I_{p1}

(17 marks)

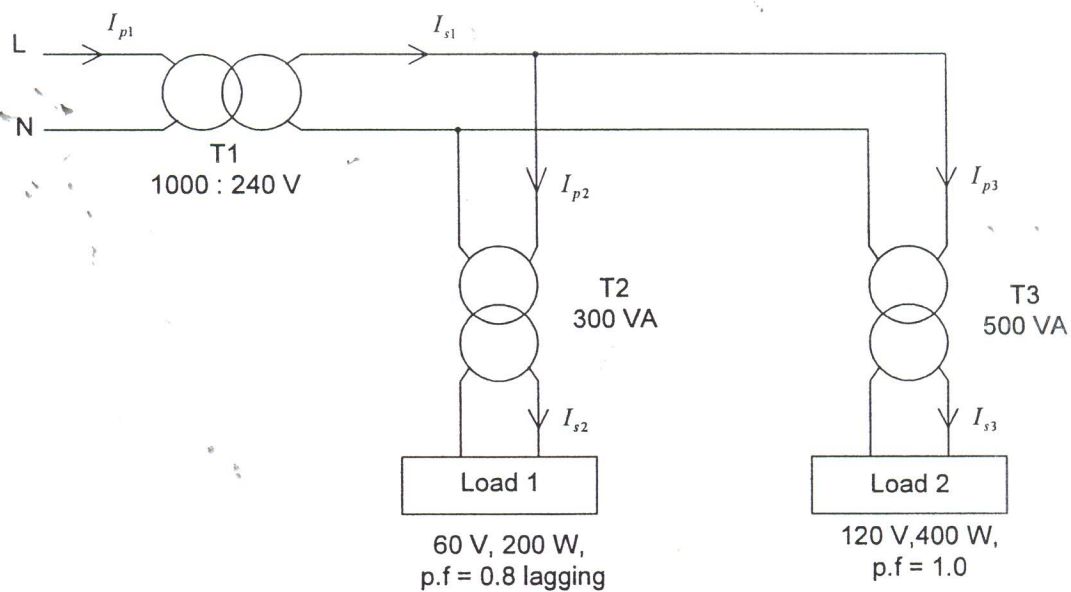


Figure 5

Question 5

A three phase 415 V, 50 Hz, a.c supply is feeding a three phase delta connected loads, $Z_{ry} = 60 - j10 \Omega$, $Z_{yb} = 40 + j10 \Omega$ and $Z_{br} = 40 + j20 \Omega$ as shown in Figure 6. Determine :

- phase current, $I_{\phi 1}$, $I_{\phi 2}$ and $I_{\phi 3}$
- line current, I_{L1} , I_{L2} and I_{L3}
- total active power.

(25 marks)

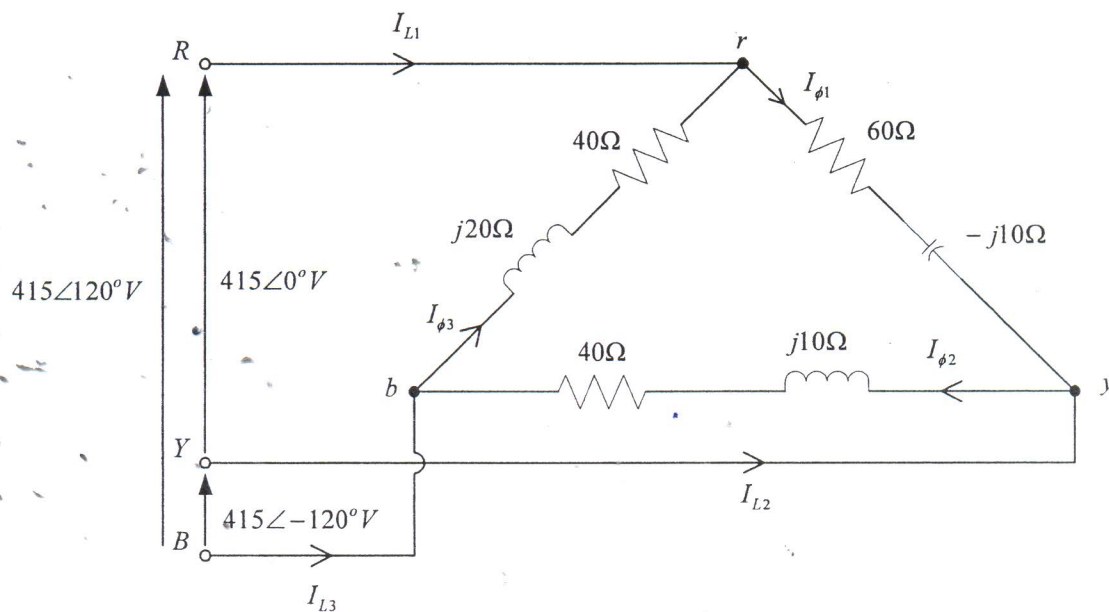


Figure 6

END OF QUESTION PAPER