UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2014 SESSION

SUBJECT CODE	:	**NMB10102**
SUBJECT TITLE	:	**ELECTRICAL ENGINEERING**
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. Answer should be written in blue or black ink except for sketching, graphic and illustration.

5. Answer five (5) questions only.

6. Answer all questions in English.

THERE ARE 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTION: Answer FIVE questions only.

Please use the answer booklet provided.

Question 1

i.)   In the circuit shown in figure 1, determine voltage, V_x and current, I_o.
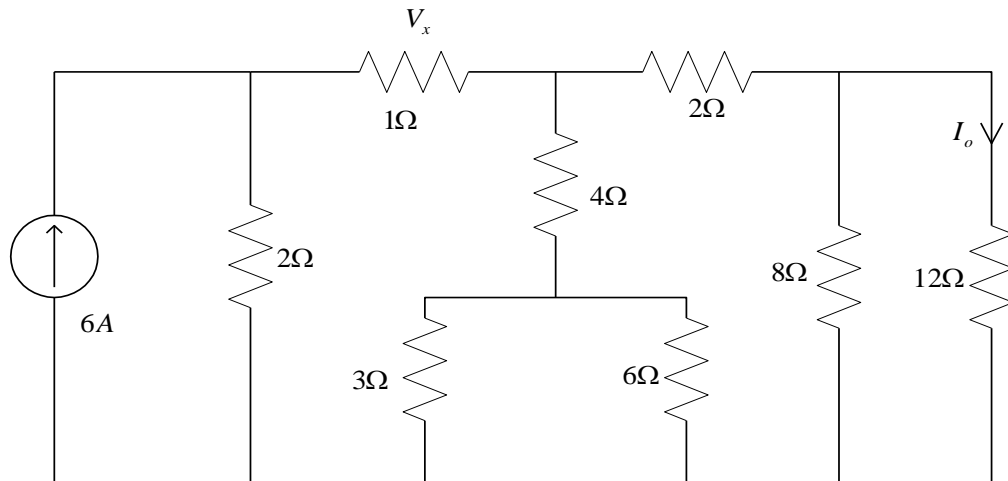
(15 marks)

Figure 1

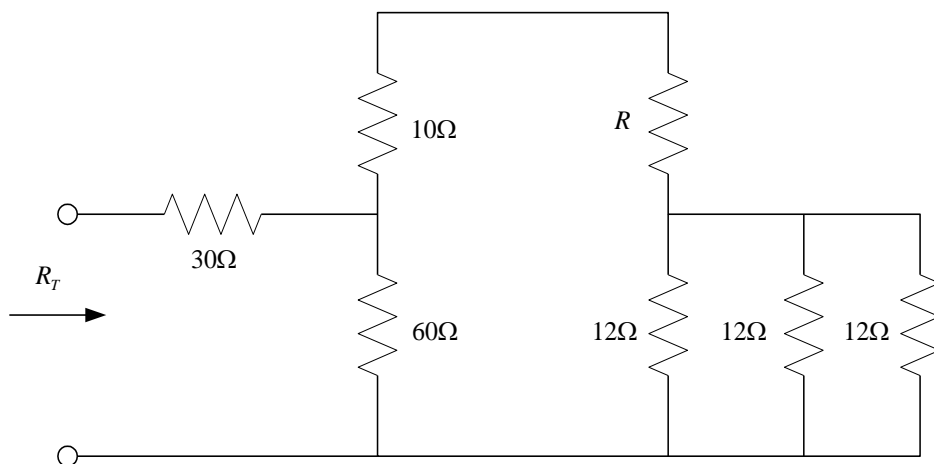ii.)   If $R_T = 50\ \Omega$ in the circuit in figure 2, determine value of resistor, R

(5 marks)

Figure 2

Question 2

i.)   Obtain the mesh current equations for the circuit in figure 3, and find current flows through resistor 2 Ω, 3 Ω , 4 Ω and 6 Ω respectively.

(8 marks)
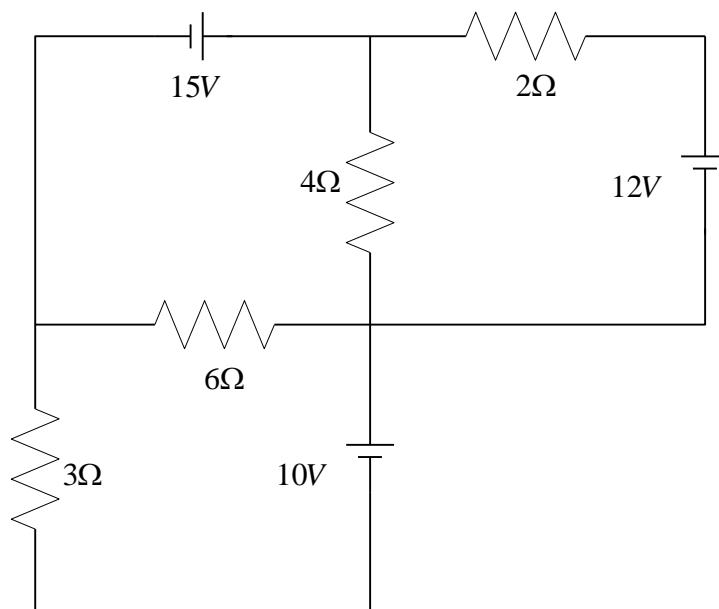

Figure 3

ii.)   Apply superposition principle to find V_o in the circuit in figure 4
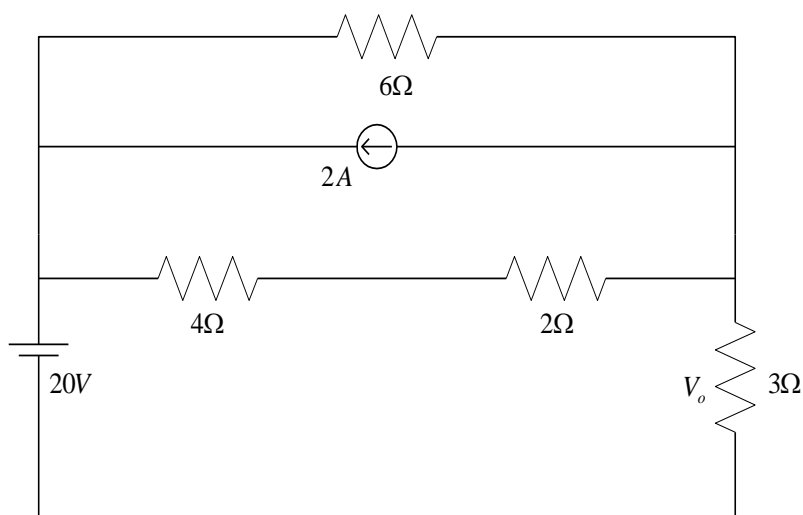
(12 marks)

Figure 4

Question 3

i.)   Apply Thevenin's Theorem to find V_o in the circuit shown in figure 5.
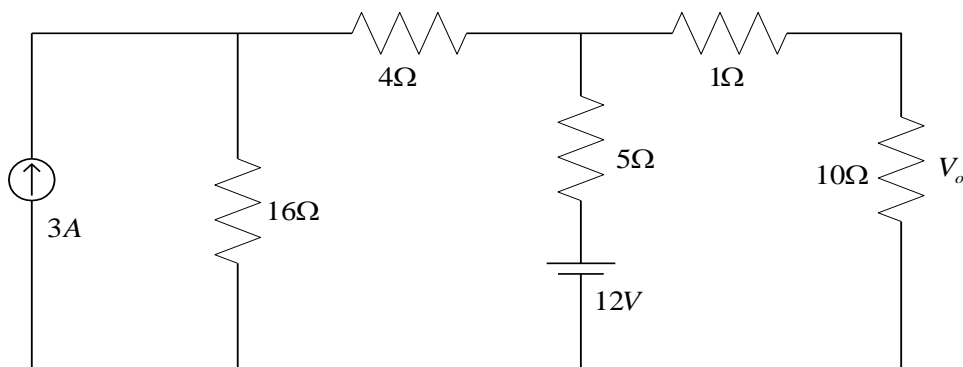
(12 marks)

Figure 5

ii.)   For the system shown in figure 6.

    a.   Find the total number of watts, volt-amperes reactive, volt-amperes and power factor F_p

    b.   Draw the power triangle
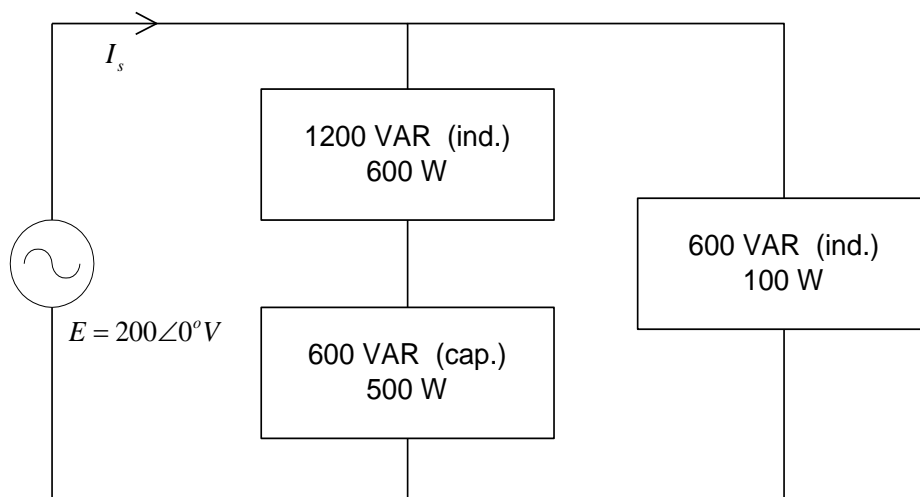
    c.   Find the current, I_s

(8 marks)

Figure 6

Question 4

The phase sequence for the Y and Δ system in figure 7 is RYB.

Determine :   (20 marks)

a.   Phase current I_a, I_b and I_c.

b.   Phase current I_1, I_2 , I_3 and I_n

c.   Line current I_{Rr}, I_{Yy} and I_{Bb}

d.   Line current I_R, I_Y and I_B

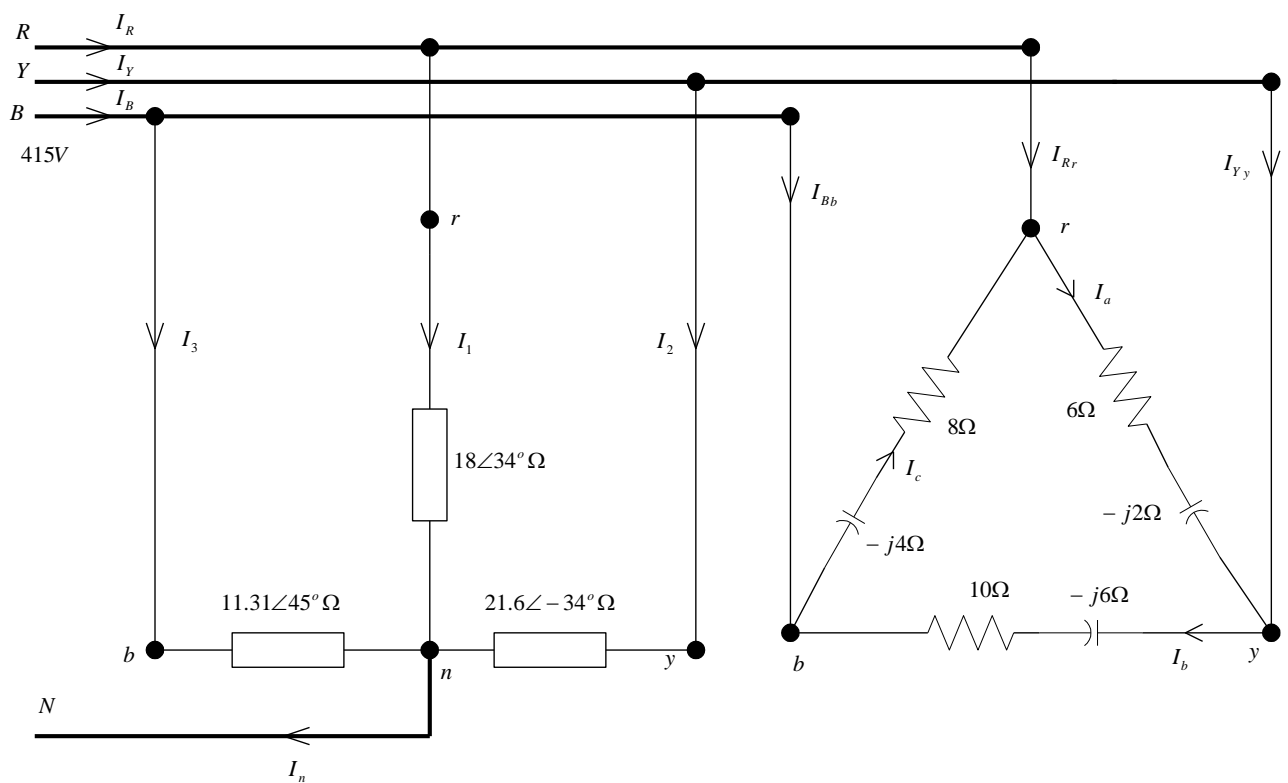e.   Total power for the system, P_T

Figure 7

Question 5

i.)   The load taken from an a.c supply 240 V, 50 Hz consists of :

-        A heating load of 15 kW

-        A motor load of 40 kVA at 0.6 lagging power factor

-        A load of 20 kW at 0.8 lagging power factor.

a.   Calculate the total load from the supply (in kW and kVA) and its power factor.

b.   What would be the capacitor rating to bring the power factor to unity and how would the capacitor be connected ?

(10 marks)

ii.)   Find the Thevenin equivalent of the circuit in figure 8 as seen from terminal a-b.
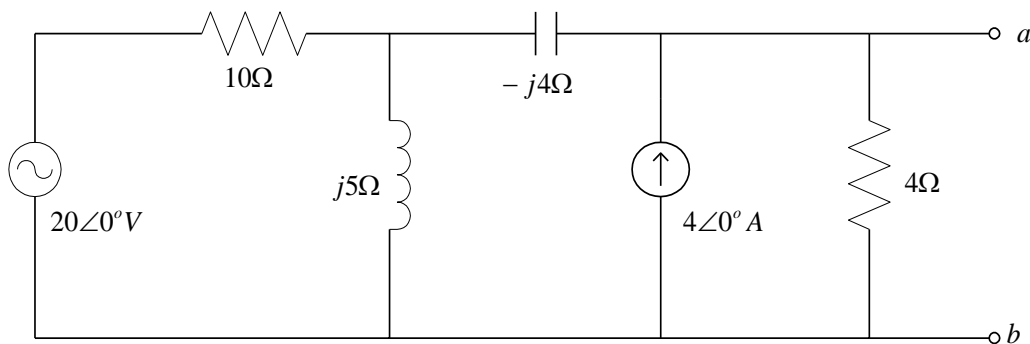
(10 marks)

Figure 8

Question 6

i.)   Define the purpose of laminating the core in a transformer.

(5 marks)

ii.)   The high voltage and low voltage winding of a 1100/110 V single phase 50 Hz transformer has resistance of 2.4 Ω and 0.02 Ω and reactances of j 1Ω and j 0.009 Ω respectively. The low voltage winding is connected to a load having an impedance of (3 + j2) Ω.

Determine :   (10 marks)

     a.   Current in L.V winding
     b.   Current in H.V winding
     c.   The load voltage
     d.   Power consumed by the load.

iii.)   The input power to a 3-phase induction motor is 60 kW. The stator-losses total 1.5 kW. Find the total mechanical power developed if the motor is running with a slip of 4 %

(5 marks)

END OF QUESTIONS PAPER