UNIVERSITY OF SWAZILAND

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

SUPPLEMENTARY EXAMINATION:	2015/16
TITLE OF PAPER:	BASIC ELECTRICAL ENGINEERING
COURSE NUMBER:	EE251
TIME ALLOWED:	3 HOURS

INSTRUCTIONS:

ANSWER ALL FIVE (5) QUESTIONS.

MARKS FOR DIFFERENT SECTIONS ARE SHOWN ENCLOSED IN SQUARE BRACKETS.

THIS PAPER HAS FIVE (5) PAGES INCLUDING THIS PAGE.

DO NOT OPEN THE PAPER UNTIL PERMISSION HAS BEEN GIVEN BY THE INVIGILATOR.

Question 1 (20 marks)

(a) For the circuit in Fig. 1.1, obtain v_1 and v_2. [6]

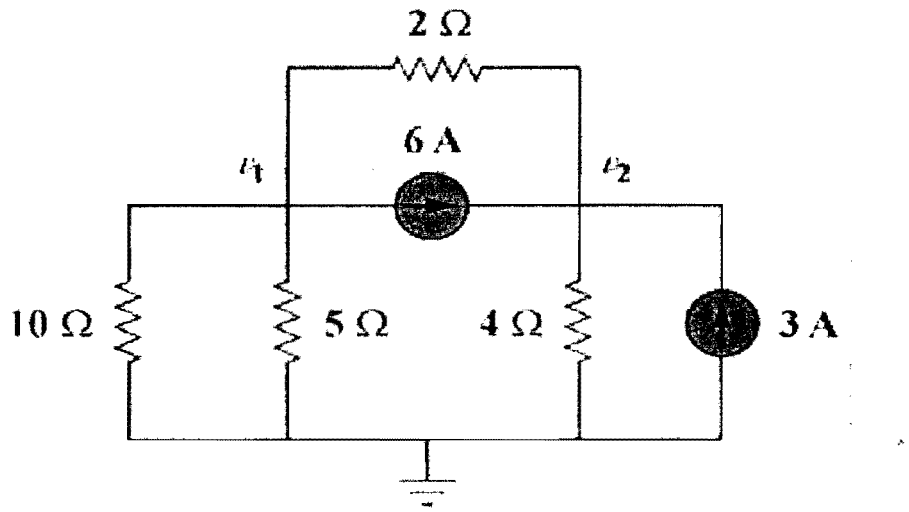

Figure 1.1

(b) Find the currents i_1 through i_4 and the voltage v_o in the circuit in Fig. 1.2. [6]

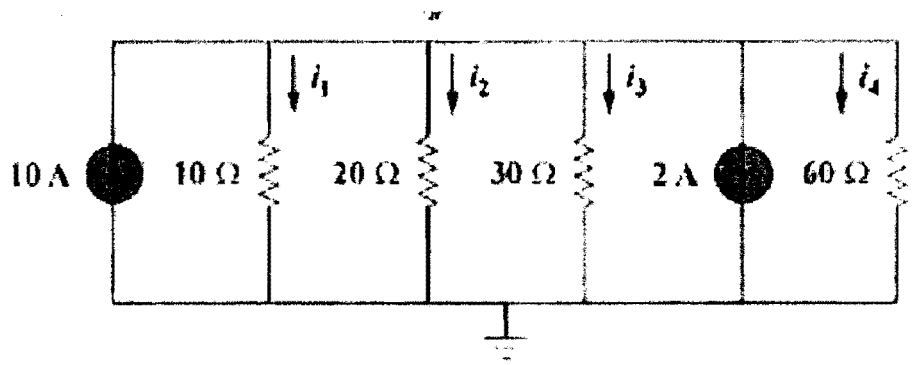

Figure 1.2

(c) Use mesh analysis to obtain i_o in the circuit of Fig. 1.3. [8]

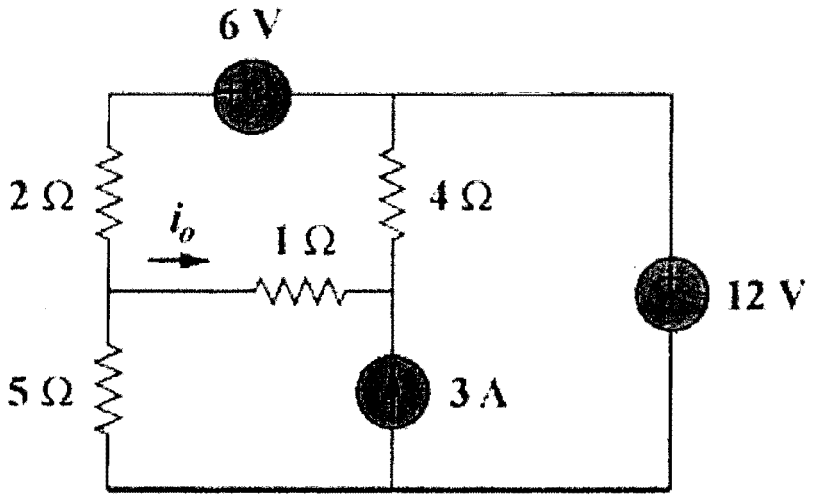

Figure 1.3

Question 2 (15 marks)

Using nodal analysis, determine V_o in the circuit in Fig. 2.

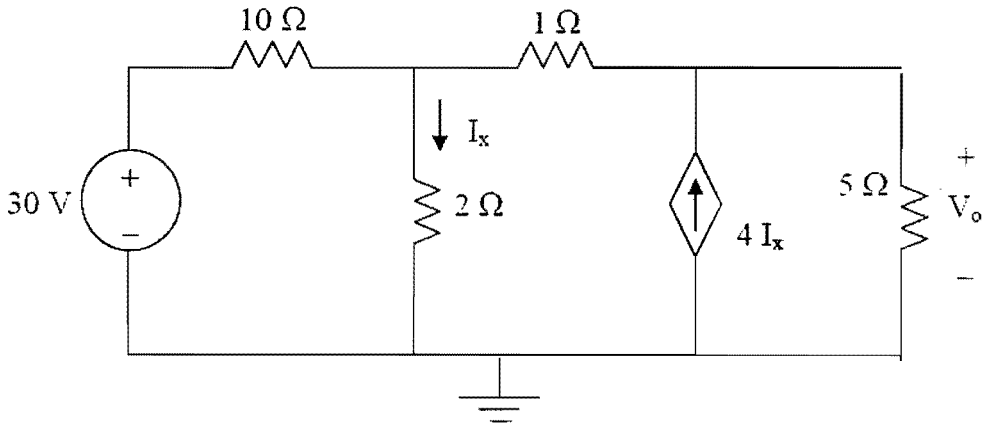

Figure 2

Question 3 (22 marks)

Use the superposition principle to find i_o and v_o in the circuit of Fig. 3

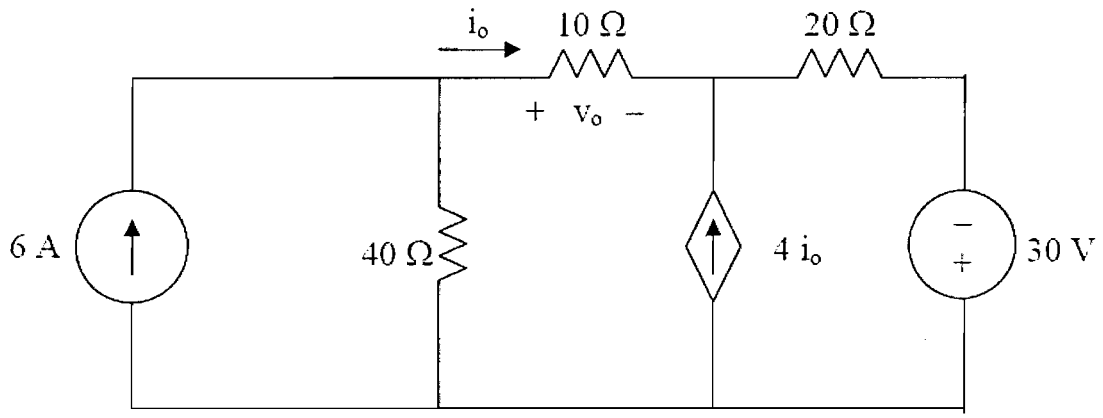

Figure 3

Question 4 (23 marks)

Use mesh analysis to determine current $\mathbf{I}_o$ in the circuit of Fig. 4 below

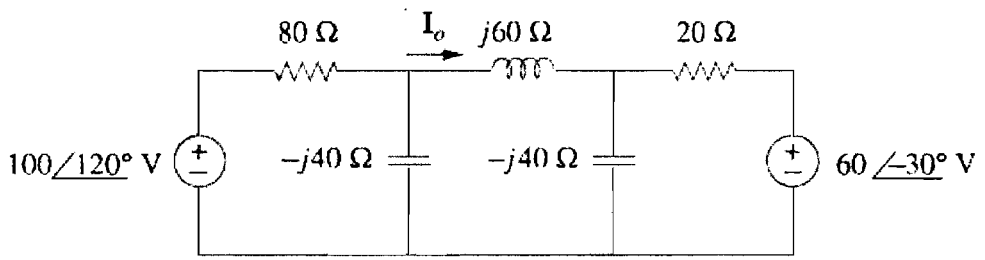

Figure 4

Question 5 (20 marks)

Obtain the line currents in the three-phase circuit of Fig. 5

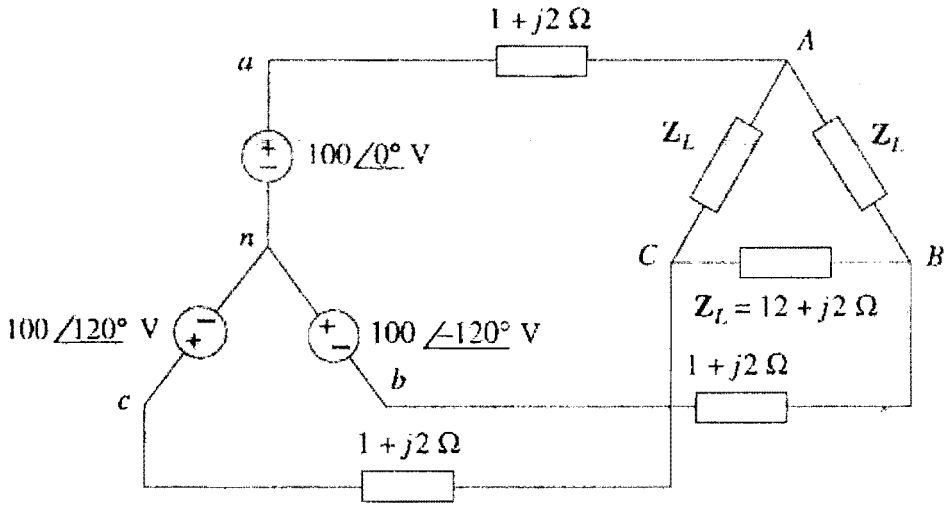

Figure 5