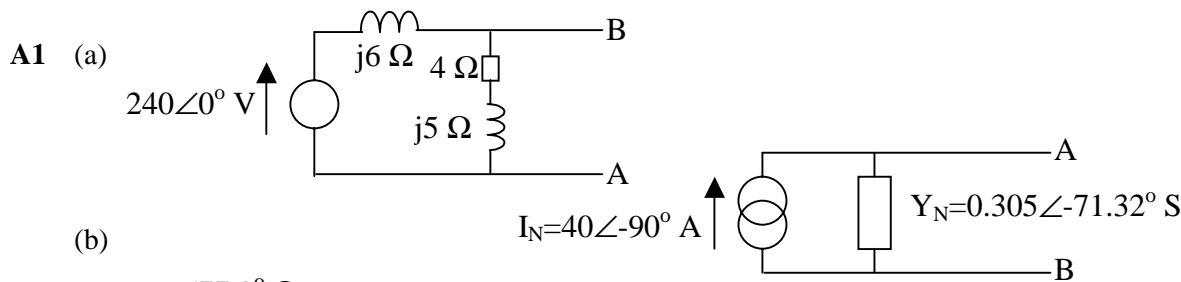




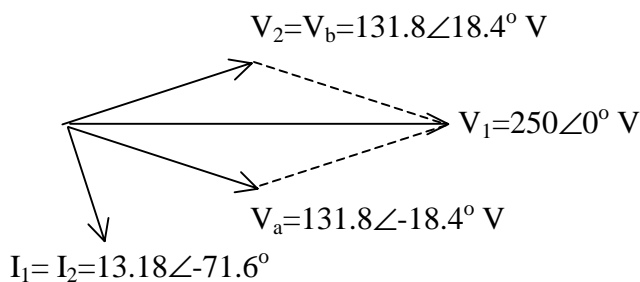
UEE 201 - THEORY OF ELECTRICITY - Answers

Final Part I Examination 1999/00 - May 2001



(c) $28.6\angle 77.9^\circ \Omega$

(d)
$$\begin{bmatrix} 1.897\angle -18.4^\circ & 28.6\angle 41.0^\circ \\ 0.1\angle -90^\circ & 1.897\angle -18.4^\circ \end{bmatrix}$$

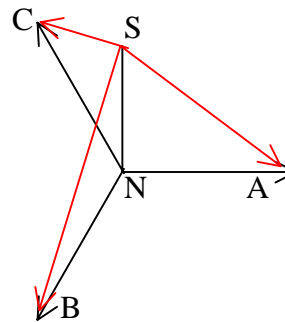


(f) $X = -5 \Omega, 190.4\angle 53.2^\circ \text{ V}, 4375 \text{ W}$

(g) $11.41 \times 10^6 \text{ H}^{-1}, 87.7 \text{ mH}$

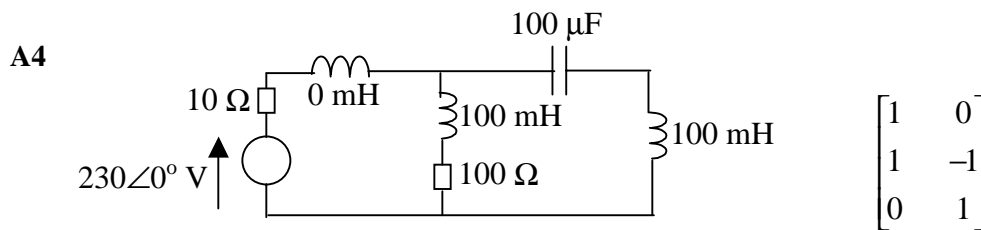
(h) $3.86 \text{ pF}, 69.53 \text{ V}, 130.47 \text{ V}$

- A2** (a) $162.67\angle 90^\circ \text{ V}$
 (b) $282.5\angle -35.2^\circ \text{ V}, 380.6\angle -107.7^\circ \text{ V}, 121.4\angle 162.1^\circ \text{ V}$
 (c) $1024.4 \text{ W}, 104.1 \text{ W}$
 (d)



(e) With lamps used in place of resistors this circuit can be used to determine the phase sequence, using the sequence "Bright-dim-capacitance" order.

- A3** (a) 1.443 A
 (b) $1.054 \cos \omega_0 t + 1.000 \cos 3\omega_0 t + 0.899 \cos 5\omega_0 t + 0.760 \cos 7\omega_0 t + \dots \text{ A}$
 (c) $98.98 \cos (\omega_0 t + 15.16^\circ) - 1.000 \cos 3\omega_0 t - 0.899 \cos 5\omega_0 t - 0.760 \cos 7\omega_0 t + \dots \text{ V}$
 (d) 50.9 W
 (e) 2.083 W
 (f) $-0.09898 \sin (\omega_0 t + 15.16^\circ) - 0.00300 \sin 3\omega_0 t - 0.00449 \sin 5\omega_0 t - 0.00532 \sin 7\omega_0 t + \dots \text{ A}$



$$\begin{bmatrix} 110 + j31.416 & -(100 + j31.416) \\ -(100 + j31.416) & 100 + j31.001 \end{bmatrix}, 22.96\angle 2.36^\circ \text{ A}$$



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A5 (a) $2.228\angle-13.26^\circ$ A

(b) $1.110\angle-49.46^\circ$ A

(c) $3.193\angle-25.11^\circ$ A

(d) 0.905 lag, 2002 W, 938 var

(e) 3 of $1.86\ \mu\text{F}$

A6 (a) $5.752\angle-51.49^\circ$ A, $7.257\angle-30^\circ$ A, $2.309\angle120^\circ$ A

(b) $3.551\angle-35.13^\circ$ A, $2.167\angle25.09^\circ$ A, $3.613\angle-110.8^\circ$ A

(c) 1360 W

(d) $\sum |I|^2 R = 1360$ W

A7 (a) 477.5 Hz

(b) $90.9\angle0^\circ$ V

(c) $\frac{\omega}{s^2 + \omega^2}$

(d) standard derivations