1. Find V_o in the network shown in Fig. 1. [15%]

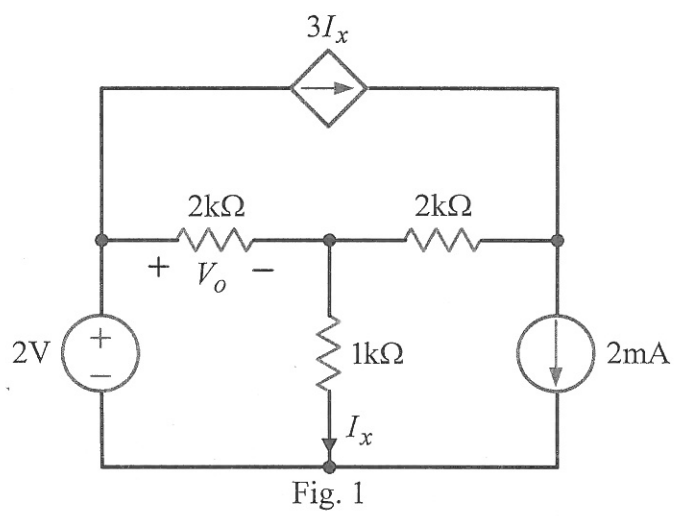

Fig. 1

2. Find the value of R_L in Fig. 2 for maximum power transfer. Also calculate the maximum power that can be transferred. [15%]

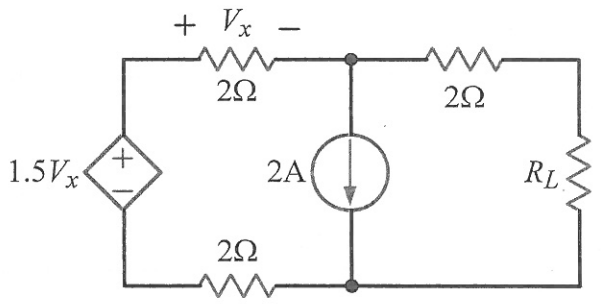

Fig. 2

3. For the op-amp circuit in Fig. 3(a), the input is given by the waveform in Fig. 3(b). Derive and plot the waveform for the output voltage $v_o(t)$ if $v_o(0) = 0$. [20%]

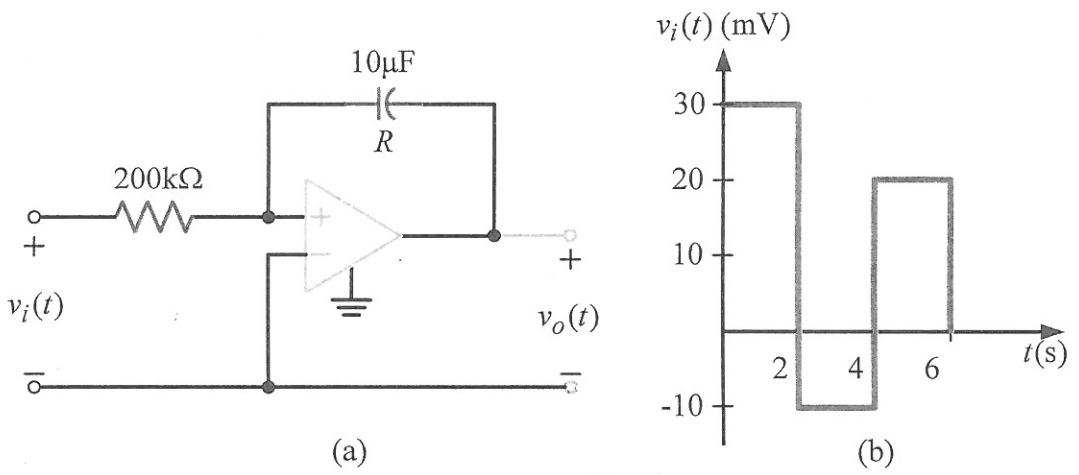

Fig. 3

4. Find the complex power supplied by the source, the power factor of the source, and $v_S(t)$ if $f = 60\,\text{Hz}$ in Fig.4. [18%]

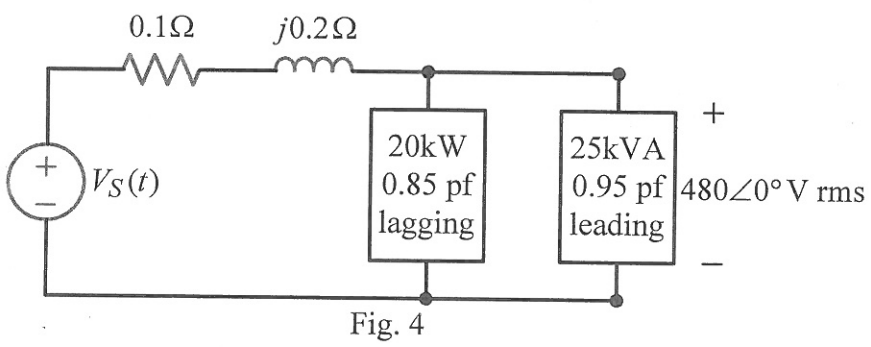

Fig. 4

5. The amplitude and phase spectra for a periodic function $v(t)$ that has only a small number of terms is shown in Fig. 5. Determine the expression for $v(t)$ if its period is $T_0 = 1\,\text{s}$. [12%]

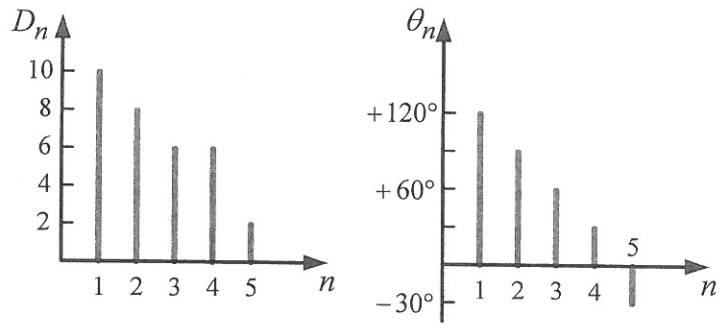

Fig. 5

6.(a)Determine $\mathbf{Z}_1, \mathbf{Z}_2, \mathbf{Z}_3$ so that the two-port network in Fig. 6 has the $\mathbf{Z}$ parameters $[\mathbf{Z}] = \begin{bmatrix} 6+j4 & 3+j3 \\ 3+j3 & 8+j5 \end{bmatrix}$. (b) Find the Thevenin equivalent circuit for the Part A of the circuits. (c) Determine the output voltage $\mathbf{V}_o$ of the network. [20%]

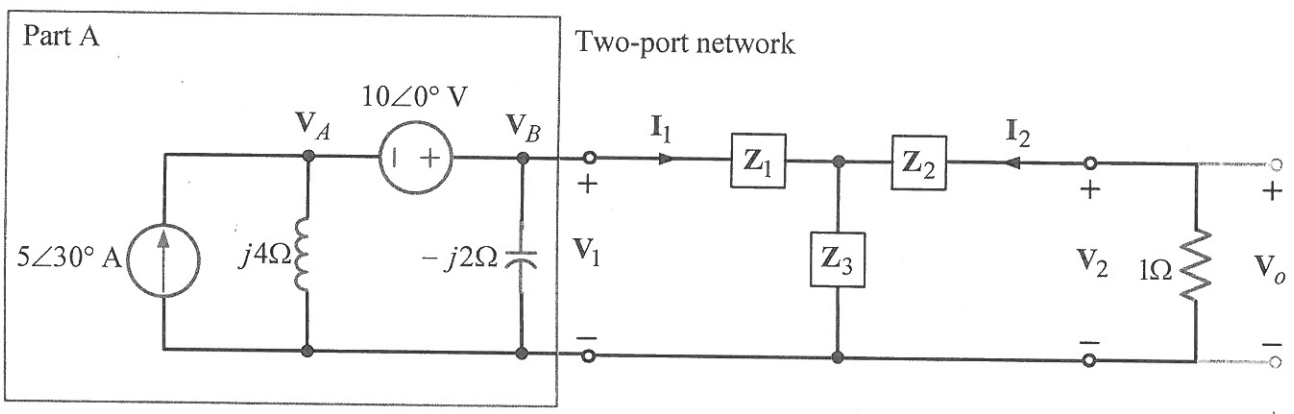

Fig. 6