

- (a) Find I_B and V_C for the circuit in Figure A. Let $\beta = 80$, $V_{BE} = 0.5V$ (10%), (b) find the Thevenin equivalent to the left of points P and E as shown in Figure A (10%).
- (a) Use three operation amplifiers to implement the Instrumentation Amplifier (IA), and (b) describe its three major characteristics. (20%)
- In Figure B, $V_s(t) = u(t)$ (a unit step function), (a) write down the differential equation by using $V_s(t)$, $V_1(t)$, and $V_o(t)$ (10%) and (b) solve the equation by Laplace transform and find $V_o(t)$ (10%), (c) if $V_s(t) = 5\cos(100t + 10^\circ)$, find $V_o(t)$ in the phasor domain (10%). Assume zero initial conditions at capacitors and inductors.
- Calculate three line currents in the three-wire Y-Y system of Figure C (15%).
- Calculate the phasor currents I_1 and I_2 in the circuit of Figure D, $\omega = 1000 \text{ rad/s}$ (15%).

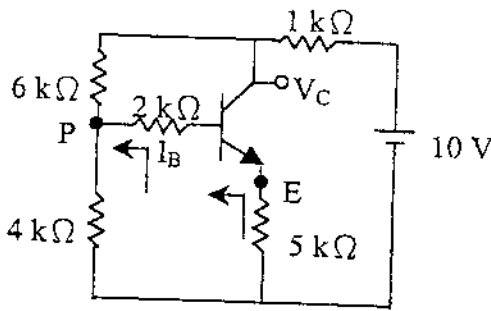


Figure A

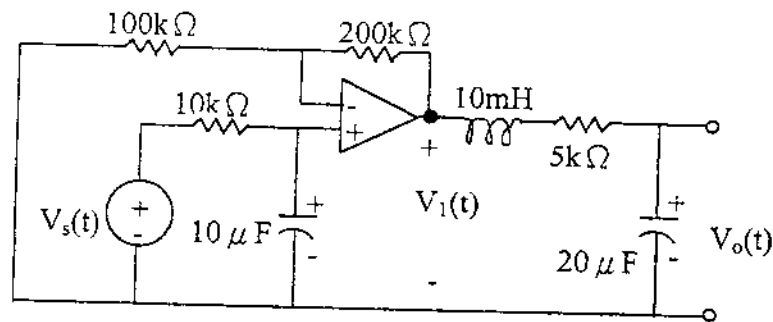


Figure B

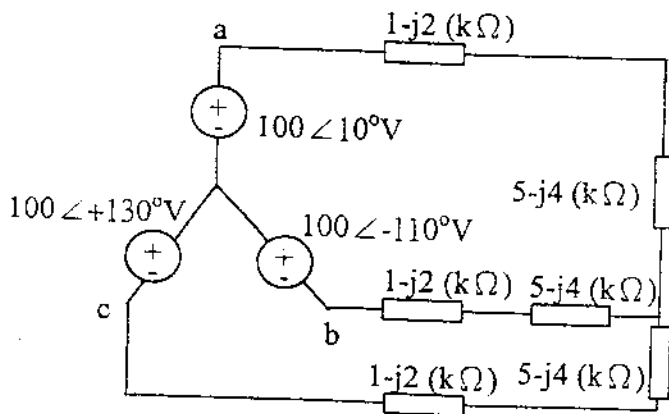


Figure C

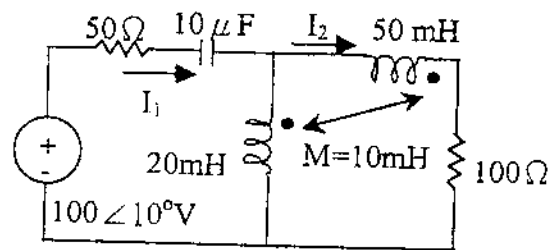


Figure D