



Daffodil International University
Department of Electrical and Electronic Engineering
Faculty of Engineering

Final Examination, Summer-2026

Course Code: 0713-121

Section: A, B

Full Marks: 40

Course Title: Electrical Circuits II

Level-Term: L1-T2

Exam Date: August 23, 2026

Teacher's Initial: MSA, KNA
Time: 2 Hours

Question no. 1 is COMPULSORY. Answer ANY FOUR from the remaining Questions.

- Q1. The switch in the circuit of Fig. 1 closes at $t = 0$, after being open for a long time. Calculate the transient current $i_3(t)$, if $V_s = 120\sqrt{2}\sin(100\pi t + 30^\circ)$ V. CO-3 8
C(3)

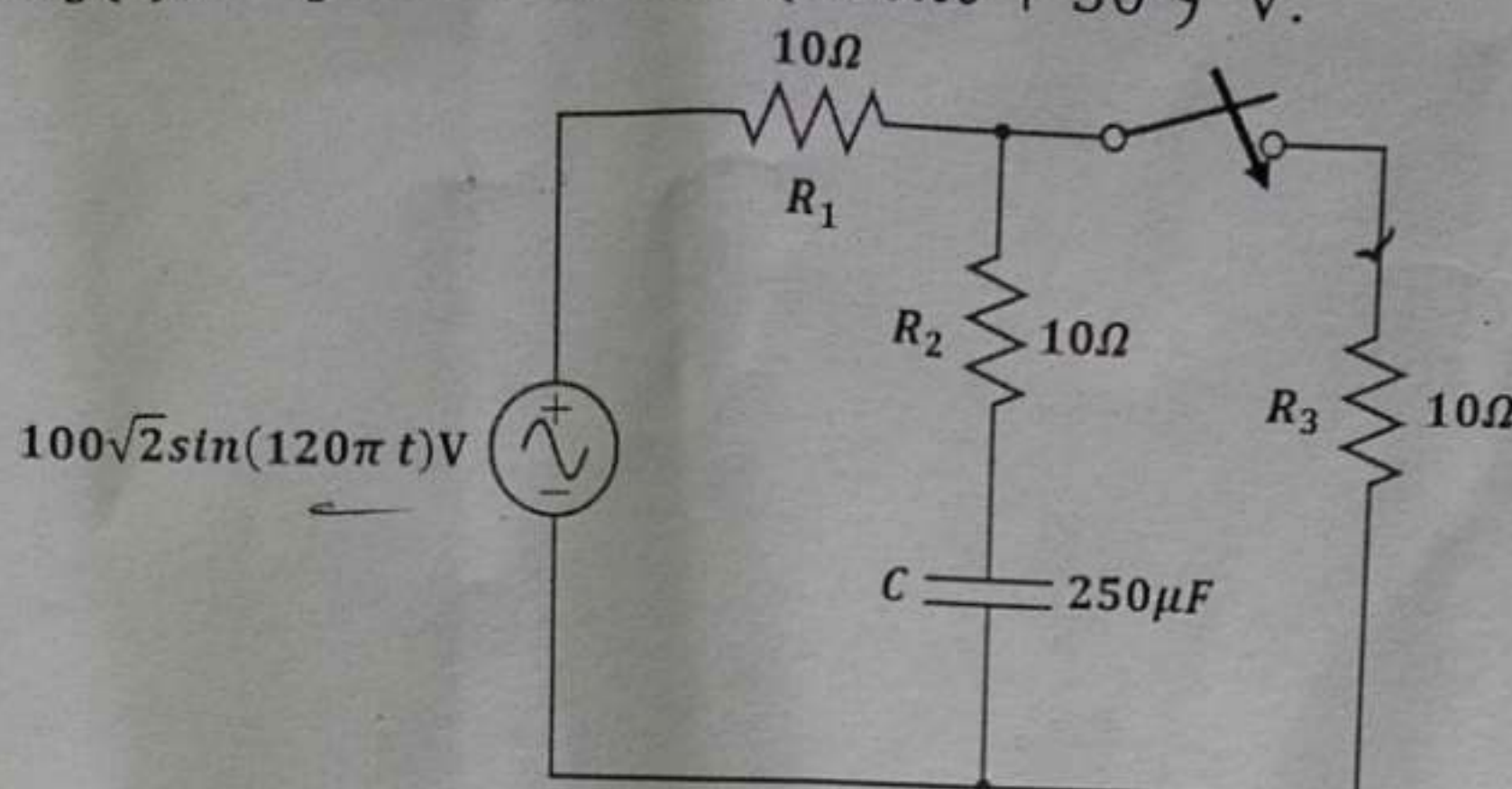


Fig. 1

- Q2. The energy stored in the coupled inductors of the circuit diagram shown in Fig. 2 is given by $\frac{1}{2}L_1i_1^2 + \frac{1}{2}L_2i_2^2 - Mi_1i_2$. Derive an expression for the maximum possible value of M from the limiting value of the energy, and define coupling coefficient (k) from your derived expression. What is the range of coupling coefficient? CO-2 8
C(2)

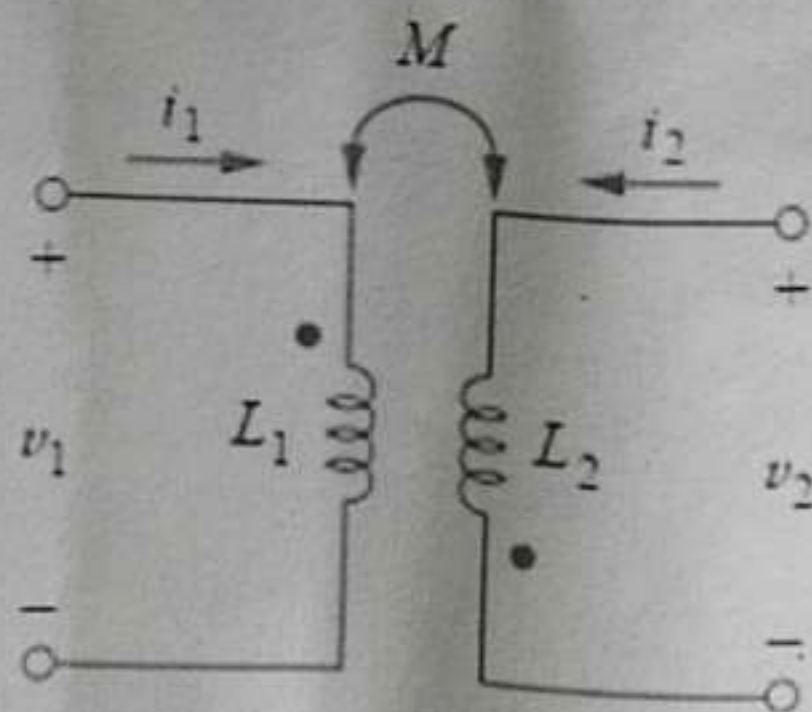


Fig. 2

- Q3. Explain mathematically what type of filter the circuit in Fig. 3 works as. Illustrate the ideal and actual frequency response of this filter, labeling important point(s). CO-2 8
C(2)

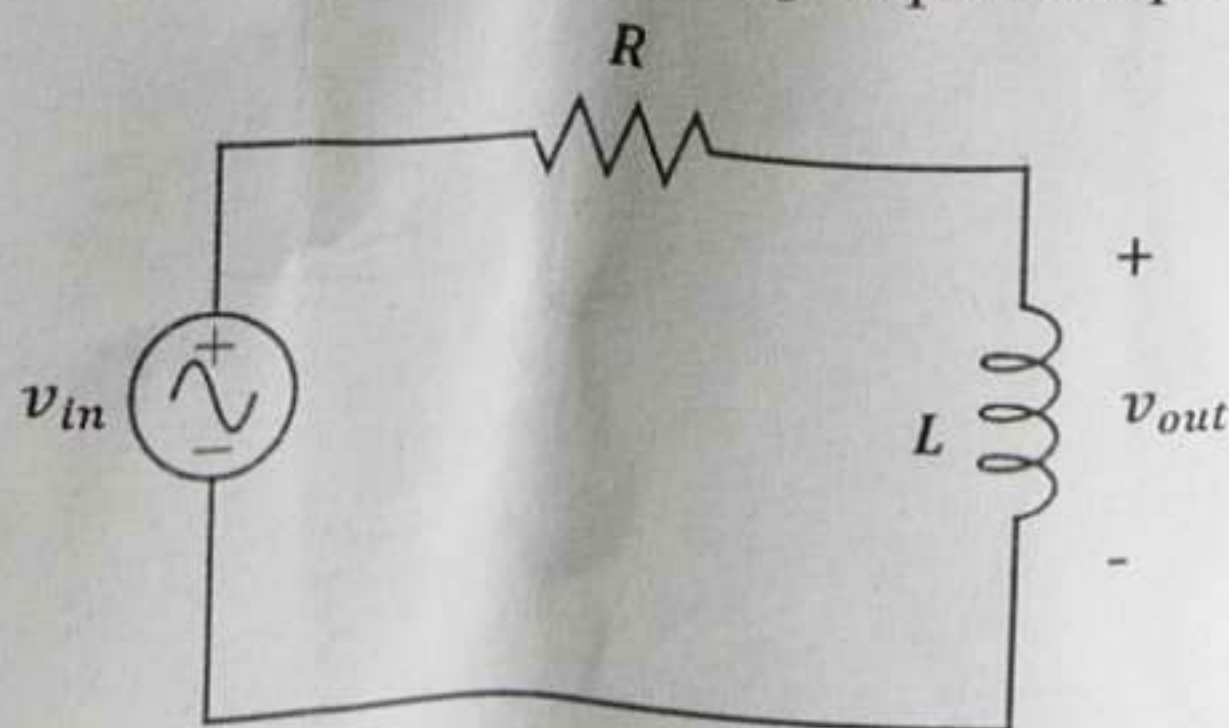


Fig. 3

- Q4. (a) Resonant frequency and quality factor of a RLC series resonant circuit is 10 rad/s and 20 , respectively. Determine R , L , and C . Also, determine the amplitude of the currents at ω_0 and ω_1, ω_2 . CO-2 4
C(3)
- (b) A parallel resonant circuit has $R = 100 \text{ k}\Omega$, $L = 20 \text{ mH}$, and $C = 5 \text{ nF}$. Calculate ω_0 and ω_1, ω_2, Q and B . 4
- Q5. (a) For the Y- Δ circuit in Fig. 5(a), determine the line currents, and average power delivered to the load. CO-2 4
C(3)

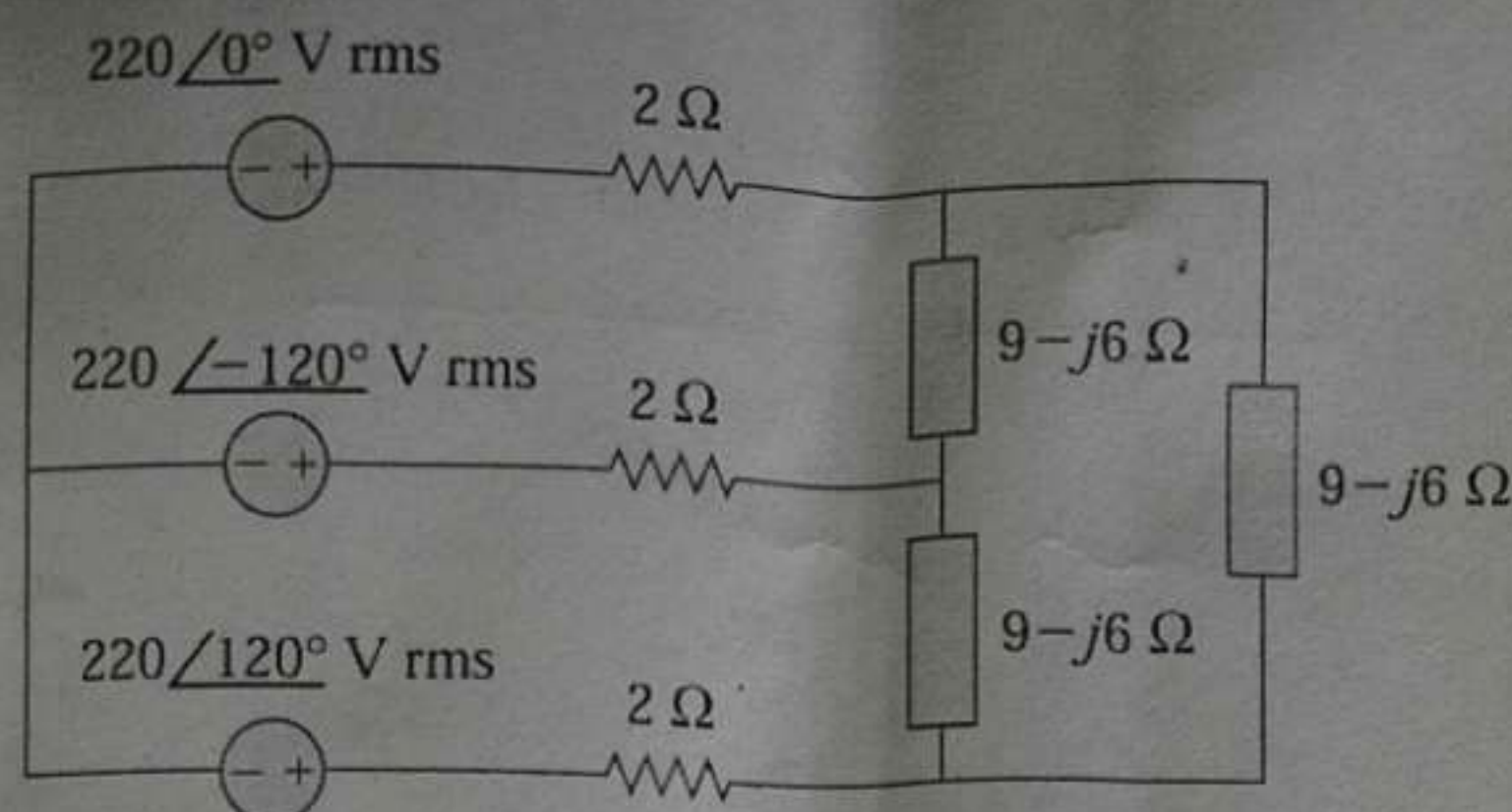


Fig. 5(a)

- (b) A three-phase Δ -connected motor draws 10 kVA at a power factor of 0.8 lagging. If the three-phase system has an effective line voltage of 400 V with abc phase sequence, find the line current. 4
- Q6. Determine the currents i_1 and i_2 in the circuit of Fig. 6. Calculate the energy stored in the coupled coils at time $t = 1 \text{ s}$, if $v_s = 120 \cos 10t \text{ V}$. CO-2 8
C(3)

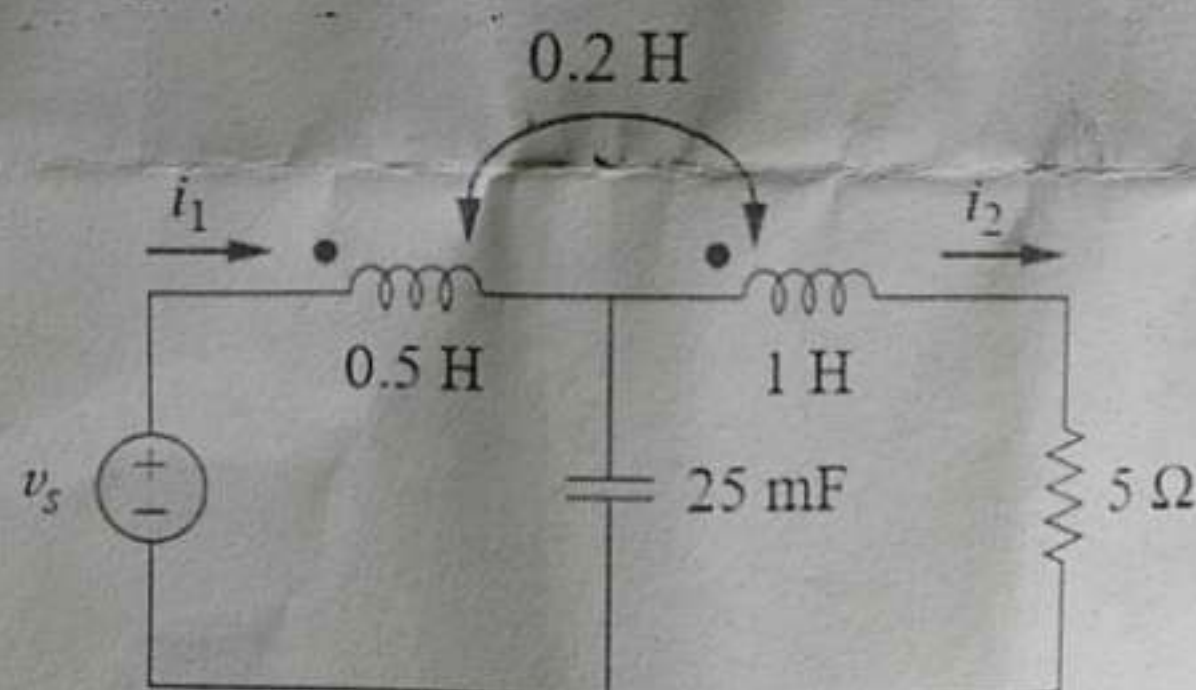


Fig. 6

- Q7. The unbalanced Δ -load of Fig. 7 is supplied by balanced line-to-line voltages of 230 V in the positive sequence. Find: (i) the line currents I_a, I_b, I_c , and (ii) the total power absorbed by the load. CO-2 8
C(3)

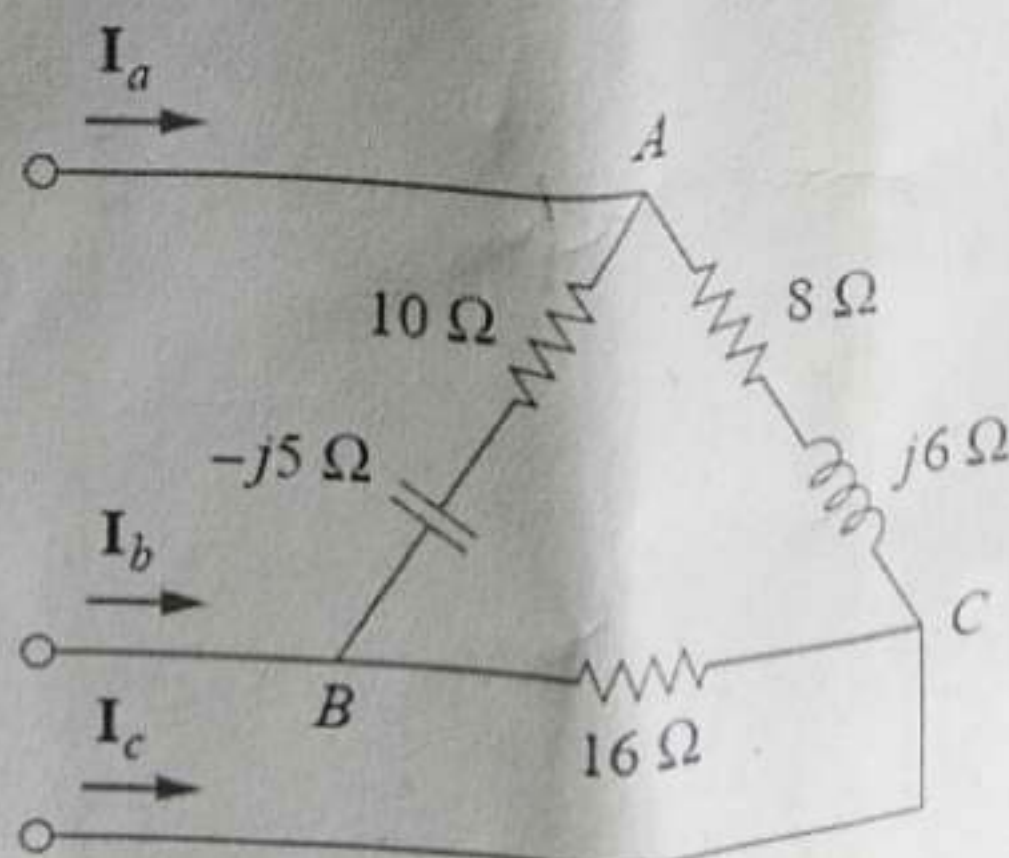


Fig. 7