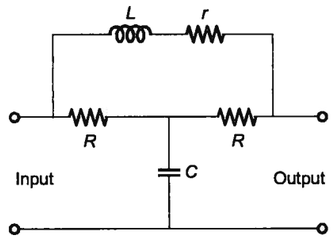
8 Filters and Magnetic Coupled Circuits

Multiple Choice Questions

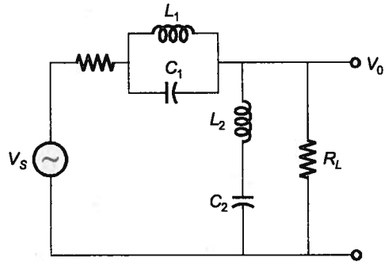
Q.1 The circuit shown in the figure below is a



(a) low pass filter (b) high pass filter
(c) band pass filter (d) band stop filter

[ESE-2000]

Q.2 The circuit of the figure represents a



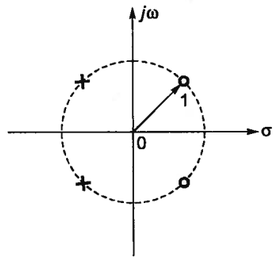
(a) low pass filter (b) high pass filter
(c) band pass filter (d) band reject filter

[GATE-2000]

Q.3 If the numerator of a second-order transfer function $F(s)$ is a constant, then the filter is a
(a) band-pass filter (b) band-stop filter
(c) high-pass filter (d) low-pass filter

[ESE-2001]

Q.4 The pole-zero pattern shown in the given figure is for



(a) a low-pass filter (b) a high-pass filter
(c) an all-pass filter (d) a band-pass filter

[ESE-2001]

Q.5 The transfer function

$$\frac{V_2(s)}{V_1(s)} = \frac{10s}{s^2 + 10s + 100}$$ is for an active

(a) low pass filter (b) band pass filter
(c) high pass filter (d) all pass filter

[ESE-2001]

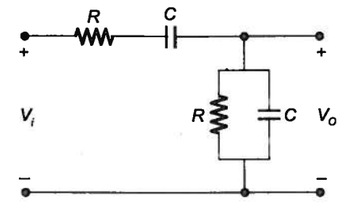
Q.6 Which one of the following is the transfer function of an electrical lowpass filter using R and C elements?

(a) $\frac{RCs}{[1+RCs]}$ (b) $\frac{1}{[1+RCs]}$

(c) $\frac{RC}{[1+RCs]}$ (d) $\frac{s}{[1+RCs]}$

[ESE-2004]

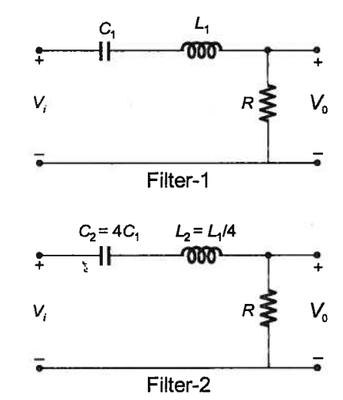
Q.7 The RC circuit shown in the figure is



(a) a low-pass filter
(b) a high-pass filter
(c) a band-pass filter
(d) a band-reject filter

[GATE-2007]

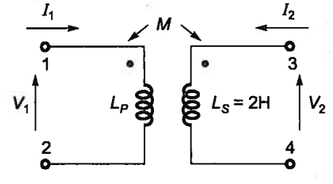
Q.8 Two series resonant filters are as shown in the figure. Let the 3-dB bandwidth of Filter 1 be B_1 and that of Filter 2 be B_2. The value of $\frac{B_1}{B_2}$ is



(a) 4 (b) 1
(c) 1/2 (d) 1/4

[GATE-2007]

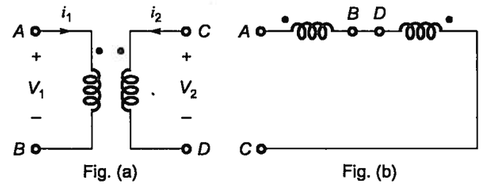
Q.9 In the transformer shown in the figure below, the inductance measured across the terminal 1 and 2 was 4 H with open terminals 3 and 4. It was 3 H when the terminal 3 and 4 were short circuited. The coefficient of coupling would be



(a) 1
(b) 0.707
(c) 0.5
(d) indeterminate due to insufficient data

[ESE-2000]

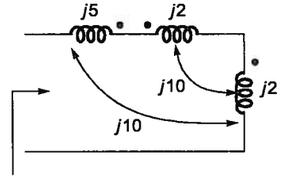
Q.10 The inductance matrix of a system of two mutually coupled inductors shown in figure 1 is given by $L = \begin{bmatrix} 5 & +4 \\ +4 & 7 \end{bmatrix}$



When the inductors are connected as shown in figure 2, the equivalent inductance of the system is given by
(a) 20 H (b) 4 H
(c) 16 H (d) 8 H

[ESE-2002]

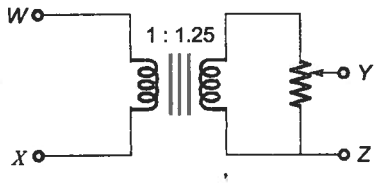
Q.11 Impedance Z as shown in the given figure is



(a) $j29\ \Omega$ (b) $j9\ \Omega$
(c) $j19\ \Omega$ (d) $j39\ \Omega$

[GATE-2005]

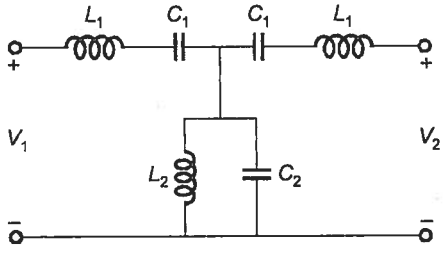
Q.12 The following arrangement consists of an ideal transformer and an attenuator which attenuates by a factor of 0.8. An ac voltage $V_{WX1} = 100$ V is applied across WX to get an open circuit voltage V_{YZ1} across YZ. Next, an ac voltage $V_{YZ2} = 100$ V is applied across YZ to get an open circuit voltage V_{WX2} across WX. Then, V_{YZ1}/V_{WX1}, V_{WX2}/V_{YZ2} are respectively,



(a) 125/100 and 80/100
(b) 100/100 and 80/100
(c) 100/100 and 100/100
(d) 80/100 and 80/100 [GATE-2013]

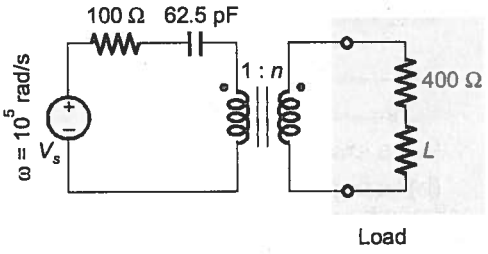
Try Yourself

T1. The circuit given below will act



(a) Low pass filter (b) High pass filter
(c) Band pass filter (d) Band stop filter

T2. In the circuit below, the load consists of a 400 Ω resistor and an inductor. For what value of n and L, the power transferred to the load will be maximum?



(a) $n = 4$, $L = 3.2$ H
(b) $n = 0.5$, $L = 1.6$ H
(c) $n = 2$, $L = 6.4$ H
(d) $n = 2$, $L = 4.8$ H