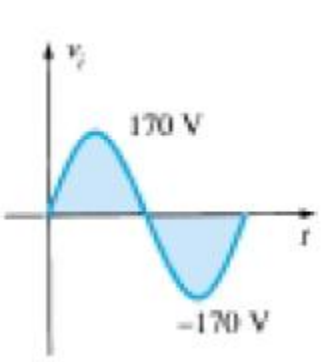
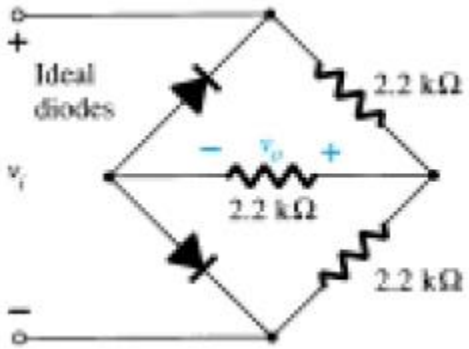
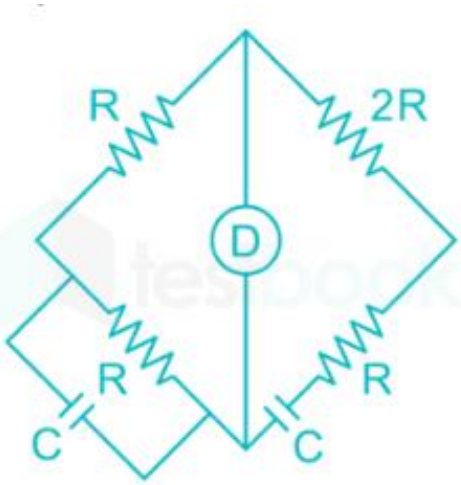
Questions Bank of Circuit Analysis

Q1. Sketch v_o for the network of Fig. and determine the dc voltage available.

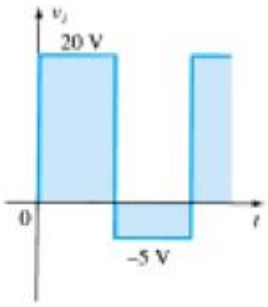


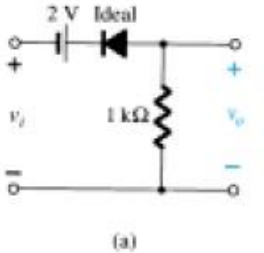


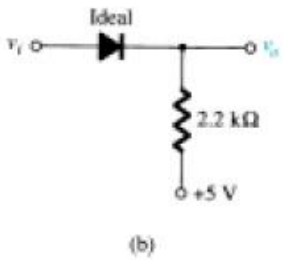
Q2. In the AC bridge shown ($R=10^3\ \Omega$ and $C=10^{-7}$ F) if the bridge is balanced at a frequency f_0, then find f_0.



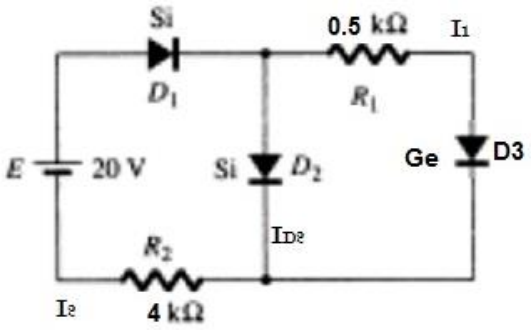
Q3. Determine v_o for each network for the input shown.







Q4. Determine the currents I_1, I_2, and I_{D2} for the network of the given circuit.



Q5. /The arms of the four arm bridge (abcd), supplied with sinusoidal voltage , have the following values:

Arm (ab) : Aresistance of (R_1=200 Ω) in parallel with a capacitance (C_1= 1 µF)

Arm (bc): Pure resistance (R_3=400 Ω)

Arm (cd): Pure resistance (R_4=1000 Ω)

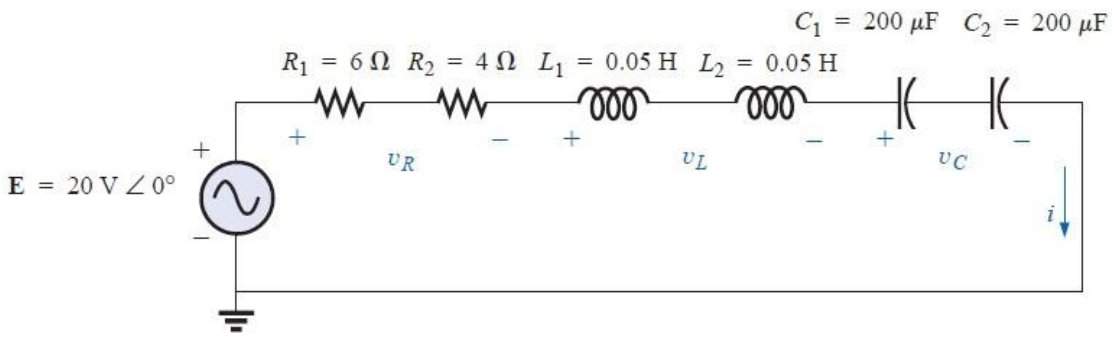
Arm (da) : A resistance (R_2) in series with a capacitor (C_2= 2 µF)

Determine the value of R_2 and the frequency at which the bridge will balance .

The detector is connected between b and d, and supply voltage between a and c

Q6. For the circuit (277 rad/s) of Fig.

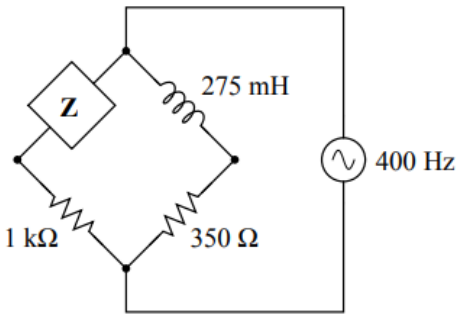
a. Calculate **I**, **V***R*, **V***L*, and **V***C* in phasor form.
b. Calculate the total power factor.
c. Calculate the average power delivered to the circuit.
d. Draw the phasor diagram.
e. Obtain the phasor sum of **V***L*, and **V***C*.



Q7. Answer the following questions:

1- If the applied voltage lags the current in a series RLC circuit, is the frequency above or below resonance?
2- Draw the I_{rms} as function of *w* for RL,RC and Resistor only circuit.
3- At low frequencies the capacitive reactance considered as:
   a) Short circuit b) open circuit c) none of these
4- In the resonance circuit the larger resistance , the resonant current is ----------.
   a) Smaller b) larger c) not affected
5- In an RLC circuit with an ac power source, the impedance is a minimum at ----------:
   a) Low frequency b) high frequency c) resonance frequency

Q8. Calculate the value of C or L in the unknown Z arm that is necessary to balance this AC bridge.



Q9. Choose the correct answer: (12 marks)

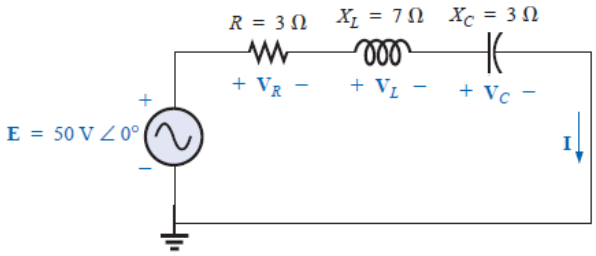
1- When the semiconductor has equal number of free electrons and holes, it is called……
   (a- Doped semiconductor b- intrinsic semiconductor
   c- extrinsic semiconductor d- P-type semiconductor
2- N-type semiconductor can be produced by introducing ------- into pure silicon crystal.
   (a- Arsenic b- Gallium c- Boron d- indium)
3- The current and voltage in a ---------- are not in phase, the voltage lags by 90^0.
   (a- inductor b- Resistor c- Capacitor d- Diode)
4- Half wave rectifier is an example of ----------.
   (a- Clipper b- amplifier c- clamper d- both a and c)
5- In the p-n junction of semiconductor you can see only ---------- in the depletion region.
   (a- holes b- free electrons c- mobile charge carrier d- ions)

6- If the applied voltage is in phase with the current in a series RLC circuit, then the frequency is----------.
(a- below resonance b- above resonance c- zero d- at resonance)

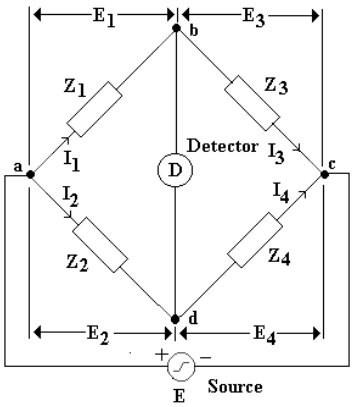
7- The forward current in the semiconductor diode is due to ----------.
(a- Resistance b- majority carrier c- minority carrier d- capacitance at junction)

8- When the AC source, capacitor and inductor all are connected in parallel under high frequency limit, which of the following statement is true ?
a- Inductor works like short circuit and capacitor works like open circuit.
b- Inductor works like open circuit and capacitor works like short circuit.
c- Both are work like open circuit.
d- Both are work like short circuit

Q10. For the given circuit, find V_R, V_C, V_L and I in vector notation and then draw the phasor diagram.



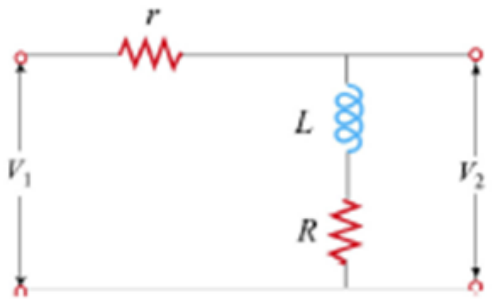
Q11. An AC bridge is shown in figure, working at 1000 Hz. Arm (ab) is 0.2 μF pure capacitance, arm (bc) is 500 Ω pure resistance, arm (cd) contains an unknown impedance and arm (da) has 300 Ωresistance in parallel with 0.1 μF capacitor.
Find R and C or L constants of arm (cd) considering it as a series circuit.



Q12. For the given circuit determine:

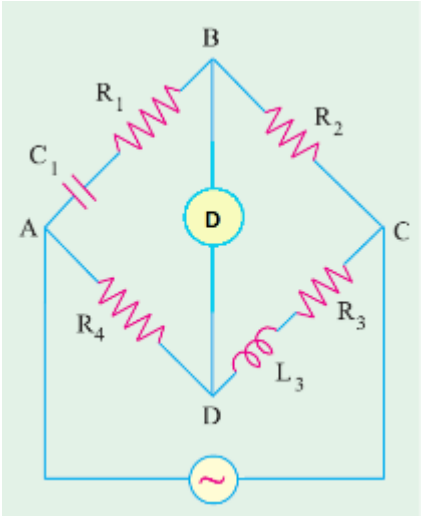
a) Find $(\frac{V_{2o}}{V_{1o}})$, the ratio of the maximum output voltage V_{2o} to the maximum input voltage V_{1o}.

b) Suppose r = 15 Ω, R = 10 Ω and L= 250 mH. Find the frequency at which $\frac{V_{2o}}{V_{1o}} = \frac{1}{2}$

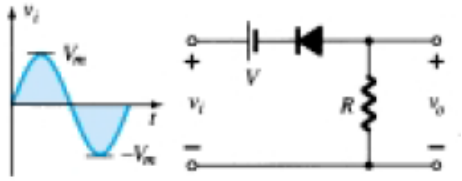


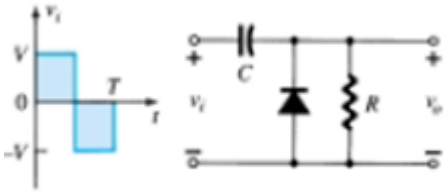
Q13. For the given Hay's bridge at balance show that:

$L_3 = \frac{C_1 R_2 R_4}{(1+w^2 C_1^2 R_1^2)}$ and $R_3 = \frac{w^2 C_1^2 R_1 R_2 R_4}{(1+w^2 C_1^2 R_1^2)}$



Q14. Write the output wave form for the following circuits.





Q15. Use Thevenin's theorem to find the Voltage across the resistor R_2 in the circuit below.