

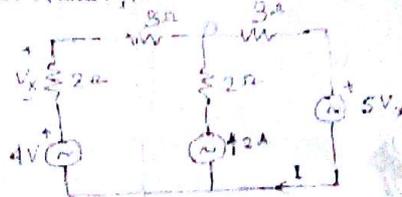
EEL101 Minor II  
Semester II, 2008-09 – Mar 20, 2009  
Electrical Engineering, IIT Delhi

Answer all questions in sequence. No partial credit. **Highlight your final answers**

Maximum time: 60 Minutes  
Maximum points: 30

Name, ID, and Group No.:

1. In the circuit below, determine  $I$ , and  $V_x$ . [2, 2]



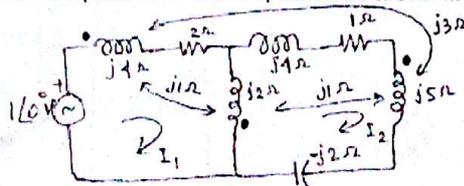
2. A series LCR circuit is to have a maximum response of 5V for a signal of 1.5 MHz, and bandwidth of 5 KHz, the output voltage being taken across R. The signal voltage source has a voltage 10 V and an internal resistance of 10 ohms. Specify the circuit parameters. [2,2,2]

3. For the circuit shown below, write down the condition for resonance in terms of  $R_1$ ,  $R$ ,  $X_L$ , and  $X_C$ . (ii) Using the known parameter values, find the value of  $R_1$  at resonance. [2, 2]



4. Three similar coils are wound on a common core in such a way that the voltage of mutual inductance between each set of coils is positive. The self inductance of each coil is 0.2H. The effective inductance of the first two in series is 0.6H and of all the three in series is 1H. When the terminals of the first coil are interchanged, the effective inductance of the three coils in series becomes 0.5H. Determine the coefficient of coupling between each set of coils. [2, 2, 2]

5. Write down the mesh equations for the coupled circuit shown in figure below. [2, 2]



6. Three impedances of value  $Z_\Delta = 12 + j9\Omega$  are connected in  $\Delta$  as shown below. For balanced line voltages of 208V, find the line current, dissipative power, and reactive power. [2, 2, 2]

