Question Paper

Exam Date & Time: 01-Feb-2023 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER B.TECH MAKE UP EXAMINATIONS, JAN-FEB 2023

NETWORK ANALYSIS [BME 2154]

Marks: 50 **Duration: 180 mins.**

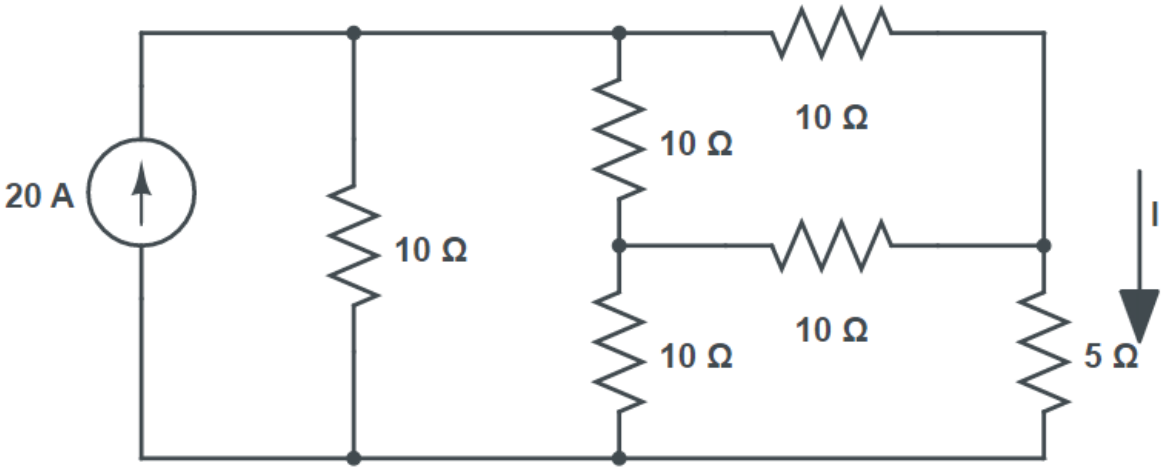
A

Answer all the questions.

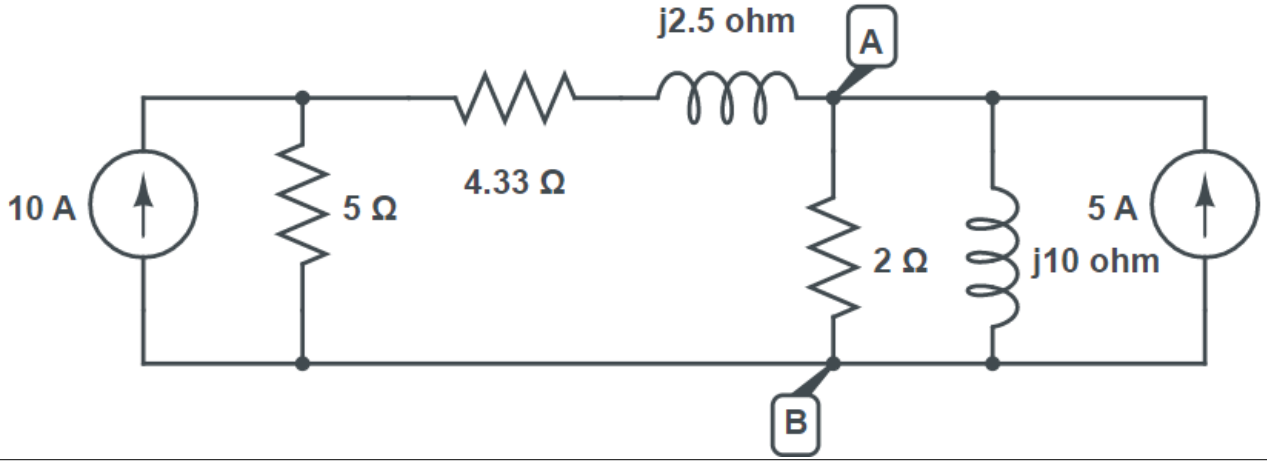
Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

1) For the network shown apply nodal analysis and calculate the current I in 5 ohm resistor. (3)

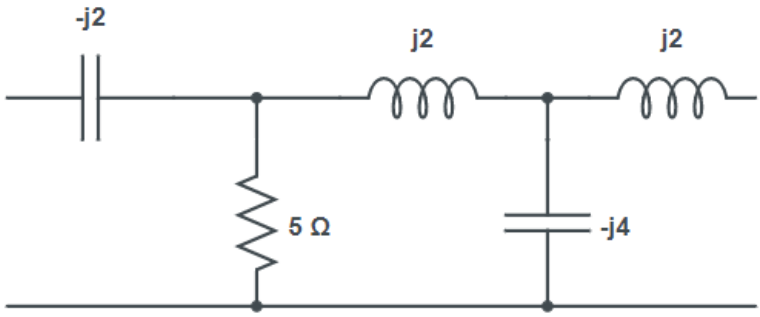
A)



B) In the circuit shown apply superposition theorem and calculate voltage VAB across 2 ohm resistor. (3)

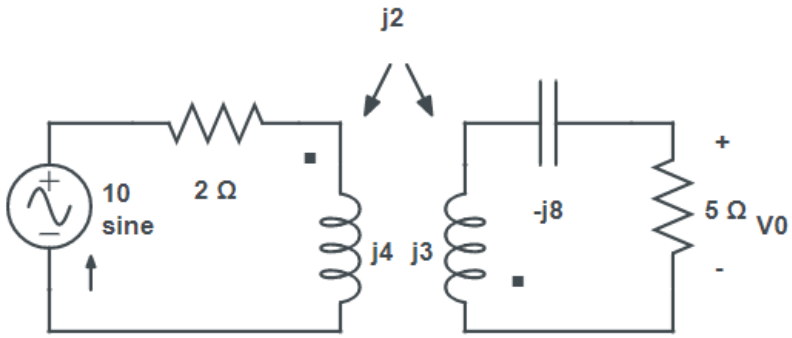


C) Obtain the star equivalent to the circuit shown. (4)



2) For the coupled circuit shown calculate the values of current and Vo. (4)

A)



B) In the circuit shown the reactance and resistance associated with the load are varied. Determine ZL for it to receive the maximum power and obtain the maximum power. (3)

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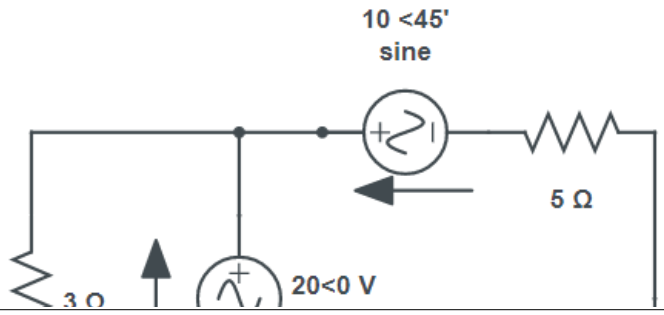
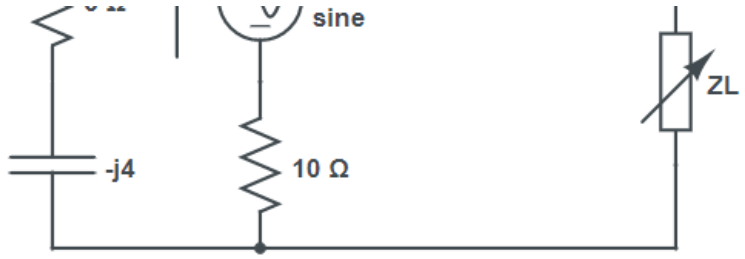




C) For a series RLC circuit V=2 V, L=20 mH, C=0.02 μF and R=20 Ω. Calculate: (3)

i. Resonant frequency

ii. Q of the coil

iii. Maximum current

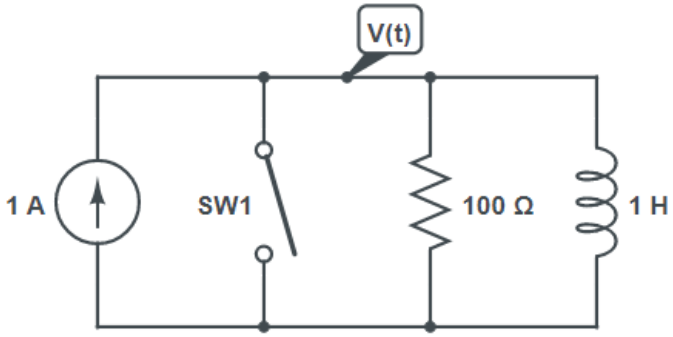
iv. Band width

v. Half power frequencies

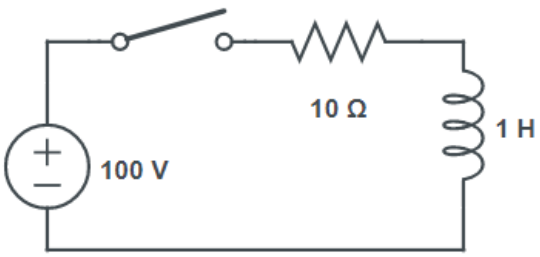
vi. Voltage across elements at resonant.

3) For the network shown the switch is opened at t=0 , calculate V, dv/dt and d^2 v/dt^2 at t=0+ . (3)

A)



B) For the circuit shown the switch is closed at t=0 with initial zero current in inductor, calculate I, di/dt and d^2 i/dt^2 at t=0+. (4)

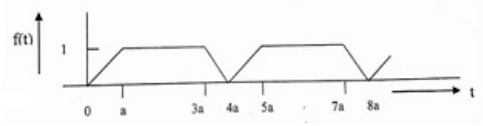


C) Determine the step response of RL circuit using initial conditions. (3)

4) Derive the initial value and final value to: (4)

A) $$F(s) = \frac{s^3+7s^2+5}{s(s^3+3s^2+4s+2)}.$$

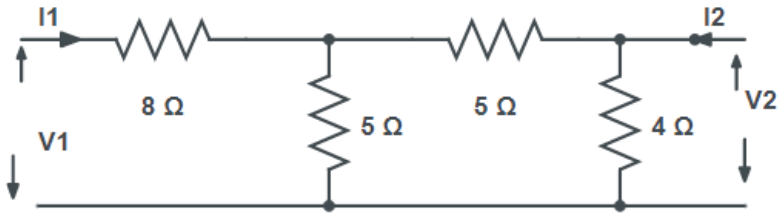
B) Determine the Laplace transform for the periodic waveform. (3)



C) Determine Laplace transform of $f(t) = 1\,, for\ t = 0\ and\ f(t) = 0, for\ t \neq 0$. (3)

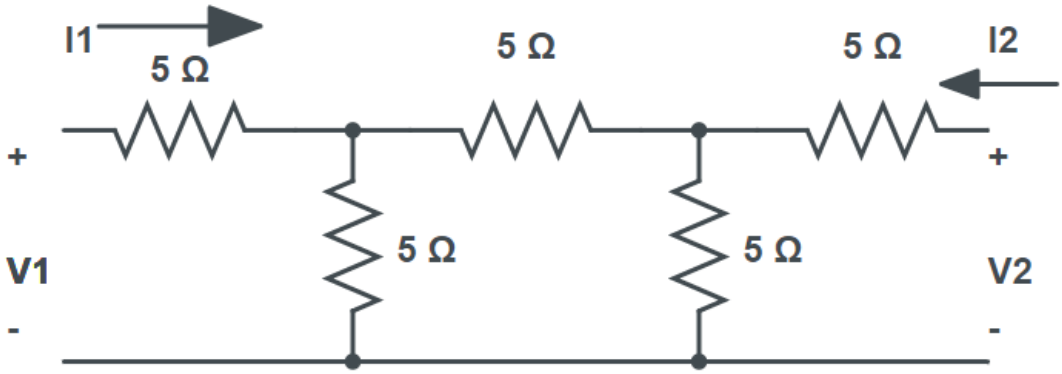
5) For the circuit shown Obtain the Z parameters. (3)

A)



B) Derive the Y parameters in terms of Z parameters. (4)

C) Derive the expression of Y parameter. (3)



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