

Instructions to candidates

Duration: Two (02) hour

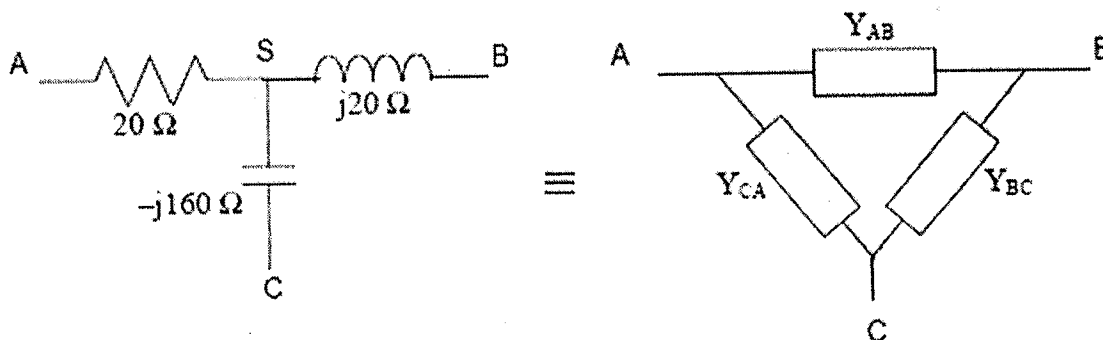
Number of questions: Four (04) Essays

Mark allocation: 100 mark

Answer all questions.

1.

- a. What are active and passive circuit elements? Give examples. (08 mark)
- b. State Nodal mesh transformation theorem. (05 mark)
- c. Determine the delta equivalent of the star connected network given below. (12 mark)

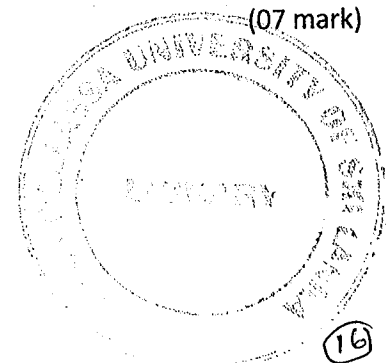


2.

- a. What are the advantages of having a sinusoidal waveform over other waveforms? (05 mark)
- b. Define Average Value, Peak Value, RMS Value, Form Factor and Peak Factor of an alternating wave form. (10 mark)
- c. A 15 V source is applied to a capacitive circuit that has an impedance of $(10 - j25) \Omega$. Determine the current and the power in the circuit. (10 mark)

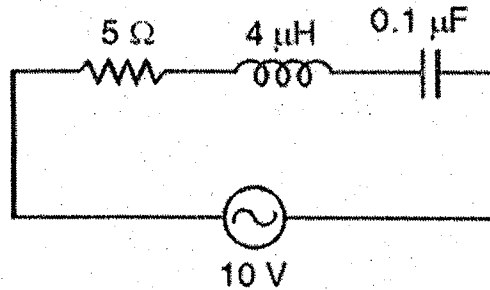
3.

- a. Describe the relationship between frequency and reactance. (08 mark)
- b. What is power factor correction? (07 mark)



- c. For the circuit shown below determine the maximum current, the frequency at which it occurs and the resulting voltage across the inductance and capacitance.

(10 mark)

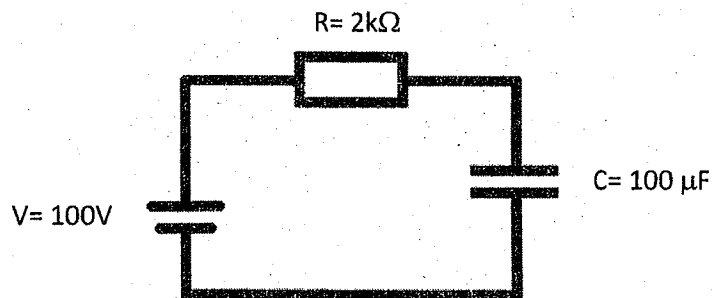


4.

- a. A three phase 400V, 50 Hz balanced supply feeds a balanced load consisting of three equal single phase loads of $(40+j30)\Omega$ connected in star, and a three phase heating load (purely resistive) of 1.8 kW.

Determine the supply current, supply power factor, active and reactive power supplied and the value of capacitance that must be connected in delta to improve the overall power factor to 0.95 lag. Obtain the result using one phase of the three phase system. (15 mark)

- b. For circuit below, calculate the initial charging current of capacitor using Laplace transform technique. (05 mark)



- c. Solve the electric circuit by using Laplace transformation for final steady-state current. (05 mark)

