

Course Code: EE209

Course Name: ELECTRICAL TECHNOLOGY

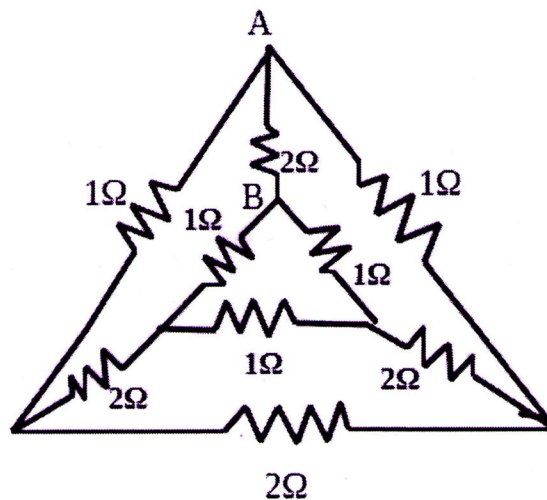
Max. Marks: 100

Duration: 3 Hours

**PART A***Answer all questions, each carries 5 marks.*

Marks

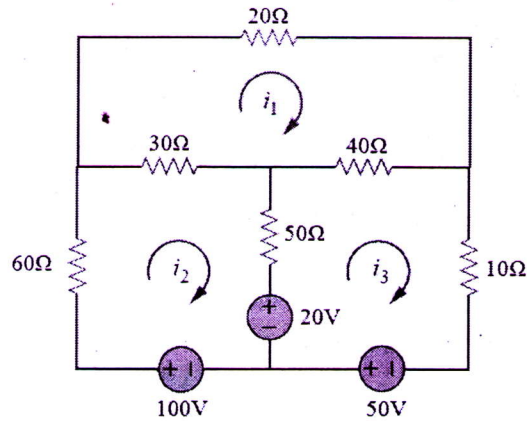
- 1 Using star delta conversion, calculate the effective resistance between A and B of the following figure. (5)



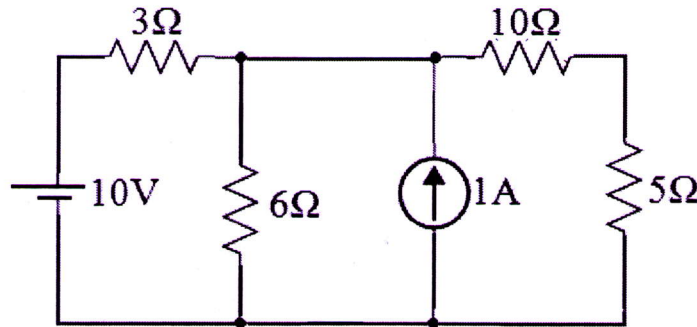
- 2 State and explain Norton's theorem. (5)
- 3 Define the terms Q factor and bandwidth with necessary equations. (5)
- 4 Draw and explain the power flow diagram of a DC motor. (5)
- 5 Derive an expression for induced emf in a transformer in terms of frequency, the maximum value of flux and the number of turns on the windings. (5)
- 6 Define synchronous speed and slip of a three phase induction motor. (5)
- 7 Why a single phase induction motor is not self-starting? How it can be made self-starting? (5)
- 8 List the applications of AC servomotors (5)

**PART B***Answer any three full questions, each carries 10 marks.*

- 9 Calculate the current in each loop using mesh analysis (10)



- 10 Find the current in  $5\Omega$  resistor in the given network by using Norton's theorem (10)



- 11 a) A RLC series circuit consists of a resistance of  $10\Omega$ , an inductance of  $0.02\text{H}$  and a capacitance of  $2\mu\text{F}$ . The applied voltage across the circuit is  $100\text{V}$ . Find the resonant frequency of the circuit (5)  
 b) Define series and parallel resonance with necessary equations. (5)
- 12 Explain the method for three phase power measurement in a star connected system using two wattmeter method with necessary diagrams. (10)
- 13 Explain the constructional details of a DC machine with neat sketches. (10)

**PART C**

*Answer any two full questions, each carries 15 marks.*

- 14 a) Explain the construction and working principle of a single phase transformer. (10)  
 b) What do you mean by voltage regulation of a transformer? (5)
- 15 a) The power input to a  $500\text{V}$ ,  $50\text{Hz}$ , 6 pole, 3 phase induction motor running at  $975\text{rpm}$  is  $40\text{kW}$ . The stator losses are  $1\text{kW}$  and the friction and windage losses are  $2\text{kW}$ . Calculate (i) Slip (ii) Rotor copper loss (iii) Shaft power (iv) Efficiency. (10)  
 b) Draw the power stages in a 3 phase induction motor (5)
- 16 Explain the working principle of stepper motor and write its applications. (15)
- 17 Explain different types of single phase induction motors. (15)

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