



End Term (Odd) Semester Examination December 2024

Roll no. 2461393

Name of the Course and semester: B.tech First Semester

Name of the Paper: Basic Electrical Engineering

Paper Code: TEE 101

Time: 3 hour

Maximum Marks: 100

Note:

- (i) All the questions are compulsory.
- (ii) Answer any two sub questions from a, b and c in each main question.
- (iii) Total marks for each question is 20 (twenty).
- (iv) Each sub-question carries 10 marks.

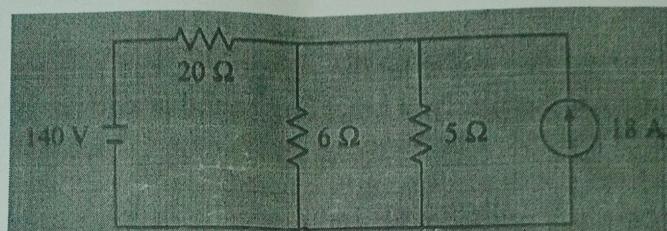
Q1.

- A) Give the derivation for conversion of star to delta network.
B) Find the current through the 20 ohm resistor using Nortons theorem:

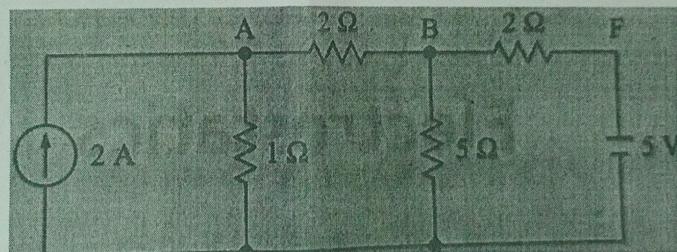
(2X10=20 Marks)

(CO 1)

(CO 1)



- C) For the network given below, find the current through branch AB using nodal analysis: (CO 1)



Q2.

(2X10=20 Marks)

- A) Derive the expression for the bandwidth of a series RLC circuit. Analyze the factors that influence bandwidth. Additionally, explain the concept of the quality factor of a coil and its significance in resonance. (CO 2)
- B) Define following terms, briefly: (CO 2)
- i) Time period of a waveform
 - ii) Frequency and Angular frequency
 - iii) Leading and lagging phasors
 - iv) Power factor
 - v) Resonant frequency in series RLC circuit.



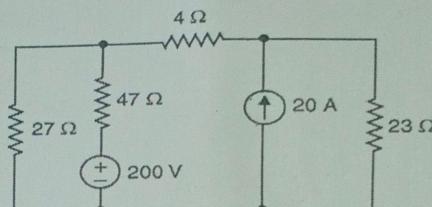
End Term (Odd) Semester Examination December 2024

- C) A reactor having a negligible resistance and inductance of 0.1 H is connected in series with a resistor of 15 ohm. The circuit is connected across a 250 V, 50 Hz single phase supply. Find the following: (CO 2)
- Current flowing in the circuit
 - Power factor of the circuit
 - Voltage across the reactor and resistor

Q3.

(2X10=20 Marks)

- A) Using superposition theorem, find the current in $23\ \Omega$ resistor in the circuit shown in Fig. (CO1)



- B) What are the different types of power flow in the AC circuit? Give the significance of each. (CO 2)

- C) A circuit having a resistance of 15 ohms, inductance of 0.4 H and a variable capacitance, is connected in series across supply of 120 V, 50 Hz supply. Calculate the following: (CO 2)
- Value of capacitance to have resonance in the circuit
 - Current at the time of resonance
 - Quality factor of the coil.

Q4.

(2X10=20 Marks)

- A) A 208-V, 10hp, four pole, 60 Hz, Y-connected induction motor has a full-load slip of 5 percent. Calculate (i) synchronous speed of this motor, (ii) rotor speed of this motor at rated load and (iii) the rotor frequency of this motor at rated load. (CO4)

- B) A 4 pole DC generator with LAP connected armature supplies a load of 100 A at 200 V. The armature resistance is 0.1 ohms and field resistance as 80 ohms. Find the current in the armature and the generated EMF. (CO 4)
- C) Explain the working of Lead acid batteries also discuss the construction part. (CO 4)

Q5.

(2X10=20 Marks)

- A) What is earthing and why it is necessary in power system? Define any one kind of earthing technique with its diagram of installation. (CO 3)
- B) Give comparison between MCB and MCCB protection devices. (CO 3)
- C) Write short notes on two of the following: (CO 3)
- DPDT switch
 - Stair case wiring
 - Two-way Switch