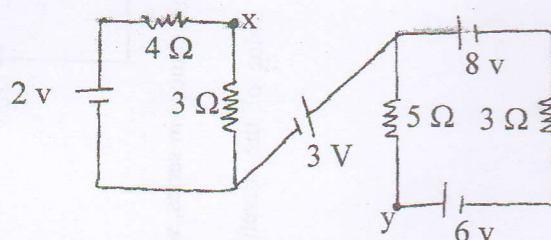


Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, BAME, BIE, B. Agri.	Pass Marks	32
Year / Part	I / I	Time	3 hrs.

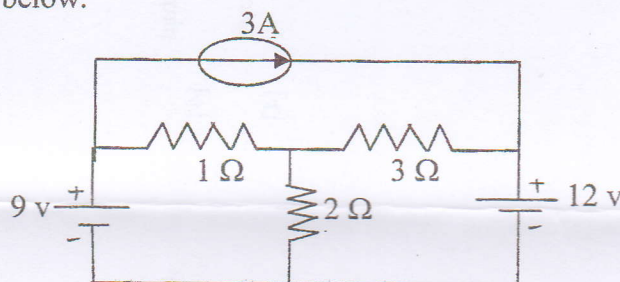
Subject: - Basic Electrical Engineering (EE401)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

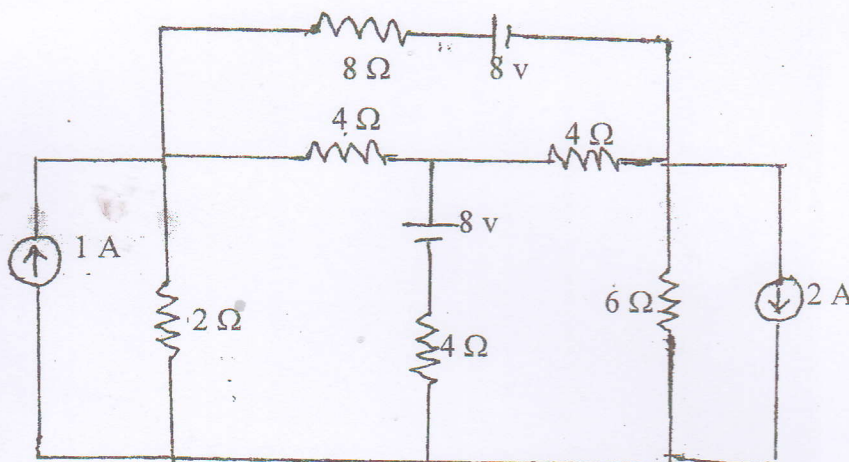
1. a) What is source transformation? Explain with the help of an example. [4]
- b) A coil of stranded copper wire having a resistance of 12Ω at 25°C is embedded in the core of a large transformer supplied at 230 V. After the transformer has been in service for several hours, the resistance of the coil is found to be 13.4Ω . What is the temperature of the core? Also find the power rating of the resistance. Assume temperature coefficient of wire as $0.00125/^\circ\text{C}$ at 15°C . [6]
- c) Find V_{xy} in the following circuit diagram. [6]



2. a) Use loop current method to calculate the current through the 2Ω resistance for the network shown below. [6]



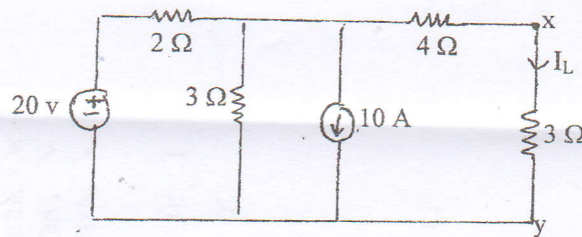
- b) Solve the given network with nodal analysis to find voltage drop on 8Ω resistor. [6]



- c) State and explain Norton's theorem with suitable example. [4]

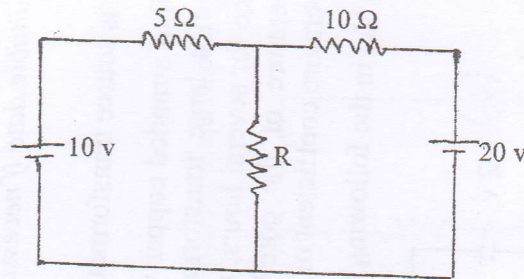
3. a) Find power dissipated in $3\ \Omega$ resistor using Norton's theorem.

[6]



- b) Calculate the value of 'R' such that maximum power will be absorbed by it in the given circuit.

[6]

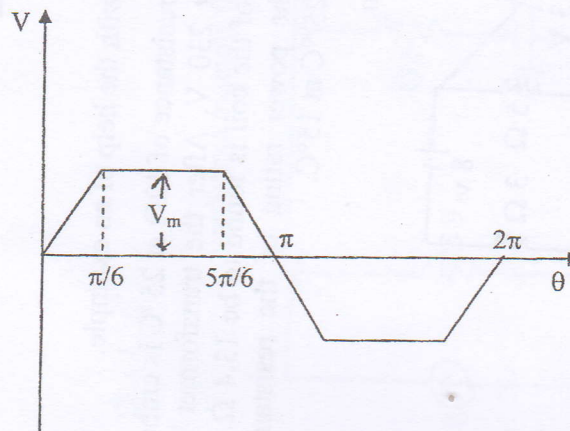


- c) What is inductance? Derive the expression for two inductances in series, with mutual flux aiding each other.

[4]

4. a) Calculate the average (half period) value and rms value of the waveform shown below.

[4]

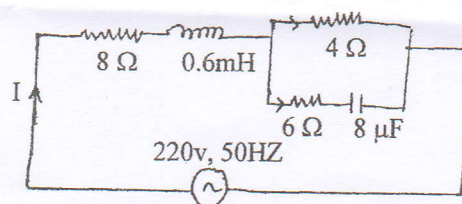


- b) An alternating source of emf $v = 200\sin(314t)$ volts is applied to a practical coil with resistance $20\ \Omega$ and inductance $0.1\ \text{H}$ respectively. Determine (i) expression for instantaneous current and power factor (ii) active reactive and apparent power of circuit (iii) voltage drop on resistor and inductor and (iv) construct phasor diagram for above circuit.

[6]

- c) Find current flowing in each branches of the following circuit:

[6]



5. a) A 400V, 50 HZ, 3 phase induction motor takes 60 KW power from supply mains at 0.8 power factor lagging. Calculate the capacitance per phase and KVAR rating per phase of capacitor in order to improve the power factor to 0.9 lagging using (i) star connected capacitor bank and (ii) Delta connected capacitor bank. [8]
- b) Define phase order and explain its significance. A three phase balanced star connected load with $(6+j8)$ ohm per phase is supplied by 400V, 50 HZ three phase source. Find the line and phase currents and the total power dissipated in the load. [2+6]

