

SVKM's NMIMS
MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Programme: B. Tech (All Streams)

Year: I

Semester: I

Academic Year: 2018-2019

Subject: Basic Electrical Engineering

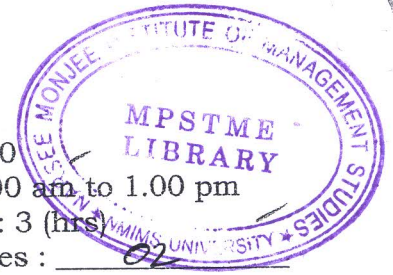
Date: 19 November 2018

Marks: 100

Time: 10.00 am to 1.00 pm

Durations: 3 (hrs)

No. of Pages : 02



Final Examination

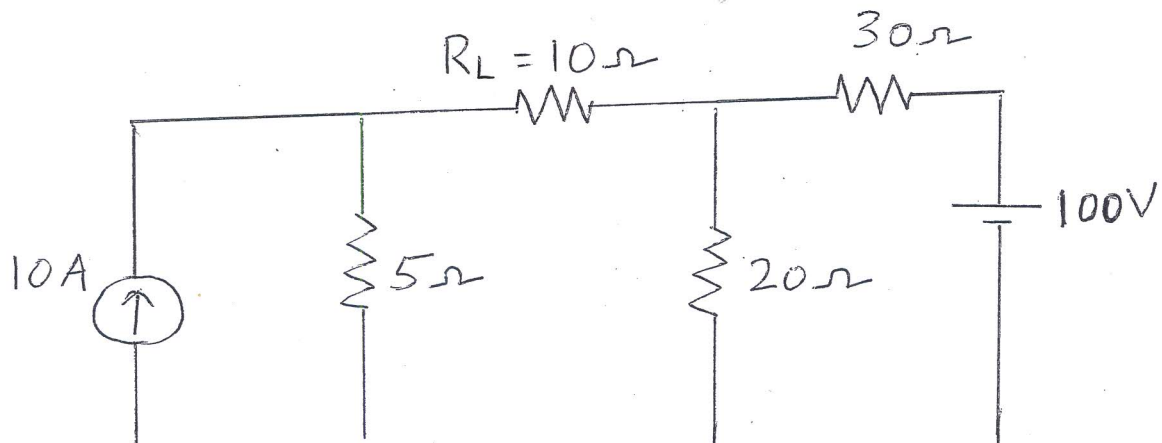
Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) Question No. 1 is compulsory.
- 2) Out of remaining questions, attempt any 4 questions.
- 3) In all 5 questions to be attempted.
- 4) All questions carry equal marks.
- 5) Answer to each new question to be started on a fresh page.
- 6) Figures in brackets on the right hand side indicate full marks.
- 7) Assume suitable data if necessary.

Q.1 Attempt any four questions [20]

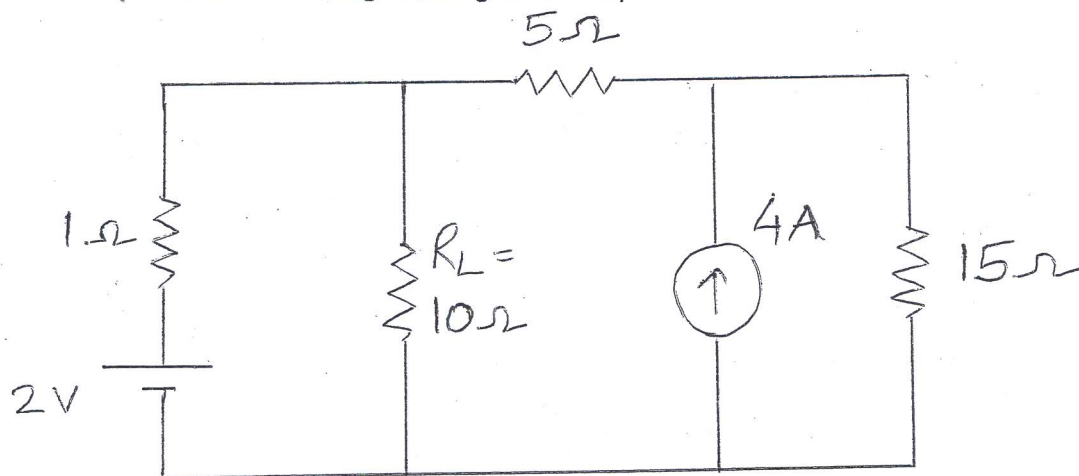
- a Derive the emf equation of a single phase transformer. [05]
- b Derive the equation for rise in voltage across the capacitor in R-C circuit when it is connected to a DC source. [05]
- c Explain the methods of duty ratio control for choppers. [05]
- d State five properties of a series RLC circuit in resonance. [05]
- e What is synchronous speed and slip in a 3-phase induction motor? [05]

Q.2
a Find the current through R_L using Thevenin's theorem. [10]



b Find the current through R_L using mesh analysis.

[10]



Q.3

a A choke coil is connected in series with a pure resistor. A 240V, 50 Hz supply is connected this combination and a current of 2.5 A flows. If the voltage drop across the coil is 140 V and that across the pure resistor is 160 V, calculate the resistance and inductance of the coil, resistance of pure resistor and the power drawn by the coil. [10]

b A series RLC circuit has the following parameters: $R = 10$ ohms, $L = 0.2$ H and $C = 40$ μ F. A voltage of 100 V at variable frequency is applied to the circuit. Compute at resonance the resonant frequency, current, impedance, quality factor, bandwidth, upper and lower cutoff frequencies, voltage across R, L and C and power consumed. [10]

Q.4

a Draw the phasor diagram and hence derive the relation between the phase and line voltages, phase and line currents for star connected three phase ac system for balanced load, also write the equation for power consumed by the three phase load. Assume lagging power factor load. [10]

b Draw and explain the equivalent circuit of ideal and practical transformer. Explain the various losses in a practical transformer. [10]

Q.5

a Prove that when a three phase induction motor is supplied with a three phase supply a rotating magnetic field is generated in the airgap. [10]

b Explain the construction and working of separately excited DC motor. [10]

Q.6

a Explain with circuit diagram and waveforms the working of a dc-dc buck converter with resistive load. [10]

b Explain with circuit diagram and waveforms the working of a single phase full bridge inverter with resistive load. [10]

Q.7

a Write short notes on any two [10]

b Types of wires and cables [10]

b Methods of earthing [10]

c Series RC circuit connected to AC source [10]