

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

Programme: MBA Tech (All Streams) Year: I Semester: II

**Academic Year: 2018-2019**

Subject: Basic Electrical Engineering

Date: 15 April 2019

Marks: 100

Time: 10.00 am to 1.00 pm

Durations: 3 (hrs)

No. of Pages: 03.

**Final Examination (2018-19)**

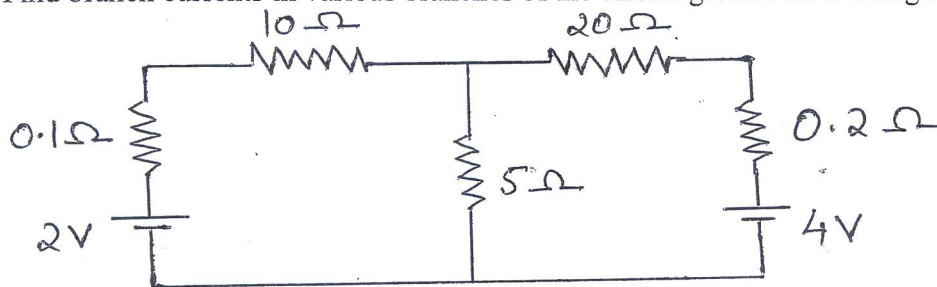
**Instructions:** Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 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.



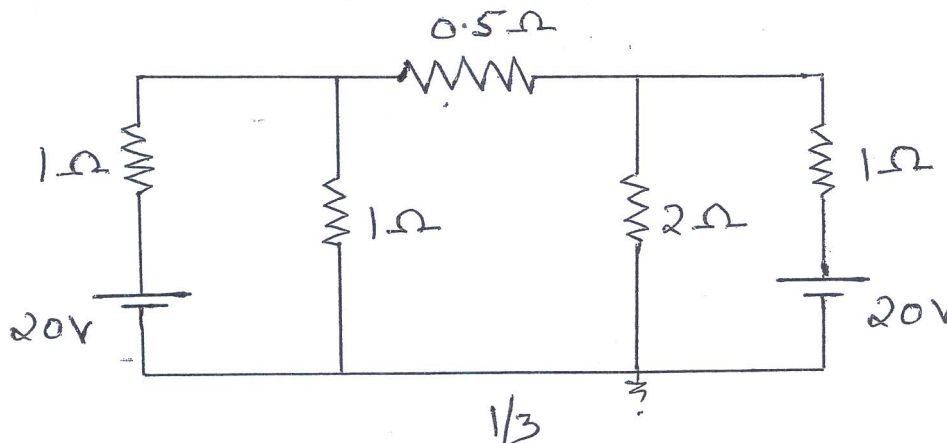
**Q1. Attempt any Five in the following:**

- a. Find branch currents in various branches of the circuit given below using Mesh Analysis. (04)

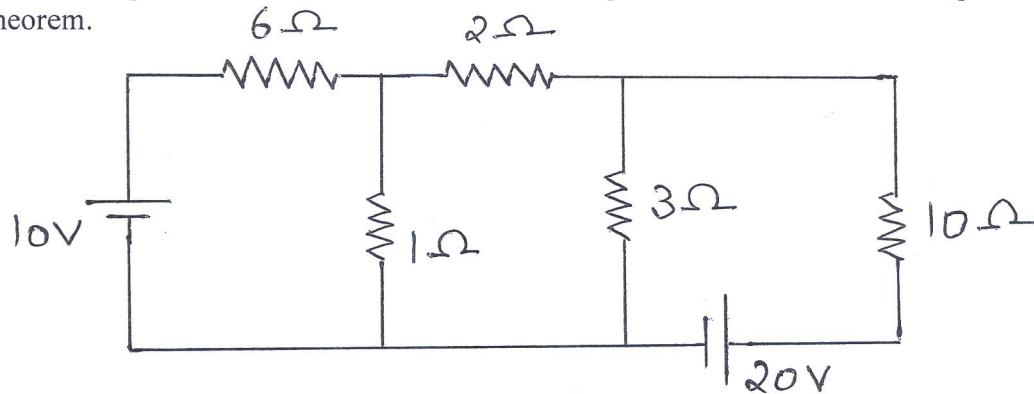


- b. Explain the behavior of a pure capacitor connected to AC supply. (04)  
c. List the difference between an ideal and practical transformer. (04)  
d. With neat diagram explain the working of buck converter. (04)  
e. Explain the different losses in a DC machine (04)  
f. Explain the need of earthing in a electrical installation and explain how earthing is done. (04)

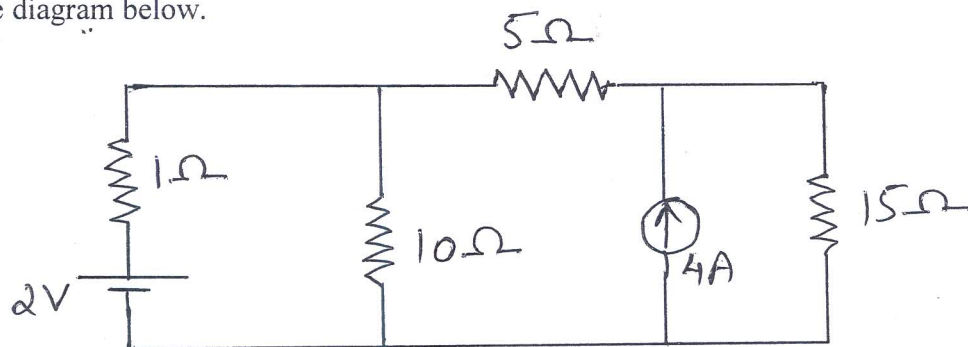
- Q2. a. Calculate the current through 2-ohm resistor using Nodal Analysis. (10)**



- b. Find the magnitude and direction of current through the 10 ohm resistor using Thevenin's Theorem. (10)



- Q3. a. Using Norton's theorem, calculate the current flowing through the 10 ohm resistor shown in the diagram below. (10)



- b. Define the following terms related with alternating ac quantity: (5)
- Instantaneous value
  - Average value
  - RMS or effective value
  - Form factor
  - Peak factor
- c. A current of 5A flows through a non-inductive resistance in series with a choke coil (coil is impure, it has some resistance) is supplied at 250V, 50 Hz. If the voltage across the resistance is 125 V and across the coil is 200V. Calculate the following: (5)
- Impedance, reactance, and resistance of the coil
  - Power absorbed by the coil
  - Power factor of the coil

- Q4. a. Three similar coils, each of resistance  $8\ \Omega$ , and inductance 0.02 H, are connected in star across a three-phase 50 Hz, 230 V supply. Calculate the line current, total power absorbed, reactive volt amperes, and total volt amperes. (10)
- b. A choke coil of  $10\ \Omega$  resistance and 0.1 H inductance is connected in series with a capacitor of  $200\ \mu\text{F}$  capacitance. Calculate the current, the coil voltage and the capacitor voltage. The supply voltage is 230V at 50 Hz. At what frequency will the circuit resonate? Calculate the voltage across the coil and capacitor at the resonant frequency across the inductor and capacitor. For this assume the supply voltage is 230 V and variable frequency. (10)

- Q5. a. Derive the emf equation of a transformer (05)  
b. Define voltage regulation and efficiency of a two winding transformer. (05)  
c. List the difference between an auto transformer and two winding transformer. (05)  
d. The primary of a 50-Hz, step down transformer has 480 turns and is fed from 6400 V supply. (05)  
Find (i) the peak value of flux produced in the core and (ii) the voltage across the secondary winding if it has 20 turns.
- Q6. a. Draw and explain the construction and working of a single phase induction motor. (10)  
b. Explain the torque-slip characteristics of an induction motor. (10)
- Q7. a. Explain the working principle of a single phase full bridge inverter. (10)  
b. What is the purpose of using a circuit breaker in an electrical installation? Explain the (10)  
different circuit breakers (MCB, ELCB, MCCB)
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