TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCE, BME, BGE	Pass Marks	32
Year / Part	I / II	Time	3 hrs.

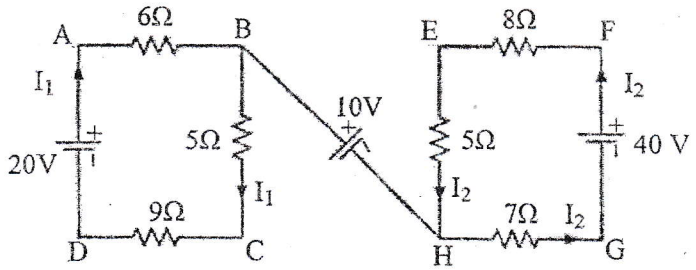
Subject: - Basic Electrical Engineering *(EE 451)*

- ✓ 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.*

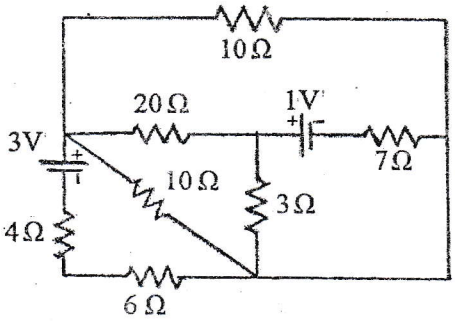
1. a) What do you mean by ideal and practical voltage source? Explain the effect of an internal resistance of a voltage source on its terminal characteristics. [4]

   b) 1 km of wire with circular cross sectional having diameter of 11.7 mm and of resistance 0.031 Ω is drawn, so that its diameter becomes 5 mm. What will be the new resistance? [6]

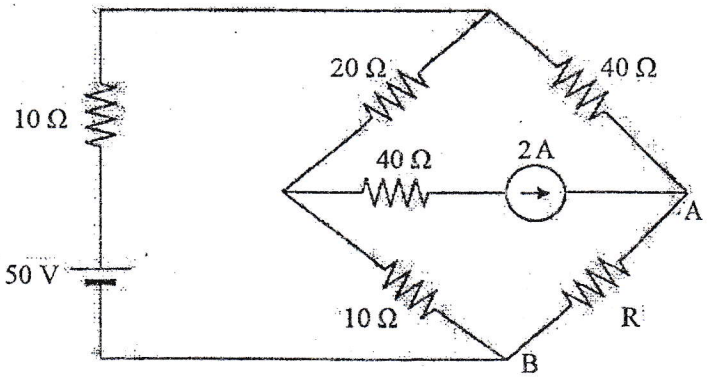
   c) Find the voltage across CE in the given circuit. [6]



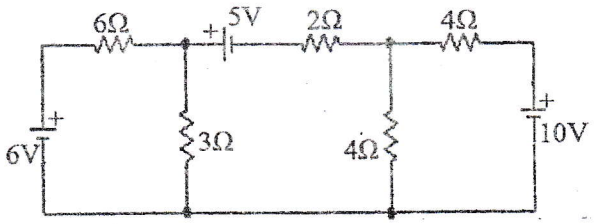
2. a) Determine the current in 20 Ω resistor in the network shown below using Nodal analysis. [8]



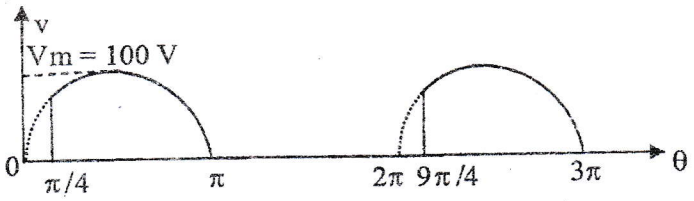
   b) Calculate the power absorbed by R resistor using Thevenin's theorem. When (i) R = 50 Ω (ii) R = 100 Ω [8]



3. a) Find the current through 2Ω resistor of the circuit shown in figure given below using superposition theorem. [8]



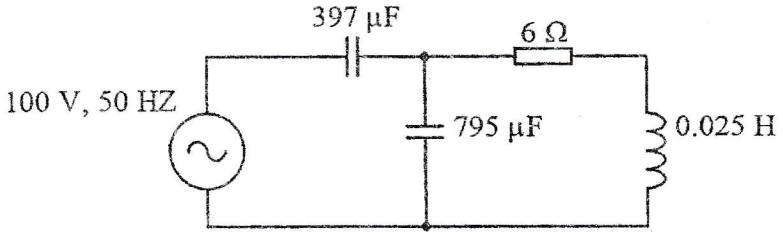
b) Define Rms value and Average value of AC. Calculate the Rms value, Average value, Peak and form factor of the voltage waveform given below. [3+5]



4. a) A series circuit consists of resistance equal to 4Ω and inductance of 0.01H. The applied voltage is 283 sin (300t)V. Calculate the following: [8]

(i) Power factor
(ii) Expression for i(t)
(iii)The power dissipated in the circuit
(iv)Voltage drop across each elements
(v) Draw a phasor diagram

b) Find the source current, power factor and total power consumed in the given circuit. [5]



c) What is power factor? Write down the drawbacks of poor power factor. Explain how connecting a capacitor across the load improves the power factor. [3]

5. a) A balanced star connected load is supplied from symmetrical 3-phase 400V system. The current in each phase is 30A and lags behind the phase voltage by 30°, Find the total power and draw phasor diagram of the current and voltages. [8]

b) What are the advantages of 3 phase AC over single phase AC system? [4]

c) Describe the method of measuring power in 3-phase circuit by two wattmeter method. [4]

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