TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Bhadra

| Exam.		Regular / Back		
Level	BE	Full Marks	80	
Programme	BCE, BGE, BME	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) Explain the V-I characteristics of Ideal and practical current source. [4]

   b) A coil is connected across a constant dc source of voltage 120V, draw a current of 12A at room temperature. After running 6 hours temperature rises to 65°C and current reduces to 8A. Calculate the current when temperature increses to 80°C and the coefficient of resistance at 30°C. [consider room temperature = 25°C] [6]

   c) Find the current through 2Ω resistor in the given circuit if 24V is applied from AB terminals. (All resistances are in Ω). [6]
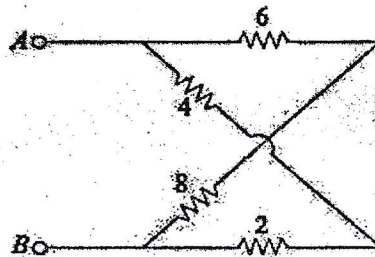
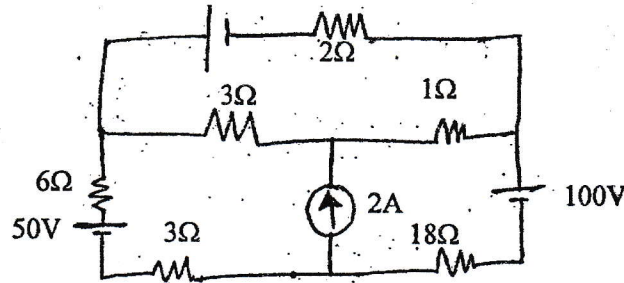2. a) Using Nodal analysis determine the current through 10Ω resistors. [6]
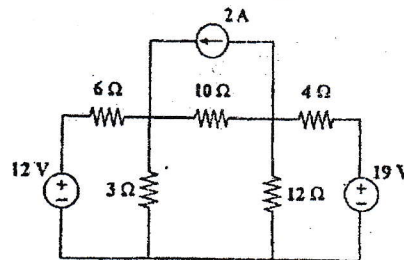
   b) Nortonize the circuit to find the current through 1Ω resistor. [6]
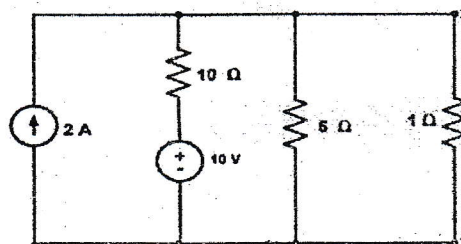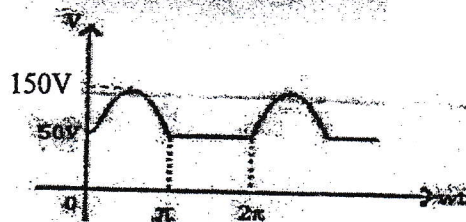

   c) State and prove maximum power transfer theorem. [4]

3. a) Use Superposition Theorem and find current on 9Ω resistor. [8]

b) A capacitor of 4μF is charged to 600V. Find the energy stored in the capacitor. [2]

c) Calculate the Average and rms value of the voltage signal given below. [6]

4. a) How do you verify that a pure inductor with an ac supply s wattless? [4]

b) A coil is connected in series with a resistance of 30Ω across of 240V, 50Hz power supply. The reading of a voltmeter across coil is 180V and across a 30Ω is 130V. Calculate resistance and reactance of the coil. [6]

c) A coil with resistance 8Ω and inductance 30mH is connected in parallel to a circuit with resistance 10Ω in series with a 397 μF capacitor. The combination is fed with 220V, 50Hz single phase ac supply. Calculate:

   i) branch currents
   ii) supply current
   iii) power factor of circuit
   iv) power consumed in the circuit. [6]

5. a) What are the causes and hence the consequence of poor power factor in an electric system? How can such poor power factor be corrected? [6]

b) In Two-Watt meter method of 3-φ power measurement, the wattmeters read 20W and 10W respectively. Determine phase difference between voltage and current of the connected balanced 3-φ load. [4]

c) In a Y-connected 400V, 50 Hz system, branch load of 4Ω resistor in series with 6Ω inductor is connected between each phase and the neutral. Calculate

   i) The line currents
   ii) Current in the neutral conductor
   iii) Total power absorbed in circuit. [6]

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