Code No: RR100206 **RR**

B.Tech I Year(RR) Supplementary Examinations, May/June 2010
NETWORK THEORY
(Common to Electrical & Electronic Engineering, Electronics & Communication Engineering, Computer Science & Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Information Technology, Electronics & Control Engineering, Computer Science & Systems Engineering, Electronics & Computer Engineering and Instrumentation & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) What are the V-i characteristics of R,L,C parameters? Explain.
   (b) A 50 μF capacitor is initially charged to accumulate 100 μc. One uncharged capacitor of 200μF is connected across it in parallel. How much charge will be transferred? How much energy is lost by the first capacitor?
   (c) A voltage given by
   V(t) = 0 for t<0
   = 2t for 0<t<2 Sec
   = =4 for 2 < t <4 sec.
   = -2t + 12 for 4 < t < 6
   is applied to a 10 μF capacitor. Find i(t). Sketch the wave form. [6+4+6]

2. (a) Distinguish between electrical and magnetic circuits.
   (b) The magnetic circuit of a certain electro magnet can be regarded as consisting of 3 parts in series, each being of uniform C.S. area.
   Part I: Length = 10cm, μ_r = 500, C.S. area = 0.5 cm^2
   Part II: Airgap length 0.5m C.S. area = 0.5cm^2
   Part III: Length = 12cms, μ_r= 800 C.S. area = 1 cm^2
   Determine the current required in a coil of 1000 turns to produce a flux density of 0.4 Wb/m^2 in the air gap. Neglect leakage.
   (c) Explain what you understand by Leakage factor. What is its effect? [4+8+4]

3. (a) Explain about active, Reactive and apparent powers.Give expression for the above. Draw the power triangle.
   (b) Given i = 50 sin (wt + 60)
   ν = 200 sin (wt + 30) Find the elements of the network with their values active, reactive and apparent power. [8+8]

4. (a) In a series RLC circuit R = 1kΩ L = 100mH and C=12pF. If a voltage of 200V is applied to the combination. Find,
      i. resonance frequency
      ii. Q-factor
   Bandwidth
   Voltage across L and C.
   (b) Derive the expression for impedance parameters in terms of h-parameters for a two port network. [8+8]

5. (a) A 3 phase 3 wire balanced supply is connected to an unbalanced 3 wire star connected load. Derive an expression for the neutral displacement voltage between supply and load neutral points.
   (b) A 3phase, 3 wire 208 volts BYR system has a star connected load with $Z_R = 6\angle 0^0\Omega$ $Z_Y = 6\angle 30^0$ and $Z_B = 5\angle 45^0$. Obtain the line currents and load voltages of the circuit using the neutral displacement method. Draw the phasor diagram. [6+10]

6. (a) Define magneto motive force (MMF), Reluctance, and flux density in a magnetic circuit. Specify the units of each of the above quantities.
   (b) Explain "dot convention" for a set of magnetically coupled coils.
   (c) A cast steel electromagnetic has an air gap of length 2mm and an iron path of length 30cms. Find the MMF needed to produce a flux density of 0.8T in the air gap. The relative permeability of the steel core at this flux density is 1000. Neglect leakage & fringing. [6+4+6]

7. (a) Application of Laplace Transforms to Electric circuits only to be considered.
   (b) Laplace transform mathemtical background should have been studied in Mathematics course. [16]

8. (a) Derive the expression for i(t) for R – L series circuit when excited by a sinusoidal source.
   (b) For R – L – C series circuit with R = 10Ω, L = 0.2 H, C = 50 micro farads, determine the current i(t) when the switch is closed at t = 0. Applied voltage is V(t) = 100 Cos (1000 t + 60)^0. [8+8]

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