Registration No. :

Total number of printed pages – 3

B. Tech

BEES 2211

Third Semester Examination – 2013

NETWORK THEORY

BRANCH : EIE, IT, CSE, EC, ETC, EEE, IEE, ELECTRICAL, AEIE

QUESTION CODE : C- 506

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any *five* from the rest.
The figures in the right-hand margin indicate marks.

1.   Answer the following questions :   2×10

   (a)   Explain why the voltage across a capacitor cannot change instantaneously.

   (b)   Explain how voltage source with a source resistance can be converted into an equivalent current source.

   (c)   Name the four different types of dependent sources in electric circuits.

   (d)   A voltage source has internal impedance $(10 + j15)$ ohm. Find the load impedance for maximum power transfer.

   (e)   Write the formula to find the maximum output voltage in single and double tuned circuits.

   (f)   What are critical frequencies ? Why they are so called ?

   (g)   Distinguish between steady state and transient response.

   (h)   List any two advantages of 3-phase system over 1-phase system.

   (i)   Write the relation between the line and phase value of voltage and current in a balanced star connected load.

   (j)   What is meant by Unilateral and Bilateral element ?

P.T.O.

2. (a) Find the power dissipated in 10 ohm resistor for the circuit shown in figure.

   5
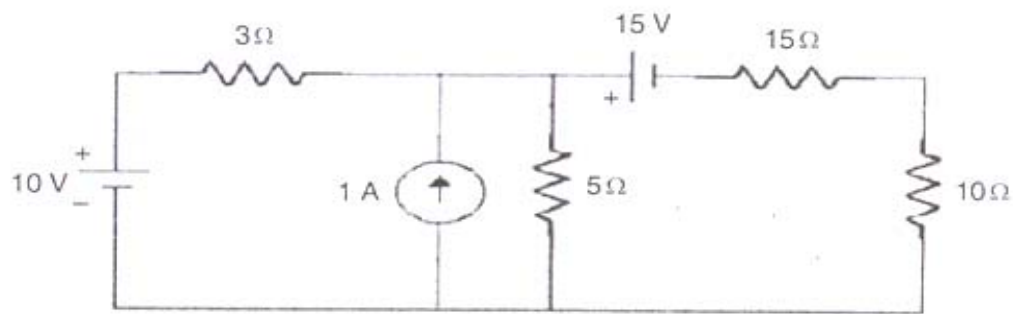
(b) The transform voltage V (s) of a network is given by V (s) = 4s/(s + 2)(s2 + 2s + 2) plot its pole-zero diagram and hence obtain v (t).   5

3. (a) A pure resistor, a pure capacitor and a pure inductor are connected in parallel across a 50Hz supply, find the impedance of the circuit as seen by the supply. Also find the resonant frequency.   5

(b) A three-phase delta connected load has Zab = (100 + j0) ohms, Zbc = (−j100) ohms and Zca = (70.7 + j70.7) ohms is connected to a balanced 3-phase 400 V supply. Determine the line currents Ia, Ib and Ic. Assume the phase sequence abc.   5

4. In the circuit shown in figure, switch S is in position 1 for a long time and brought to position 2 at time t = 0. Determine the circuit current.   10
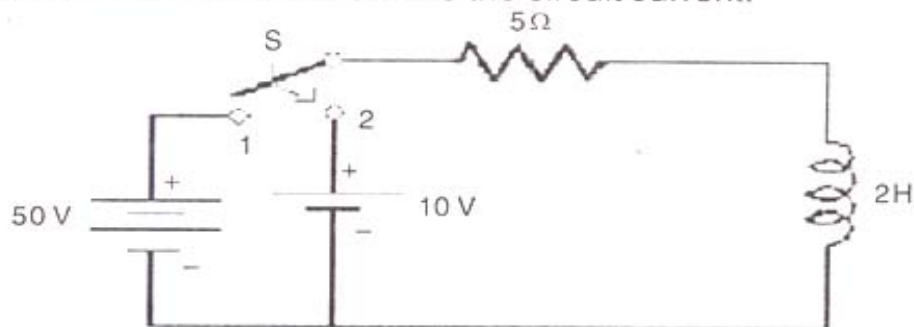
5. (a) Find the trigonometric Fourier series for the triangular wave shown in fig. and plot the spectrum.   5
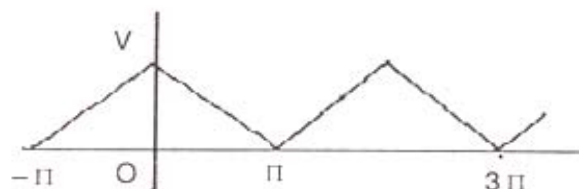
(b) When connected to a 230 V, 50 Hz single-phase supply, a coil takes 50 kVA and 45 kVAR. For this coil calculate resistance, inductance of coil and power consumed. 5

6. (a) An alternating current is expressed as i = 14.14 sin 314t. Determine rms current, frequency and instantaneous current when t = 0.02 ms. 5

   (b) What is phase sequence ? Explain its significance. 5

7. (a) Compute the current in 23 ohm resistor using superposition theorem for the circuit shown below. 5
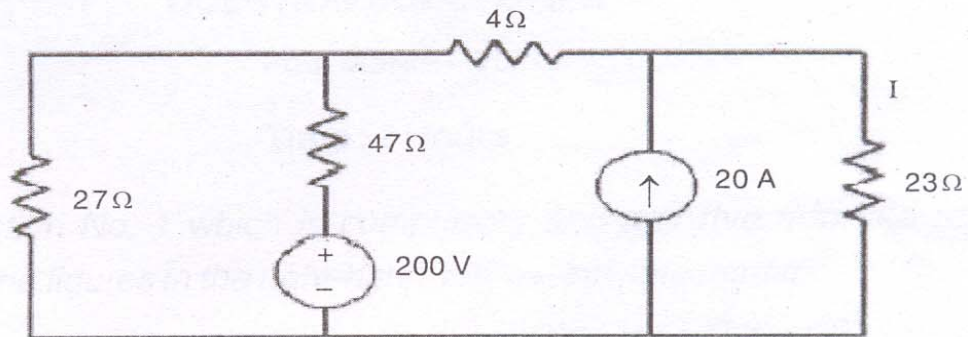
   (b) A balanced 3-phase Delta connected load with voltage of 200 V, has line currents as I1 = 10∠90°, I2 = 10∠−150° and I3 = 10∠−30°

      (i) What is the phase sequence ?

      (ii) What are the impedances ? 5

8. Write short notes on any **two** : 5×2

   (a) Norton's theorem

   (b) Driving point impedance

   (c) Time constant

   (d) Quality factor