B.Tech II Year I Semester (R15) Supplementary Examinations June 2017

ELECTRICAL CIRCUITS – II

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) The current in the inductor is given by $i(t) = \frac{1}{L}\int_0^t v(t)dt + i(0^+)$. Write equivalent domain expression.

(b) Draw the time response of the current in a series RC circuit.

(c) Draw phasor diagram of currents in 3-phase delta connected system.

(d) What are the advantages of 3-phase system over other systems?

(e) Write the properties of Fourier transform.

(f) Write the exponential form of Fourier series.

(g) Write the properties of incidence matrix.

(h) What is duality in electrical engineering?

(i) What are the properties of filters?

(j) How the basic elements are presented in simulation environment.

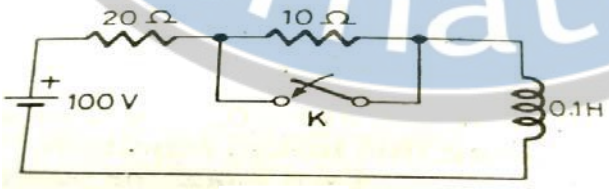
PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) Derive an expression for transient response in RC series circuit with DC excitation.

(b) A DC voltage of 100 V is applied to the circuit shown in figure below and the switch K is open. The switch K is closed at t = 0. Find the complete expression for the current.



OR

3 (a) Write equation for voltage in a RLC series circuit.

(b) The winding of an electromagnet has an inductance of 3H and a resistance of 15 Ohms. When it is connected to a 120 V d.c. supply, calculate: (i) The steady state value of current flowing in the winding. (ii) The time constant of the circuit. (iii) The value of the induced e.m.f. after 0.1s.

UNIT – II

4 A Delta connected load has a parallel combination of resistance 5 ohms and capacitive reactance of –j5 ohms in each phase. If the balanced 3-phase 400 V supply is applied between lines, find the phase currents and line currents and draw the phasor diagram.

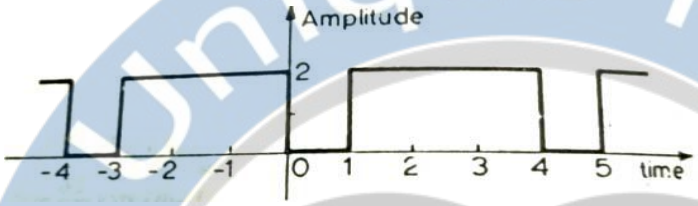
OR

5 Three impedances Z_A, Z_B and Z_C are connected in star across a 100 V, 50 Hz balanced 3-phase supply. Assuming $Z_A = 50\angle 0\ \Omega$, $Z_B = j10\ \Omega$, $Z_C = -j10\Omega$, find the drop across each impedance and the potential of the neutral.

Contd. in page 2

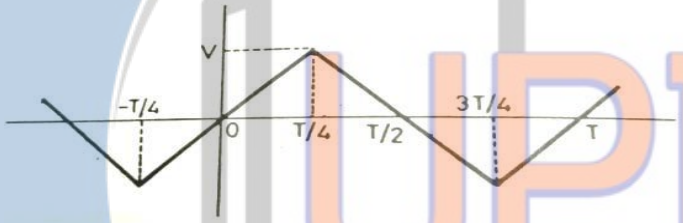
UNIT – III

6 Obtain the Fourier Series for the waveform shown in figure below.



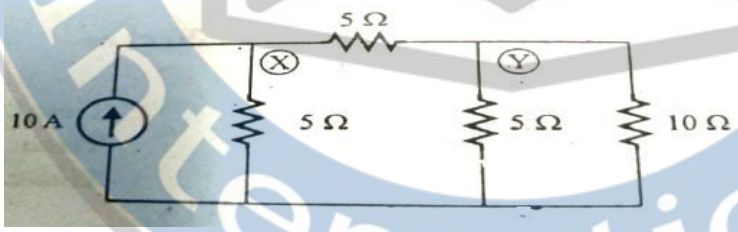
OR

7 Obtain the Fourier Series for the waveform shown in figure below.



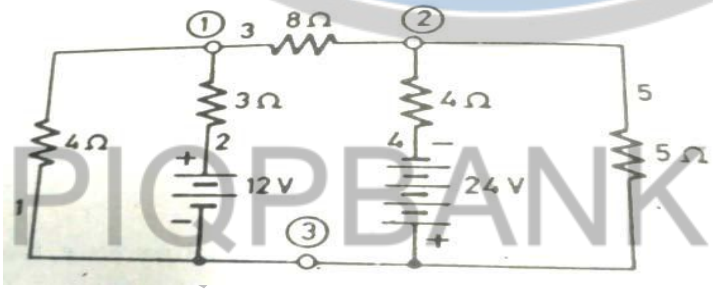
UNIT – IV

8 Write cutest matrix, obtain the equilibrium equations using nodal equations for the network shown in figure below. Also find the Node voltages at X and Y using network topology.



OR

9 For the network shown in figure below, write tie set matrix, write equilibrium equations and obtain the loop currents using network topology.



UNIT – V

10 Design a constant K-low pass filter having cut-off frequency 2.5 kHz and design resistance R_0 = 700 Ω. Also find the frequency at which this filter produces attenuation of 19.1dB. Find its characteristic impedances and phase constant at pass band and stop or attenuation band.

OR

11 Solve the circuit using PSpice program.