

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

ELECTRICAL CIRCUITS – I

(Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Define Kirchhoff's law.
 - What is the significance of coefficient of coupling in a magnetic circuit?
 - Draw voltage, current and power waveforms for pure capacitive circuit.
 - Draw phasor diagram for simple RL series circuit.
 - Define Q factor.
 - Draw simple Locus diagram for series RC circuit with R (variable parameter).
 - Define maximum power transfer theorem for sinusoidal excitation.
 - State Thevenin's theorem.
 - Define H – parameters.
 - What is the condition of reciprocity and symmetry in Y – parameters?

PART – B

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

UNIT – I

- 2 A bridge network ABCD has $AB = 6 \Omega$, $BC = 12 \Omega$, $CD = 10 \Omega$ and $DA = 3 \Omega$. The galvanometer of resistance 20Ω is connected between B and D and battery of emf 2 V and negligible internal resistance is connected between A and C. Calculate the current in the galvanometer.

OR

- 3 (a) An iron ring of mean length 40 cm has an air gap of 2 mm and a winding of 300 turns. If the permeability of the iron core is 300, when a current of 1A flows through the coil, find the flux density.
- (b) Define Faraday's laws of electromagnetic induction.

UNIT – II

- 4 (a) In a series circuit, the voltage, current is given by $v(t) = 282.8 \sin 314t$, $i(t) = 14.14 \sin (314t - 60^\circ)$. Calculate value of the circuit elements and calculate active, reactive and apparent power.
- (b) Define form factor and crest factor.

OR

- 5 (a) Show that the power through pure capacitor when excited with $e = E_m \sin \omega t$ is zero.
- (b) A constant current of 5 A flows for 0.04 seconds and to complete the cycle, a constant current of 2 A flows in the opposite direction for 0.06 seconds. Sketch the waveform of current over one cycle and calculate: (i) Mean value of the current. (ii) The r.m.s value of the current.

UNIT – III

- 6 A 10 mH coil is connected in series with a loss free capacitor to a variable frequency source which supplies a constant voltage of 10 V. The circuit current has a maximum value of 0.2 A at frequency of 50 kHz. Calculate: (i) The capacitance of the capacitor. (ii) The Q factor of the coil. (iii) The half-power frequencies.

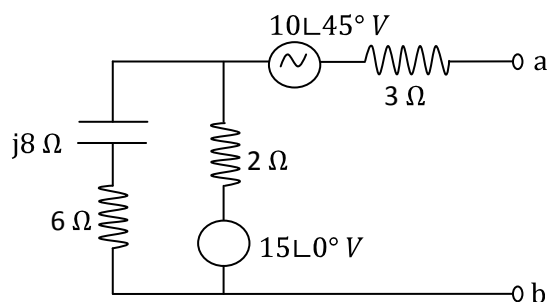
OR

- 7 Draw Locus diagrams for parallel RLC circuit with all parameter variations.

Contd. in page 2

UNIT – IV

- 8 Obtain the Thevenin's equivalent circuit at terminals a-b of the network shown in below.



OR

- 9 State and prove maximum power transfer theorem for both AC and DC networks.

UNIT – V

- 10 Derive the relationship between hybrid parameters and impedance parameters.

OR

- 11 Determine the transmission parameters for the given network.

