



NCD-003-1272001 Seat No. _____

M. Sc. (ECI) (Sem. II) (CBCS) Examination
April / May - 2017

Basic Circuit Analysis : Paper - V

Faculty Code : 003
Subject Code : 1272001

Time : Hours]

[Total Marks : 70

1 Answer any seven from the following : 14

- (1) How one can convert a network with a graph? Give one example.
- (2) Briefly explain: Incidence, directed graph, degree of nodes and connected graph.
- (3) Write general mesh equations for a three-mesh resistive network.
- (4) Explain how to convert a current source into voltage source.
- (5) Write reciprocity theorem and explain.
- (6) Write the equations for sinusoidal source with phase difference and without phase difference in terms of angle. Also draw corresponding waveforms.
- (7) Convert $100 \angle 30^\circ$ into symbolic notation, i.e. in $a+jb$ form.
- (8) Briefly explain mutual inductance.
- (9) What is the dot convention in coupled circuits?
- (10) Define natural response and transient response.

2. Answer any two from the following :

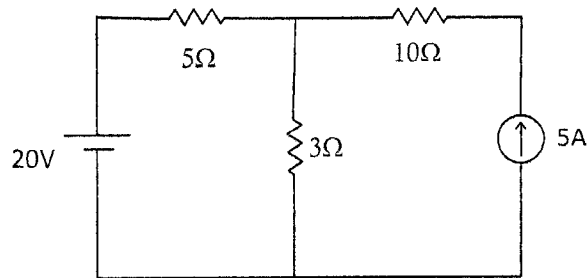
- (1) Explain how to draw a graph from incidence matrix with one example. 7
- (2) Explain how Kirchhoff's current and voltage laws can be expressed using graph theory with one example for each. 7
- (3) Explain the concept of super mesh and super node with one example. 7

3 Answer the following :

(1) Draw the star and delta networks. Show that 7

$$R_A = \frac{R_1 R_2}{R_1 + R_2 + R_3}, \quad R_B = \frac{R_1 R_3}{R_1 + R_2 + R_3}, \quad \text{and} \quad R_C = \frac{R_2 R_3}{R_1 + R_2 + R_3},$$

(2) State the super-position theorem. Find the current 7
passing through a 3 Ohm resistance in the following
circuit using this theorem.



OR

3 Answer the following :

(1) Discuss the impedance of a series RL circuit with 7
necessary mathematical steps and phasor diagram.

(2) Explain resonance in series RLC circuit. Discuss 7
the impedance and Phase angle for the same.

4 Answer the following :

(1) Draw a parallel RLC circuit and the admittance and 7
current curves against frequency. Obtain the formulae
for the resonant frequency, lower half-power frequency,
upper half-power frequency and bandwidth. Also derive
expression for quality factors for inductor and capacitor.

(2) Explain the circle diagrams of series RL and RC 7
circuits with proper diagram.

5 Answer any two from the following :

(1) Write a detailed note on the co-efficient of coupling. 7

(2) Draw the diagram of ideal transformer and discuss 7
about its turns ratio relation with voltage ratio and
derive the formula for input impedance.

(3) Discuss the DC transient response of series RL 7
circuit with proper diagrams.

(4) Discuss sinusoidal response of series RLC circuit. 7