



INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

B.TECH II Semester End Examinations (Regular) AUGUST- 2021

Regulation:UG20

ELECTRICAL CIRCUITS

(ECE|EEE)

Time: 3 Hours

Max Marks: 70

Answer all questions in Modules I and II

Answer ONE out of two questions from Modules III, IV and V

(NOTE: Provision is given to answer TWO questions from among one of the Modules III / IV / V)

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

MODULE – I

1. (a) Explain the following terms:
 - i) Ideal and practical sources of energy
 - ii) Active & passive elements[7M]
- (b) Find the RMS value of current for the periodic waveform shown in Figure 1. [7M]

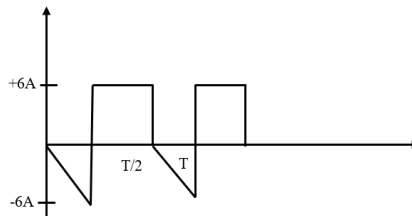


Figure 1

MODULE – II

2. (a) Explain about source transformation phenomenon of independent voltage and current sources. [7M]
- (b) Apply mesh analysis and calculate the current flowing through 3Ω element for the network shown in Figure 2 [7M]

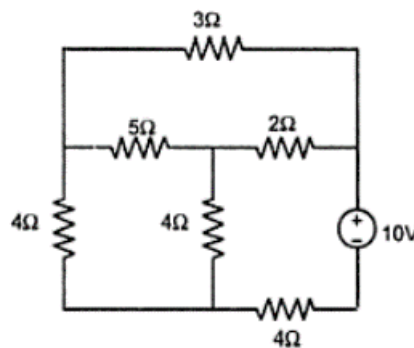


Figure 2

MODULE – III

3. (a) State and prove Thevenin's theorem with an example for DC excitation. [7M]
 (b) Find the Thevenin's voltage and Thevenin's resistance of the network shown in Figure 3. [7M]

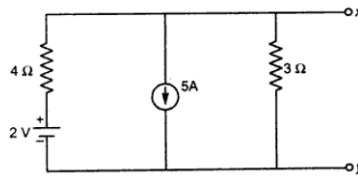


Figure 3

4. (a) Derive the condition for Norton's theorem with AC excitation and verify with an example. [7M]
 (b) Calculate the maximum power delivered across R_L of the circuit shown in Figure 4. [7M]

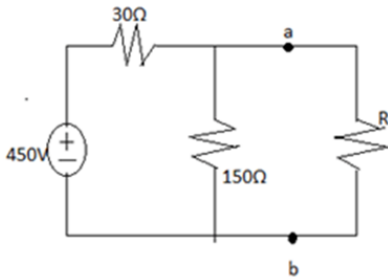


Figure 4

MODULE – IV

5. (a) State Faraday's law of electro-magnetic induction. Write the similarities between magnetic and electric circuits. [7M]
 (b) Find the voltage across 5Ω resistor in the circuit for dots as given in the Figure 5. [7M]

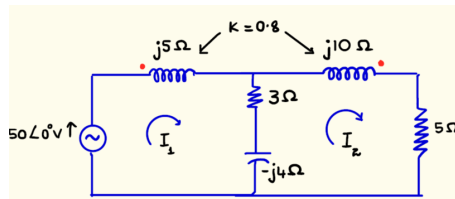


Figure 5

6. (a) Explain about the self-inductance and mutual inductance between the coils. [7M]
 (b) Calculate the equivalent self inductance of the following inductive circuit shown in Figure 6. [7M]

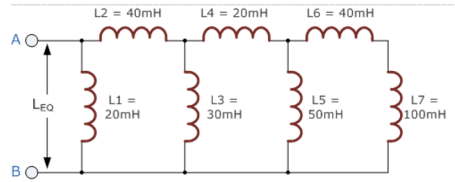


Figure 6

MODULE – V

7. (a) What are ABCD transmission parameters? Explain with corresponding equations. Write the condition for symmetry and reciprocity of ABCD parameters. [7M]
- (b) The parameters of two port network are $Z_{11} = 20\Omega, Z_{22} = 30\Omega, Z_{12} = Z_{21} = 10\Omega$. Determine Y and H parameters of the network. [7M]
8. (a) What is meant by duality? Explain the principle of duality. What is the procedure to obtain the dual network? [7M]
- (b) Write the tie-set matrix for the network graph shown in Figure 7 by selecting a tree with branches 3,4,5. [7M]

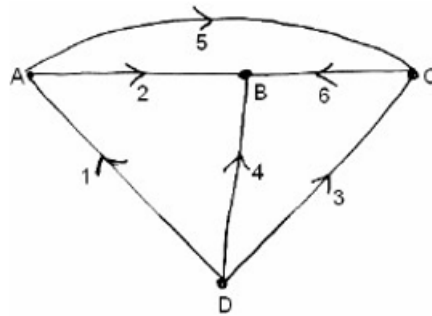


Figure 7

