

R16

Code No: 131AK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2019

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to EEE, ECE, CSE, EIE, IT, ETM)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Determine v_o and i in the circuit shown in figure 1.

[2]

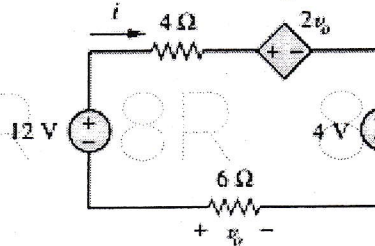


Figure: 1

- b) Write the expressions for a delta-to-wye transformation. [3]
- c) State the principle of superposition. [2]
- d) What is the resonant frequency of a series RLC circuit where $R = 10\Omega$, $L = 25$ mH and $C = 100 \mu\text{F}$? Evaluate the Q factor. [3]
- e) What is the current equation of diode? [2]
- f) What is a junction capacitance of a diode? [3]
- g) What is a bipolar junction transistor? [2]
- h) What are the three types of configuration in transistors? [3]
- i) Define pinch off voltage in FET. [2]
- j) Sketch the basic structure of an N-Channel JFET. [3]

PART-B

(50 Marks)

2.a) State and explain Kirchhoff's laws.

b) Calculate the equivalent resistance of the circuit shown in the figure 2.

[4+6]

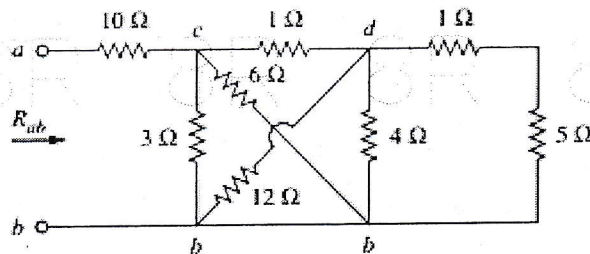


Figure: 2

OR

- 3.a) Define average and effective value, RMS value for voltage signal with an example.
 b) Use source transformation to determine the current and power absorbed by the 8Ω resistor as shown in figure 3. [5+5]

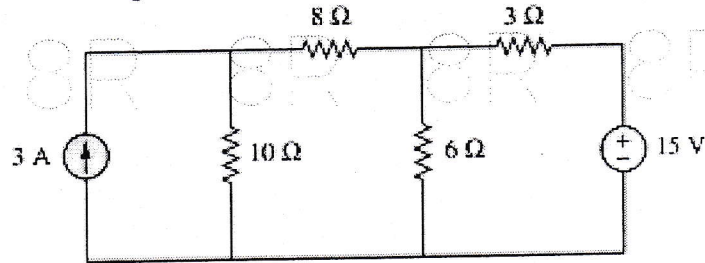


Figure: 3

- 4.a) Derive the condition for resonant frequency of the given parallel circuit and define the band width and quality factor of a resonant circuit figure 4.

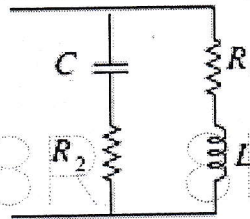


Figure: 4

- b) Find the Thevenin's equivalent looking into terminals $a-b$ of the circuit in figure 5 and solve for i_x . [5+5]

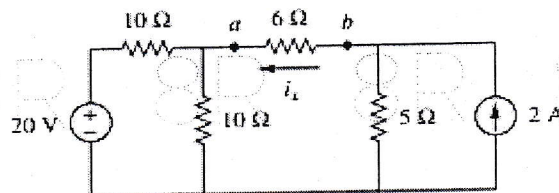


Figure: 5

OR

- 5.a) Verify Reciprocity theorem of the given circuit shown in figure 6.

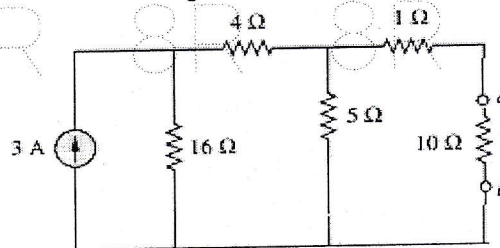


Figure: 6

- b) Find the Norton equivalent with respect to terminals $a-b$ in the circuit shown in figure 7. [5+5]

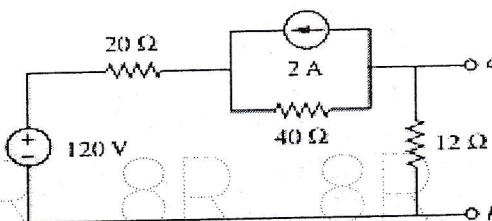


Figure: 7

- 6.a) Discuss the phenomenon of diffusion of charge carriers in semiconductors.
b) How does a capacitor filter improve the response of a rectifier circuit? [5+5]

OR

- 7.a) Explain about Zener diode and its V – I characteristics.
b) Derive an expression for the rectification efficiency of a full-wave rectifier. [5+5]
- 8.a) Discuss about different operating regions of transistor.
b) Explain the input and output characteristics of a transistor in CE configuration. [5+5]

OR

- 9.a) Explain the two types of breakdown in transistors.
b) Explain the input and output characteristics of a transistor in CB configuration. [5+5]
- 10.a) Explain the phenomenon of pinch off voltage in a FET with a neat diagram and write the expression for I_{DS} with respect to pinch off voltage.
b) Two identical FETs are connected in parallel. Derive an expression for its overall μ factor. [5+5]

OR

- 11.a) Write a note on biasing schemes of JFET.
b) Give the small-signal equivalent circuit of a FET amplifier in CG configuration and derive the equation for voltage gain. [5+5]

---ooOoo---