

Code No: 131AK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

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

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) State ohm's law and mention the limitations of it. [2]
- b) Mention the advantages of sinusoidal alternating quantity. [3]
- c) Explain what is meant by Bandwidth and Q factor? [2]
- d) Give the statement of Reciprocity theorem. [3]
- e) What is forward bias and reverse bias in a PN junction? [2]
- f) Define ripple factor. What is the value of ripple factor for FWR and HWR? [3]
- g) Why transistor is called as a current controlled device? [2]
- h) Explain how h_{ie} is different from h_{fe} in CE configuration. [3]
- i) How is drain current controlled in a JFET? [2]
- j) List some applications of varactor diode. [3]

PART-B

(50 Marks)

2.a) For the circuit shown in figure 1, find the current flowing in all the branches.

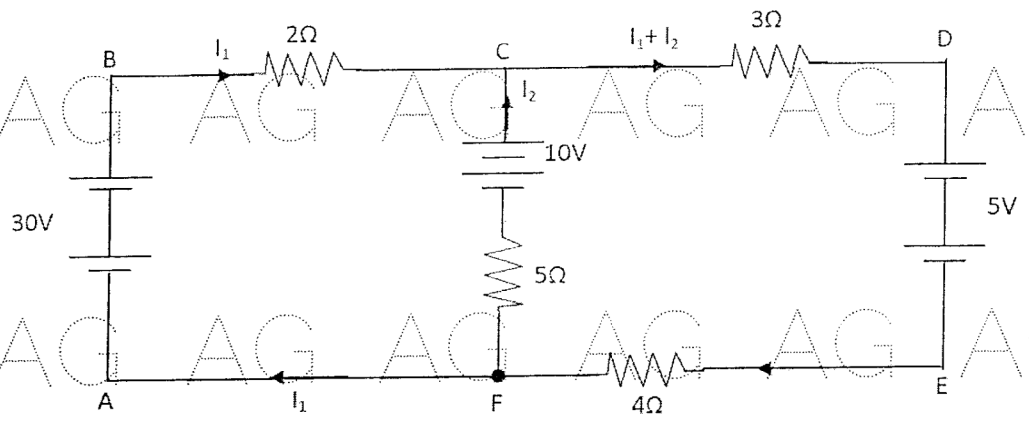


Figure: 1

b) Find the rms value, average value and form factor of a half wave rectified voltage. [5+5]
OR

3.a) Define the following:

- i) Alternating Quantity
- ii) R.M.S. Value
- iii) Average value
- iv) Form factor.

b) Deduce an expression for the equivalent capacitance of three capacitors connected in

- i) Parallel
- ii) Series.

Hence calculate the equivalent capacitance if three capacitors of capacitances 2, 4, and 8 micro – Farads are connected in 1) Series 2) Parallel

If a voltage of 10 V is connected, calculate the charge stored in each case. [5+5]

4.a) A series circuit comprising R, L and C is supplied at 220 V, 50 Hz. At resonance, the voltage across the capacitor is 550 V. The current at resonance is 1A. Determine the circuit parameters R, L and C.

b) In the network shown in figure-2, find the value of Z_L so that the power transferred from the source is maximum. Also find P_{max} . [5+5]

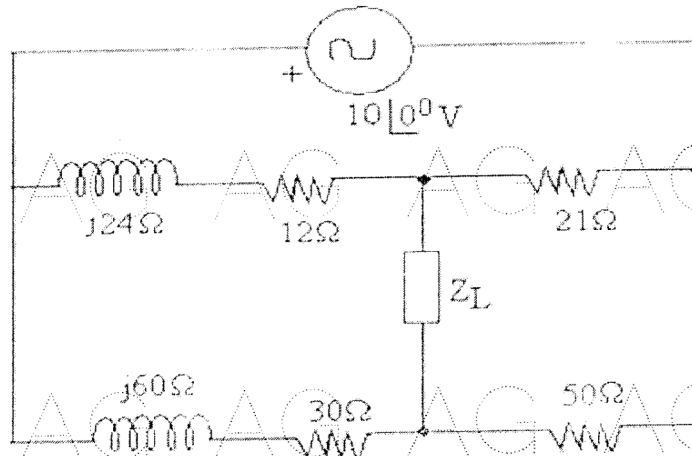


Figure: 2
OR

5.a) A coil having a resistance of 10 ohms and an inductance of 0.2H is connected in series with a 100×10^{-6} F capacitor across a 230V, 50Hz supply, Calculate:

- i) The active and reactive components of the current
- ii) The voltage across the coil. Draw the phasor diagram.

b) Using Thevenin's theorem, calculate the current I through the resistance connected between the terminal A and B (All resistances are in ohms) as shown in figure 3. [5+5]

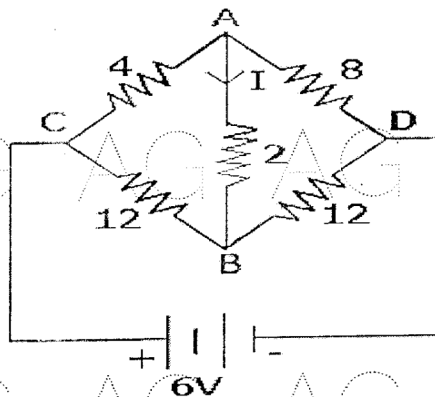


Figure: 3

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- 6.a) Draw and explain the V-I characteristics of a pn junction.
b) Compare Half wave rectifier, Full wave rectifier and Bridge rectifier in any four aspects. [5+5]

OR

- 7.a) What are the applications of the semiconductor diode? Explain each one with suitable circuit diagram.
b) A silicon diode operates at forward voltage of 0.4V. Calculate the factor by which the current will be multiplied when the temperature is increased from 25°C to 150°C. [5+5]

- 8.a) Draw the input and output characteristics of n-p-n transistor in common base configuration and explain how they are obtained.
b) In a fixed bias circuit using n-p-n transistor, find the operating point if $V_{CC} = 24V$, $R_B = 220k$, $R_E = 4.7k$. [5+5]

OR

- 9.a) Draw the circuit and explain the characteristics of CB configuration.
b) Write short notes on thermal runaway problems. [6+4]

- 10.a) What is a zener diode? Draw the equivalent circuit of an ideal zener in the break down region.
b) How is zener diode used as a voltage regulator? [5+5]

OR

- 11.a) Draw the circuit and explain the drain and gate characteristics of a JFET.
b) Give the parameter values and specifications of a JFET. [6+4]

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