

**R16**

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**

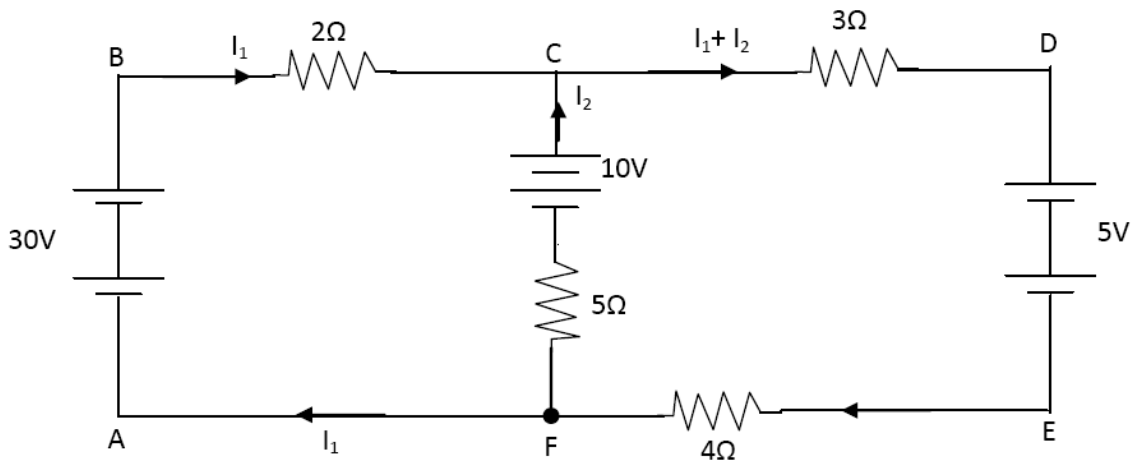
**(25 Marks)**

- 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.

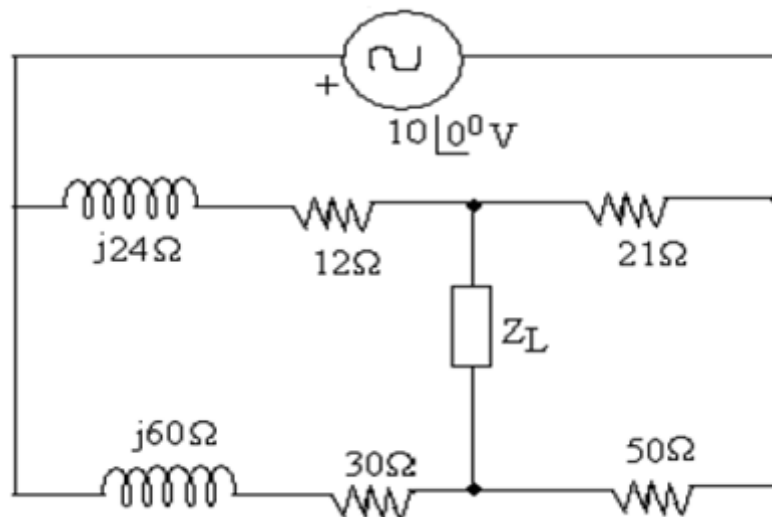


**Figure: 1**

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

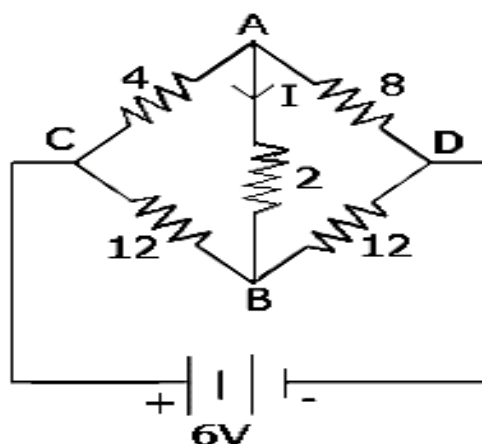
**OR**

- 3.a) Define the following:
- Alternating Quantity
  - R.M.S. Value
  - Average value
  - Form factor.
- b) Deduce an expression for the equivalent capacitance of three capacitors connected in
- Parallel
  - 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  $100 \times 10^{-6}$  F capacitor across a 230V, 50Hz supply, Calculate:
- The active and reactive components of the current
  - 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**

- 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  $V_{CC} = 24V$ ,  $R_B = 220k$ ,  $R_C = 4.7k$ . [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]

---ooOoo---