

Code No: 123BR

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**  
**B.Tech II Year I Semester Examinations, November/December - 2016**  
**BASIC ELECTRICAL ENGINEERING**  
 (Common to CSE, 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 the Superposition theorem.                                | [2] |
| b) Distinguish between potential difference and electromotive force. | [3] |
| c) Define Periodic function and Cycle.                               | [2] |
| d) What is the significance of form factor and peak factor?          | [3] |
| e) What is the purpose of using core in a transformer?               | [2] |
| f) Define the regulation of transformer.                             | [3] |
| g) List the basic requirements to produce e.m.f.                     | [2] |
| h) What are the various losses in a D.C. Motor?                      | [3] |
| i) What are the various classifications of instruments?              | [2] |
| j) What are the various types of Ammeters and voltmeters?            | [3] |

**PART-B**

**(50 Marks)**

- 2.a) Explain the Kirchhoff's laws.
- b) By using star-delta transformation for the following figure 1. Find the current 'I' supplied by the battery? [5+5]

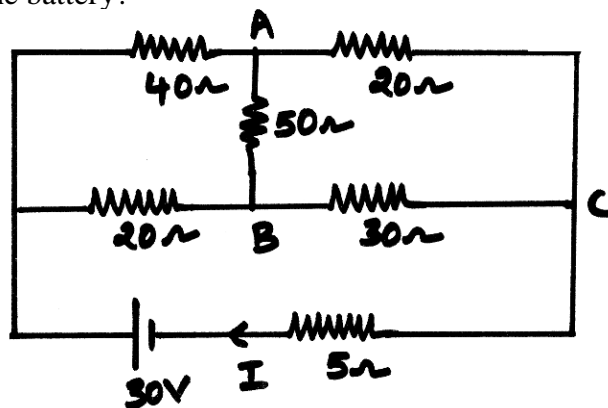


Figure: 1  
OR

3. Using method of superposition, determine the current through the 5kΩ resistors for the circuit in figure 2. [10]

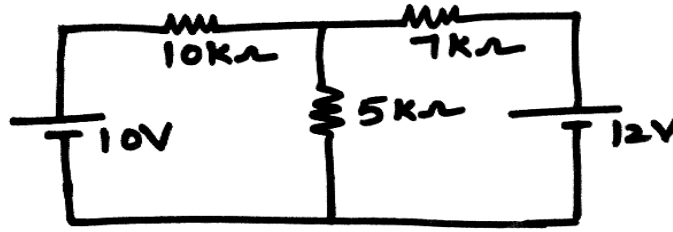


Figure: 2

- 4.a) Explain the concept of Average value and RMS value.  
 b) An alternating current varying sinusoidally, with a frequency of 50Hz, has an rms value of 20A. Write down the equation for the instantaneous value and find this value at (i) 0.0025s, (ii) 0.0125s after passing through a positive maximum value. At what time, measured from a positive maximum value, will instantaneous current be 14.14A? [5+5]

OR

- 5.a) In an a.c. circuit,  $v = 200 \sin(\omega t + 30^\circ)$  V,  $i = 15 \sin(\omega t - 30^\circ)$  A. Find reactive power.  
 b) In a series RC circuit, the values of  $R = 100 \Omega$  and  $C = 25 \mu\text{F}$ . A sinusoidal voltage of 50 MHz is applied and the maximum voltage across the capacitance is 2.5V. Find the maximum voltage across the series combination and also determine the apparent power. [5+5]

- 6.a) Explain the transformer on no-load with phasor diagram.  
 b) A 50Hz single phase transformer has 6600V/400V. Having e.m.f per turn is 10V and the maximum flux density in the core is 1.6 Tesla. Find the:  
 i) Suitable number of primary and secondary turns  
 ii) Cross sectional area of the core. [5+5]

OR

7. A 25 kVA, 2200/220V, 50Hz single phase transformer obtained the following test results.  
 OC test (L.V.side) = 220V, 1.2A, 100 w  
 SC test (H.V.side) = 100V, 7 A, 310w  
 Calculate the parameters of the equivalent circuit of transformer referred to L.V. side and draw the equivalent circuit. [10]

8. Explain the constructional details of a D.C. Generator with neat sketches. [10]

OR

- 9.a) Derive the torque equation of induction motor.  
 b) A three-phase induction motor runs at 1440 rpm at full load when supplied power from 50 Hz, 3-phase line. Calculate i) slip at full load ii) frequency of rotor voltage iii) speed of rotor at a slip of 10%. [5+5]

10. Describe the moving coil permanent magnet instrument with neat circuit diagram. [10]

OR

11. Explain the essential requirements of indicating instruments with necessary diagrams. [10]