**Printed pages: 2**                                                    **Sub Code: EEE101**

**Paper Id:** | 120104 |                          **Roll No.** | | | | | | | | | | |

**B TECH**
**(SEM-I) THEORY EXAMINATION, 2018-19**
**ELECTRICAL ENGINEERING**

**Time: 3 Hours**                                                    **Total Marks: 100**

**Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.

## SECTION A

1.      **Attempt all questions in brief.**                          **2 x 10 = 20**

   a.     Explain Active networks and passive networks.
   b.     Explain Kirchhoff's laws for voltage and current.
   c.     What do you mean by R.M.S value of an alternating quantity?
   d.     Calculate form factor a sinusoidal ac wave?
   e.     What do you mean by restraining torque and deflecting torque?
   f.     Explain balanced and unbalanced supply.
   g.     What do you mean by grid?
   h.     Explain auto transformer and its advantages.
   i.     Why condenser is used in a single phase induction motor?
   j.     What is the significance of back e.m.f. in dc motor?

## SECTION B

2.      **Attempt any three of the following:**                      **10 x 3 = 30**

   a.     Using Maxwell loop current method find the current in 9 ohm resistor.
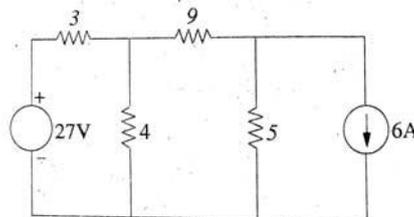


   b.     Prove that in a purely capacitive circuit average power is zero. Also find the
          expression for current, instantaneous power and draw wave diagram.

   c.     Derive the relation between line values and phase values in three phase star and
          delta connection with phasor diagram.

   d.     A ring has a mean diameter of 21 cm and a cross sectional area of 10 cm$^2$. The
          ring is made up of semicircular sections of cast iron and cast steel, with each
          joint having reluctance equal to an air gap of 0.2 mm. Find the ampere turn
          required to produce a flux of 8 x 10$^{-4}$Wb. The relative permeability of cast steel
          and cast iron are 800 and 166 resp.

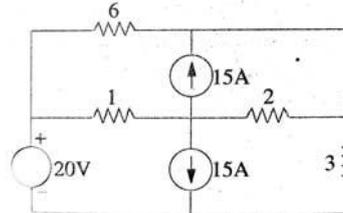   e.     Explain the working of Alternator and give its applications.

## SECTION C

**3.** **Attempt any one part of the following:**     **10 x 1 = 10**

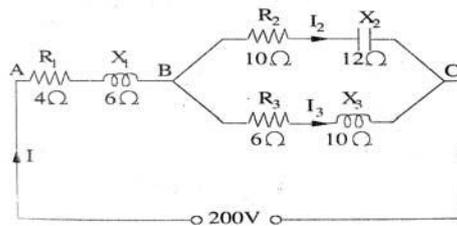(a)   Obtain Norton's equivalent circuit of the given network.
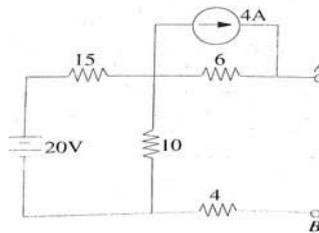


(b)   Use superposition theorem to calculate the voltage through 3 ohm resistor.



**4.** **Attempt any one part of the following:**     **10 x 1 = 10**

(a)   Determine the current drawn by the following circuit when a 200 V supply is applied across the same. Draw the phasor diagram.



(b)   Derive the relations for half power frequencies and bandwidth in a series RLC circuit.

**5.** **Attempt any one part of the following:**     **10 x 1 = 10**

(a)   A 220 V , 3-phase Voltage is applied to a balanced delta connected 3 phase load of phase impedance (15+ j20) ohm

(i)    Find the phase current in each line

(ii)   What is power consumed /phase

(iii)  What is the phasor sum of three line currents? Why does it have this value

(b)   Explain construction and working of single phase dynamometer with its advantages and disadvantages.

**6.** **Attempt any one part of the following:**     **10 x 1 = 10**

(a)   Explain efficiency of a single phase transformer and derive the condition for maximum efficiency.

(b)   Explain magnetic hysteresis and explain B-H loop for a magnetic material.

**7.** **Attempt any one part of the following:**     **10 x 1 = 10**

(a)   Explain principle of operation of three phase induction motor and production of rotating magnetic field

(b)   Explain working of DC motor and derive torque equation for it.