M18001015

Registration No: | | | | | | | | | | |

Total Number of Pages : 03 **B.TECH**

B.TECH 2ND SEMESTER REGULAR EXAMINATIONS, MAY 2018
BASICS OF ELECTRICAL ENGINEERING
Subject Code:BBSES1042
Time: 3 Hours
Max Marks : 100

CO1 Calculate currents and voltages in ac and dc circuits using different methods.
CO2 Analyze the effect of magnetization in different electrical equipments.
CO3 Design the fundamental electrical circuits using hardware.
CO4 Analyze different electrical and electronics instrumentations.
CO5 Illustrate the design of different conventional power plants.

PART-A (10X1 = 10 MARKS)

Answer *All* Questions.

a. Kirchhoff's voltage Law is applicable at _____only. **[CO1]**
a) Branch b) junction c) loop d) none

b. An Ideal current source should have _____ internal resistance. **[CO3]**
a) 0 b) infinite c) 1 d) none

c. Peak factor is the ratio of _____to_____. **[CO1]**
a) I_{RMS}, I_{AV} b) I_{RMS}, I_{MAX} c) I_{MAX}, I_{RMS} d) I_{AV}, I_{MAX}

d. The power factor is the ratio of _____ power and _____power. **[CO1]**
a) Active, apparent b) active, reactive c) reactive, active d) none

e. For a Delta connected load, Phase current = _____× Line current. **[CO4]**
a) $\sqrt{3}$ b) $1/\sqrt{3}$ c) 1 d) none

f. The power factor of a pure resistive circuit is_____. **[CO4]**
a) 0 b) 1 c) 0.5 d) none

g. The form factor of a pure sinusoidal wave is _____. **[CO4]**
a) 1.11 b) 1.414 c) 1 d) none

h. Silicon steel is used in the transformer core to reduce _____ loss. **[CO2]**
a) Eddy current b) hysteresis c) cupper d)windage

i. For a Lap armature winding number of parallel path(A) = _____ **[CO5]**
a) P b) 2 c) 0 d) 3

j. A PMMC instrument can be used as _____ by using a low resistance shunt. **[CO4]**
a) Ammeter b) voltmeter c) wattmeter d) none

PART-B (15 x 2 = 30 MARKS)

Answer any fifteen questions from the following.

1. Explain how the current source with a source resistance can be converted into an equivalent voltage source. **[CO1]**
2. In a given circuit, three identical resistances each of value 20Ω are connected in delta. Find the equivalent resistances in star. **[CO1]**
3. A DC voltage E is switched on to a series R-C circuit. Write the differential equation for the circuit and also find the expression for instantaneous voltage. **[CO4]**
4. A resistance R is connected across a D.C supply of 320V and dissipates energy of 4000W. What is the value of R. **[CO1]**
5. What is controlled current source. **[CO1]**
6. What do you mean by coercive force magnetic field? **[CO2]**
7. Write down the equation of a sinusoidal source voltage of 50 Hz frequency and maximum value of 200V. **[CO3]**

8. Two impedances (3+j6) and (5+j9) are connected in parallel then what would be the resultant power factor. **[CO3]**
9. A circular iron ring is wound with 500 turns of coil develops a magnetic flux of 20miliwb.when the coil carries a current of 5A. Find the mmf of the source and reluctance of the ring. **[CO2]**
10. A balanced 3-ph star connected load of 100kW takes a lagging current of 100Amp when connected to 440V 50Hz supply. Find the impedance of load per phase ` **[CO1]**
11. What do you understand about synchronous speed of 3-phase induction motor? **[CO2]**
12. Write the voltage equation of a DC shunt motor. **[CO4]**
13. Draw the phasor diagram of a transformer with no load. **[CO2]**
14. A 4 pole 60 HZ Induction motor is running at 1440 rpm. What is the synchronous speed and slip? **[CO4]**
15. A transformer delivers 100mA at 100 Volts from 200V supply. How many turns required in secondary.(Given no of turns in primary =400) **[CO2]**
16. Differentiate between deflecting torque and damping torque. **[CO4]**
17. What is spring control? **[CO4]**
18. Why surge tank is used in Hydro power plant? **[CO5]**
19. Draw the connection diagram of a PMMC instrument. **[CO4]**
20. Why earthing is done for the measurement systems? **[CO4]**

PART-C (6 x 5 = 30 MARKS)

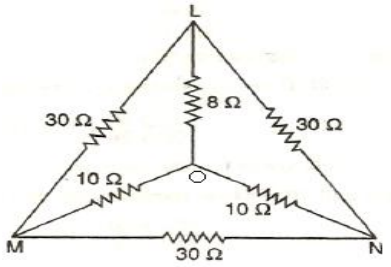
Section-i Answer any Six questions

1. State and Explain Thevenin's theorem with a suitable example. **[CO1]**
2. Two batteries are connected in parallel with emf and internal resistances as 100V, 10 ohm and 2000V, 20 ohm respectively. Another load resistance of 50 ohm is connected across battery terminals. Calculate the Current through 50 ohm resistor using superposition theorem. **[CO4]**
3. A resistance of 40 ohms, an inductor of 20mH and acapacitor of 200microfarad are connected to a single phase 220V, 50Hz AC supply. Find the impedance,current and power consumption in the given circuit. **[CO1]**
4. Define magnetic circuit and make a comparison between an electrical and a magnetic circuit. **[CO2]**
5. Explain the priciple of a DC motor and derive the voltage equation of a DC shunt motor. **[CO4]**
6. A single- phase transformer is supplied from a 230V, 50Hz single phase AC supply. It has 100 turns in primary and 600 turns in secondary. What is the maximum flux density in the core of $5cm^2$ cross section and the secondary induced e.m.f. **[CO2]**
7. Draw the block diagram showing the generation plant, transmission section and distribution part of a power system with the rating of the transformer. **[CO5]**
8. Compare between hydro electric and thermal power plant. **[CO5]**

Section-ii Answer any Two questions (2 x 15 = 30 MARKS)

1 **a.** A resistance of 100Ω and a capacitor of 40μF connected in series across a 210V DC supply. The fully charged capacitor is then disconnected from the supply and discharged through a short circuit link through a switch K. Calculate the initial voltage, final voltage, time constant and voltage after 10μsec of switching. **[8]** **[CO1]**

b. Calculate the resistance R_{LN} and R_{MN} from the circuit below **[7]** **[CO3]**



2.a. A balanced 3-ph delta load has load impedance of (5-j10) ohms per phase and is supplied from a balanced

3-ph 440V, 50 Hz AC supply. **[8] [CO1]**

Calculate the values for:

(a) Line voltages.

(b) Phase voltages

(c) Line currents

(d) Phase currents.

(e) Power consumption at the load

b. A non inductive resistor is connected in series with a coil. The combination is connected across 230V, 50Hz supply and draws a current of 3 A from the line. The voltage across the choke coil and the resistor are 120V and 210V respectively. Calculate the resistance and reactance of the coil, power observed by the coil and the total power. **[7] [CO1]**

3. a. Derive the voltage and power equations of shunt generator and compound generators**. [8] [CO4]**

b. Briefly explain about no load transformer and it's phasor diagram. **[7] [CO2]**

4. a. Explain about nuclear power plant with neat diagram **[8] [CO5]**

b. Write the principle of MI type instrument and derive it's torque equation. **[7] [CO4]**

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