

- (b) What is B-H curve? Also explain the hysteresis and eddy current loss.
- (c) Write down the principle of operation of 3-phase synchronous motor. Also write its applications.

5. Attempt any **two** parts of the following. All parts carry equal marks.

- (a) State the Thevenin's theorem and Norton's theorem.
- (b) Explain the following terms:
- Phasor representation of sinusoids
 - Bandwidth and Quality factor.
- (c) What is accuracy and resolution of an instrument? Briefly explain the induction type energy meter.

6. Attempt any **two** parts of the following. All parts carry equal marks.

- (a) Describe the working of an auto transformer.
- (b) Explain the PMMC instrument. Also derive the expression for deflecting torque.
- (c) Explain the starting methods of single phase induction motor.

7. Attempt any **two** parts of the following. All parts carry equal marks.

- (a) Derive the sinusoidal response of parallel RC circuit.
- (b) Explain the following:
- Efficiency of transformer
 - Operation of alternator.
- (c) A three-phase 4 pole induction motor is running with 4% slip. The supply frequency is 50 Hz. Find out the speed of induction motor.



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2301

Roll No.

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B.Tech.

(SEM. I) ODD SEMESTER THEORY EXAMINATION

2010-11

ELECTRICAL ENGINEERING



Time : 3 Hours

Total Marks : 100

Note :— All sections are compulsory.

Section—A

1. All parts are compulsory. All parts carry equal marks.

(10×2=20)

- (a) A 100 ohm resistor is needed in an electric circuit to carry a current of 0.3 A. Which resistor would you specify?
- 100 ohm 5 W
 - 100 ohm 7.5 W
 - 100 ohm 10 W
 - None of these
- (b) An inductor at $t=0^+$ with zero initial condition act as:
- Voltage source
 - Current source
 - Open circuit
 - None of these
- (c) In star connection of resistance is R then in equivalent delta connection this value will be:
- R/2
 - 3R/2
 - 3R
 - R/3
- (d) In Dynamometer type wattmeter is used for measuring:
- AC only
 - DC only
 - Both AC and DC
 - None of these

- (e) In two wattmeter method, if the readings are equal with opposite sign then the power factor of the load is _____.
- (f) The short circuit test of transformer is done to determine:
- iron loss
 - eddy current loss
 - copper loss at full load
 - copper loss at desired load.
- (g) The back e.m.f. of DC motor is given by $E_b =$ _____.
- (h) The wound rotor induction motor is mainly used due to:
- High starting torque
 - Speed Control
 - High rotor resistance
 - None of these.
- (i) The color codes of line wires for three-phase four wire AC system are _____.
- (j) The efficiency is only _____ when maximum power transfer is achieved.

Section—B

2. Attempt any **three** parts of the following. All parts carry equal marks. (10×3=30)

- Derive the response of RLC series circuit to sinusoidal input. Also derive the condition of resonance.
- Discuss the various methods of speed control of DC shunt motor.

The armature of a four-pole DC machine has 100 turns and runs at 600 RPM. The EMF generated in open circuit is 220 V. Find the useful flux per pole when armature is

- lap connected
 - wave connected.
- (c) Draw the general layout of an electrical power system and explain briefly.

What is the significance of turn ratio in transformer? The maximum efficiency of a 100kVA transformer is 98.40% and operates at 90% full load unity power factor. Calculate the efficiency of a transformer at unity power factor at full load.

- (d) What are the different torques required in an indicating type instruments? Draw and explain the working of attraction type moving iron instrument.

Section—C

Note: All questions are compulsory. All questions carry equal marks. (10×5=50)

3. Attempt any **two** parts of the following. All parts carry equal marks.

- (a) Find the voltage drop across R_1 and R_2 (see Figure 1). The resistance R_3 is not specified.

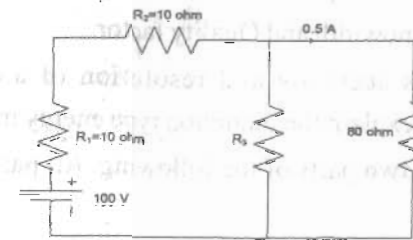


Figure 1

- What is meant by the time constant of a first-order linear circuit? Also derive the sinusoidal response of series RL circuit.
- Derive the relation between line voltage and phase voltage in three-phase star circuit. Also derive the expression for power.

4. Attempt any **two** parts of the following. All parts carry equal marks.

- (a) By means of superposition theorem find the current which flows through R_2 in the circuit of Figure 2.

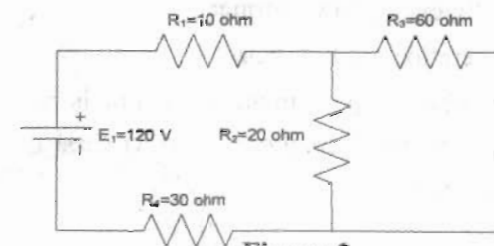


Figure 2