

## ELEMENTS OF ELECTRICAL ENGINEERING

COA-104/COB-204(Old Code) EE 1109 (New Code)

(L:3 & T:1)

*No. of questions to be set: 8 (Four from each unit)*

*No. of questions to be answered: 5 (Minimum of two questions from each unit)*

### UNIT-I

**DC CIRCUITS:** Review of Linear, Lumped, Finite, Passive, Bi-lateral Circuit Elements, Voltage sources, Current sources, Source transformation, Mesh Current and Node Voltage analysis of DC Circuits, Network Reduction Technique: Star-Delta and Delta-Star transformation.

**MAGNETIC CIRCUITS:** MMF, Magnetic flux, Reluctance, Flux density, Analogy with electric circuits, Analysis of magnetic circuits, Self and Mutual Inductances, Expression of self and mutual induced emfs.

**SINGLE PHASE AC CIRCUITS:** Representation of sinusoidal voltages and currents, rms value and average value, j-operator, Phasors, Voltages and Currents relationship and instantaneous and average power in a pure resistor, pure inductor and pure capacitor, Impedance, Admittance, Analysis of circuits, Complex power, active and reactive powers, Power Triangle, Power factor, Power factor Improvement.

### UNIT - II

**THREE PHASE AC CIRCUITS:** Symmetrical sinusoidal supply systems, voltage, current and power relationship in 3-phase balanced star and delta connected loads, Analysis of three phase balanced star and delta connected loads, Measurements of power in a single and three phase balanced loads, Two wattmeter method of measurement of power.

**TRANSFORMERS:** Construction, working principle, Emf equation, Transformer on no-load, Phasor diagrams on no-load and full-load, Auto-transformer: working principle.

**THREE PHASE INDUCTION MOTOR:** Revolving field, principle of operation, slip, rotor induced emf, rotor frequency, rotor reactance, expression of torque developed from rotor input and torque-slip characteristic.

**POWER SYSTEM:** Scheme of Power System from generation, transmission & distribution, internal wiring of buildings, earthing.

#### Textbooks:

- (a) Basic Electrical Engineering: M S Naidu & S Kamakshiah: TataMcGraw Hill Publications
- (b) Basic Electrical Engineering: T K Nagasarkar and M S Sukhija: Oxford University Press
- (c) Electrical & Electronics Technolgy: Hughes: Pearson Publications

#### References:

- (a) Theory and Problems of Basic Electrical Engineering: D P Kothari & I J Nagrath:  
Prentice Hall Publication
- (b) Principles of Electrical Engineering: V K Mehta: S Chand Publications