

**INDEX****UNIT I****Chapter 1 : Basics of Protection****1-1 to 1-32**

Syllabus : Necessity, functions of protective system. Normal and Abnormal Conditions. Types of faults and their causes. Protection zones and backup protection. Short circuit fault calculations in lines fed by generators through transformers. Need of current limiting reactors and their arrangements.

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UNIT III

Chapter 3 : Protective Relays

3-1 to 3-38

Syllabus : Fundamental quality requirements : Selectivity, Speed, Sensitivity, Reliability, Simplicity, Economy. Basic relay terminology – Protective relay, Relay time, Pick up, Reset current, current setting, Plug setting, multiplier, Time setting multiplier. Protective relays : Electromagnetic disc relay operation, Thermal relay. Block diagram and working of Static relay, over voltage relay. Over current relay – Time current characteristics. Microprocessor based protection relays : Block diagram, working and protection features. Distance relaying – Principle, Directional relay : Need and operation with block diagram. Operation of current and voltage differential relay.

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UNIT IV

Chapter 4 : Protection of Alternator and Transformer

4-1 to 4-48

Syllabus : Alternator Protection : Faults, Differential protection : over current, earth fault, overheating and field failure protection. Reverse power protection. **Transformer Protection:** Faults, Differential, over current, earth fault, over heating protection. Limitations of differential protection. Buchholz relay: Construction, operation, merits and demerits. Introduction to Microprocessor based transformer protection.

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UNIT V

Chapter 5 : Protection of Motors, Bus-bars and Transmission Line 5-1 to 5-30

Syllabus : Motor : Faults, Short Circuit Protection, Overload Protection, Single Phase Preventer, **Bus-bar and Transmission Lines,** Faults on Bus-bar and Transmission Lines. Bus bar Protection : Differential and Fault Bus Protection. Transmission Line : Over current, Distance and Pilot wire Protection.



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UNIT VI

Chapter 6 : Overvoltage Protection 6-1 to 6-48

Syllabus : Causes of over voltages. Lightning phenomena, over voltage due to lightning, typical waveform of lightning surge. Protection of transmission line & substation from direct stroke. Types of lightning arresters - Rod gap, Horn gap, Expulsion and Thyrite type, their construction & principle of operation. Surge absorber - Definition & working with neat diagram. Protection against traveling waves. Necessity of Insulation co-ordination.

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