

CURRICULUM FOR "ENERGY CONVERSION" (IAS : 405)

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MODULE # 1

1. ENERGY BALANCE
2. LOSSES AND EFFICIENCY
3. CONSIDERATIONS GOVERNING MACHINE APPLICATIONS
4. ROLE OF ELECTRIC MACHINES IN GENERATION, TRANSMISSION AND DISTRIBUTION OF POWER
5. A.C. WINDINGS.
6. EMF EQUATIONS OF A.C. MACHINES
7. M.M.F OF A.C WINDINGS.
8. REVERSAL OF DIRECTION OF ROTATING FIELDS
9. TORQUE IN ROUND ROTOR MACHINES

MODULE # 2

1. 3 PHASE TO 2 PHASE CONVERSION & VICE VERSA
2. 3 PHASE TO 6 PHASE CONVERSION.
3. VOLT-AMPERE RELATIONS
4. THYRISTORS
5. HEAT SINKS AND MOUNTING
6. RELAXATION OSCILLATOR USING UJT
7. SCR TRIGGERING CIRCUITS UNIJUNCTION TRANSISTORS
8. COMMUTATION OF SCR (FORCED AS WELL AS NATURAL)
9. COMPARISON BETWEEN TRANSISTORS & THYRISTORS
10. AC-DC CONVERTERS.

MODULE #3

1. INVERTERS
2. COMMUTATION OF SINGLE PHASE BRIDGE INVERTER CIRCUITS
3. Mc MURRAY FULL BRIDGE INVERTER
4. VOLTAGE AND FREQUENCY CONTROL
5. WAVEFORM CONTROL (HARMONIC REDUCTIONS)
6. CHOPPERS (C HOPPERS) & ITS PRINCIPLES
7. CONSTANT & VARIABLE FREQUENCY SYSTEMS
8. PRINCIPLES OF INTEGRAL CYCLE CONTROL
9. INDUSTRIAL APPLICATIONS OF AC REGULATORS
10. STARTERS (FOR AC/DC MOTORS)

MODULE #4

1. AC/DC MOTOR DRIVES
2. CLASSIFICATION.
3. ELECTRIC BRAKING
4. THYRISTOR CONTROL OF DC SERIES MOTOR
5. SYNCHRONOUS MOTOR DRIVES
6. TIME RESPONSE ANALYSIS & STABILITY ANALYSIS
7. STEADY STATE ERROR FOR DIFFERENT TYPES OF SYSTEMS
8. FREQUENCY DOMAIN ANALYSIS
9. MAPPING OF CLOSE CONTOUR & PRINCIPLES OF ARGUMENT.
10. NYQUIST PATH.

MODULE #5

1. ANALYSIS OF STABILITY BY LYAPUNOV'S THEORY
2. LYAPUNOV'S STABILITY THEOREM
2. SYLVESTER'S THEOREM

4. FREQUENCY RESPONSE ANALYSIS OF A PROCESS
5. MINIMUM PHASE & NON MINIMUM PHASE SYSTEMS
6. CORRELATION B/W TIME & FREQUENCY RESPONSE
7. RELATIVE AND ABSOLUTE STABILITY
8. ELEMENTS OF INDUSTRIAL AUTOMATIC CONTROLLER
9. P-I-D CONTROL ACTION, WITH RESPONSE
10. EFFECT OF CONTROLLERS ON SYSTEM PERFORMANCE
11. INTEGRAL & DERIVATIVE CONTROL ACTION.

MODULE # 6:

1. PROCESSES: TRANSFER FUNCTIONS & MODELLING
2. COMPLEX CONTROL SCHEMES (RATIO CONTROL SYSTEMS)
3. SPLIT RANGE CONTROL
4. SELECTOR CONTROL & INVERSE DERIVATIVE CONTROL
5. ANTI RESET CONTROL
6. MULTI VARIABLE CONTROL SYSTEMS
7. CONNECTING ELEMENTS & COMMON CONTROL LOOPS

APPLICATION: BELT CONVEYOR CONTROL

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