

**ANNEXURE IV (a)**  
**SYLLABUS FOR PLANT ENGINEERING**

**THE THEORETICAL SECTION OF THE SUBJECT PLANT ENGINEERING TO BE COVERED BY UNIVERSITIES AND TECHNIKONS**

Questions will be framed on all aspects of the theory and the practical application of such theory in its widest sense as would be expected of a certificated engineer while performing his normal duties. Emphasis is placed on his competency in the execution, control and supervision of the safe installation, maintenance and operation of machinery.

**SYLLABUS FOR PLANT ENGINEERING**

**Mechanical Students**

**Electrical Students**

<b>SAFETY AND MANAGEMENT</b>	
Accident prevention	Accident prevention
Fire protection	Fire protection
Risk control	Risk control
Project management	Project management
Financial management	Financial management
Loss control	Loss control
<b>ELECTRICAL TECHNOLOGY</b>	
Direct current machines	Direct current machines
Direct current generators	Direct current generators
Direct current motors	Direct current motors
Efficiency of d. c. machines	Efficiency of d. c. machines
Alternating voltage and current	Alternating voltage and current
Single and three phase circuits	Single and three phase circuits
Transformers	Transformers
	Alternator windings
Production of a rotating magnetic field	Production of a rotating magnetic field
Characteristics of synchronous generators and motors	Characteristics of synchronous generators and motors
Three phase induction motors	Three phase induction motors
Semi-conductor devices	Semi-conductor devices
Electric lamps and illumination	Electric lamps and illumination
Electric power transmission and distribution	Electric power transmission and distribution
Short circuit conditions	Short circuit conditions
Circuit breakers	Circuit breakers
Underground cables	Underground cables
Insulators	Insulators
Overhead lines	Overhead lines
Economics of power supply	Economics of power supply
Maximum demand	Maximum demand
Power factor correction	Power factor correction
	High frequency transients
	Method of earthing Protection
	Rectification
	Storage of energy

Fault discrimination (basics) (Symmetrical faults only)	Fault discrimination
	Communication
Explosion proof equipment	Explosion proof equipment
Lightning protection	Lightning protection
	Basics of data transmission
<b>3. APPLIED THERMODYNAMICS</b>	
Air- and gas compressors and blowers	Air- and gas compressors and blowers (rotary compressors only)
Air motor (applications)	
Compressed air columns	Compressed air columns
Compressed air receivers	
Refrigeration and properties of refrigerants	Refrigeration and properties of refrigerants
Psychometry	
Steam generators (boilers & ancillary equipment)	Steam generators (boilers & Ancillary equipment)
Properties of steam	Properties of steam
Heat balance	
Condensers	
Steam and gas turbines	
Fans	Fans (classification)
Internal combustion engines	Internal combustion engines
Fuels and combustion	
<b>4. STRUCTURES AND STRENGTH OF MATERIALS</b>	
Simple stresses	Simple stresses
Simple stresses and Strain	Simple stresses and Strain
Thin-walled pressure vessels	Thin-walled pressure vessels
Torsion of circular shafts	Torsion of circular shafts
Close coiled helical springs	
Shear force and bending moments	Shear force and bending moments
Temperature stresses	Temperature stresses
Stain energy due to direct stresses	
Second moment of area	Second moment of area
Bending stresses	Bending stresses
Shear stresses in beams	
Struts and buckling	
Catenaries	Catenaries
Foundations	
Fatigue failure	
Mechanical and chemical properties of metals	Mechanical and chemical properties of metals
Testing of materials	Testing of materials
Twisting of shafts	
Ropes	Ropes
Properties of different types of ropes	
Reinforced concrete	
Retaining walls	
Fastening	Fastening

<b>5. THEORY OF MACHINES</b>	
Conveyors	Conveyors
Winding plant	Winding plant
Lifts and Elevators	Lifts and Elevators
Traction	Traction
Motion and inertia	Motion and inertia
Displacement, velocity and acceleration	Displacement, velocity and acceleration
Static and dynamic balancing	Static and dynamic balancing
Belt and chain drives	Belt and chain drives
Brakes and dynamometers	Brakes and dynamometers
Toothed gearing Gear trains	
Lubrication	Lubrication
Clutches	Clutches
Knowledge of machine tools	Knowledge of machine tools
Cranes	Cranes
Lifting equipment	Lifting equipment
Bearings	Bearings
Vibrations	Vibrations
<b>6. FLUID MECHANICS</b>	
Hydrostatic transmission	Hydrostatic transmission
Pumps	Pumps
Flow-through pipe-lines	Flow-through pipe-lines
Friction losses	Friction losses
Characteristics curves (pumps and systems)	Characteristics curves (pumps and systems)
Material transmission by pipe lines	Material transmission by pipe lines
Measurement of flow rates	Measurement of flow rates
Orifices	Orifices
Pelton wheel	Pelton wheel
Flow in launders	
Hydraulic machines, circuits and components	
<b>7. ENVIRONMENTAL</b>	
Characteristics of airflow and measurement	Characteristics of airflow and measurement
Properties and effects of dust (health)	Properties and effects of dust (health)
Water purification	Water purification
Waste disposal	Waste disposal
Pollution	Pollution
Noise	Noise
Illumination	Illumination