# Annexure “A”

**SYLLABUS FOR WRITTEN TEST**

#### Marks :-150 Time :- 2.30 Hours

1. **Theory of Machines and Machine Design: 20 Marks** Four bar linkage and link motion, Flywheels and fluctuation of energy, Power transmission by belts-V-belts and Flat belts. Gears-Type of gears, gear profile and gear ratio calculation. Cams. Governors-Principles and classification. Design of keys, shafts, Riveted joint, couplings.
2. **Engineering Mechanics and Strength of Materials: 20 Marks** Laws of forces, Equilibrium of Forces, Moment of Inertia, Laws of motion. Friction.Concept of simple machines, M A, V R, %age. Concepts of stress and strain, Elastic limit and elastic constants. Bending moments and shear force diagram.Stress in composite bars. Torsion in circular shafts.Columns:Euler’s and Rankine’s theories. Thin walled pressure vessels.
3. **Thermal Engineering and Refrigeration & Air-conditioning:**

**25 Marks** Thermodynamics: Heat, work and temperature, First and second laws of thermodynamics. Carnot, Rankine, Otto and Diesel Cycles. P-v & P-T diagrams H2O. Saturated, wet & superheated steam. Definition of dryness fraction of steam, degree of superheat of steam. Rankine cycle of steam: Simple Rankine cycle, plot on P-V, T-S, h-s planes, Rankine cycle efficiency with & without pump work.

Concept of COP, Carnot Cycle, Vapour compression cycle. Refrigerants. Psychometry,DBT, WBT, DPT.

### Fluid Mechanics & Machinery: 20 Marks

Properties & Classification of Fluids, Newton’s law of viscosity, Fluid Statics,

Measurement of Fluid Pressure by Manometers, U-tube, Inclined tube. Fluid Kinematics : Stream line, laminar & turbulent flow, external & internal flow, continuity equation. Dynamics of ideal fluids : Bernoulli’s equation, Total head; Velocity head; Pressure head.

Measurement of Flow rate, Basic Principles & working of Venturimeter, Pitot tube, Orifice meter. Hydraulic Turbines & Centrifugal Pumps

1. **Material Science & Production Engineering: 25 Marks** Structure of metals, Space lattice, Unit cell, BCC, FCC etc, Iron carbon diagram, Classification of Steels : mild steel & alloy steel. Heat treatment of steel.

Welding – Arc Welding, Gas Welding, Resistance Welding, Special Welding Techniques i.e. TIG, MIG. Brazing & Soldering, Welding Defects & Testing. Foundry & Casting methods, defects, different casting processes. Forging, Extrusion etc. Metal cutting principles, cutting tools. Basic Principles of machining with Lathe, Milling,Drilling,Shaping, Grinding.Machine tools & manufacturing processes.

1. **Metrology and Automobile Engineering: 20 Marks** Tools used in Linear Measurements, Angular Measurement, Surface finish. Limits, fits & Tolerance, Error,

Classification of Automobiles. Transmission, Steering, Braking, Suspension system. IC Engine Performance, IC Engine Combustion process ,Cooling and Lubrication system in I.C Engine

1. **Industrial Management and CAD/CAM: 20 Marks** Planning, Organizing, Leading, Controlling. Inventory Control, Inspection & Quality Control.

Basic concepts of CAD/CAM. NC, DNC, CNC machines.