

**ANNEXURE “B”**  
**Jammu & Kashmir Services Selection Board**  
**Posts: Jr. Engineer (Mechanical)/Draftsman Mechanical**  
**Multiple Choice Based Written test**  
**Reference Guidelines and Syllabus**  
**120 Marks/120 Minutes**

- 1. Theory of Machines and Machine Design: 15 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: 15 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: 20 Marks**  
Thermodynamics: Heat, work and temperature, First and second laws of thermodynamics. Carnot, Rankine, Otto and Diesel Cycles. P-v & P-T diagrams H<sub>2</sub>O. 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.
- 4. Fluid Mechanics & Machinery: 15 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
- 5. Material Science & Production Engineering: 20 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.

- 6. Metrology and Automobile Engineering: 15 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
- 7. 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.

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