

DRAFT CURRICULUM OF KPSC DIPLOMA LECTURER'S RECRUITMENT EXAMINATION

WELDING AND SHEET METAL TECHNOLOGY

- **Strength of Materials:** Stress and strain, stress-strain relationship and elastic constants, Mohr's circle for plane stress and plane strain, shear force and bending moment diagrams, bending and shear stresses, deflection of beams, torsion of circular shafts, Euler's theory of columns, strain energy methods, thermal stresses, thick cylinders and thin cylinders.
- **Theory of Machines:** Basics KOM, friction, power transmission, mechanical vibrations, gear trains, flywheels, cams, balancing of rotating masses and governors.
- **Thermodynamics:** Zeroth, First and Second laws of thermodynamics; thermodynamic system and processes, Carnot cycle, irreversibility and availability, behaviour of ideal and real gases, properties of pure substances, calculation of work and heat in ideal processes, analysis of thermodynamic cycles related to energy conversion.
- **Fluid Mechanics:** Fluid properties, fluid statics, manometer, buoyancy, control-volume analysis of mass, momentum and energy, fluid acceleration, differential equations of continuity and momentum, Bernoulli's equation, viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends etc. Turbo machinery- Pelton-wheel, Francis and Kaplan turbines - impulse and reaction principles and velocity diagrams.
- **Heat-Transfer:** Modes of heat transfer, one dimensional heat conduction, resistance concept, electrical analogy, unsteady heat conduction, fins, dimensionless parameters in free and forced convective heat transfer, various correlations for heat transfer in flow over flat plates and through pipes, thermal boundary layer, effect of turbulence, radiative heat transfer, black and grey surfaces, Boiling and condensation, mass transfer, heat pipes, heat exchanger performance, LMTD and NTU methods.
- **Metrology and Inspection:** Standards, Limits, fits and tolerances, linear and angular measurements, comparators, gauge design, interferometry, form and finish measurement, alignment and testing methods, tolerance analysis in manufacturing and assembly.
- **Manufacturing:** Casting, Design of patterns, moulds and cores, solidification and cooling; riser and gating design, design considerations, lathe, drilling machines, milling machines, shaper, planner, grinding, hot working, cold working, NC, CNC, CAD, CAM, Robotics, EDM, USM, AJM, EBM and LBM.
- **Refrigeration and Air-conditioning:** Vapour compression and absorption refrigeration cycle,

refrigeration machines, refrigerants and lubrication, condensers, evaporators, heat pumps, gas refrigeration, Reverse Brayton cycle; moist air: psychrometric chart, basic psychrometric processes. Air conditioning system ó Blowers, Exhaustors, Ducts, Grills, resistors, filters and air conditioning plants.

- **Welding Processes:** Arc welding, gas welding, shielded metal arc welding, submerged arc welding, spot welding process, gas tungsten arc welding, gas metal arc welding, electro slag welding and electro gas welding, resistance welding, soldering, brazing and adhesive bonding, solid state welding process, friction welding, explosive welding, cold pressure welding, plasma arc welding, electron beam welding, laser beam welding and robotic welding.
- **Press Tool Technology & Metal Finishing:** Fly press, power press, hydraulic press, friction screw press, punching press, bending press and press brake, forming press, drawing operation, progressive die, compound die, combination die, clearance in press tool, angular clearance, punch clearance, die clearance and press tonnage. Sheet metal tools, machineries and forming operations ó bending , flanging, seaming, curling , wiring , staking , crippling , bulging, beading, enclosing, tube forming, chipping, box drawing, panel drawing, shallow, deep drawing, electroplating processes, vat, sand blasting, shot blasting, grinding, polishing and barrel cleaning.