KPSC DRAFT SYLLABUS FOR WRITTEN EXAMINATION FOR THE RECRUITMENT OF LECTURERS IN

MACHINE TOOL TECHNOLOGY

MACHINE TOOL DESIGN.

GENERAL REQUIREMENT OF MACHINE TOOL DESIGN, ENGINEERING DESIGN PROCESS APPLIED TO MACHINE TOOL, **DESIGN OF MACHINE TOOL STRUCTURE,** BED, BASE, COLUMN, HOUSING, MODEL TECHNIQUES,CROSS-RAIL, REQUIREMENT, POWER CAPACITY, MATERIALS AND PROPERTY, PROFILES OF MACHINE TOOLS STRUCTURE, BASIC DESIGN PROCEDURE OF MACHINE TOOL STRUCTURE, **DESIGN OF SPINDLES:** FUNCTIONS, REQUIREMENT, MATERIALS.**DESIGN OF MACHINE TOOL GUIDEWAYS:** FUNCTIONS, REQUIREMENT, TYPES OF SLIDEWAYS, PLASTIC SLIDEWAYS, AEROSTATIC SLIDEWAYS.POSITIVE FEATURES OF AN AEROSTATIC SLIDEWAYS.

PRESS TOOL ENGINEERING.

DESIGN OF PUNCHES AND DIES.CLASSIFICATION BASED ON OPERATION, CLASSIFICATION BASED ON CONSTRUCTION,GENERAL PRESS INFORMATION, FACTORS CONSIDERED FOR SELECTION OF PRESS,PUNCH CHARACTERISTICS, DESIGN OF DRAWING DIES, FACTORS AFFECTING DRAWING, DESIGN PROCEDURE FOR DRAWING DIE, DIE ACCESSORIES,TYPES OF BENDING DIES, BENDING ALLOWANCE, SPRING BACK, FORMING DIES AND TYPES, JIGS AND FIXTURES, LOCATION.

MANUFACTURING TECHNOLOGY:-

GEAR GENERATING 1)GEAR SHAPING, 2)GEAR HOBBING, 3)GEARFINISHING

4) GEAR SHAVING, 5)GEAR GRINDING. COPYING MACHINE, UN-CONVENTIONAL MACHINING METHODS, **CASTING PROCESS:** PATTERNS, MOULDINGS-TYPES, HOT AND COLD WORKING. **WELDING:** DIFFERENT TYPES OF WELDING A)ARC WELDING, 2)GAS WELDING, 3)ELECTRIC RESISTANCE WELDING, LEAN AND AGILE MANUFACTURING. **LATHE:-** DESCRIPTION AND OPERATION, **MILLING MACHINE:-** DESCRIPTION AND OPERATION. NC, CNC, DNC, ROBOTICS, CIM, FMS, CAD/CAM. **CUTTING TOOL MATERIALS**, PLASTIC TOOLING, COMPOSITE MATERIALS, NANO MATERIALS, CUTTING TOOL NOMENCLATURE [SINGLE POINT], MILLING CUTTERS [MATERIALS & CUTTING ANGLES].

MECHANICAL MEASUREMENT.

DEFINITION:- ACCURACY, PRECISION, READABILITY, REPEATABILITY, TYPES OF ERRORS, **COMPARATORS**:- 1)MECHANICAL, 2) PNEUMATIC, 3) OPTICAL, SCREW THREAD AND GEAR TERMINOLOGY, LIMITS, FITS, TOLERANCES. INTERCHANGEABILITY, HOLE BASIS AND SHAFT BASIS SYSTEM, SLIP GAUGES, ANGLE GAUGES, ANGLE &LINEAR MEASUREMENTS TRANSDUSERS, TEMPERATURE MEASURING SYSTEM.

MAINTENANCE AND MEMS:-

MAINTENANCE TYPES a)BREAKDOWN b)CORRECTIVE c)ROUTINE d)PREVENTIVE, **CONDITION MONITORING** a)TEMPERATURE b)LEAKAGE c)VIBRATION d)CORROSION, STEPS FOR JOB PLANNING a)LONG TERM b)SHORT TERM PLANNING, APPROACH TOWARDS COMPUTERISATION WITH RESPECT TO MAINTENENCE, MACHINE TOOL FOUNDATION ,TYPES OF AUTOMATION, MICRO ELECTRO MECHAN ICAL SYSTEMS (MEMS), DIFFERENCE B/W MICROELECTRONICS AND MICROSYSTEM,,MICRO-ACTUATION AND MICRO-MANUFACTURING.

HYDRAULICS AND PNEUMATICS:-

PROPERTIES OF FLUIDS, TYPES OF FLUIDS, SURFACE TENSION, CAPILARITY, VAPOUR PRESSURE, CAVITATION,LAMINAR AND TURBULENT FLOW, STUDY AND UNSTUDY FLOW, PASCALõS LAW **PUMPS** 1)EXTERNAL AND INTERNAL GEAR PUMP, HYDRAULIC MOTOR 1) VANE MOTOR , 2) PISTON MOTOR, **ACTUATORS:-** DIFFERENT TYPES OF ACTUATORS, SEALS AND PACKINGS, PNEUMATIC DC VALVES, PRESSURE CONTROL VALVES, FLOW CONTROL VALVE, ACCUMULATORS, SINGLE AND DOUBLE ACTING CYCLINDER, HYRAULICS CIRCUITS FOR MACHINE TOOLS, SENSORS, SWITCHES AND RELAYS.

STRENGTH OF MATERIALS:-

CENTRE OF GRAVITY, MOMENT OF INERTIA, STRESS AND STRAIN, STRESS-STRAIN RELATIONSHIP AND ELASTIC CONSTANTS, PRINCIPAL SRTRESSES AND STRAINS, MOHRõS CONSTRUCTION, UNIAXIAL LOADING, THERMAL STRESSES. BEAMS:BENDING MOMENT AND SHEAR FORCE DIAGRAM, BENDING STRESSES AND DEFLECTION OF BEAMS. SHEAR STREE DISTRIBUTION. TORSION OF SHAFTS, STRAIN ENERGY CONCEPTS AND THEORIES OF FAILURE.

THEORY OF MACHINES:-

DISPLACEMENT, VELOCITY AND ACCELERATION ANALYSIS OF PLANE MECHANISMS; DYNAMIC ANALYSIS OF SLIDER-CRANK MECHANISM, CAMS. TRANSMISSION OF POWER, FRICTION, FLYWHEELS, GOVERNORS. BALANCING OF MASSES, FREE AND FORCED VIBRATION OF SINGLE DEGREE AND MULTI DEGREES OF FREEDOM SYSTEMS; EFFECT OF DAMPING; CRITICAL SPEED OF SHAFTS.

THERMO DYNAMICS:-

BASICS OF THERMODYNAMICS SYSTEM, BOUNDARY, SURROUNDING, OPEN SYSTEM, CLOSED SYSTEM, ISOLATED SYSTEM, HEAT, DENSITY, POWER, ENERGY, STP, NTP, SPECIFIC HEAT, SPECIFIC VOLUME, INTERNAL ENERGY, ENTHALPY, ENTROPY, **LAWS:** ZEROTH, FIRST, SECOND. PROPERTIES OF STEAM, TWO AND FOUR STROKE PETROL AND DIESEL ENGINES, IHP, BHP, FHP MECHANICAL EFFICIENCY, SIMPLE CARBURATOR, **REFRIGERATOR** PRINCIPLES AND C.O.P WORKING OF VAPOUR COMPRESSON AND VAPOUR ABSORPTION CYCLE, PROPERTIES.

INDUSTRIAL ENGINEERING AND MANAGEMENT:-

PRODUCTION PLANNING; MASTER PRODUCTION SCHEDULING; ROUTING, SCHEDULING AND PRIORITY DISPATCHING MRP, PUSH AND PULL PRODUCTION SYSTEMS, CONCEPTS OF JIT MANUFACTURINGF SYSTEM; LOGISTICS, DISTRIBUTION, AND SUPPLY CHAIN MANAGEMENT; INVENTORY CONTROL. QUALITY-CONCEPT AND COSTS, QUALITY CIRCLES, QUALITY ASSURANCE; STASTISTICAL QUALITY CONTROL, ACCEPTANCE SAMPLING, ZERO DEFECTS, SIX SIGMA, TOTAL QUALITY MANAGEMENT; ISO 9000; DESIGN OF EXPERIMENTS-TAGUCHI METHOD.