

SYLLABUS FOR ENTRANCE EXAMINATION & MODEL QUESTION PAPER - 2021

Common Entrance Examination for All Postgraduate Programmes (GATE Pattern)

#	Examination Topic	Duration
1	Computer Enabled Examination (120 Objective Questions)	2 Hours

SYLLABUS

ENGINEERING MATERIALS :

Structural and mechanical properties of common engineering / metals, alloys, plastics and ceramics. Heat treatment of steels.

FOUNDRY :

Patterns, pattern allowances, moulding and core making, gating and risering calculations, Casting processes; sand, die, centrifugal, investment and shell mould casting. Defects in castings.

WELDING :

Gas, arc and resistance welding. Tungsten inert gas (TIG), metal inert gas (MIG) and atomic hydrogen welding; Power sources of welding, Brazing, Soldering and adhesive bonding.

METAL WORKING :

Basic plasticity for metal forming. Hot and Cold working, Forming processes; blanking, piercing and deep drawing. Technology of wire drawing, rolling and forging processes, Force and power calculations. Elements of powder metallurgy.

MACHINE TOOLS :

Construction, operation, kinematics and applications. Automatic and semiautomatic machine tools, indexing attachments. Jigs and fixtures, Elements of N/C machine tools.

MACHINING PROCESSES :

Turning, drilling, shaping, planing, boring, reaming, milling, grinding and finishing processes. Production of Screw threads. Gear manufacturing processes; hobbing and shaping. Introduction to unconventional machining processes like EDM, ECM, USM, Laser machining etc.

LIMITS, FITS AND TOLERANCES :

Fundamental deviation, basic size, hole basis and shaft basis system, recommend fits for assembly.

INDUSTRIAL ENGINEERING :

Plant layout and material handling. Work study. Economic analysis; break-even

analysis, present value criterion. Forecasting. Elements of production planning and control; machine loading, sequencing and inventory control. Statistical quality control. Elements of linear programming and PERT / CPM in production system.

STRENGTH OF MATERIALS :

Stress, Strain, Biaxial and triaxial stresses. Stress-strain relationship for elastic bodies. Mohr's circle. Theories of failure. Calculations of stresses, slope of deflection. Torsion of cylindrical shafts. Energy methods. Thin and thick cylinders. Stability of columns.

THEORY OF MACHINES :

Constrained motion. Plane mechanisms; Velocity and acceleration diagrams. Coriolis component of acceleration. Instantaneous centre. Flywheels and their applications. Balancing of reciprocating and rotating masses. Planar cams and followers. Involute tooth geometry. Types of gears. Gear trains with fixed axes and planetary configuration, differential. Natural and forced vibration with and without damping for systems with single degree of freedom. Transmissibility and isolation of vibration. Transverse vibrations of beams and shafts, Critical speed. Multi rotor torsional vibratory systems. Principle of gyroscope.

MACHINE DESIGN :

Material and manufacturing considerations. Design of elements subjected to static and variable stresses. Factor of safety. Stress concentration. Design of flanged joints and seals, shafts and keys, helical springs, rigid and flexible. couplings, universal (Hooke's) joints, Oldham coupling, Clutches and brakes, belt, chain and rope drives. Hydrodynamic lubrication. Rolling element bearings. Power screws. Design calculations of spur and helical gears. Indian Standards and specifications.

STATICS :

Simple applications of equilibrium equations.

DYNAMICS :

Simple applications of equations of motion. Simple harmonic motion. Work, energy, power.

PRODUCTION MANAGEMENT :

Method and time study, motion economy and work space design, operation and flow process charts. Product design and cost selection manufacturing process. Break-even analysis, Site selection. Plant layout. Materials handling, Selection of equipment for job shop and mass production, Scheduling, despatching, routing.

METROLOGY :

Measurements, linear angular comparators, measuring instruments.

ENGINEERING DRAWING :

First angle and third angle projections, Sections of solids, Missing lines, views, representation of screw threads, Ability to visualize in three dimensions and represent them in isometric / orthogonal / perspective views.

Standard textbooks that are used in the graduate programmes will be sufficient to prepare for the entrance examination.

MODEL QUESTION PAPER

Choose the most applicable answer :

1. Silicon steel is used in
 - a) Cutting tools
 - b) Dies and punches
 - c) Electrical industry
 - d) Chemical industry.

2. A body which is free in space has _____ degrees of freedom
 - a) Two
 - b) Three
 - c) Six
 - d) Zero.

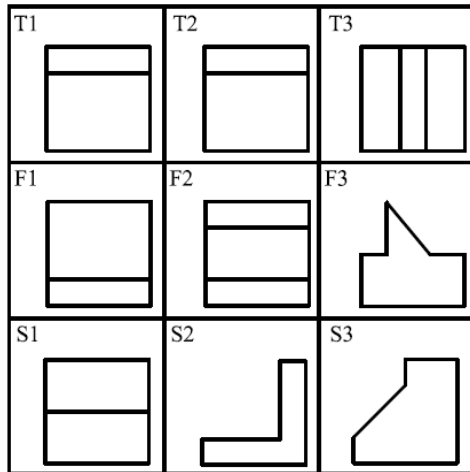
3. Upsetting or cold heading is a
 - a) Rolling process
 - b) Extruding process
 - c) Bending process
 - d) Forging process.

4. Investment casting uses a pattern made of
 - a) Wax
 - b) Clay
 - c) Metal
 - d) Wood.

5. Grinding wheel is balanced
 - a) At the time of manufacture
 - b) Before grinding
 - c) After grinding operation
 - d) Frequently.

6. If the pressure angle is large, the basic circles will be smaller resulting in
 - a) Smaller contact ratio
 - b) Greater contact ratio
 - c) Either smaller or greater contact ratio
 - d) None of the above.

7. The drawing given below does not match with top, front and side view. Select the correct one that matches properly from the table given below.



a)

T	T1	T2	T3
F	F2	F3	F1
S	S3	S2	S1

b)

T	T1	T3	T2
F	F1	F3	F2
S	S1	S3	S2

c)

T	T1	T2	T3
F	F1	F2	F3
S	S2	S3	S1

d)

T	T2	T3	T1
F	F1	F2	F3
S	S2	S3	S1