2nd Sem / Mechanical (Tool & die Design)

Subject : Mechanics of Solids

Time : 3 Hrs.   M.M. : 60

SECTION-A

Note: Multiple choice questions. All questions are compulsory   (6x1=6)

Q.1 A number of forces acting at a point will be in equilibrium if

a) Their total sum is zero

b) Two resolved parts in two directions at right angles are equal

c) Sum of resolved parts in any two perpendicular directions are both zero

d) All of them are inclined equally

Q.2 Scissor is an example of

a) Class-1 Lever   b) Class-2 Lever

c) Class-3 Lever   d) All of the above

Q.20 Explain the cone of friction.

Q.21 Describe second system of pulleys.

Q.22 Compare solid and hollow shaft with reference to strength.

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions.   (2x8=16)

Q.23 Explain the stress strain diagram with the points of a mild steel material.

Q.24 Find the MOI of lamina of an I-section which has

Top flange = 100 mm x 25 mm

Web or centre section = 100 x 25 mm

Bottom flange = 150mm x 25 mm

Q.25 Explain the working principle and application of wheel and axle.

Q.3 Units of Moment of Inertia of a lamina is

a) Mm⁴

b) Kg-m²

c) Mm³

d) None of the above

Q.4 Poisson's Ratio is

a) Lateral stress/axial stress

b) Axial stress /Lateral stress

c) Lateral strain / axial strain

d) Axial strain / Lateral strain

Q.5 Mechanical Advantage means

a) The job advantage taken by mechanical students

b) Load /Effort

c) Force/Area

d) Stress/strain

Q.6 The following have the same units

a) Stress and strain

b) Stress and young modulus of elasticity

c) Bulk modulus and young modulus

d) Both B and C

SECTION-B

Note: Objective/ Completion type questions. All questions are compulsory. (6x1=6)

Q.7 Static friction is_____ than dynamic friction.

Q.8 Units of moment are_____

Q.9 Define centre of gravity

Q.10 What is factor of safety?

Q.11 Torsion has minimum value at_____.

Q.12 In law of machine, the effort lost in friction is given by_____

SECTION-C

Note: Short answer type questions. Attempt any eight questions out of ten questions. (8x4=32)

Q.13 State and derive parallelogram law of forces.

Q.14 State and explain perpendicular axis theorem of moment of inertia.

Q.15 Explain the laws of solid friction.

Q.16 Describe the concept of mean and maximum torque.

Q.17 Explain the law of machine with a neat diagram.

Q.18 Write short note on thermal stress and strain.

Q.19 State the assumptions in bending theory.