

Q.20 Explain the various assumptions made during deriving the Bending Equation. (CO6)

Q.21 State and explain the Law of machine (CO7)

Q.22 Differentiate between Torque and Torsion (CO6)

### SECTION-D

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

Q.23 Derive the Torsion Equation,  $\frac{T}{J} = \frac{Gq}{L} = \frac{t}{R}$  (CO6)

Q.24 Explain simple wheel and axle with the help of neat sketch and derive an expression for its velocity ratio. (CO7)

Q.25 Find the moment of inertia of a T section of dimension 100 x 100 x 20 mm about the horizontal and vertical axis passing through the centre of gravity of the section. (CO4)

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### 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 Unit of Strain is

- a) MM<sup>3</sup>
- b) N/MM<sup>2</sup>
- c) No units
- d) MM<sup>2</sup>

Q.2 Force is measured by product of

- a) Mass and Velocity
- b) Mass and Acceleration
- c) Weight and Acceleration
- d) Momentum and Velocity

Q.3 When trying to turn a key into a lock, which of the following is applied:- (CO2)

- a) Coplaner forces
- b) Non- coplaner forces
- c) Moment
- d) Couple

(40)

(4)

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(1)

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Q.4 Which of the following is correct:- (CO3)

- a)  $F = mR$
- b)  $F = m^2 R$
- c)  $F = m/R$
- d)  $F = mR^3$

Q.5 The point through which the whole area of a plane figure may be assumed to act is known as (CO4)

- a) Centre of the pressure
- b) Centroid
- c) Mid point
- d) None of the above

Q.6 Input of a Machine is (CO7)

- a) Work done by the effort on the machine
- b) Load raised by the machine
- c) Effort applied on the machine
- d) None of the above

## SECTION-B

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

Q.7 Machines help in lifting heavy loads with \_\_\_\_\_ effort (CO7)

Q.8 S.I unit of Torque is \_\_\_\_\_ (CO6)

Q.9 The stresses induced in a body due to change in temperature is known as \_\_\_\_\_ (CO5)

Q.10 The total Strain Energy stored in a body is known as \_\_\_\_\_ (CO5)

Q.11 Centre of Gravity of a Triangle lies at \_\_\_\_\_ (CO4)

Q.12 A beam made up of two or more materials; joined together to act like a single piece is known as \_\_\_\_\_ (CO6)

## SECTION-C

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

Q.13 Draw the Stress Strain curve for a Mild Steel Specimen subjected to a tensile load and explain main points. (CO5)

Q.14 State Hook's law. (CO5)

Q.15 State Parallel Axis theorem (CO4)

Q.16 State Parallelogram law of forces (CO1)

Q.17 Find the magnitude and direction of the resultant force when two pulls of 50N and 30 N are acting at an angle of  $60^\circ$ . (CO1)

Q.18 Differentiate between like and unlike parallel forces. (CO2)

Q.19 State the laws of Dynamic Friction (CO3)