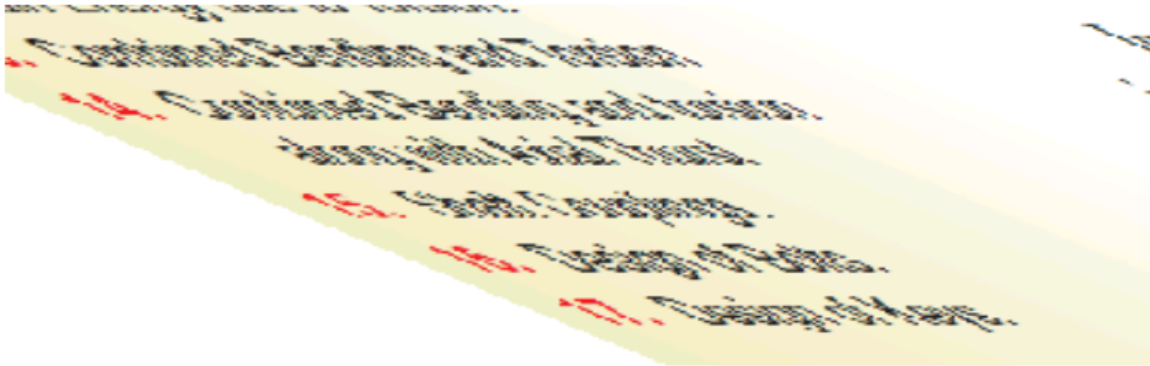




# 19MET204- STRENGTH OF MATERIALS

## UNIT III - TORSION AND SPRINGS

### Torsion Formulation stresses and Deformation in Circular and Hollow shafts





# Unit 1

## Unit 1: Introduction to the course

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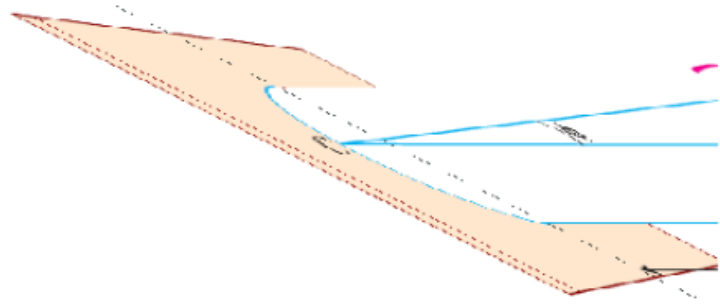
Unit 1: Introduction to the course

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## 11.7 Transient Processes and Oscillations



At the time  $t = 0$ , the water is at rest.

$C$  = Depth of water, just before the transient motion of the

water commences.

At the time  $t = 0$ , the water is at rest.

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At the time  $t = 0$ , the water is at rest.

$L$  = Length of the tank.

$H$  = Height of the tank.

$\rho$  = Density of water.

$C$  = Depth of water, just before the transient motion of the



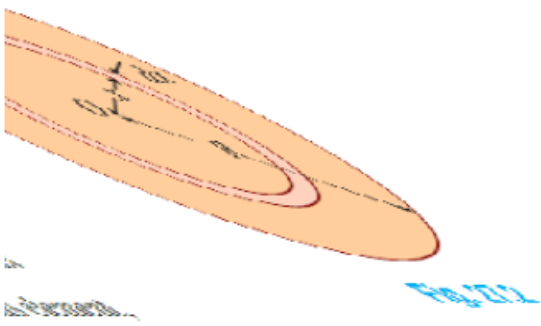
Consider a thin rod of length  $l$  and mass  $M$  pivoted at one end. The rod is released from a horizontal position. Find the angular velocity  $\omega$  and the linear velocity  $v$  of the free end at the instant the rod is vertical.

Ans:

Initial energy = Potential energy =  $Mgl$   
Final energy = Kinetic energy =  $\frac{1}{2} I \omega^2$   
By conservation of energy,  $Mgl = \frac{1}{2} I \omega^2$

Consider a thin rod of length  $l$  and mass  $M$  pivoted at one end. The rod is released from a horizontal position. Find the angular velocity  $\omega$  and the linear velocity  $v$  of the free end at the instant the rod is vertical.

$$I = \frac{1}{3} Ml^2$$
$$Mgl = \frac{1}{2} \left( \frac{1}{3} Ml^2 \right) \omega^2$$
$$\omega = \sqrt{\frac{6g}{l}}$$
$$v = \omega l = \sqrt{6gl}$$





1. The first part of the question is a multiple choice question. The correct answer is (b). The second part is a short answer question. The answer is that the function of the teacher is to provide a learning environment for the students to learn and grow.

2.

3. The first part of the question is a multiple choice question. The correct answer is (a). The second part is a short answer question. The answer is that the function of the teacher is to provide a learning environment for the students to learn and grow.

4.



## Q.8. Power Transmission by a Cable

The cable is suspended between two poles. The weight of the cable is  $w$  per unit length. The tension at the ends is  $T_1$  and  $T_2$ . The horizontal distance between the poles is  $l$ . The vertical distance between the poles is  $h$ . The cable is assumed to be parabolic.

$$T_1 = T_2 = T$$

$$T = \frac{w l^2}{8d}$$

$$d = \frac{w l^2}{8T}$$

$$d = \frac{w l^2}{8T}$$

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Let  $T =$  Power transmitted to the load, and  
 $l =$  Length of the cable.

We know that power transmitted to the load is,

$$P = \frac{V^2}{R}$$

$$P = \frac{V^2}{R} \times \frac{l}{l}$$

We also know that power

$$P = VI$$

$$\frac{V^2}{R} \times \frac{l}{l} = VI$$

$$\frac{V^2}{R} \times \frac{l}{l} = VI$$









