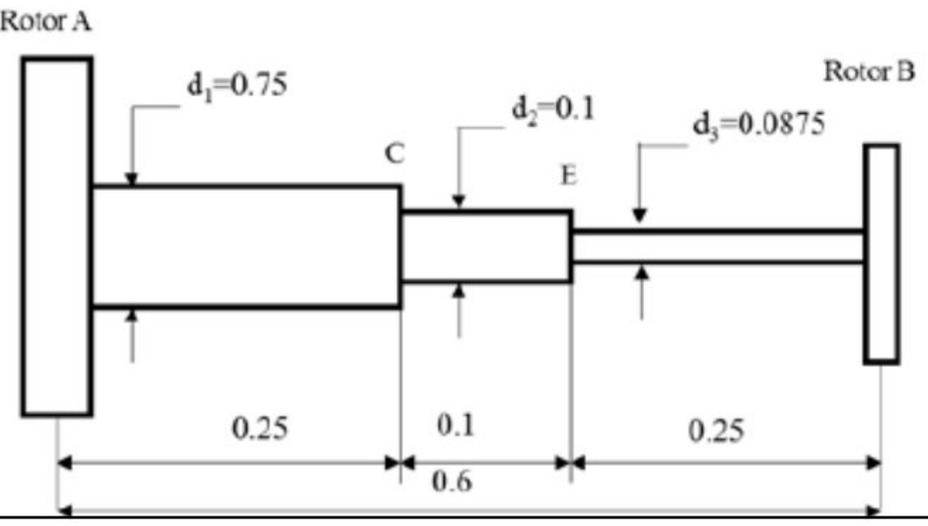
ASSIGNMENT NO 6 : Two Degrees of Freedom System

1.	**Give one Example** of two degree of freedom system.
2.	**Explain Torsionally Equivalent Shaft**.

Examples

1.	Two rotors A and B are attached to the end of a shaft 50 cm long. Weight of the rotor A is 300 N and its radius if gyration is 30 cm and the corresponding values of B are 500 N and 45 cm respectively. The shaft is 7 cm in diameter for the first 25 cm, 12 cm for the next 10 cm and 10 cm diameter for the remaining of its length. Modulus of rigidity for the shaft material is 8×10^{11} N/m^2. Find: (i) the position of the node (ii) the frequency of torsional vibration.

2.	Two identical rotors are attached to the two ends of a stepped shaft as shown in Figure. Each rotor weighs 450 Kg and has radius of gyration of 0.38 m. The diameters of the shaft are 0.75 m for first 0.25 m length, 0.1 m for next 0.1 m length and for the remaining length 0.0875 m is the diameter. The total length of the shaft is 0.6 m. Find the frequency of free torsional vibrations of the system and position of the node from either masses. Assume modulus of rigidity as 80 x 10^9 N/m^2. 

Multi Degrees of Freedom Systems and Analysis

1.	**Name any two methods** for analysis of multi degree of freedom systems
2.	Explain the **Stodola's method** to find out fundamental natural frequency of system having three degree of freedom.

Examples

1.	Estimate the approximate fundamental natural frequency of the system shown in Fig. using Rayleigh's method. Take: m=1 kg and K=1000 N/m.