School of Mechanical Engineering

Mechanical Engineering

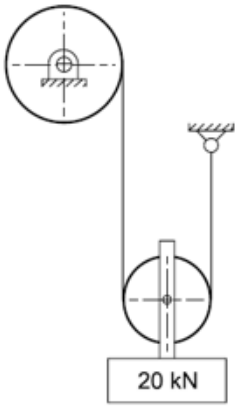
ETE - Jun 2024

Time : 3 Hours **Marks : 100**

Sem VI - BME041 - Design of Transmission Systems

Your answer should be specific to the question asked

Draw neat labeled diagrams wherever necessary

1.	Why is the pinion weaker than the gear made of same material?	K2 CO1 (4)
2.	List two practical applications of cone clutch	K2 CO1 (4)
3.	Compare between Structure Diagram and Speed (Ray) Diagram.	K2 CO1 (4)
4.	What is self-energizing block brake?	K2 CO1 (4)
5.	Classify four important types of gears.	K2 CO1 (4)
6.	A pair of worm and worm wheel is designated as 3/60/10/6. The worm is transmitting 5 kW power at 1440 rpm to the worm wheel. The coefficient of friction is 0.1and the normal pressure angle is 20°. Determine the components of the gear tooth force acting on the worm and the worm wheel.	K3 CO2(10)
7.	An assembley of helical gears consists of a 20 teeth pinion and the velocity ratio is 3: 1. The helix angle is 15° and the normal module is 5 mm. Calculate(i) the pitch circle diameters of the pinion and the gear; and(ii) the centre distance.	K3 CO2(10)
8.	Draw the equation 2(1) 2(2) 2(4)'s structural diagrams.	K3 CO2(12)
9.	A temporary elevator is assembled at the construction site to raise building materials, such as cement, to a height of 20 m. It is estimated that the maximum weight of the material to be raised is 5 kN. It is observed that the acceleration in such applications is 1 m/s2. 10 mm diameter,6 ¥ 19 construction wire ropes with fiber core are used for this application. The tensile designation of the wire is 1570 and the factor of safety should be 10 for preliminary calculations. Determine the number of wire ropes required for this application. Neglect bending stresses.	K4 CO3 (16)
10.	A 6 × 19 wire rope with fiber core and tensile designation of 1570 is used to raise the load of 20 kN as shown in Fig. 23.7. The nominal diameter of the wire rope is 12 mm and the sheave has 500 mm pitch diameter. Determine the expected life of the rope assuming 500 bends per week. 	K4 CO3(16)
11.	A 2 x 2 drive is required to be designed for transmitting speeds starting from 400 rpm with a geometric progression ratio of 1.4. Draw a suitable structure and speed diagram. Also draw the layout of the gear box and determine the number of teeth on each gear.	K4 CO4(16)