

INTERNAL TEST-1
DEPARTMENT OF MECHANICAL ENGINEERING

		Reg. No.	
Semester: 06	Year: III	Date:	
Maximum Marks: 100	Duration: 03.00 Hrs	Session : FN	
Subject Code & Name: ME 8651-Design of Transmission Systems			

Part A – Answer All (10 x 2 = 20 Marks)

- Distinguish between open drive and cross drive of a belt drive. Which is better [CO1,K1]
- How the ends of flat belt joined? [CO1,K2]
- Define the term “Crowning of pulley” [CO1,K1]
- In what ways the timing belts are superior to ordinary V-belts? [CO1,K1]
- List out the losses in belt drive. [CO1,K2]
- State law of gearing and summarize how interference can be avoided in gear. [CO2,K2]
- Name the profiles of spur gear. List the various methods of manufacturing gears. [CO2,K1]
- Describe the following (i) Pressure angle (ii) Diametrical pitch (iii) module [CO2,K2]
- State the advantages and disadvantages of helical and herringbone Gear. [CO2,K1]
- What is a spiral gear? What hands of helix are used? [CO2,K1]

Part B – Answer All (5x13= 65 Marks)

- A Design a flat belt drive to transmit 15 KW at 480rpm from an engine to line shaft at 1200 rpm. The centre distance between the pulleys is 2 m .The diameter of engine pulley is 600 mm. [CO1,K2] 13

OR

B A flat belt drive is required to transmit 12 KW from a motor running at 720 RPM. The belt is 12 mm thick and has mass density of 0.001 gm/mm³. Permissible stress in the belt not to exceed 2.5 N/mm².Diameter of driving pulley is 250 mm whereas the speed of driven pulley is 240 RPM. The two shafts are 1.25 m apart, coefficient of friction is 0.25. Determine the width of the belt. [CO1,K2] 13
- A Design a suitable V-belt for a centrifugal pump running at 340 rpm is to be driven by 100 KW motor at 1440 rpm. The drive is to work at least 20 hours every day. Centre distance is 1.2 m. [CO1,K2] 13

OR

B Design a V-belt drive and calculate the actual belt tension and average stress for the following data. Driven pulley diameter, D= 500 mm, driver pulley diameter, d=150 mm, center distance C=925 mm, speed n₁ = 1000 rpm, n₂ = 300 rpm and power, P = 7.5kW. [CO1,K2] 13
- A A Truck equipped with a 9.5 KW engine uses a roller chain as the final drive to the rear axle. The driving sprocket runs at 900 RPM and [CO1,K2] 13

the driven sprocket at 400 RPM with a centre of distance of approximately 600mm. Select the roller chain.

OR

- B The transporter of a heat treatment furnace is driven by a 4.5 KW, 1440 RPM induction motor through a chain drive with a speed reduction ratio of 2.4. The transmission is horizontal with bath type of lubrication. Rating is continuous with 3 shifts per day. Design the complete chain drive. [CO1,K2] 13
14. A Design a pair of straight spur gear drive for a stone crusher, the gears are made of C40 steel. The pinion is to transmit 30 KW at 1200 rpm. The gear ratio is 3. The gear is to work 8 hours/day 6days in a week for 3 years. [CO2,K2] 13

OR

- B Design a spur gear pair to transmit 22.5KW at 900 RPM. Speed reduction ratio is 2.5. Material for pinion and wheel are C15 steel and cast iron grade 30 respectively. Take pressure angle 20^0 and working life of gear is 10,000 hours. [CO2,K2] 13
15. A Design a helical gear for the following specification: Power - 12.5KW, Pinion speed-1200 RPM, Gear Ratio - 3.5, Pressure angle is 20^0 , helix angle is 15 degree. Gear are expected to work 6 hours/day for 10 years. [CO2,K3] 13

OR

- B A helical gear with 30 degree helix angle has to transmit 35 KW at 1500 RPM with a speed reduction ratio 2.5. If the pinion has 24 teeth determine the necessary module, pitch diameter and face width for 20 degree full depth teeth. Assume 15Ni 2Cr 1 Mo15 material for both pinion and wheel. [CO2,K2] 13

Part C – Answer All (1x15= 15 Marks)

16. A Design a helical gear to transmit 15 KW at 1400 RPM to the following specifications: Speed reduction is 3; Pressure angle is 20^0 ; Helix angle is 15^0 ; The material of both the gears is C45 steel. Allowable static stress 180 N/mm^2 ; Surface endurance limit is 800 N/mm^2 ; Youngs modulus of material is $2 \times 10^5 \text{ N/mm}^2$. [CO2,K4] 15

OR

- B A compressor running at 360 RPM is driven by a 140KW, 1440 RPM motor through a pair of 20^0 full depth helical gears having helix angle of 25^0 . The centre distance is approximately 400 mm. The motor pinion is to be forged steel and the driven gear is to be cast steel. Assume medium shock conditions. Design the gear pair. [CO2,K2] 15