

Roll No.

--	--	--	--	--	--	--	--	--	--

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, April/May 2019

Mechanical Engineering

Sixth Semester

ME8601 Design of Transmission Systems

(Regulation 2012)

Time : 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What are the materials used for V grooved pulleys?
2. What do you mean by chordal action of chain drive?
3. What is the effect of centre distance on surface compressive stress?
4. Why dynamic loads are occurring in a gear tooth?
5. What is herringbone gear? What is its advantage over helical gear?
6. What is irreversibility in worm gears?
7. Why G.P. series is selected for arranging the speeds?
8. For bevel gear define back cone distance?
9. What is the function of clutch?
10. Name four materials used for lining of friction surfaces in clutches.



Part - B (5 x 16 = 80 marks)

11. It is requested to select a flat belt drive for a fan running at 360rpm. This is driven by a 10KW, 1440rpm motor. The belt is open type and space available for a center distance of 2m approximately. The diameter of a driven pulley is 1000mm.
- 12) a) Design a cast iron spur gear drive for a crank hoist to transmit 3.75KW at 1440 rpm. Maximum gear ratio in the gear box is 4. Each gear is expected to work 2 hours/day for 10 years. Determine the minimum centre distance, required face width and module of the gear. (OR)
b) A helical gear with 30 degree helix angle has to transmit 35kW 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.
- 13) a) Design the teeth of a pair of bevel gears to transmit 18.75 kW at 600 rpm of the pinion. The velocity ratio should be about 3 and the pinion should have about 20 teeth which are full depth 20o involutes. Find the module, face width, diameter of the gears and pitch core angle for both gears

(OR)

- b) Design a worm gear drive to transmit a power of 22.5 kW. The worm speed is 1440 RPM and the speed of the wheel is 60 RPM. The drive should have a minimum efficiency of 80% and above. Select suitable materials for worm and wheel and decide upon the dimensions of the drive.
- 14) a) Design the layout of a 12 speed gear box for a milling machine having an output of speeds ranging from 180 to 2000 rpm. Power is applied to the gear box from a 6 kW induction motor at 1440 rpm. Choose standard step ratio and construct the speed diagram. Decide upon the various reduction ratios and number of teeth on each gear wheel sketch the arrangement of the gear box.

(OR)

- b) Draw the kinematic arrangement and ray diagram of a six speed gear box having O/P speeds ranging from 460-1400 rpm.
- 15) a) A plate clutch with maximum diameter 60mm has maximum lining pressure of 0.35 MPa. The power to be transmitted at 400 rpm is 135 KW and $\mu = 0.3$. Find inside diameter and spring force required to engage the clutch. Springs with spring index 6 and material spring steel with safe shear stress 600 MPa are used. Find the diameters if 6 spring are used

(OR)

- b) A multi disk clutch consists of five steel plates and four bronze plates. The inner and outer diameters of friction disks are 75mm and 150mm respectively. The coefficient of friction is 0.1 and the intensity of pressure is limited to 0.3. N/mm². Assuming the uniform wear theory, calculate (i) the required operating force, and (ii) power transmitting capacity at 750 rpm.

