

B.E. / B.TECH DEGREE EXAMINATIONS, December 2020

Semester- VI

ME16601 – DESIGN OF TRANSMISSION SYSTEMS*(use of approved data book is permitted, assume if any data needed)*

(Regulation 2016)

Time: Three Hours

Maximum : 80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 Marks)**

1. The distance between hinge centres of two corresponding links is known as _____
 - a) Pitch
 - b) Pitch circle diameter
 - c) Sprocket length
 - d) Sprocket diameter
2. The product of the diametral pitch and circular pitch is equal to
 - a) 1
 - b) $1/\pi$
 - c) π
 - d) $\pi \times \text{No. of teeth}$
3. Which of the following is the need of the gearbox?
 - a) To vary the speed of the vehicle
 - b) To vary the torque of the vehicle
 - c) To vary the power of the vehicle
 - d) To vary the acceleration of the vehicle
4. Double block brake is a type of
 - a). Band brake
 - b). Internal expanding shoe brake
 - c). Shoe brake
 - d). None of the above
5. Distinguish regular lay and lang lay of wire ropes with one application.
6. Justify why the cross helical gears are not widely used in applications?
7. How mitre gears are manufactured?
8. Suggest the suitable situations to apply uniform pressure and wear theory while designing a clutch.

PART B - (4 X16 = 64 Marks)

9. (a) Design a V- belt drive and its pulley for transmitting 50kW at 1440rpm. The service hours is two shifts of 8 hours each. The speed reduction is 2. The speed of the belt is 24m/sec. **(16)**

(OR)

- (b) Design a chain drive for the following specifications: Power=10kW, at 1000 rpm. **(16)**
The driven shaft runs at 320 rpm.
The centre distance is 700 mm. Service condition is 2 shifts/day with 8 hours/shift.
10. (a) Design a spur gear drive to transmit 22kW at 1000rpm. Speed reduction is 2.5. The centre distance between the shafts is 350 mm. Take materials: Pinion C45 and Wheel as CI grade 30. **(16)**

(OR)

- (b) Design a helical gear for the following requirements. **(16)**
Power=37.5kW at 1750 rpm. Speed reduction is 4.25. helix angle is 15° . Assume the life hours as 10000 hours.
11. (a) Design a worm gear drive to transmit 7.5kW at 1440 rpm and the worm wheel rotates at 20 rpm. Assume suitable material. **(16)**

(OR)

- (b) Design a nine speed gear box for the following requirements. **(16)**
Speed range :100 to 1500 rpm, Power=5kW at 1440 rpm. Materials for the gears : alloy steel.
12. (a) A single plate clutch with both sides effective; is required to transmit 25 kW at 900 rpm. the outer diameter of the plate is 350 mm. the maximum intensity of pressure over the friction surface is not to exceed 0.1 N/mm^2 . Assume coefficient of friction as 0.25. Determine (i) the inner diameter of the plate (ii) axial force required to engage the clutch. **(16)**

(OR)

- (b) A brake drum of single block having diameter of 1000 mm as shown in figure (16) below. It has a torque of 240 N-m at 400 rpm. The coefficient of friction is 0.32. Determine the required force to be applied when the rotation of the drum is (a) clock wise (b) counter clock wise and the angle of contact (i) 35° and (ii) 100° . Also find the value of c for self locking

