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Question Paper Code : 51860

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Sixth Semester

Mechanical Engineering

ME 2352/ME 61/ME 1352/10122 ME 603 – DESIGN OF TRANSMISSION

(Common to Mechanical and Automation Engineering)

(Regulations 2008/2010)

**(Common to PTME 2352/10122 ME 603 – Design of Transmission System for
B.E. Part-Time) Fifth/Sixth Semester Mechanical Engineering – Regulations 2009/2010)**

Time : Three Hours

Maximum : 100 Marks

Use of Approved Design Data Books permitted.

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. When do you use stepped pulley drive ?
2. What is meant by ply in a flat belt ?
3. What are the main types of gear tooth failure ?
4. Where do we use helical gears ?
5. Differentiate a straight bevel gear and a spiral bevel gear.
6. Define normal pitch of a worm gear.
7. What are preferred numbers ?
8. State any two basic rules to be followed while designing a gear box.
9. Name few commonly used friction materials.
10. What is a self-locking brake ?

PART - B (5 × 16 = 80 Marks)

11. (a) Select a flat belt to drive a mill at 250 rpm from a 10 kW, 730 rpm motor, centre distance is to be around 2 m. The mill shaft pulley is of 1 m diameter.

OR

- (b) Design a chain drive to run a compressor from a 11 kW electric motor running at 970 rpm, the compressor speed being 330 rpm. The compressor operates 16 hours/day. The centre distance should be approximately 500 mm. The chain tension can be adjusted by shifting the motor on slides.

12. (a) In a spur gear drive for a stone crusher, the gears are made of C45 steel. The pinion is transmitting 30 kW at 1200 rpm. The gear ratio is 3. Gear is to work 8 hours per day, six days a week and for 3 years. Design the drive.

OR

- (b) A pair of helical gears subjected to moderate shock loading is to transmit 40 kW at 1750 rpm of the pinion. The speed reduction ratio is 4. Design the gear, assuming a life of 10,000 hours.

13. (a) Design a bevel gear drive to transmit 7 kW at 1600 rpm for the following data :

Gear ratio = 3

Material for pinion and gear = C45 steel

Life = 10,000 hours

OR

- (b) A steel worm running at 240 rpm receives 1.5 kW from its shaft. The speed reduction is 10 : 1. Design the drive so as to have an efficiency of 80.1. Also determine the cooling area required, if the temperature rise is restricted to 45 °C. Take overall heat transfer coefficient as 10 W/m²°C.

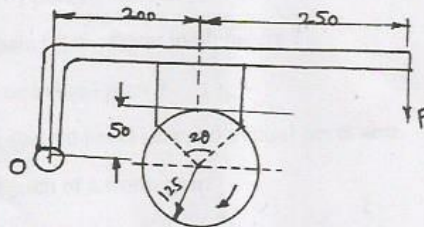
14. (a) A nine speed gear box, used as a head stock gearbox of a turret lathe, is to provide a speed range of 180 rpm to 1800 rpm. Using standard step ratio, draw the speed diagram and the kinematic layout. Also find and fix the number of teeth on all gears.

OR

- (b) A gear box is to be designed to provide 12 output speeds ranging from 160 to 2000 rpm. The input speed of motor is 1600 rpm. Choosing a standard speed ratio, construct the speed diagram and the kinematic arrangement.
15. (a) A single plate clutch transmits 25 kW at 900 rpm. The maximum pressure intensity between the plates is 85 kN/m^2 . The ratio of radii is 1.25. Both the sides of the plate are effective and the coefficient of friction is 0.25. Determine :
- the inner diameter of the plate, and
 - the axial force to engage the clutch.
- Assume theory of uniform wear.

OR

- (b) A single block brake as shown in fig. has the drum diameter 250 mm. The angle of contact is 90° and the coefficient of friction between the drum and the lining is 0.35. If the torque transmitted by the brake is 80 N-m, find the force required to operate the brake.



Dimensions are in mm