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Question Paper Code : 21573

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Sixth Semester

Mechanical Engineering

ME 2352/ME 61/ME 1352/10122 ME 603 — DESIGN OF TRANSMISSION
SYSTEMS

(Regulation 2008/2010)

(Common to PTME 2352 – Design of Transmission Systems for B.E. (Part-Time)
Fifth Semester Mechanical Engineering Regulation 2009)

Time : Three hours

Maximum : 100 marks

Approved Design Data Book is permitted to use in the examination.
Any missing data can be suitably assumed.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the materials used for belt-drive?
2. Why slip is less in the case of v-belts when compared with flat belts?
3. Define module.
4. What are the main types of gear tooth failure?
5. What are the forces acting on bevel gear?
6. Where do we use worm gears?
7. What are preferred numbers?
8. What are the possible arrangements to achieve 12 speeds from a gear box?
9. What is the axial force required at the engagement and disengagement of cone clutch?
10. What is a self-locking brake?

PART B — (5 × 16 = 80 marks)

11. (a) Design a V-belt drive to the following specifications :

Power to be transmitted : 75 kW
Speed of driving wheel : 1440 rpm
Speed of driven wheel : 400 rpm
Diameter of driving wheel : 300 mm
Centre distance : 2500 mm
Service : 16 hours/day.

Or

- (b) Design a chain drive to actuate a compressor from a 10 kW electric motor at 960 rpm. The Compressor speed is to be 350 rpm. Minimum center distance should be 0.5 m. Compressor is to work for 8 hours/day.

12. (a) Design a straight spur gear drive. Transmitted power 8 kW. Pinion speed 764 rpm. Speed ratio is 2. The gears are to be made of C45 steel. Life is to be 10,000 hours.

Or

- (b) Design a pair of helical gears to transmit 10 kW at 1000 rpm of the Pinion. Reduction ratio of 5 is required. Give details of the drive in a tabular form.

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 hrs.

Or

- (b) Design a worm gear drive a transmit 22.5 kW at a worm speed of 1440 rpm. Velocity ratio is 24:1. An efficiency of atleast 85% is desired. The temperature rise should be restricted to 40°C. Determine the required cooling area.

14. (a) Design a 9 speed gear box to give output speeds between 280 and 1800 rpm. The input power is 5.5 kW at 1400 rpm. Draw the kinematic layout diagram and the speed diagram. Determine the number of teeth on all gears.

Or

- (b) Design the layout of a 12 speed gear box for a lathe. The minimum and maximum speeds are 100 and 1200 rpm. Power is 5 kW from 1440 rpm. Draw the speed and kinematic diagram. Also calculate the number of teeth on all gears.
15. (a) An automobile single plate clutch consists of two pairs of contacting surfaces. The inner and outer radii of friction plate are 120 mm and 250 mm respectively. The coefficient of friction is 0.25 and the total axial force is 15kN. Calculate the power transmitting capacity of the clutch plate at 500 rpm using
- (i) Uniform wear theory and
 - (ii) Uniform pressure theory.

Or

- (b) Describe with the help of a neat sketch the design procedure of an internal expanding shoe brake. Also deduce the expression for the braking torque.