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 **REG NO:**

**SIR ISSAC NEWTON COLLEGE OF ENGINEERING AND TECHNOLOGY**
Mechanical Engineering
**ME 6601 — DESIGN OF TRANSMISSION SYSTEMS**
Time: Three hours Maximum: 100 Marks

**SINCET/III MECH/ MODEL/ME6601 DTS/SET-3/MAY-JUNE 2016//AU-MJ 2012**

Answer ALL questions

**PART A — (10 × 2 = 20 Marks)**

1. How is v-belt specified?

2. Give the advantages of chain drives over belt drives.

3. What are the generally used gear profiles?

4. Specify the significance of minimum number of teeth in pinions.

5. Give the speed ratio range of worm-wheel drive.

6. What is reference angle? How is it related to speed ratio of bevel gear ratio?

7. What is step ratio in gear box?

8. What is meant by ray diagram?

9. State the profile of cam that gives no jerk and mention how jerk is eliminated.

10. Why is it necessary to dissipate the heat generated during clutch operation?

**PART B — (5 × 16 = 80 Marks)**

11. (a) A flat belt drive is to designed to drive a flour mill. The driving power requirement of the mill is 22.5 kW at 750 rpm with a speed reduction of 3.0. The distance between the shafts the 3 m. Diameter of the mill pulley is 1.2 m. Design and make a neat sketch of the drive.

**[OR]**

(b) Design a chain drive to drive a centrifugal compressor from an electric motor 15 KW at 1000 rpm. The speed reduction ratio required is 2.5. The compressor to work for 16 hours a day. State solutions for common problems encountered in continuous operation of the driver.

12. (a)Design a spur gear drive for a heavy machine tool with moderate shocks. The pinion is transmitting 18 KW at 1200 rpm with a gear ratio of 3.5.Design the drive and check for elastic stresses and plastic deformation. Make a sketch a lable important dimension arrived.

**[OR]**

(b) Design a pair of helical gears to transmit 37.5 KW at 1750 rpm of the pinion. The drive is subjected to heavy shock loading. The speed reduction ratio is 4 and the helix angle is 15. Select suitable material and design the gears. Check for working stresses and sketch the drive.

13.(a) Design a bevel gear drive to transmit 7.5 KW at 1500 rpm. Gear ratio is 3.5. Material for pinion and gear is C45 steel. Minimum number of teeth is to be 25.

**[OR]**

(b).Design a worm gear drive and determine the power loss by heat generation. The hardened steel worm rotates at 1500 rpm and transmits 10 KW to a phosphor bronze gear with gear ratio of 16.

14.(a) Design a sliding mesh nine speed gear box for a machine tool with speed ranging from 36 rpm 550 rpm. Draw the speed diagram and kinematic arrangement showing number of in all gears.

**[OR]**

(b) An all geared headstock of a lathe requires a 12 speed gear box with minimum and maximum speeds of 110 rpm and 1440 respectively. Draw speed diagram and show the details of number of teeth in all the gears in a kinematic layout.

15.(a) Design a cam for operating the exhaust valve of an engine. It is required to give equal uniform acceleration and retardation during opening and closing of the valve, each of which corresponding to 60 degree of cam rotation. The valve should remain in the fully open position for 20 degree of cam rotation .The lift of the valve is 32 mm and the least radius of the cam is 50mm, follower is provided with a roller of 30 mm diameter and its line of stroke passes through the axis of the cam.

**[OR]**

(b) A dry single plate clutch is to be designed to transmit 112 kW at 2000 rpm. The outer radius of the friction plate is 1.25 times the inner radius. The intensity of pressure between the plate is not to exceed 0.07 N/mm2. The co efficient of friction may be assumed equal to 0.3.the helical springs required by this clutch to provide axial force necessary to engage the clutch are 8.if each springs has stiffness equal to 40N/mm. Determine the dimensions of the friction plate and initial compression in the springs.

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